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Environmental Compliance Assessment and Management Program (ECAMP)

Federal Republic of Germany

The number of environmental laws and regulations continues to grow in the United States and throughout the world, making compliance with regulations increasingly difficult. Environmental assessments became a way to evaluate compliance with current environmental regulations. The Air Force has adopted a compliance program that identifies problems before they are cited as violations by regulatory agencies.

Beginning in 1984, the U.S. Army Construction Engineering Research Laboratories (USACERL), in cooperation with the Air Force Engineering and Services Center, began research on the Environmental Compliance Assessment and Management Program (ECAMP). The concept was to combine Federal, Department of Defense (DOD), and Air Force environmental regulations with good management practices and risk management issues into a series of checklists that show legal requirements and which specific items or operations to review. Each assessment protocol lists a point of contact to help assessors review the checklists as effectively as possible.

The Environmental Compliance Assessment and Management Program-Federal Republic of Germany ECAMP is based on the "Environmental Final Governing Standards—Germany," published by Headquarters, U.S. Army, Europe (HQ USAREUR) in November 1994. FRG ECAMP includes pertinent information from Air Force Instructions, DOD Directives and Instructions, and cited good management practices.

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FOREWORD

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The research was performed by the Planning and Management Laboratory, Environmental Processes Division of the U.S. Army Construction Engineering Research Laboratories (USACERL). The Principal Investigator was Dr. David A. Krooks, Environmental Processes Division (PL-N). Mr. L. Jerome Benson is Acting Division Chief (PL-N).

COL James T. Scott is Commander, USACERL. Dr. Michael J. O'Connor is Director.

NOTICE

This manual is intended as general guidance for personnel at Air Force (AF) facilities. It is not, nor is it intended to be, a complete treatise on environmental laws and regulations. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information contained herein. For any specific questions about, or interpretations of, the legal references herein, consult appropriate counsel.

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MANUAL OBJECTIVES AND ORGANIZATION

This manual provides the Environmental Compliance Assessment and Management Program (ECAMP) assessment checklists to be used during an ECAMP assessment. These environmental assessment checklists are based on the *Environmental Final Governing Standards - Germany* (FGS-FRG), November 1994. This manual serves as the primary tool in conducting the environmental compliance assessment phase of the ECAMP process. Specifically, this manual:

1. compiles applicable Department of Defense (DOD) and AF environmental regulations and instructions with AF operations and activities
2. synthesizes environmental regulations, management practices (MPs), and risk management issues into consistent and easy to use checklists
3. serves as an aid in the assessment process and the management action development phases of the ECAMP.

This manual is divided into 13 sections. General ECAMP guidance and information applicable to all 13 compliance assessment checklists in the ECAMP manual can be found in the Main Introduction. Sections 1 through 13 contain the specific environmental compliance guidelines and checklists for each of the 13 compliance categories:

Air Emissions Management
Cultural Resources Management
Hazardous Materials Management
Hazardous Waste Management
Natural Resources Management
Other Environmental Issues
Pesticide Management
Petroleum, Oil, and Lubricant (POL) Management
Solid Waste Management
Storage Tank Management
Toxic Substances Management
Wastewater Management
Water Quality Management.

This manual contains references to existing Air Force Regulations (AFRs), Air Force Policy Directives (AFPDs), Air Force Manuals (AFMs), and Air Force Pamphlets (AFPs). The AF is in the process of replacing AFRs with Air Force Instructions (AFIs). This ECAMP manual contains references to a combination of the above. References to AFRs will be replaced with applicable citations in the next version of the manual. HQ USAF/CEV will issue interim guidance as the new policies and regulations are approved.

The AFIs included in the manual are up-to-date through Air Force Index 2, *Numerical Index of Standard and Recurring Air Force Publications*, 1 August 1996 (for the period ending 19 July 1996).

PROGRAM BACKGROUND

The ECAMP is explained in AFI 32-7045, *Environmental Compliance Assessment and Management Program* (ECAMP). The primary objectives of ECAMP are:

1. improve AF environmental management
2. improve AF environmental compliance and compliance management
3. build supporting financial programs and budgets for environmental compliance requirements
4. ensure that Major Commands (MAJCOMs) are effectively addressing past, present, and future environmental concerns.

AF installations, support sites, and government-owned contractor-operated (GOCO) facilities are required to receive an external environmental compliance assessment at least once every 3 yr. Each installation and support site must conduct an internal assessment each calendar year, except in years when external assessments are conducted.

Facilities can be exempted from the ECAMP if their inclusion in the program will significantly interfere with their military effectiveness or if it is otherwise in the national interest. Approval authority for such exemptions is the Deputy Assistant Secretary of the Air Force for Environment, Safety, and Occupational Health (SAF/MIQ). The MAJCOM Environmental Protection Committee (EPC) will prepare requests for exemption and forward to HQ USAF/CEV for action.

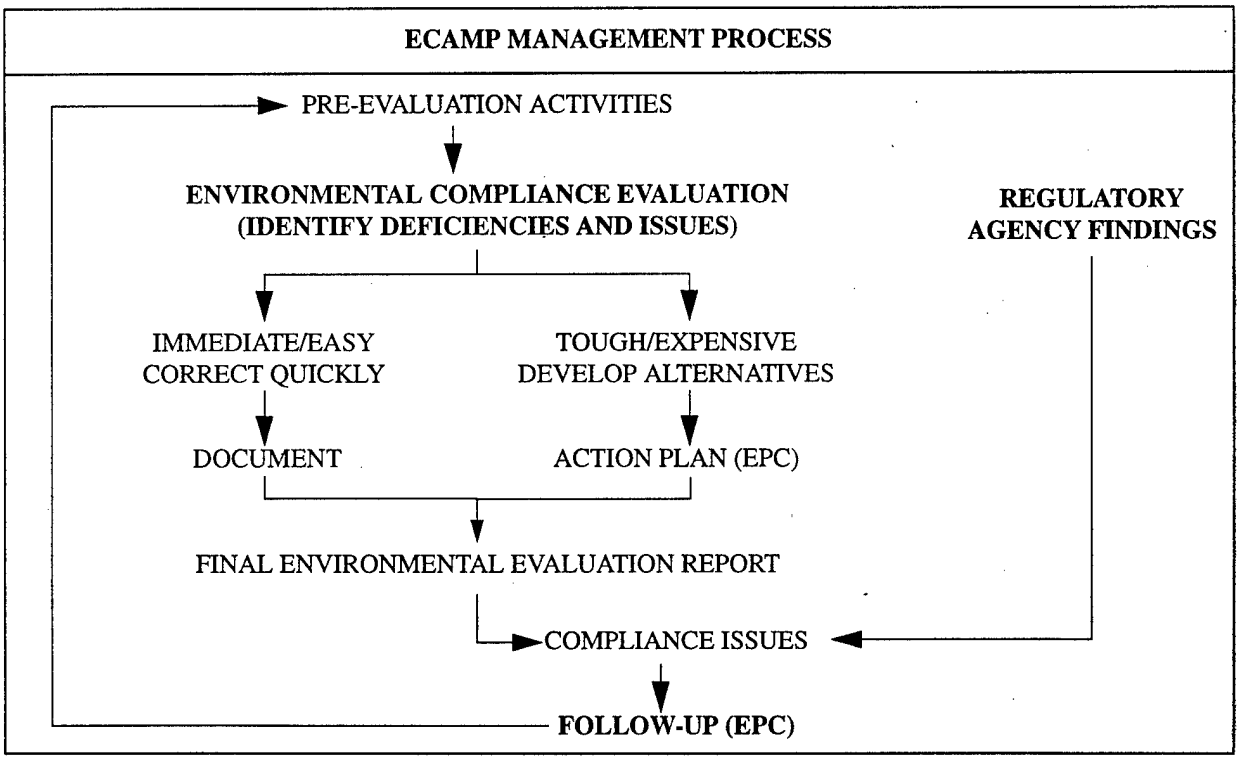
ECAMP PROGRAM MANAGEMENT PROCESS

The ECAMP program management process begins with the environmental compliance assessment and written report that identifies compliance and management issues. The commander, through the EPC, then assigns appropriate staff agencies to work each issue.

ECAMP Action Summary - The path illustrated on the far left of the flowchart represents the process the installation follows in resolving most issues. Immediate hazards should, of course, be addressed as quickly as possible. The procedural, easy-to-fix issues, are corrected during the assessment process and documented in the report.

The path in the center, for the tough and expensive issues, includes preparing a management action plan describing how these problems will be addressed.

Formal notices of noncompliance issued by regulatory agencies are represented by the path on the far right. Open notices of noncompliance at the time of the assessment are included in the ECAMP assessment and report. Notices of noncompliance issued after the date of the ECAMP assessment do not appear in the report, but are managed by the installation EPC along with ECAMP issues.



ECAMP ABROAD

AFI 32-7006, *Environmental Program in Foreign Countries*, 29 April 1994, details the objectives, background, and standards unique to AF environmental activities in foreign countries. It requires that installations comply with the DOD Final Governing Standards (FGSs) issued for the particular host country where each installation is located.

The Instruction acknowledges, however, that FGS have not yet been issued for all countries in which the AF has installations. In instances where the FGS have not been completed, installations must comply with the requirements of the *Overseas Environmental Baseline Guidance Document* (OEBGD), but only after ensuring that the criteria in it do not conflict with any applicable international agreements such as treaties, status of forces agreements (SOFAs), or bilateral agreements. This manual is based on FGS-FRG, November 1995.

Those few installations and facilities located in foreign countries for which environmental executive agents (EEAs) have not been assigned to prepare the FGS must comply with the criteria in the OEBGD, but only after ensuring that the criteria in it do not conflict with any applicable international agreements such as treaties, SOFAs, or bilateral agreements. The Worldwide ECAMP manual is used in these cases as well. When an EEA is assigned and the FGS prepared, the FGS will supersede the use of the OEBGD.

As the sole compliance standards at installations and facilities in foreign countries, the FGS (or the OEBGD under the conditions discussed above) takes precedence over compliance with AF environmental instructions specified as not required in Attachment 2 to AFI 32-7006. Compliance with instructions so designated in the Attachment is not required. Compliance with the AFIs specified as "required" is mandatory, but only after ensuring that their requirements do not conflict with the provisions of the FGS (or the OEBGD) or with any applicable international agreements such as treaties, status of forces agreements (SOFAs), or bilateral agreements. The following AFIs specified as "required" in AFI 32-7006 are included in this manual:

32-7001 - *Environmental Budgeting*
32-7002 - *Environmental Information Management System*
32-7005 - *Environmental Protection Committees*
32-7045 - *Environmental Compliance Assessment and Management Program*
32-7061 - *Environmental Impact Analysis Process*
32-7080 - *Pollution Prevention Programs*
48-119 - *Instructions for Medical Service Environmental Pollution Monitoring.*

It should be noted that only those requirements that are based on the FGS are eligible for funding with environmental compliance monies.

ENVIRONMENTAL COMPLIANCE ASSESSMENT PROCESS

The ECAMP program management process described previously can be divided into three distinct phases:

1. preassessment activities
2. site assessment activities
3. postassessment activities.

Preassessment Activities - There are five key activities that should be completed before an assessment team begins the site assessment.

1. Previsit Questionnaire - The purpose of the previsit questionnaire is to collect information that will familiarize the assessment team with the installation and its operations so that its assessment team is able to review the applicable regulations and prepare a detailed assessment schedule. The previsit questionnaire is essential as part of the preassessment activities for an external assessment. It is also an excellent tool for ensuring internal assessment team members are starting from the same base of information. Table 1 (see page xlv) contains a sample previsit questionnaire.

2. Define Assessment Scope and Team Responsibilities - The installation or MAJCOM may wish to place special emphasis on certain compliance categories or to review additional areas not covered in the volumes. These goals should be clearly stated so the assessment can be properly planned. Additionally, the duration of the assessment, appointment of team members by the EPC, and handling of tenants and offbase sites should be addressed. Typical teams include members from personnel, and may include: Environmental Coordinator (EC), Bioenvironmental Engineering Services (BES), Judge Advocate (JA), Ground Supply Officer, Supply, Maintenance, Transportation, Defense Reutilization and Marketing Office (DRMO), Base Civil Engineer (BCE) Water and Waste Superintendent, BCE (Contract Management), BCE (Natural Resources Manager), BCE (Fire Department), BCE (Engineering Design); or, if contracted, people with equivalent varied experience may be chosen. Assessors should possess a good working knowledge of the various environmental pollution statutes and regulations. Collectively, the team must have the knowledge and background required to conduct all aspects of an installation assessment efficiently and effectively. Team members should also understand appropriate techniques for collecting information and interviewing installation personnel. Team members should have received formal training or received oversight from someone who has received formal training. Finally, responsibilities for each of the checklists should be assigned to the team members as appropriate.

   Table 2 (see page lxi) lists the major environmental operations and activities at typical AF installations and the sections within which they are addressed. As shown, many activities and operations cause environmental impacts in more than one area, and are, therefore, addressed in more than one section.

3. Review Relevant Regulations - Once the assessment scope and responsibilities are known, the assessors should undertake a thorough review of the regulations relevant to the installation. Which environmental regulations are applicable must be determined before the assessment begins.

4. Develop Assessment Schedule - The team should develop a detailed assessment schedule that includes the activities planned for each day.

5. Review Assessment Protocols - Each assessor should know the regulatory requirements and be familiar with the assessment checklists that will be used.

Site Assessment Activities - Onsite, the assessors will conduct record searches, interviews, and site surveys to determine the compliance status of the installation. Operations are compared with environmental standards and any deficiencies are written up as findings. The data collected should be sufficient, reliable, and relevant to provide a sound basis for assessment findings and recommendations. Figure 1 (see page xv), the ECAMP Finding Form, is available to assist assessors in compiling needed information during an ECAMP assessment. A Finding Form should be completed for each finding during the assessment. These forms comprise the basis of the ECAMP report. Figure 1 is based on the future version of the finding screen layout on the Work Information Management System - Environmental Subsystem (WIMS-ES).

On the following pages, the reader will find an ECAMP Finding Form, an explanation of the fields it contains, and an example ECAMP Finding Form that has been properly filled out.

(NOTE: Any findings discovered through the use of this guidance manual by the internal assessment should be validated by the environmental coordinator and Judge Advocate. The findings and corrective actions should be recorded in the EPC minutes.)

Postassessment Activities. The first step in the postassessment activities is the creation of the draft report. The MAJCOM EPC will ensure that each installation reviews and comments on the Preliminary Environmental Findings, develops a management action plan that addresses all unresolved findings; and tracks each significant, major, and minor noncompliance finding. The MAJCOM EPC will coordinate the development of a management action plan, the Draft Final Environmental Compliance Assessment Report, and the Final Environmental Compliance Assessment Report within 120 days of the site assessment. Upon approval, the MAJCOM will forward the final report to HQ USAF/CEV and the Air Force Center for Environmental Excellence (AFCEE)/EP via the WIMS-ES.

Figure 1

ECAMP Finding Form

Date of Finding _____ Protocol _____ Finding # _____-_____

Rating _____ Repeat Finding? _____ Est Comp Date _____

Act Comp Date _____

Street Address _____

Grid Coordinates _____

Facility # _____ Location _____

Finding Title _____

Details

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(continued)

Figure 1 (continued)

ECAMP Finding Form

Question Number _____ A-106 Media _____

Responsible Organization _____ Org Type _____

_____ _____

_____ _____

_____ _____

CFR Citation _____

Other Criteria _____

_____

_____

Root Cause _____ Explain _____

_____

_____

_____

Violation Type ____ ____ ____ Finding ID ____ ____ ____ Finding Type _____ Source _____

Owning Org POC _____ Off Sym _____ Phone _____ Ext _____

Env Mgt Org POC _____ Off Sym _____ Phone _____ Ext _____

Suggested Solution _____

_____

_____

_____

_____

_____

_____

_____

A-106 Proj # _____ Est Cost $ _____

Definitions for ECAMP Finding Form

(NOTE: The following fields, which are included on the ECAMP Finding Form are not in the current version of the software, but this form can be used to assist with data entry in the current version: Repeat Finding; Grid Coordinates; Street Address; Organization Type; Code of Federal Regulations (CFR) Citation; Other Criteria; Root Cause; additional two entries for Violation Type; additional two entries for Finding Identification (ID); Suggested Solution.)

1. **Date of Finding**: Enter the date the finding was discovered. This is the exact date the finding was discovered. Try to avoid using the same date for all findings. YYYY MM DD (Convert "Finding Date").

2. **Protocol**: Using the selector, choose the protocol for the finding.

   Air
   Hazardous Materials
   Hazardous Waste
   Nat/Cul Resources
   Noise
   Pesticide
   Petroleum, Oil, and Lubricant (POL)
   Solid Waste
   Special Programs (Polychlorinated Biphenyls (PCBs), Asbestos, Radon Mitigation, Installation Restoration Program (IRP), A-106 Pollution Abatement Plan, Environmental Impact Analysis Process (EIAP), Work Information Management System-Environmental Subsystem (WIMS-ES), and Lead-based Paint (LBP))
   Water Quality
   Pollution Prevention

3. **Finding Number**: This field indicates the placement of this finding in the report. It may have nothing to do with its priority or status, depending on the philosophy of the program manager. Each protocol has its own set of numbers. In other words, you can have a HW-001 and an AIR-001.

4. **Rating**:
   Significant
   Major
   Minor
   Management Practice
   Positive

5. **Repeat?**: Identify with a "Y" if this finding is a repeat finding. Has there been a finding documented in a prior ECAMP identical to this finding? If not, enter "N".

6. **Estimated Compliance Date (ECD)**: What is the YYYY MM DD that this finding will be brought into compliance?

7. **Actual Compliance:** If the finding is brought into compliance during the evaluation, enter that date.

8. At least one of the following three must be completed. If more information is known, it should be entered.

    a. **Street Address**: Enter the street/mailing address for the location of this finding.

    b. **Grid Coord**: Enter the grid coordinated for the location of the finding. This is optional.

    c. **Facility Number**: Enter the facility number for the location of the finding.

9. **Location Description**: Use this field if facility number or street address is not applicable. Briefly describe the location of the finding.

10. **Finding Title**: Enter a brief, descriptive title for the finding (up to 51 characters).

11. **Details**: Enter a detailed description of the finding. State what is wrong, how the process or procedures are being done now, and how long is has been under way. State exactly how the AF is out of compliance. Be concise, objective, and strictly factual. Do not be subjective. Do not make inflammatory remarks (up to 726 characters).

12. **Question #**: This is the question number from the ECAMP manual. The first three characters are entered automatically by the system. Enter the question number from the manual (enter the main paragraph number only, no periods or dashes required).

13. **A-106 Media**: Choose the A-106 media that best matches the finding condition.

AT	Atomic Energy
CA	*Clean Air Act*
CW	*Clean Water Act*
ES	*Endangered Species Act*
FF	*Federal Insecticide/Fungicide/Rodenticide Act*
HP	Historic Preservation
MU	Multi-Media
NC	Noise Control
NE	*National Environment Policy Act*
RC	*Resources Conservation and Recovery Act*
SD	*Safe Drinking Water Act*
SF	*Comprehensive Environmental Response, Compensation, and Liability Act*
TS	*Toxic Substance Control Act*

14. **Responsible Organization**: Enter the organizations that "caused" the finding. You can enter up to three organizations. This is the "who done it" data field that can be used for trend analysis to find organizations that need additional training, equipment, manpower, etc.

15. **Organization Type**: For each organization, identify the appropriate type code.

Academic	Academic
AC Maint	Aircraft maintenance
AC Clean	Cleaning/degreasing aircraft parts
AC Storage	Aircraft storage, ramp, parking, etc.
AC Wash	Aircraft washrack

AGE Repair	Aerospace ground equipment (AGE) storage and/or repair
Alert	Transient alert
Arts	Arts and crafts
Auto Body	Auto hobby
Audio	Audiovisual services
Avionics	Aircraft avionics maintenance
Base Svc	Base service station
Bio	Bioenvironmental Engineering
Bulk Fuels	Bulk fuels management
BX	Base exchange
Childcare	Childcare center
Clean/Deg	Cleaning and degreasing (not aircraft)
CE Maint	Civil Engineering maintenance shop
CE Mat	Civil Engineering material control
CE Self	Civil Engineering self-help store
Cmmssry	Commissary
Comm Maint	Communications maintenance
Dental	Dental clinic
DRMO	DRMO treatment, storage, and disposal facility (TSDF)
Elect/Env	Electro/environmental
Entomology	Entomology shop
EOD	Explosive ordinance disposal
Env Mgt	Environmental management
Fire Dept	Fire department
Golf	Golf course
Heat Plnt	Heat plant
Hvy Equip	Heavy equipment maintenance/storage
Hospital	Hospital/clinic
Housing	Housing maintenance
Hyd/Pneu	Hydraulics/Pneudraulics
IWTP	Industrial wastewater treatment plant
Landfill	Landfill
Off Bldg	Business offices (Consolidated Base Personnel Office(CBPO),banks,etc.)
Other	Other, any other not listed
Rsrch Lab	Research laboratory
Supply	Base supply
Swim	Swimming pool
Test Cell	Engine test cell
TSD	Base TSDF
Veh Maint	Vehicle maintenance/storage
Veh Wash	Vehicle washrack
Vet Clinic	Veterinary clinic
WWTP	Wastewater treatment plant

16. **CFR Citation**: Enter the CFR citation for the finding.

17. **Other Criteria**: Enter all the laws, regulations, statutes, etc., other than the CFR citation, defining the out-of-compliance condition. You may also enter a brief description of that criterion (up to 192 characters).

18. **Root Cause**: Select the root cause that best reflects the basic reason for the out of compliance condition.

Materials:
- M1 Supply
- M2 Poor Quality

Personnel:
- P1 Awareness of Requirement
- P2 Understanding
- P3 Not conscientious (deals with attitude of personnel)
- P4 Result vs. Action (The result did not equal the action taken. Procedures were followed which should have produced a favorable result but did not.)
- P5 Accountability not assigned
- P6 Action vs. Procedure (correct procedure(s) in place but incorrect action taken)
- P7 Insufficient skills
- P8 Inexperience (not an attitude of personnel)

Equipment:
- E1 Controls failure
- E2 Inadequate facility design
- E3 Monitoring equipment failure
- E4 Poor maintenance

Techniques:
- T1 Time to do the job
- T2 No procedures in place
- T3 Priority conflict
- T4 Inadequate Procedures
- T5 Procedures not available

19. Explain the reason for your selection of Root Cause. Be specific and stick to the facts (up to 119 characters).

20. **Violation Type**: Choose the appropriate code(s) that best describe(s) the situation. You can enter up to three.

Administrative

A1 Records
A2 Labels
A3 Reports
A4 Manifests
A5 Lack of a permit
A6 Inadequate/missing plan
A7 Public notification
A8 Operator certification
A9 Fire standard
A10 Program planning
A11 Sampling
A12 training
A13 Other
A14 Registration
A15 Uncharacterized
A16 Lacking or incomplete inventory/survey

Potential Discharge

P1 Operational practices
P2 Inadequate facility
P3 Inadequate equipment/containers
P4 Other
P5 No testing/verification
P6 Containment

Discharge

D1 Excess chemical parameter
D2 Excess physical parameter
D3 Groundwater contamination
D4 Spills/leaks
D5 Other

21. **Finding Category Codes**: Choose the appropriate code(s). You can enter up to three.

Air Emissions Management
- 1A Fuel Burners
- 1B Incinerators
- 1C Volatile Organics
- 1D Others
- 1E Ozone Depl Chems
- 1F Particulates/Bead Blast
- 1G Air Toxics, Metals
- 1H General Requirements

Hazardous Material Management
- 2A Storage Structures
- 2B Operations/Management
- 2C Others

Hazardous Waste Management
- 3A Accumulation Points
- 3B TSDFs
- 3C Training
- 3D Waste Minimization
- 3E Others
- 3F Oil/Water Separators
- 3G Satellite Accum Points
- 3H Operational Procedures

Natural/Cultural Resources Management
- 4A Wildlife/Recreation/Forestry
- 4B Cultural/Historic
- 4C Land/Agriculture
- 4D Wetlands/Floodplains
- 4E Others

Environmental Noise Management
- 5A Installation compatible use zone (ICUZ)
- 5B Procedures
- 5C Others

Pesticide Management
- 6A Facilities/Equipment
- 6B Operations/Mgt
- 6C Others

Petroleum, Oil, and Lubricant (POL) Mgt
- 7A Above Ground Tanks
- 7B Underground Tanks
- 7C Operations/Mgt
- 7D Others
- 7E Oil/Water Separators
- 7F Drum Storage

Solid Waste Management
- 8A Landfills
- 8B Receptacles
- 8C Recycling
- 8D Others
- 8E Medical Waste
- 8F Regulated Materials

Special Programs Management
- 9A PCBs
- 9B Asbestos
- 9C Radon Mitigation
- 9D Others
- 9E IRP
- 9F EIAP
- 9G A-106
- 9H ECAMP
- 9I Lead-Based Paint (LBP)
- 9J Low Level Radiation
- 9K Automation Issues

Water Quality Management
- 10A Sanitary Wastewater
- 10B Industrial Wastewater
- 10C Stormwater Runoff
- 10D Nonpoint Runoff
- 10E Operations
- 10F Others
- 10G Facilities/Equipment
- 10H Oil/Water Separators
- 10I Drinking Water

Pollution Prevention Management
- 11A Management Plans
- 11B Ozone depleting chemicals (ODCs)
- 11C EPA 17
- 11D Hazardous Waste Minimization
- 11E Recycling
- 11F Affirmative Procurement
- 11G Energy Conservation
- 11H Education and Training
- 11I Hazardous Material Control
- 11J Other

22. **Finding Type**: Choose the appropriate code.

23. **Source**: Choose the appropriate source for the definition of the noncompliance.

    U.S. Protocols
    Worldwide Manual/Overseas Manual
    Installation Supplement to ECAMP Manual
    Command Supplement to ECAMP Manual
    Country Manual
    Country Supplement
    State Supplement
    Local Law/Ordinance

24. **Owning Organization Point of Contact (POC)**: Enter the name of the POC of the organization handling the fix.

25. **Office Symbol**: Enter the office symbol for the POC.

26. **Phone and Extension**: Enter the phone and extension for the POC.

27. **Environmental Management POC**: Enter the name of the POC within the Environmental Management Office (EMO) who is responsible for tracking this finding.

28. **Office Symbol**: Enter the office symbol for the POC.

29. **Phone and Extension**: Enter the phone and extension for the POC.

30. **Evaluator's Suggested Solution**: Enter the suggested solution for the evaluator. After validation, this is nonmodifiable (up to 308 characters).

31. **A-106 Project #**: If there is funding already programmed for the fix, enter the A-106 project number, if available.

32. **Estimated Cost**: If the information is available, enter the estimated cost of the project.

Sample ECAMP Finding Form

Date of Finding _____ Protocol _____ Finding # _____-_____

Rating _____ Repeat Finding? _____ Est Comp Date _____

Act Comp Date _____

Street Address _____

Grid Coordinates _____

Facility # _____ Location _____

Finding Title _____

Details

_____

_____

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(continued)

Sample ECAMP Finding Form (continued)

Question Number _____ A-106 Media _____

Responsible Organization _____ Org Type _____

_____ _____

_____ _____

_____ _____

CFR Citation _____

Other Criteria _____

_____

_____

Root Cause _____ Explain _____

_____

_____

_____

Violation Type _____ _____ _____ Finding ID _____ _____ _____ Finding Type _____ Source _____

Owning Org POC _____ Off Sym _____ Phone _____ Ext _____

Env Mgt Org POC _____ Off Sym _____ Phone _____ Ext _____

Suggested Solution _____

_____

_____

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_____

A-106 Proj # _____ Est Cost $ _____

USING THE ECAMP MANUAL

AF installations engage in many operations and activities that can cause environmental impacts on public health and the environment if not controlled or properly managed. Many of these activities and operations are regulated by FGS-FRG and by AFIs/policies. After a review of these activities at AF installations, it is apparent that there are major categories of environmental compliance into which most environmental regulations and agency activities can be grouped. This manual is divided into 13 sections that correspond to major compliance categories:

1. Air Emissions Management
2. Cultural Resources Management
3. Hazardous Materials Management
4. Hazardous Waste Management
5. Natural Resources Management
6. Other Environmental Issues
7. Pesticide Management
8. Petroleum, Oil, and Lubricant (POL) Management
9. Solid Waste Management
10. Storage Tank Management
11. Toxic Substances Management
12. Wastewater Management
13. Water Quality Management

Each section is organized in the following format:

A. **Applicability of this Protocol**. This provides guidance on the major activities and operations included in the section and a brief description of the major application.

B. **Department of Defense (DOD) Directives and Instructions.** This identifies DOD Directives and Instructions that have not yet been implemented by an AFR or AFI.

C. **Air Force Documents.** This identifies, in summary form, the key AFRs, AFIs, and AFPDs that mandate requirements in the compliance category.

D. **Responsibility for Compliance**. This identifies the personnel on the installation who have compliance responsibilities for the compliance category.

E. **Definitions.** This presents definitions taken from FGS-FRG and pertinent AFRs and AFIs for those key terms associated with each compliance category.

F. **Compliance Assessment Checklists.** The final portion of each section is a checklist composed of requirements or guidelines that serve as indicators to point out possible compliance problems and practices, conditions, or situations that could indicate potential problems. The checklist is intended to focus attention on the key compliance issues. Instructions are provided to direct the assessor to the action, references, or activity appropriate to the specific requirement or guideline.

USING THE CHECKLISTS

Understanding the layout and structure of the checklists facilitates their use during the assessment.

- **Explanation of Layout/Content**. The checklist portion of assessment section is divided into two columns. The first of these is a statement of a requirement. This may be a strict regulatory requirement, in which case the citation is given, or it may be a requirement that is considered to be a good management practice to maintain compliance, but which is not specifically mandated by regulation. The second column gives instructions to help conduct the compliance assessment. These instructions are intended to be specific action items that should be accomplished by the investigator. Some of the instructions may be a simple documentation check taking a few minutes; others may require physical inspection of a facility.

- **Worksheet.** At the end of each section there is an assessment worksheet. This worksheet should be reproduced and used during the assessment to take notes. It is designed to be inserted between each page of the checklists, allowing the main text to be kept usable for the next assessment. The worksheet is divided into two columns. The first column is a quick check for those items that are in compliance (C), not applicable (N/A) to the facility being reviewed, or require management action (RMA). The second column on the worksheet allows for more detailed notations or comments. These notations will provide a record for use in preparing the final report. These notations should include both situations of substandard operation needing attention and those operations that are above requirements or provide examples of good programs. For future reference and clarity, it is essential that the building number be recorded or that some other reference to location be made during the review.

- **Standard Checklist Items**. The first three checklist items in each section of the manual are standardized. The first item requires a review of any previous assessment documents. The second is a management practice that indicates the AF documents that the installation should have on hand. The third item provides a place for assessors to write up findings that are based on regulations that have been promulgated since the publication of the manual or regulations not included in the manual.

The assessment procedures are designed as an aid and should not be considered exhaustive. Use of the checklist requires the assessor's judgment to play a role in determining the focus and extent of further investigation.

CUSTOMIZING THE CHECKLISTS FOR YOUR INSTALLATION

Creating Shop-Specific and Self-Inspection Checklists - The ECAMP checklists in this manual are a useful tool for creating self-inspection checklists for individual shops. These shop-specific checklists can be used by shop supervisors and workers to ensure correct practices and procedures are being followed on a routine basis. Thus, good self-inspection checklists are an excellent supplement to annual ECAMP assessments. A customized checklist can be created in five steps:

1. Review the shop's activities to determine which sections apply.
2. Select broad portions of the applicable sections for closer review by using the guidance page found before the checklist in each section.
3. Review the individual checklist items selected for application to the shop being assessed.
4. Edit the applicable checklist items to make them shop-specific.
5. Compile the checklist items.

WRITING THE ECAMP REPORT

All ECAMP documents prepared prior to the Final Environmental Evaluation Report are internal working documents until the time that the Final Environmental Report is executed. They will be marked FOR OFFICIAL USE ONLY and handled accordingly. The AF has determined that their premature release would jeopardize the AF's interest in preserving the free flow, analysis, and comment on internal information regarding environmental compliance. Therefore, except as otherwise required by law, ECAMP documents will not be released to the public sector prior to the execution of the Final Environmental Evaluation Report. As a matter of policy, the Final Environmental Evaluation Report will be made available for release to the public, upon request, as soon as it is executed.

Final assessment reports will consist of five chapters and subheadings for each chapter as follows:

Chapter 1.0 Executive Summary

- 1.1 Background
- 1.2 Summary of Findings

Chapter 2.0 Background and Scope

- 2.1 Background
- 2.2 Scope

Chapter 3.0 Environmental Compliance Status

- 3.1 Air Emissions Management
- 3.2 Cultural Resources Management
- 3.3 Hazardous Materials Management
- 3.4 Hazardous Waste Management
- 3.5 Natural Resources Management
- 3.6 Other Environmental Issues
- 3.7 Pesticide Management
- 3.8 Petroleum, Oil, and Lubricant (POL) Management
- 3.9 Solid Waste Management
- 3.10 Storage Tank Management
- 3.11 Toxic Substances Management
- 3.12 Wastewater Management
- 3.13 Water Quality Management

Chapter 4.0 Environmental Practices Issues

- 4.1 Air Emissions Management
- 4.2 Cultural Resources Management
- 4.3 Hazardous Materials Management
- 4.4 Hazardous Waste Management
- 4.5 Natural Resources Management
- 4.6 Other Environmental Issues
- 4.7 Pesticide Management
- 4.8 Petroleum, Oil, and Lubricant (POL) Management
- 4.9 Solid Waste Management

4.10 Storage Tank Management
4.11 Toxic Substances Management
4.12 Wastewater Management
4.13 Water Quality Management

Chapter 5.0 Management Plan

5.1 Corrected Environmental Compliance Findings
5.2 Open Environmental Compliance Findings
5.3 Closed Environmental Practice Issues
5.4 Open Environmental Practice Issues

Each chapter of the assessment report should follow the described format:

Chapter 1.0. Executive Summary - The executive summary should contain background information and a summary of findings as follows:

1. Background
   a. date and location of the assessment and identification of the assessment team
   b. overall assessment purpose.
2. Summary of Findings
   a. narrative summary of compliance status by section and major environmental issues. To provide balanced tone, consider placing positive comments first, followed by a summary of negative comments, if applicable
   b. the Environmental Compliance Summary (see Figure 2 for format, page xxxv)
   c. the Detailed Environmental Compliance Status (see Figure 3, page xxxvii)
   d. the Environmental Compliance Status (see Figure 4, page xli), which is a summary of findings by violation type.

Figure 2

Environmental Compliance Summary

Compliance Area	Summary Sig	Major	Minor	TOTAL
1. Air Emissions Management				
2. Cultural Resources Management				
3. Hazardous Materials Management				
4. Hazardous Waste Management				
5. Natural Resources Management				
6. Other Environmental Issues				
7. Pesticide Management				
8. POL Management				
9. Solid Management				
10. Storage Tank Management				
11. Toxic Substances Management				
12. Wastewater Management				
13. Water Quality Management				
TOTAL				

Figure 3

Detailed Environmental Compliance Status

	FINDINGS			
Compliance Area	**Sig**	**Major**	**Minor**	**TOTAL**
Air Emissions Management				
Fuel Burners	____	____	____	_____
Incinerators	____	____	____	_____
Volatile Organics	____	____	____	_____
Vehicle Emissions	____	____	____	____
Ozone Depleting Chemicals	____	____	____	____
Particulates, Bead Blast	____	____	____	____
Air Toxic Metals	____	____	____	____
General Requirements	____	____	____	_____
TOTAL	____	____	____	____
Cultural Resources Management				
Cultural/Historic	____	____	____	_____
TOTAL	____	____	____	____
Hazardous Materials Management				
Storage Structures	____	____	____	_____
Operations/Management	____	____	____	_____
TOTAL	____	____	____	_____
Hazardous Waste Management				
Accumulation Points	____	____	____	_____
TSD Facilities	____	____	____	_____
Training	____	____	____	_____
Waste Minimization	____	____	____	_____
Oil/Water Separators	____	____	____	_____
Satellite Accumulation Points	____	____	____	____
Operational Procedures	____	____	____	____
TOTAL	____	____	____	____

(continued)

Figure 3 (continued)

Detailed Environmental Compliance Status

Compliance Area	FINDINGS Sig	Major	Minor	TOTAL
Natural Resources Management				
Wilderness/Recreation/Forestry	____	____	____	_____
Land/Agriculture	____	____	____	_____
Wetlands/Floodplains	____	____	____	_____
TOTAL	____	____	____	_____
Other Environmental Issues				
EIAP	____	____	____	_____
Environmental Noise Management				
ICUZ	____	____	____	_____
Procedures	____	____	____	_____
Management	____	____	____	_____
IRP	____	____	____	_____
Pollution Prevention Management				
Management Plans	____	____	____	____
ODCs	____	____	____	____
EPA 17	____	____	____	____
Hazardous Waste Minimization	____	____	____	____
Recycling	____	____	____	____
Affirmative Procurement	____	____	____	____
Energy Conservation	____	____	____	____
Education and Training	____	____	____	____
Hazardous Material Control	____	____	____	____
Program Management				
A-106	____	____	____	_____
ECAMP (Preparation/ Conduct)	____	____	____	_____
TOTAL	____	____	____	____
Pesticide Management				
Facilities/Equipment	____	____	____	_____
Operations/Management	____	____	____	_____
TOTAL	____	____	____	_____

(continued)

Figure 3 (continued)

Detailed Environmental Compliance Status

Compliance Area	FINDINGS Sig	Major	Minor	TOTAL
Petroleum, Oil, and Lubricant (POL) Management				
Operations/Management	____	____	____	_____
Loading/Unloading Racks	____	____	____	____
Oil/Water Separators	____	____	____	____
Drum Storage	____	____	____	____
Hydrant System	____	____	____	____
TOTAL	____	____	____	____
Solid Waste Management				
Landfills	____	____	____	_____
Receptacles	____	____	____	_____
Recycling	____	____	____	_____
Medical Waste	____	____	____	_____
Regulated Wastes	____	____	____	_____
TOTAL	____	____	____	____
Storage Tank Management				
Aboveground Tanks	____	____	____	_____
Underground Tanks	____	____	____	_____
TOTAL	____	____	____	____
Toxic Substances Management				
PCB	____	____	____	_____
Asbestos	____	____	____	_____
Radon Mitigation	____	____	____	_____
Lead-Based Paint	____	____	____	____
Low Level Radiation	____	____	____	____
TOTAL	____	____	____	____

(continued)

Figure 3 (continued)

Detailed Environmental Compliance Status

	FINDINGS			
Compliance Area	**Sig**	**Major**	**Minor**	**TOTAL**
Wastewater Management				
Sanitary Wastewater	____	____	____	_____
Industrial Wastewater	____	____	____	_____
Stormwater Runoff	____	____	____	_____
Nonpoint runoff	____	____	____	_____
Facilities/Equipment	____	____	____	_____
Oil/Water Separators	____	____	____	_____
TOTAL	____	____	____	____
Water Quality Management				
Drinking Water	____	____	____	____
TOTAL	____	____	____	____
TOTAL FINDINGS	____	____	____	____

Figure 4

Environmental Compliance Status

	Findings			
Totals Identified	**Sig**	**Major**	**Minor**	**TOTAL**
Discharge	____	____	____	____
Potential Discharge	____	____	____	____
Administrative	____	____	____	____
TOTAL FINDINGS	____	____	____	____

Chapter 2.0. Background and Scope The background and scope section is reserved for information needed to make a complete report but which does not fit into the executive summary or compliance findings section.

1. Background.

   a. ECAMP Objectives. A statement of the ECAMP objectives as stated in this manual and individual objectives unique to each specific assessment.
   b. Installation Description. Describe the major attributes of the installation.
   c. Environmental Management Structure. Describe in general how the installation's environmental management organization is structured.

2. Scope.

   a. Activity Review. Describe the base activities that were inspected (this is the appropriate section for positive statements). Comment on the state and local or host nation regulations that were considered. Identify any permits or licenses (by number and issuing agency) that were reviewed.
   b. Summary of Evaluation Procedures. A statement that the assessment included a review of documentation, inspection of facilities, interviews of personnel, and that samples were or were not collected.

Chapter 3.0. Environmental Compliance Status The regulatory compliance section of the report should contain a separate subsection for each assessed checklist. The information presented in Figure 4 (page xli) pertains to each compliance section. Each compliance finding may consist of two parts: a findings paragraph and a separate observations and comments paragraph as follows:

1. Findings. Findings may be positive or negative. Positive findings (descriptions of exemplary activities and procedures) should be stated concisely. Negative findings will be limited to noncompliance issues involving FGS-FRG, DOD, and/or AF documents and should briefly summarize the permit conditions or other restrictions, note the deficiency, and cite the specific regulation (be specific). Where applicable, describe the total sample universe, the number of items sampled, and how many were out of compliance:

   a. Ensure that each negative finding is clearly identified as regulatory, host country, or procedural.
   b. Negative findings that were closed since the last ECAMP and have occurred again must be identified as repeat findings.
   c. Negative findings that remain open since the last external ECAMP must be identified as carryover findings.
   d. Ensure that each finding paragraph is concise, factual (conditions clearly in noncompliance with criteria), and free of the assessor's opinions and recommendations. If there is uncertainty over the regulations that apply, their meaning, or the actual conditions on the installation, place such comments in the Environmental Practice Issues Section of the report.
   e. Negative findings will be separately labelled and numbered. All negative findings will include finding identification codes for summarizing ECAMP results. See the explanation of how to fill out the findings summary for a listing of codes.

2. Observations and Comments on Compliance Findings. Since the finding paragraphs are reserved for strictly factual compliance criteria and conditions, all comments and recommendations on a compliance finding will be placed in a separate comments paragraph immediately following the finding. No new findings will be introduced in the comments paragraphs. Information in the comments paragraphs may include background information on a finding if necessary, statements on causes and effects, and a recommendation for correcting the deficiency. Assessment teams are under no obligation to make recommendations. When recommendations are made, they should be aimed at resolving root causes. Often, the onsite portion of the assessment does not permit time to identify root causes. Recommendations made under these conditions usually address symptoms rather than providing permanent solutions.

Chapter 4.0. Environmental Practice Issues. The assessment team may include recommendations for reducing environmental risks and improving environmental management practices as well as suggesting areas requiring additional study. Recommendations placed in this chapter are not based on environmental regulations and do not involve noncompliance. Instead, they are management practices that will help keep an installation in compliance. Items appropriate for this chapter include:

1. Environmental risk reduction issues not associated with noncompliance.
2. Potential noncompliance based on final regulations with a future compliance deadline.
3. Management practice recommendations based on items in the ECAMP checklist.
4. Other management practice recommendations.

Chapter 5.0. Management Action Plan. The management action plan states how each compliance finding was resolved or contains the installation EPC's plan for resolving the compliance finding. The Management Action Plan also states how each environmental practice issue is being addressed. Since environmental practice issues do not involve noncompliance, they should be carefully reviewed by the installation EPC, but may be closed without action. After the installation approves the Management Action Plan, it should be included in the Draft Final Environmental Assessment Report as Chapter 5. The Management Action Plan tracks each compliance finding or environmental issue.

Table 1: *Previsit Questionnaire--Federal Republic of Germany*

Name of Installation: _____ Date: _____

ITEM	YES	NO	N/A
General			
1. Is the installation manned?	____	____	____
2. Do German authorities inspect the site or show particular interest in it in some other way?	____	____	____
3. Has the installation received notifications of non-compliance, complaints, or enforcement actions from German agencies at the national, state, or local level?	____	____	____
4. Has the installation ever received a significant finding as a result of an external ECAMP assessment? What was the reason for the finding? When was the finding written? When was the finding closed?	____	____	____
5. Is the installation currently the subject of litigation that concerns environmental issues?	____	____	____
6. Has the installation ever been the subject of litigation that concerns environmental issues?	____	____	____
7. Are there contaminated sites (old spill sites)?			
a) Suspected? What is the suspected contaminant?	____	____	____
b) Validated? What is the contaminant?	____	____	____
c) Under assessment? What is the contaminant?	____	____	____
d) Under remediation? What is the contaminant?	____	____	____
8. Do any German agencies hold permits or authorizations on behalf of the installation? (Please list on the back of this page or attach a separate sheet.)	____	____	____
9. Is the installation located:			
a) in Baden-Wuerttemberg?	____	____	____
b) in Bayern?	____	____	____
c) in Hessen?	____	____	____
d) in Rheinland-Pfalz?	____	____	____

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
9. (continued)			
e) in some other state? Which?	____	____	____
10. Is the installation located within the boundaries of a water protection area? (See definition.) If yes, in which zone?	____	____	____
11. Has the installation been identified for closure?	____	____	____
12. Has the installation inherited quantities of undisposed waste or material? If yes, what and how much?	____	____	____

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Air Emissions Management			
1. Does the installation emit any of the following:			
a) substances that belong to Class I in Table 1-2 of FGS-FRG ECAMP? If yes, which?	____	____	____
b) substances that belong to Class I or Class II in Table 1-3 of FGS-FRG ECAMP? If yes, which?	____	____	____
c) Class I carcinogens (see definition)? If yes, which?	____	____	____
d) Class II carcinogens (see definition)? If yes, which?	____	____	____
e) Class III carcinogens (see definition)? If yes, which?	____	____	____
f) cadmium and its compounds, mercury and its compounds, or thallium and its compounds? If yes, which?	____	____	____
g) arsenic and its compounds, cobalt and its compounds, nickel and its compounds, selenium and its compounds, or tellurium and its compounds? If yes, which?	____	____	____
h) lead or its compounds? If yes, which?	____	____	____
2. Does the installation operate any of the following:			
a) spray painting facilities?	____	____	____
b) rotary presses?	____	____	____
c) carpentry shops?	____	____	____
d) surface treatment facilities?	____	____	____
e) chemical dry cleaning plants?	____	____	____

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
2. (continued)			
f) extraction facilities?	____	____	____
g) combustion engine test stands?	____	____	____
h) gas turbines?	____	____	____
3. Does the installation use any of the following ozone-depleting substances or products that contain them:			
a) CFC-11 (R 11)?	____	____	____
b) CFC-12 (R 12)?	____	____	____
c) CFC-13 (R 13)?	____	____	____
d) CFC-112 (R 112)?	____	____	____
e) CFC-113 (R 113)?	____	____	____
f) CFC-114 (R 114)?	____	____	____
g) CFC-115 (R 115)?	____	____	____
h) Halon-1211?	____	____	____
i) Halon-1301?	____	____	____
j) Halon 2402?	____	____	____
k) carbon tetrachloride?	____	____	____
l) methyl chloroform?	____	____	____
m) HCFC-22 (R-22)?	____	____	____
4. Does the installation treat, produce, transport, handle, or store dusty materials (see definition)?	____	____	____
5. Does the installation operate any coal-fired heating plants? How many? What is the rated heat output of each? (Please list on the back of this page or attach a separate sheet.)	____	____	____
6. Does the installation operate any oil-fired heating plants? How many? What is the rated heat output of each? (Please list on the back of this page or attach a separate sheet.)	____	____	____
7. Does the installation operate any gas-fired heating plants? How many? What is the rated heat output of each? (Please list on the back of this page or attach a separate sheet.)	____	____	____
8. Are any of the installation's heating plants inspected by German authorities?	____	____	____

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Air Emissions (continued)			
9. Does the installation operate fixed systems for gasoline transfer (constructed after 7 October 1992) that have a capacity greater than 1000 L or more **or** that have a total annual delivery of 100,000 L or more?	____	____	____
10. Does the installation operate mobile systems for gasoline transfer (constructed after 7 October 1992) that have a capacity greater than 1000 L or more **or** that have a total annual delivery of 100,000 L or more?	____	____	____
11. Does the installation have a gas station (military or AAFES) that was constructed or substantially modified after 1 February 1993 **and** that has an output of 1000 cubic meters per year or more?	____	____	____
12. Does the installation have any air emissions sources that are subject to continuous emissions monitoring under the terms of FGS-FRG?	____	____	____
13. Does open burning occur on the installation?	____	____	____
14. Has the installation received complaints from German individuals or agencies about its air emissions? What was the nature of the complaint?	____	____	____
15. Have German agencies or authorities made any inquiries regarding air emissions?	____	____	____
16. What was the nature of these inquiries?			
17. Additional observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Cultural Resources Management			
1. Has any German authority shown a particular interest in any on-base cultural/archaeological resource? If yes, which resources?	____	____	____
2. Does the installation have any listed monuments on its grounds? If yes, what monuments?	____	____	____
3. Are human artifacts or human remains ever discovered as part of routine base operations? If yes, what types of artifacts/remains?	____	____	____
4. Additonal Observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Hazardous Materials			
1. Are hazardous materials in use on the site?	____	____	____
2. What kind of spill response capabilities does the installation have?			
3. Does the installation store hazardous materials in any of the following:			
a) storage rooms inside buildings?	____	____	____
b) storage buildings or warehouses?	____	____	____
c) outdoor storage areas?	____	____	____
4. Does the installation operate one or more hazardous materials storage areas (see definition)? How many?	____	____	____
5. Does the installation have any industrial processes that use hazardous materials?	____	____	____
6. Does the installation have a battery shop?	____	____	____
7. Does the installation have acid storage facilities?	____	____	____
8. Does the installation have any hazardous substance USTs?	____	____	____
9. Does the installation store compressed gas cylinders? If yes, in what type of facility?	____	____	____
10. Have German agencies or authorities made any inquiries regarding hazardous materials?	____	____	____
11. What was the nature of these inquiries?			
12. Additional observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Hazardous Waste			
1. Does the installation generate HW? What are the principal waste streams and amounts? (Please use the back of this page for a list or attach a separate page.)	___	___	___
2. Does the installation generate any acute HW? If yes, what waste in what amounts? (Please use the back of this page for a list or attach a separate page.)	___	___	___
3. Does the installation treat or dispose of HW on-site? What method(s) is used?	___	___	___
4. Does the installation employ a contractor to dispose of HW off-site?	___	___	___
5. Does the installation's contractor hold valid permits from appropriate German authorities?	___	___	___
6. Does the installation accept HW from other installations for treatment, for storage, or for disposal? For which of those purposes?	___	___	___
7. Do installation personnel transport HW off-site?	___	___	___
8. Does transport of HW include an adequate, functioning system for manifesting?	___	___	___
9. Does the installation have Hazardous Waste Accumulation Points where more than 55-gal of HW per waste stream accumulates? How many such areas are there?	___	___	___
10. Are ignitable or reactive wastes stored at HWAPs?	___	___	___
11. Does the installation operate one or more Hazardous Waste Storage Areas?	___	___	___
12. Does the installation store or treat HW in any kind of underground tank or container?	___	___	___
13. Does the installation operate a hazardous waste disposal facility?	___	___	___
14. Does the installation store conventional explosive ordnance?	___	___	___
15. Have German agencies or authorities made any inquiries regarding hazardous waste?	___	___	___

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Hazardous Waste Management (continued)			
16. What was the nature of these inquiries?			
17. Additional observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Natural Resources Management			
1. Has any German authority shown a particular interest in any on-base natural resource? If yes, which resources?	____	____	____
2. Do the installation's boundaries overlap with or include any of the following types of areas:			
a) national parks?	____	____	____
b) landscape protection areas?	____	____	____
c) nature parks?	____	____	____
d) natural landmarks?	____	____	____
e) protected portions of landscapes?	____	____	____
f) wetlands?	____	____	____
g) areas with shore vegetation?	____	____	____
3. Is there any surface water to be found within the installation's perimeter? Of what type is it (lake, river, pond, creek, etc.)?	____	____	____
4. Does any part of the installation fall within the borders of a water protection area? If yes, in what zone?	____	____	____
5. Is the installation located above or very near to an aquifer?	____	____	____
6. Does a species that the FRG has identified as endangered or threatened have habitat within the boundaries of the installation? What species?	____	____	____
7. Does the installation operate an air-to-surface weapons range?	____	____	____
8. Does the installation engage in the destruction of ordnance by explosion or burning? If yes, what method is used?	____	____	____
9. Have German agencies or authorities made any inquiries regarding either natural or cultural resources on the installation?	____	____	____

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Natural Resources Management (continued)			
10. What was the nature of these inquiries?			
11. Additional observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Other Environmental Issues: EIAP			
1. Does the BCE's office perform environmental planning functions?	____	____	____
2. Does the BCE's office maintain copies of AF Form 813, *Request for Environmental Analysis*?	____	____	____
3. Does the Environmental Protection Committee review and approve or disapprove environmental documents during the EIAP?	____	____	____
Other Environmental Issues: Environmental Noise			
4. Does the installation have an active flightline?	____	____	____
5. Does the installation carry out any operations that produce environmental noise (e.g., target ranges, skeet ranges, helicopter pads)? What are they?	____	____	____
6. Does the installation manage Special Use Airspace, Military Training Routes, or supersonic areas or routes? Which?	____	____	____
7. Does the installation have an open-air sports facility? Of what type?	____	____	____
8. Has any installation activity been the cause of noise complaints from German individuals or agencies? What activity resulted in the complaint?	____	____	____
9. If the answer to Question 5 is "yes," have the complaints been resolved to the satisfaction of all parties?	____	____	____
10. Have German agencies or authorities made any inquiries regarding environmental noise?	____	____	____
11. What was the nature of these inquiries?			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Other Environmental Issues: Cleanup			
12. Does the installation currently have any designated cleanup sites? If yes, how many? What is the nature of the contamination?			
Other Environmental Issues: Pollution Prevention			
13. Does the installation have a Pollution Prevention Management Plan?	____	____	____
14. Does the installation still purchase ODCs?	____	____	____
15. Does the installation reclaim ODCs?	____	____	____
16. Are the purchase, issue, and distribution of hazardous materials under centralized control?	____	____	____
17. Does the installation have a hazardous waste minimization program?	____	____	____
18. Does the installation have a Qualified Recycling Program?	____	____	____
19. Does the installation actively purchase recycled products?	____	____	____
20. Does the installation operate a Hazardous Materials Pharmacy?	____	____	____
21. Are the hazardous materials managed by the Pharmacy supplied through the Standard Base Supply System (SBSS)?	____	____	____
22. Does the Pharmacy centrally manage materials from other sources of supply (i.e., COCESS, IMPAC, COPARS, NAF, MEDLOG, other installation contractors, local purchase)? If yes, which?	____	____	____
Other Environmental Issues: Program Management			
23. Does the installation operate an air-to-surface weapons range?	____	____	____
24. Does the installation include all environmental projects listed in the Civil Engineering Contract Reporting System (CECORS) in the A-106 Report?	____	____	____
25. Does the installation have a single POC for the A-106 Pollution Abatement Plan? If yes, who is the POC?	____	____	____
26. Who is responsible for the quality and dating of the automated A-106 WIMS-ES?			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Other Environmental Issues: Program Management (continued)			
27. Does the installation have a mechanism in place to ensure that the automated A-106 accurately reflects the project and requirement data maintained in other databases (CECORS, Programming, Design, and Construction (PDC), etc.)?	____	____	____
28. Does the installation accurately reflect financial data (obligations, expenditures) in the A-106 systems?	____	____	____
29. Does the installation recieve deployments from CONUS?	____	____	____
30. Additional Observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Pesticide Management			
1. Are restricted-use pesticides in use on the installation?	____	____	____
2. Are restricted-use pesticides applied by personnel who have been certified both by DOD and by the appropriate German authority?	____	____	____
3. Does the installation use pesticides that contain any of the substances in Tables 6-1, 6-2, or 6-3 of FGS-FRG ECAMP?	____	____	____
4. Has a release of pesticides on the installation ever killed the wastewater treatment plant that receives the installation's wastewater? What were the circumstances?	____	____	____
5. Does the installation's Pest Management Facility drain to a holding tank, a septic system, a sanitary sewer, or to a stormwater system? If yes, to which?	____	____	____
6. Does the installation's Pest Management Facility have backflow prevention devices that are both of an appropriate type and operational?	____	____	____
7. Is the installation's Pest Management Facility located closer than 200 ft to surface water, existing wells and cisterns, or 100-yr flood plains?	____	____	____
8. Is the installation's Pest Management Facility located uphill from sources of potable water or from structures that are occupied continuously?	____	____	____
9. Is the installation's Pest Management Facility located over an aquifer?	____	____	____
10. Have German agencies or authorities made any inquiries regarding pesticide use on the installation?	____	____	____
11. What was the nature of these inquiries?			
12. Additional observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Petroleum, Oil, and Lubricants (POL) Management			
1. What kinds of fuel are stored on site? How much of each kind of fuel is stored on-site? (Please use the back of this page for a list or attach a separate sheet.)			
2. Does the installation transport or distribute POL products by road, rail, or water? If yes, what method of transport is used?	____	____	____
3. Does the installation have any pipeline systems whose design and/or construction do not currently meet recognized U.S. industry standards?	____	____	____
4. Has the installation had a confirmed release of a hazardous substance or POL from a pipeline system, an AST, or a UST? What substance? How much?	____	____	____
5. Does the installation burn used oil fuel?	____	____	____
6. Does the installation use a hydrant system or fuel trucks for aircraft fueling? Which?	____	____	____
7. Have past or present releases of fuel and/or other POL products engaged the interest of German authorities?	____	____	____
8. Have the installation's POL facilities been inspected by German agencies?	____	____	____
9. Have German agencies or authorities made any inquiries regarding POL?	____	____	____
10. What was the nature of these inquiries?			
11. Additional observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Solid Waste Management			
1. Does the installation have a solid waste management facility onsite?	____	____	____
2. Does the installation operate an official or unofficial landfill at this time?	____	____	____
3. Has the installation operated an official or unofficial landfill in the past?	____	____	____
4. Has the installation formally closed a landfill?	____	____	____
5. Has the installation simply stopped using a landfill rather than close it formally?	____	____	____
6. Does the installation collect and dispose of solid waste itself?	____	____	____
7. Are collection and disposal contracted out to a German firm?	____	____	____
8. Does that firm hold valid permits from appropriate German authorities?	____	____	____
9. Does the installation dispose of any solid waste by open burning?	____	____	____
10. Has runoff from a land disposal site been the cause of complaints from German individuals or agencies?	____	____	____
11. What was the nature of the complaints?			
12. Does the installation operate a thermal processing facility that processes more than 50 tons/day?	____	____	____
13. Does the installation operate an incinerator for the disposal of municipal solid waste?	____	____	____
14. Does the installation compost sludge from a domestic wastewater treatment plant?	____	____	____
15. Does the installation currently dispose of asbestos onsite?	____	____	____
16. Has the installation ever disposed of asbestos onsite?	____	____	____
17. Is there evidence of a recycling program? Is the program strong? Weak?	____	____	____
18. Is the program effective?	____	____	____
19. Does the installation dispose of animal carcasses? If yes, what kind of carcasses are disposed of and what is the method of disposal?	____	____	____
20. Does the installation include a commissary, an AAFES Shoppette, or other retail facilities that distribute **non-imported** goods (such as liquid foods (i.e., water, beer, etc.), washing agents, detergents)?	____	____	____

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Solid Waste Management (continued)			
21. Is there an active hospital or clinic on the installation?	____	____	____
22. Which of the following types of medical waste are generated there (see definitions):			
a) Category A? How much?	____	____	____
b) Category B? How much?	____	____	____
c) Category C? How much?	____	____	____
d) Category D? How much?	____	____	____
e) Category E? How much?	____	____	____
23. Does the installation dispose of infectious medical waste itself? What method of collection and disposal is used?	____	____	____
24. Are collection and disposal of such waste contracted out to a German firm?	____	____	____
25. Does that firm hold valid permits from appropriate German authorities for the category (or categories) of waste that it receives?	____	____	____
26. Does the installation store infectious medical waste prior to disposal?	____	____	____
27. Does the installation treat infectious medical waste prior to disposal? By what process?	____	____	____
28. Do installation personnel transport infectious medical waste off-site for disposal?	____	____	____
29. Does the installation generate pathology waste (see definition)? How is it disposed of?	____	____	____
30. Does the installation dispose of animal carcasses and/or animal body parts from veterinary facilities or medical laboratories?	____	____	____
31. Have German agencies or authorities made any inquiries regarding solid or medical waste?	____	____	____

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Solid Waste Management (continued)			
32. What was the nature of these inquiries?			
33. Additional observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Storage Tank Management			
1. Does the installation have ASTs whose design and/or construction do not currently meet recognized U.S. industry standards?	____	____	____
2. Do any ASTs appear to present a risk of failure?	____	____	____
3. Do any ASTs appear to be inadequately maintained?	____	____	____
4. Does the installation have any ASTs that are no longer in use but have not been formally closed or removed? If yes, how many and what size?	____	____	____
5. Does the installation have any ASTs (regardless of size) that do not have proper secondary containment that is impermeable to petroleum products? If yes, how many and what size?	____	____	____
6. Does the installation use USTs for the storage of any of the following substances:	____	____	____
a) POL?	____	____	____
b) heating oil?	____	____	____
c) combustible liquids?	____	____	____
d) hazardous materials?	____	____	____
e) hazardous waste?	____	____	____
7. Does the installation have any USTs whose design and/or construction do not currently meet recognized U.S. industry standards?	____	____	____
8. Does the installation have any USTs that are without secondary containment or double-walled construction? If yes, how many and what size?	____	____	____
9. Do installation personnel think that there are tanks onsite that are likely to fail?	____	____	____
10. Does the installation have any leaking USTs that have not been removed from service?	____	____	____

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Storage Tank Management (continued)			
11. Does the installation have any USTs that are no longer in use but have not been properly closed?	____	____	____
12. Has the installation had a confirmed release of a hazardous substance or POL from a UST? What substance? What quantity?	____	____	____
13. Does the installation store combustible liquids in USTs? How many tanks are used for this purpose? What size are they?	____	____	____
14. Have past or present releases of hazardous substances or POL attracted the attention of German authorities?	____	____	____
15. Have German agencies or authorities made any inquiries regarding ASTs or USTs on the installation?	____	____	____
16. What was the nature of these inquiries?			
17. Additional observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Toxic Substances Management: Polychlorinated Bi- and Terphenyls			
1. Has the installation tested all electrical equipment that is likely to contain PCBs/PCTs for PCB/PCT concentrations?	___	___	___
2. Does the installation use any electrical equipment that contains PCBs/PCTs in concentrations greater than 50 ppm?	___	___	___
3. Does the installation store any electrical equipment that contains PCBs/PCTs in concentrations greater than 50 ppm?	___	___	___
4. Does the installation service any electrical equipment that contains PCBs/PCTs in concentrations greater than 50 ppm?	___	___	___
5. Does the installation replace such equipment at the end of its service life with equipment that does not contain PCBs/PCTs?	___	___	___
6. Does the installation dispose on-site of PCBs/PCTs and/or equipment that contains or is contaminated with PCBs/PCTs?	___	___	___
7. Does the installation dispose of PCBs/PCTs through DRMO?	___	___	___
8. If the answer to Question 7 is "no," what method of disposal is used?			
9. Do installation personnel transport PCBs/PCTs offbase?	___	___	___
Toxic Substances Management: Asbestos	___	___	___
10. Are there facilities on-site that are known to contain or are suspected of containing ACM?	___	___	___
11. Has the installation tested any friable materials that are likely to contain asbestos to discover if in fact the material does contain asbestos?	___	___	___
12. Does the friable material actually contain asbestos?	___	___	___
13. Does the installation have any sites where damaged asbestos is found?	___	___	___
14. Does the installation have any sites where friable asbestos is found?	___	___	___
15. Does the installation have any sites where asbestos abatement is either planned or on-going?	___	___	___
16. Does the installation have an active in-house asbestos removal team?	___	___	___
17. Is the installation renovating or demolishing any structures where ACM may be disturbed or removed?	___	___	___
18. Is the installation currently storing any asbestos containing waste material for disposal? If yes, what ACM and what quantity?	___	___	___
19. Are any sites on the installation currently being monitored for concentrations of airborne asbestos fibers?	___	___	___

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Toxic Substances Management: Asbestos (continued)			
20. Have any monitoring results indicated concentrations greater than 0.25 fibers per cubic centimeter?	____	____	____
21. Have any monitoring results indicated concentrations of fine dust that contains asbestos in concentrations greater than 2.0 mg per cubic meter?	____	____	____
22. Does the installation dispose of asbestos containing waste material? What type? What quantity?	____	____	____
23. Does the installation have an active waste disposal site where ACM is being disposed of?	____	____	____
24. Does the installation have an inactive waste disposal site where ACM has been disposed of in the past?	____	____	____
Toxic Substances Management: Radon			
25. Has initial radon screening been conducted on the installation?	____	____	____
26. Did any initial screening sample show a radon level greater than 4 pCi/L?	____	____	____
27. Has mitigation been planned or conducted on buildings where radon levels exceed 4 pCi/L?	____	____	____
Toxic Substances Management: Lead-Based Paint	____	____	____
28. Has the installation identified any existing or potential LBP hazards?	____	____	____
29. Is LBP currently being used on the installation in the course of maintenance or construction? In what amounts?	____	____	____
30. Are any buildings with LBP hazards being demolished or renovated?	____	____	____
31. Are there plans to demolish or renovate any buildings with LBP hazards?	____	____	____
32. Has the installation ever had a case of elevated levels of lead in the blood?	____	____	____
33. Do any persons on the installation currently have elevated levels of lead in the blood?	____	____	____
34. Have German agencies or authorities made any inquiries regarding PCBs/PCTs, asbestos, radon, or LBP on the installation?	____	____	____

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Toxic Substances Management (continued)			
35. What was the nature of these inquiries?			
36. Additional observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Wastewater Management			
1. Does the installation operate a wastewater treatment plant?	____	____	____
2. Does the installation discharge into a publicly owned treatment works?	____	____	____
3. Does the installation engage in pretreatment of industrial wastewater prior to discharge to a wastewater treatment plant?	____	____	____
4. Does the installation conduct any effluent monitoring? For what substances?	____	____	____
5. Have the installation's point source dischargers exceeded FGS-FRG standards for any of the following within the last 12 mo:			
a) total suspended solids?	____	____	____
b) pH?	____	____	____
c) BOD_5?	____	____	____
d) COD?	____	____	____
e) ammonium/nitrogen?	____	____	____
f) total phosphorous?	____	____	____
g) cadmium?	____	____	____
h) settleable solids?	____	____	____
i) DDT or PCP?	____	____	____
j) Aldrin, Dieldrin, and/or Endrin?	____	____	____
k) the sum of values for Isodrin, Aldrin, Dieldrin, and Endrin?	____	____	____
6. If any answer in Question 5 is "yes," which parameters? For what length of time?			
7. Has the DWTP received slug discharges that have seriously impaired operations?	____	____	____
8. Has the DWTP ever been killed? If yes, how and when?	____	____	____

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Wastewater Management (continued)			
9. Does the installation discharge effluent from any of the following types of facilities:			
a) electroplating facilities?	____	____	____
b) metalworking or metal processing facilities?	____	____	____
c) dry cleaning facilities?	____	____	____
d) drinking water processing facilities?	____	____	____
e) industrial facilities? Of what type?	____	____	____
f) cooling systems?	____	____	____
g) steam production facilities?	____	____	____
10. Does the installation discharge any of the following (from point and/or non-point sources):			
a) wastewater contaminated with petroleum or petroleum products?	____	____	____
b) run-off from municipal solid waste landfills?	____	____	____
11. Has the installation surveyed stormwater discharge within the last year?	____	____	____
12. Has stormwater run-off from the installation resulted in complaints from German individuals or authorities? What was the nature of the complaints?	____	____	____
13. Is the installation subject to ground- or surface water monitoring for any reason?	____	____	____
14. Has the installation received water pollution complaints from individuals and/or German water pollution control authorities?	____	____	____
15. Have German agencies or authorities made any inquiries regarding wastewater?	____	____	____
16. What was the nature of these inquiries?			
17. Additional observations:			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Water Quality Management			
1. Does the installation operate a public water system? (See definition.)	____	____	____
2. Does the installation operate a community water system? (See definition.)	____	____	____
3. Does the installation operate a non-community water system? (See definition.)	____	____	____
4. Does the installation operate a non-transient, non-community water system? (See definition.)	____	____	____
5. Does the installation get water from on-site wells or surface water sources?	____	____	____
6. Does the installation get water from a municipal or regional water supply system?	____	____	____
7. Does the installation filter its drinking water? By what kind of filtration?	____	____	____
8. Have tests and inspections of backflow prevention devices been conducted within the last 12 mo?	____	____	____
9. Has the installation identified potential or existing cross-connections and assessed the degree of hazard that each represents?	____	____	____
10. Has the installation conducted a sanitary survey of the water system within the last 12 months?	____	____	____
11. Does the installation carry out a sampling/monitoring plan that meets FGS-FRG requirements?	____	____	____
12. Has the installation been out of compliance with FGS-FRG water quality standards for the following parameters within the last 12 months:			
a) total coliforms?	____	____	____
b) inorganic chemicals?	____	____	____
c) fluoride content?	____	____	____
d) lead?	____	____	____
e) copper?	____	____	____
f) synthetic organics?	____	____	____
g) total trihalomethanes?	____	____	____
h) radionuclides?	____	____	____
i) turbidity?	____	____	____
13. If any answer in Question 12 is "yes," which parameters? For what length of time?			

(continued)

Table 1: *Previsit Questionnaire--Federal Republic of Germany (continued)*

ITEM	YES	NO	N/A
Water Quality Management (continued)			
14. Does the installation maintain a chlorine residual throughout the water system? If yes, what is the level of residual chlorine?	____	____	____
15. Has the installation conducted proper notification, in the event of non-compliance with water quality standards?	____	____	____
16. Does the installation engage in underground injection?	____	____	____
17. Has the installation received complaints about water quality from German individuals or agencies?	____	____	____
18. What was the nature of those complaints?			
19. Have German agencies or authorities made any inquiries regarding water quality?	____	____	____
20. What was the nature of these inquiries?			
21. Additional observations:			

Table 2

Major Activities/Operations	Sections			
	Air Emissions Management 1	Cultural Resources Management 2	Hazardous Materials Management 3	Hazardous Waste Management 4
1. Incinerators	•			•
2. Heat/Power Production	•			•
3. AGE Operation	•		•	•
4. Aircraft Operations	•			
5. Aircraft Maintenance			•	•
6. Fuel Storage	•		•	
7. Surface Coating Operations	•		•	•
8. Sanitary Wastewater				
9. Stormwater Runoff				
10. Sludge Disposal	•			
11. POL Dispensing	•			
12. Wastewater Treatment				
13. Vehicle Maintenance	•		•	•
14. Shop Activities	•		•	•
15. Solid Waste Generation				
16. Water Supply				
17. Toxic/hazardous Materials Use			•	
18. Firefighting Training	•			
19. PCB Electrical Equipment				
20. Pesticide/ Herbicide Use				•
21. Environmental Noise				
22. Emergency Planning			•	•
23. Asbestos Removal				
24. Underground Storage Tanks	•		•	•
25. Remodeling Activities		•		
26. Construction Activities		•		
27. Soil Removal		•		

(continued)

Table 2 (continued)

Major Activities/Operations	Sections			
	Natural Resources Management 5	Other Envirnmtl Issues 6	Pesticide Management 7	POL Management 8
1. Incinerators				
2. Heat/Power Production				•
3. AGE Operation				•
4. Aircraft Operations		•		•
5. Aircraft Maintenance		•		•
6. Fuel Storage				•
7. Surface Coating Operations		•		
8. Sanitary Wastewater				
9. Stormwater Runoff			•	•
10. Sludge Disposal		•		
11. POL Dispensing				•
12. Wastewater Treatment				
13. Vehicle Maintenance		•		•
14. Shop Activities		•		
15. Solid Waste Generation		•		
16. Water Supply				
17. Toxic/hazardous Materials Use		•		
18. Firefighting Training				•
19. PCB Electrical Equipment				
20. Pesticide/ Herbicide Use			•	
21. Environmental Noise		•		
22. Emergency Planning				•
23. Asbestos Removal				
24. Underground Storage Tanks				•
25. Remodeling Activities	•			
26. Construction Activities	•			
27. Soil Removal	•			

(continued)

Table 2 (continued)

Major Activities/Operations	Sections			
	Solid Waste Management 9	Storage Tank Management 10	Toxic Substances Management 11	Wastewater Management 12
1. Incinerators	•			
2. Heat/Power Production	•	•		•
3. AGE Operation		•		
4. Aircraft Operations				
5. Aircraft Maintenance				•
6. Fuel Storage		•		
7. Surface Coating Operations				•
8. Sanitary Wastewater				•
9. Stormwater Runoff				•
10. Sludge Disposal	•			•
11. POL Dispensing				
12. Wastewater Treatment				•
13. Vehicle Maintenance	•		•	•
14. Shop Activities	•			•
15. Solid Waste Generation	•			
16. Water Supply				
17. Toxic/hazardous Materials Use			•	
18. Firefighting Training				•
19. PCB Electrical Equipment			•	
20. Pesticide/ Herbicide Use				•
21. Environmental Noise				
22. Emergency Planning				
23. Asbestos Removal			•	
24. Underground Storage Tanks		•		
25. Remodeling Activities	•		•	
26. Construction Activities	•		•	
27. Soil Removal				

(continued)

Table 2 (continued)

Major Activities/Operations	Sections			
	Water Quality Management 13			
1. Incinerators				
2. Heat/Power Production				
3. AGE Operation				
4. Aircraft Operations				
5. Aircraft Maintenance				
6. Fuel Storage				
7. Surface Coating Operations				
8. Sanitary Wastewater				
9. Stormwater Runoff				
10. Sludge Disposal				
11. POL Dispensing				
12. Wastewater Treatment				
13. Vehicle Maintenance				
14. Shop Activities				
15. Solid Waste Generation				
16. Water Supply	•			
17. Toxic/hazardous Materials Use				
18. Firefighting Training				
19. PCB Electrical Equipment				
20. Pesticide/ Herbicide Use				
21. Environmental Noise				
22. Emergency Planning				
23. Asbestos Removal				
24. Underground Storage Tanks				
25. Remodeling Activities				
26. Construction Activities				
27. Soil Removal				

Glossary of Acronyms

Acronym	Expansion
AAFES	Army/Air Force Exchange Service
ABG	Auftragsbauengrundsätze
ABI	unknown
ACM	asbestos-containing material
AF	Air Force
AFCEE	Air Force Center for Environmental Excellence
AFI	Air Force Instruction
AFJ	Air Force Joint [Publication]
AFJMAN	Air Force Joint Manual
AFM	Air Force Manual
AFMAN	Air Force Manual
AFOSH	Air Force Occupational Safety and Health [Standard]
AFP	Air Force Pamphlet
AFPD	Air Force Policy Directive
AFPMB	Armed Forces Pest Management Board
AFR	Air Force Regulation
AFTO	Air Force Technical Order
AOX	adsorbable organically bound halogens
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AVGAS	aviation gasoline
BBA	Biologische Bundesanstalt
BOD	biochemical oxygen demand
CAA	*Clean Air Act*
CAS	Chemical Abstract Service
CATEX	categorical exclusion
CDC	Child Development Center
CE	Civil Engineering
CECORS	Civil Engineering Contract Reporting System
CEM	Continuous Emissions Monitoring
CEP	Civil Engineering Programmer
CERCLA	*Comprehensive Environmental Restoration, Compensation and Liability Act*

(continued)

Glossary of Acronyms (continued)

Acronym	Expansion
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
COD	chemical oxygen demand
CONUS	continental United States
CPSA	*Consumer Product Safety Act*
CT	concentration/time
CWS	community water system
DCM	Deputy Commander for Maintenance
DEV	unknown
DIN	Deutsches Institut für Normung
DLA	Defense Logistic Agency
DOC	unknown
DOD	Department of Defense
DODD	DOD Directive
DODI	DOD Instruction
DOE	Department of Energy
DM	Deutsche Mark
DOPAA	description of proposed action and alternatives
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
DRMS	Defense Reutilization and Marketing Service
DVGW	Deutscher Verband für Gas und Wasserversorgung (German Federation of Gas and Water Supply)
DWTP	domestic wastewater treatment plant
EA	environmental analysis
EA	environmental assessment
EA	Executive Agent
EC	Environmental Coordinator
ECAMP	Environmental Compliance Assessment and Management Program
ECD	estimated compliance date
EEA	Environmental Executive Agent
EHO	Environmental Health Officer
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement

(continued)

Glossary of Acronyms (continued)

Acronym	Expansion
EMO	Environmental Management Office
EPC	Environmental Protection Committee
EPCRA	*Emergency Planning and Community Right-to-Know Act*
EPF	Environmental Planning Function
ER	environmental review
ERT	emergency response team
ES	environmental study
EW	Einwohnerwerten
FGS	Final Governing Standards
FONSI	Finding of No Significant Impact
FRG	Federal Republic of Germany
GOCO	government-owned contractor-operated
GSA	General Services Administration
GWUDISW	groundwater under the direct influence of surface water
HCFC	hydrochlorofluorocarbon
HMIS	Hazardous Materials Information System
HMSA	hazardous material storage area
HMTA	*Hazardous Materials Transportation Act*
HQ	Headquarters
HUD	Housing and Urban Development
HVAC	Heating, Ventilation, and/or Air-conditioning
HW	hazardous waste
HWAP	hazardous waste accumulation point
HWPS	hazardous waste profile sheet
HWSA	hazardous waste storage area
IAPMO	International Association of Plumbing and Mechanical Officials
IC	Installation Commander
ICUZ	installation compatible use zone
ID	(Finding) Identification
IEX	issue exception [code]
IOSC	Installation On-Scene Coordinator
IPM	Integrated Pest Management
IRP	Installation Restoration Program
ISCP	Installation Spill Contingency Plan

(continued)

Glossary of Acronyms (continued)

Acronym	Expansion
ITP	industrial toxic project
IWTP	industrial wastewater treatment plant
LBP	lead-based paint
LC	lethal concentration
LCCA	*Lead Contamination Control Act*
LD	lethal dose
LHKW	Leichthalogenierte Kohlwasserstoffe
LTI	lead toxicity investigation
MAJCOM	Major Command
MCL	maximum contamination level
MFH	military family housing
MILCON	military construction
MIPR	military interdepartmental purchase request
MOA	Memorandum of Agreement
MOGAS	motor gasoline
MP	Management Practice
MSDS	material safety data sheet
MSHA	Mine Safety and Health Administration
MSW	municipal solid waste
MSWLF	municipal solid waste landfill
MTR	military training route
NATO	North Atlantic Treaty Organization
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NLR	noise level reduction
NM	Nautical Miles
NOI	notice of intent
NOV	notice of violation
NPS	nonpoint (or nonstationary) source
NPWS	nonpublic water system
NTNC	nontransient, noncommunity
NTNCWS	nontransient, noncommunity water system
O&M	Operations and Maintenance
OBSC	Off-Base Spill Coordinator

(continued)

Glossary of Acronyms (continued)

Acronym	Expansion
OCONUS	Outside of the Continental United States
ODC	ozone depleting chemical
ODS	ozone depleting substance
OEBGD	Overseas Environmental Baseline Guidance Document
OPR	Office of Primary Responsibility
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PCMS	Project by Contract Management System
PCT	Polychlorinated Terphenyl
PDC	Programming, Design, and Construction (System)
PEL	permissible exposure limit
POC	point-of-contact
POE	point-of-entry
POL	petroleum, oil, and lubricant
POTW	publicly owned treatment works
POU	point of use
PPE	personal protective equipment
PVC	polyvinyl chloride
PWS	public water system
QAE	Quality Assurance Evaluator
QA/QC	quality assurance/quality control
QC&I	quality control and inspection
QRP	qualified recycling program
RAC	risk assessment code
RAL	unknown
RAMP	Radon Assessment and Mitigation Program
RCRA	*Resource Conservation and Recovery Act*
RCRA/HSWA	*Resource Conservation and Recovery Act/Hazardous and Solid Waste Amendments*
RCS	Report Control Symbol
REM	Raster Electron Microscope
RMA	require management action
RQ	reportable quantity
RRR	Resource Recovery and Recycling [Program]
RTECS	Registry of Toxic Effects of Chemical Substances

(continued)

Glossary of Acronyms (continued)

Acronym	Expansion
SARA	*Superfund Amendment and Reauthorization Act*
SF	standard form
SOFA	Status of Forces Agreement
SUA	special use airspace
SWDA	*Solid Waste Disposal Act*
TA	Technische Anleitung
TIM	Technical Information Memorandum
TLV	Threshold Limit Value
TM	Technical Manual
TNC	transient, noncommunity
TNCWS	transient, noncommunity water system
TRK	Technische Richtkonzentrationen (Technical Value Concentration)
TSDF	treatment, storage, and disposal facility
TSS	total suspended solids
TTHM	total trihalomethanes
TTO	total toxic organics
UIC	unit identification code
ULV	ultra-low volume
UN	United Nations
UPC	Uniform Plumbing Code
USACERL	U.S. Army Construction Engineering Research Laboratories
USAF	U.S. Air Force
USC	U.S. Code
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UVV	unknown
VDI	Verein Deutscher Ingenieure
VGB	unknown
VOC	volatile organic compound
WGK	Wassergefährdungsklasse
WIMS	Work Information Management System
WIMS-ES	Work Information Management System-Environmental Subsystem
ZH	unknown
ZN	unknown

Abbreviations

C	Celsius
cm	centimeter
cm^2	square centimeter
F	Fahrenheit
ft	feet
ft^2	square feet
ft^3	cubic feet
g	gram
gal	gallons
gpd	gallons per day
gpm	gallons per minute
gr	grain
gr/dscf	grain/dry standard cubic foot
h	hour
ha	hectare
in.	inch
J	Joule
kg	kilogram
kPa	kiloPascal
kW	kilowatt
L	liter
lb	pound
m	meter
m^2	square meter
m^3	cubic meter
mi	mile
mg	milligram
mgd	million gallons per day
µg	microgram
µm	micrometer
min	minute
mo	month
mm	millimeter
mm Hg	millimeters of mercury
mrem	millirem
MW	megawatt
NTU	nephelometric turbidity unit
pCi	picoCurie
ppm	parts per million
ppmv	parts per million by volume
psi	pounds per square inch
psia	pounds per square inch absolute
psig	pounds per square inch gauge
qt	quart
s	second
V	volt

CO	carbon monoxide
CO_2	carbon dioxide
Hg	mercury
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
SO_2	sulfur dioxide
SO_3	sulfur triioxide
SO_x	sulfur oxides

Metric Conversion Table

The following conversion table may be used throughout this manual to convert the measures stated in U.S. units to their approximate metric equivalents.

1 in.	=	25.4 mm
1 ft	=	0.3048 m
1 kip	=	4448 N
1 psi	=	6.89 kPa
1 psi	=	89.300 g/cm^2
1 lb	=	0.453 kg
1 lb/h	=	0.126 g/s
1 cu ft	=	0.028 m^3
1 mi	=	1.61 km
1 sq ft	=	0.093 m^2
1 gal	=	3.78 L
°F	=	(°C + 17.78) x 1.8
°C	=	0.55 (°F - 32)
1 yd	=	0.9144 m
1 Btu/lb	=	0.556 cal/g

SECTION 1

AIR EMISSIONS MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 1

AIR EMISSIONS MANAGEMENT

A. Applicability of this Section

This section includes regulations, responsibilities, and compliance requirements associated with air pollution emissions at Air Force (AF) installations. The major sources of air pollution emissions at AF installations are:

- particulates, SO_2, and NO_x from fuel burning at steam plants and boilers
- particulate emissions from the operation of classified material and pathological incinerators
- the emission of volatile organic compound (VOC) vapors from the storage and transfer of certain petroleum fuels and chemicals (solvents), and the operation of degreasers and other processes (paint stripping and metal finishing) that use solvents.

Most AF installations have air emissions sources in each of these four categories. Therefore, this section is applicable to some extent at all AF installations.

The regulatory requirements in this section are based on Department of Defense (DOD), Air Force regulations (AFRs) and Air Force Instructions (AFIs) that apply at overseas installations. Management Practices (MPs) are derived from U.S. Environmental Protection Agency (USEPA) regulations that are not mandatory overseas but are important to follow to preserve the health and safety of AF employees and protect the environment. Any procedural USEPA requirements, such as permits and notifications, are not applicable overseas and, therefore, are not in this manual. MPs in the Air Emissions section are derived from the following USEPA regulations: 40 Code of Federal Regulations (CFR) 51, 60, and 80.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 2, contains criteria for the control of air emissions from DOD-owned and/or -operated facilities and equipment. The chapter covers controlling general emissions, emissions from facilities and operations, and emissions from motor vehicles and fueled engines. In addition, it addresses the measuring and monitoring of emissions.

C. U. S. Air Force Documents

- AFR 19-6, *Air Pollution Control Systems for Boilers and Incinerators*, 9 May 1988, provides guidance on how to select, design, operate, and maintain emission control devices on boilers and incinerators. This AFR is scheduled to be replaced by Air Force Joint [Publication] (AFJ) 132-1056.

- AFI 48-119, *Medical Service Environmental Quality Program*, 25 July 1994, provides directive requirements for the Medical Service Environmental Quality Program and identifies responsibilities of participants in that program at U.S. AF bases.

- AFTO 00-20B-5, *USAF Motor Vehicle and Vehicular Equipment Inspection*, establishes procedures for vehicle inspection and reporting on vehicle emissions.

D. Responsibility for Compliance

- The Combat Support Group Commander is usually the person responsible for compliance.

- Base Civil Engineering (BCE) is responsible for the maintenance of incinerators and fuel handling and storage equipment, as well as the operation and maintenance of all fuel burners (boilers). The heating and boiler plants are responsible for the operation of fuel burners and are part of the Operations Branch of Civil Engineering.

- The Environmental Coordinator in BCE is responsible for the preparation of all air pollution emission source permit applications.

- The regional hospital or base clinic is responsible for the operation of any pathological incinerators located in its facility.

- The Fuels Management Branch of Base Supply is responsible for the operation of all fuel handling, transportation (tanks and/or pipelines), and storage facilities on base. They are also responsible for insuring that all fuels satisfy specifications.

- The Fuels Management Branch is also responsible for operating the Military Service Station that dispenses leaded or unleaded fuel.

- The Automotive Maintenance Branch of Base Transportation is responsible for the emission testing and vehicle maintenance required by FGS-FRG and AF documents.

- The various maintenance squadrons at the base are responsible for the operation of degreasers and other industrial processes that are regulated or may require operating permits.

- The Base Exchange operates a service station that dispenses leaded and unleaded fuels and is subject to the requirements of FGS-FRG. The service station is normally operated by a contractor, but the labeling and nozzle size regulations still apply. The Government is responsible for compliance, but the contractor may also be responsible, depending on the contract wording.

- Bioenvironmental Engineering Services (BES) is responsible for monitoring ambient air quality and preparing the installation air emission inventory.

E. Definitions

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Class I Carcinogens* - asbestos (chrysotile, crocidolite, amosite, anthophylite, actinolite, tremolite) as fine dust, benzo(a)pyrene, beryllium and its compounds in respirable form, dibenz(a,h)anthracen, and 2-naphthalamine (FGS-FRG 2-7a).

- *Class II Carcinogens* - arsenic trioxide, arsenic pentoxide, arsenious acid and its salts, arsenic acid and its salts (in respirable form); chromium (VI) compounds in respirable form (e.g., calcium chromate, chromium (III) chromate, strontium chromate, and zinc chromate); cobalt in the form of respirable dusts/aerosols of cobalt metal and cobalt salts of low solubility; 3,3-dichlorobenzidine; dimethyl sulfate; ethyleneimine; nickel in the form of respirable dusts/aerosols of nickel metal, nickel sulfide and pyritiferous ores, nickel oxide and nickel carbonate, nickel tetracarbonyl (FGS-FRG 2-7b).

- *Class III Carcinogens* - acrylonitrile, benzene, 1,3-butadiene, 1-chloro-2,3-epoxypropane (epichlorohydrin), 1,2-dibromomethane, 1,2-epoxypropane, ethylene oxide, hydrazine, vinyl chloride (FGS-FRG 2-7c).

- *Class I Inorganic Dust Particles* - cadmium and its compounds, mercury and its compounds, thallium and its compounds (FGS-FRG 2-8b(1)).

- *Class II Inorganic Dust Particles* - arsenic and its compounds, cobalt and its compounds, nickel and its compounds, selenium and its compounds, tellurium and its compounds (FGS-FRG 2-8b(2)).

- *Class III Inorganic Dust Particles* - antimony and its compounds, lead and its compounds, chromium and its compounds, easily soluble cyanide (e.g., NaCN), easily soluble fluoride (e.g. NaF), copper and its compounds, manganese and its compounds, platinum and its compounds, palladium and its compounds, rhodium and its compounds, vanadium and its compounds, tin and its compounds (FGS-FRG 2-8b(3)).

- *Competent* - an agency, authority, individual, official, person, etc., who meets any of the following criteria: (FGS-FRG, Appendix A)
  1. specifically designated as competent by FGS-FRG
  2. specifically designated as competent by the authority of a German government [agency]
  3. specifically designated as competent by or meets the qualifications of competency of a recognized German trade organization or association
  4. based on experience, training, and/or authority granted per DOD/component policy or regulations, judged by the responsible commander to be a capable and appropriated organization/ individual to accomplish the task in question.

- *Dusty Materials* - solid substances which, due to their density, grain size, grain form, bulk density, abrasion resistance, composition, or moisture content, could cause air emissions while being handled or stored (FGS-FRG, Appendix A).

- *Environment* - the natural and physical environment, excluding social, economic, and other environments (FGS-FRG, Appendix A).

- *Existing Source* - a source that discharges pollutants that was in operation or under construction before 1 October 1994 (FGS-FRG, Appendix A).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Large Combustion Facilities* - solid-, liquid- or mixed-fuel-fired units with a heat output of 50 MW or more and gas-fuel-fired units with a heat output of 100 MW or more (FGS-FRG 2-28).

- *Management Practices (MPs)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *New Source* - a source that discharges pollutants that was built or significantly modified on or after 1 October 1994 (FGS-FRG, Appendix A).

- *Nontactical Vehicle* - commercially available vehicles that are adapted to military use (FGS-FRG, Appendix A).

- *Open Burning* - burning of solid wastes in the open, such as in an open dump (FGS-FRG, Appendix A).

- *Ozone-Depleting Substances (ODS)* - those substances listed in Table 1-1 (FGS-FRG, Appendix A).

- *Qualified* - see *Competent.*

- *Small Combustion Facilities* - solid-, liquid-, or mixed-fuel-fired units with a heat output of less than 50 MW and gas-fuel-fired units with a heat output less than 100 MW (FGS-FRG 2-27).

- *State* - the political subdivision referred to as a *Land* in Germany (FGS-FRG, Appendix A).

- *Substantial Modification* - any functional alteration to any existing environmental control facility, the cost of which exceeds $1,000,000, regardless of funding source (FGS-FRG, Appendix A).

If an individual furnace is added to a combustion facility in such a way that they form a joint combustion facility, then:

1. the standards for the furnace to be installed are those for furnaces constructed on or after 7 January 1989 for a combustion facility with a heat output equal to the sum of the outputs of the existing facility and the new facility.

2. the standards for the facility to be enlarged are those for facilities constructed before 7 January 1989 if the facility, as it now is, existed before that date; if not, it is subject to the standards for facilities constructed on or after 7 January 1989.

Mixed and multifuel combustion present certain complications.

1. For mixed fuel combustion, the emission limits for each individual fuel must be obtained based on the ratio of the heat content of the individual fuel to the total heat content of the fuel mixture. The applicable emission limits for the combustion facility are derived by adding the values established in the sections on coal-, oil-, and gas-burning heating plants below. But the provisions for the fuel with the highest emission limit apply if this fuel accounts for at least 50 percent of the total heat content during the operation of the facility.

2. In cases of multifuel combustion, the requirements set for each individual fuel apply.

3. If there is a switch from solid to gaseous fuel, the emission limitations for solid fuels apply for a period of 4 h after the switchover.

For mixed fuel and multiple fuel furnaces with a firing thermal capacity less than 50 MW:

1. For mixed fuel furnaces, the defined emission values for the respective fuels are determined by comparing the energy applied with each fuel to the total amount of applied energy. The emission values relevant to each furnace equal the sum of these determined values. However, the standards apply to the fuel for which the highest emission value applies, if (during the operation of the facility) this fuel accounts for at least 70 percent of the total amount of applied energy.

2. For multiple fuel furnaces, the standards in effect are those which apply to the particular fuel. However, the requirements for reducing particulate emissions of solid fuels apply for a period of 4 h after the conversion from solid to gaseous fuels or to heating oil that complies with the standards of DIN 51603, Part 1 (December 1981).

3. For fluidized bed combustion carried out with mixed or multiple fuels, the particulate emission standards of FGS-FRG 2-3b apply.

AIR EMISSIONS MANAGEMENT
GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
All Installations	1-1 through 1-5	(1)(2)(11)
Emission Control in General		
Discharge of Waste Gases	1-6 through 1-16	(1)(2)(3)(5)(6)(7)(9)
CFCs & Halons in General	1-17	(1)(3)(5)(7)(8)(9)
Specific CFCs & Halons	1-18 through 1-25	(1)(5)(6)(8)(9)
Other Emissions in Waste Gases	1-26 and 1-27	(2)(3)
Dust Emissions	1-28 through 1-30	(2)(3)
Control of Particulate Emissions	1-31 through 1-38	(1)(2)(3)
Heating Plants & Incinerators		
All Furnaces	1-39 and 1-40	(1)(2)(3)
Coal-fired Heating Plants	1-41 through 1-49	(1)(2)(3)
Oil-fired Heating Plants	1-50 through 1-59	(1)(2)(3)
Gas-fired Heating Plants	1-60 through 1-66	(1)(2)(3)
Additional Standards	1-67	(1)(3)
Incinerators	1-68	(1)(2)(3)
Controlling Emissions from Facilities and Activities		
Spray Painting Facilities	1-69 through 1-71	(1)(2)(3)
Rotary Presses	1-72	(2)(3)
Carpentry Shops	1-73	(1)(3)
POL Transfer/Dispensing Points	1-74 through 1-77	(1)(3)(4)(10)
Gas Stations	1-78 through 1-80	(1)(3)(4)(10)
Emissions from Petroleum-Powered Engines/Vehicles		
Motor Vehicles & Motor Vehicle Fuel	1-81 through 1-85	(4)(5)(10)
Combustion Engine Test Stands	1-86	(3)(5)
Gas Turbines	1-87	(2)(3)
Measuring & Monitoring Emissions		
Individual Measurements	1-88 through 1-96	(2)(3)
Continuous Measurements	1-97 through 1-106	(1)(2)(3)
Small Combustion Facilities	1-107 through 1-109	(1)(2)(3)
Large Combustion Facilities	1-110 through 1-119	(1)(2)(3)

(a) **CONTACT/LOCATION CODE:**

(1) BCE (Base Civil Engineering/Environmental Planning)
(2) BES (Bioenvironmental Engineering Services)
(3) Air Pollution Source Operator
(4) Fuels - Management Branch
(5) Transportation - Maintenance Branch
(6) Logistics Supply (LGS (Base Supply))
(7) SV (Services Squadron) Auto Hobby Shop
(8) Refrigeration Shops (BCE)
(9) Equipment Maintenance Squadron
(10) AAFES (Army/Air Force Exchange Service) Gas Station
(11) Base Staff Judge Advocate

AIR EMISSIONS MANAGEMENT

Records To Review

- Emissions inventory
- All air pollution source permits
- Plans and procedures applicable to air pollution control
- Emission monitoring records
- Opacity records
- Instrument calibration and maintenance records
- Reports/complaints concerning air quality
- Host nation regulatory inspection reports
- Documentation of preventive measures or actions
- Results of air sampling at the conclusion of response action

Physical Features To Inspect

- All air pollution sources (fuel burners, incinerators, VOC sources, etc.)
- Air pollution monitoring and control devices
- Air emission stacks
- Air intake vents

People To Interview

- BCE (Base Civil Engineering/Environmental Planning)
- BES (Bioenvironmental Engineering Services)
- Air Pollution Source Operator
- Fuels - Management Branch
- Transportation - Maintenance Branch
- LGS (Base Supply)
- SV (Services Squadron) Auto Hobby Shop
- Refrigeration Shops (BCE)
- Equipment Maintenance Squadron
- AAFES (Army/Air Force Exchange Service) Gas Station
- Base Staff Judge Advocate

COMPLIANCE CATEGORY: AIR EMISSIONS MANAGEMENT
Federal Republic of Germany ECAMP

REGULATORY REQUIREMENTS:	REVIEWER CHECKS: February 1997
ALL INSTALLATIONS	
1-1. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents on air emissions should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (1)(11) (NOTE: Among the relevant documents are the following: - AFI 48-119, *Medical Service Environmental Quality Programs*, 25 July 1994 - AFTO 00-20B-5, *USAF Motor Vehicle and Vehicular Equipment Inspections*.) (NOTE: Regulations on asbestos management are addressed in Section 11, *Toxic Substances Management*.)
1-2. Installations must meet regulatory and AF requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning air quality have been issued since the finalization of the manual. (1)(2) Verify that the installation is in compliance with newly issued regulations.
1-3. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a, 1-8c, and 2-2).	Determine whether German authorities require permits related to air emissions management. (1) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
1-4. The open burning of any type of waste is prohibited (FGS-FRG 2-13c).	Verify that no open burning of wastes takes place on the installation. (1)

(1) BCE (Base Civil Engineering/Environmental Planning (2) BES (Bioenvironmental Engineering Services) (3) Air Pollution Source Operator (4) Fuels - Management Branch (5) Transportation - Maintenance Branch (6) LGS (Base Supply) (7) SV (Services Squadron) Auto Hobby Shop (8) Refrigeration Shops (BCE) (9) Equipment Maintenance Squadron (10) AAFES (Army/Air Force Exchange Service) Gas Station (11) Base Staff Judge Advocate

COMPLIANCE CATEGORY: AIR EMISSIONS MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
1-5. Installations must take and maintain an air emissions inventory (AFI 48-119, para 9.5.1.2).	Verify that the installation has done an air emissions inventory. (2) Verify that BES maintains copies of the inventory.
EMISSION CONTROL IN GENERAL **Discharge of Waste Gases**	
1-6. Waste gases must be discharged in such a way that a free air stream will provide an undisturbed dispersion (FGS-FRG 2-3a).	Verify that waste gases are discharged in such a way that a free air stream will provide an undisturbed dispersion. (1)(3) (NOTE: As a rule, discharge via a stack is required.)
1-7. Facilities must be equipped and operated with emission controls based on the current technology (FGS-FRG 2-3b).	Verify that facilities are equipped and operated with emission controls based on the current technology. (1)(3) (NOTE: The goal of these controls is to reduce the mass concentrations, mass flows, and mass proportions of air pollutants.)
1-8. Installations must pay special attention to reducing the amount of waste gas and optimizing process (FGS-FRG 2-3b).	Verify that special attention is paid to reducing the amount of waste gas and optimizing process. (1)(3)
1-9. If certain substances could be emitted, materials that will minimize the emissions must be used (FGS-FRG 2-3b).	Determine whether any of the following substances could be emitted: (1)(2)(3) - substances that belong to Class I in Table 1-2 - substances that belong to Class I or II in Table 1-3 - Class I carcinogens (see definition) - Class II carcinogens (see definition) - Class IIIa carcinogens (see definition) - Class I inorganic dust particles (see definition) - Class II inorganic dust particles (see definition) - lead or its compounds. Verify that materials that will minimize the emissions are used.

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COMPLIANCE CATEGORY: AIR EMISSIONS MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
1-9. (continued)	Verify that technical or operational means are used to avoid procedures that may result in increased emissions of the substances in Table 1-2, if possible.
1-10. Emissions of organic substances must not exceed certain limits, even if several substances of the same class are present (FGS-FRG 2-4a through 2-4f).	(NOTE: These requirements do not apply to combustion engine test stands.) Verify that emissions of Class I substances (see Table 1-2) do not have a mass flow greater than 100 g/h, nor more than 20 mg/m^3. (2)(3) Verify that emissions of Class II substances (see Table 1-2) do not have a mass flow greater than 2 kg/h, nor more than 100 mg/m^3. Verify that Class III substances (see Table 1-2) do not have a mass flow greater than 3 kg/h, nor more than 150 mg/m^3. Verify that, if organic substances in several classes are present, mass concentrations in the waste gas do not exceed a total of 150 mg/m^3 at a total mass flow of 3 kg/h or more. (NOTE: An organic substance that is not listed in Table 1-2 is assigned to the class that contains those substances to which it is most similar in terms of its effects on the environment.) (NOTE: The emissions limits of this checklist item do not apply to Class II or Class III organic dust substances. See instead checklist item 1-28).

1-11. The mass flow must be as low as possible for certain substances (FGS-FRG 2-4g and 2-26c).	Verify that the mass flow is as low as possible for: (2)(3)
	
	- harmful substances such as polyhalogenated dibenzodioxins, polyhalogenated dibenzofurans, or polyhalogenated biphenyls
	- substances that:
	  - do not degrade easily,
	  - do accumulate, and
	  - belong to Classes I, II, or III.
	
	(NOTE: This may require special processing procedures in addition to waste gas purification.)
	
	(NOTE: Compliance with these requirements is demonstrated by permanently recording suitable operational values if continuous emissions monitoring (CEM) cannot be accomplished because of missing measuring instruments.)

(1) BCE (Base Civil Engineering/Environmental Planning (2) BES (Bioenvironmental Engineering Services) (3) Air Pollution Source Operator (4) Fuels - Management Branch (5) Transportation - Maintenance Branch (6) LGS (Base Supply) (7) SV (Services Squadron) Auto Hobby Shop (8) Refrigeration Shops (BCE) (9) Equipment Maintenance Squadron (10) AAFES (Army/Air Force Exchange Service) Gas Station (11) Base Staff Judge Advocate

COMPLIANCE CATEGORY: AIR EMISSIONS MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
1-12. Vapor degreasers that use volatile organic compounds (VOCs) must incorporate systems that minimize the direct release of VOCs into the atmosphere (FGS-FRG 2-4h).	Verify that vapor degreasers that use volatile organic compounds (VOCs) incorporate systems that minimize the direct release of VOCs into the atmosphere. (3)(5)(7)(9) (NOTE: This requirement went into effect 1 January 1995.) (NOTE: Covered or refrigerated systems, for example, could be used to achieve compliance.)
1-13. The distribution and use of vinyl chloride as a propellant for aerosols is prohibited (FGS-FRG 2-4i).	Verify that vinyl chloride is neither distributed nor used as a propellant for aerosols on the installation. (1)(6)
1-14. Surface treatment facilities, chemical dry cleaning plants, and extraction facilities that use certain halogenated hydrocarbons must meet specific requirements (FGS-FRG 2-4j(1) and 2-4j(2)(a) through 2-4j(4)).	Determine whether the facility uses halogenated hydrocarbons that have a boiling point up to 423 °K (150 °C) at 1013 mbar. (2)(3) (NOTE: These standards do not apply to facilities that use mixtures of solvents that have less than 1 percent of such volatile halogenated hydrocarbons.) Verify that no halogenated hydrocarbons other than the following are in use in the facility: - tetrachloroethene - trichloroethene - dichloromethane. Verify that no carcinogenic additives are used. Verify that tetrachloroethene is the only solvent used in dry cleaning plants. Verify that dry cleaning machines are equipped with automatic locks that ensure that nothing can be taken out until the relevant mass concentrations are achieved. Verify that, in surface treatment facilities, the products are treated in closed containers. Verify that those closed containers are equipped with automatic locks that ensure that nothing can be taken out until the relevant mass concentrations are achieved.

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1-14. (continued)	Verify that, in all three types of facilities: - extracted waste gases go to a separator - the separated halogenated hydrocarbons are recycled - separators with exhaust gas volume flow rates greater than 500 m^3/h are equipped with devices for continuously measuring and recording the concentrations of volatile halogenated hydrocarbons and with devices that will automatically stop the operation if the mass concentration of halogenated compounds exceeds 1 g/m^3. Verify that the filters used for cleaning solvents are recyclable. Verify that no volatile halogenated compounds are allowed to escape the facility. Verify that the facilities have an opening for measuring contaminants that does not allow any of those contaminants to escape. Verify that equipment is filled with solvents and emptied of them in such a way that the emissions of volatile halogenated hydrocarbons is minimized. Verify that the gas pendulum procedure (*Gaspendelverfahren*) is used to change, extract, and move the solvents to a separator. Verify that residues that contain volatile halogenated hydrocarbons are handled, stored, removed from the facilities, and transported, in closed containers.
1-15. Surface treatment facilities must comply with specific emission limits (FGS-FRG 2-4j(5)(a)).	Verify that the mass concentration of volatile halogenated hydrocarbons in the facility removal area does not exceed 1 g/m^3. (2)(3) Verify that the mass concentration of volatile halogenated hydrocarbons in the undiluted waste gas does not exceed 20 mg/m^3 after passing through a separator. Verify that, when the solvent consists of more than 50 percent dichloromethane, the mass concentration of the emission does not exceed 50 mg/m^3.
1-16. Chemical dry cleaners must comply with specific emission limits (FGS-FRG 2-4j(5)(b)).	Verify that the mass concentration of volatile halogenated hydrocarbons in the facility removal area does not exceed 2 g/m^3 (5 g/m^3 for facilities with a throughput of air greater than 5 m^3/kg and 5 m^3/h). (2)(3) Verify that the mass concentration of volatile halogenated hydrocarbons in the undiluted waste gas does not exceed 20 mg/m^3 after passing through a separator.

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Chlorofluorocarbons (CFCs) and Halons in General	
1-17. No Class I or Class II ODSs may be vented to the air (FGS-FRG 2-5b).	Verify that no Class I or Class II ODSs (see Table 1-1) are vented to the air. (1)(3)(5)(7)(8)(9) (NOTE: This prohibition does not apply if venting is specifically authorized in FGS-FRG or by DOD directives.) Verify that no Class I or Class II ODSs are permitted to escape into the atmosphere during any operations, maintenance, or shut-down procedures involving those substances. Verify that operations, maintenance, and shut-down procedures involving Class I or Class II ODSs are state of the art. (NOTE: This requirement does not apply to emergency use of fire-extinguishing substances.) Verify that all work involving Class I or Class II ODSs is performed by fully trained personnel who have appropriate equipment.
Specific CFCs and Halons	(NOTE: The requirements of this section apply to the following CFCs and Halons only and to products that contain them: CFC-11 (R 11), CFC-12 (R 12), CFC-13 (R 13), CFC-112 (R 112), CFC-113 (R 113), CFC-114 (R 114), CFC-115 (R 115), Halon-1211, Halon-1301, Halon 2402, carbon tetrachloride, methyl chloroform, HCFC-22 (R-22). They do not apply to sea-going vessels flying other than a German flag nor to aircraft registered in countries other than Germany.)
1-18. Installations are not permitted to import, market, or distribute pressurized gas packaging (aerosol spray cans) that contains more than 1 percent of the substances listed in the note to this section (FGS-FRG 2-5c(1)).	Verify that the installation does not import, market, or distribute pressurized gas packaging (aerosol spray cans) that contain more than 1 percent of the substances listed in the note to this section. (6)

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1-19. Installations are not permitted to import, market, distribute, or use refrigerants that contain more than 1 percent by weight of the substances listed in the note to this section (FGS-FRG 2-5c(2)(a) and 2-5c(2)(b)).	Verify that the installation does not import, market, distribute, or use refrigerants that contain more than 1 percent by weight of the substances listed in the note to this section. (6) (NOTE: The following may be used until taken out of service: - products that contain 5 kg or more of these refrigerants in a closed-circulation system manufactured before 1 January 1992 - mobile refrigeration systems that contain 5 kg or more of these refrigerants in a closed-circulation system manufactured before 1 January 1994 - products that contain less than 5 kg these refrigerants in a closed-circulation system manufactured before 1 January 1995 - products that contain refrigerants that have more than 1 percent of R-22 only, if manufactured before 1 January 2000.) (NOTE: The items listed above may be serviced using the original type of refrigerant unless, employing the latest state-of-the-art techniques, refrigerants with a lower ozone-depleting potential can be used. The German Federal Environmental Protection Agency will announce such refrigerants as they are developed and enter the marketplace. The original refrigerants may not be available as time passes. Therefore, unless the refrigerants have been stockpiled for use, servicing with the original refrigerant may not be possible.)
1-20. Installations are not permitted to distribute or use foam products that contain or can release any of the substances listed in the note to this section (FGS-FRG 2-5c(3)).	Verify that the installation does not distribute or use any foam products that contain or can release any of the substances listed in the note to this section. (1) (NOTE: By way of exception, foam products that contain R-22 only may be emplaced until 1 January 2000.)
1-21. Installations are not permitted to distribute or use cleaning solvents that contain more than 1 percent by weight of the substances listed in the note to this section (FGS-FRG 2-5c(4)).	Verify that the installation does not distribute or use cleaning solvents that contain more than 1 percent by weight of the substances listed in the note to this section. (1)(5)(6)(9) (NOTE: This prohibition does not apply to the use of carbon tetrachloride, if it is used in a closed system where no substitute is appropriate or to tetrachloroethene, trichloroethene, or dichloromethane, if used only in facilities designed for the purpose.)

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1-22. Installations are not permitted to import, market, distribute, or use fire-extinguishing substances that contain more than 1 percent by weight of Halon 1211, Halon 1301, or Halon 2402 (FGS-FRG 2-5c(5)).	Verify that the installation does not import, market, distribute, or use fire-extinguishing substances that contain more than 1 percent by weight of Halon 1211, Halon 1301, or Halon 2402. (1)(5)(6)(8)(9) Verify that, if a waiver has been granted, the extinguishers are clearly labeled: CONTAINS OZONE-DEPLETING HALON.
1-23. Containers or products that contain the substances listed in the note to this section must be marked in accordance with specific standards (FGS-FRG 2-5c(6)).	Verify that containers or products that contain the substances listed in the note to this section are marked with a permanent, easily noticeable, and legible imprint, embossed mark, or sticker that reads as follows: (1)(5)(6)(8)(9) CONTAINS OZONE-DEPLETING CFC. (NOTE: This marking requirement does not apply to Halon 1211, Halon 1301, or Halon 2402, or to thermal insulation.)
1-24. Anyone who markets or distributes the substances listed in the note to this section or products that contain them must accept return of these substances after use or arrange for a third party to accept them (FGS-FRG 2-5c(7)).	Verify that marketers and distributors of the substances listed in the note to this section or products that contain them accept return of these substances after use or arrange for a third party to accept them. (1) (NOTE: The original seller or distributor of the substance or product is responsible for disposing of it in an environmentally safe manner.)
1-25. Installations must manage CFCs and Halons that are used in military aircraft or tactical vehicle systems in accordance with appropriate DOD directives (FGS-FRG 2-5d).	Verify that the installation manages CFCs and Halons that are used in military aircraft or tactical vehicle systems in accordance with appropriate DOD directives. (1)(5)(6)(8)(9) (NOTE: This requirement applies notwithstanding any of the above provisions on the management of CFCs and Halons.)

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Other Emissions in Waste Gases	
1-26. Installations must meet specific criteria with regard to the content of certain vaporous or gaseous inorganic substances in waste gas (FGS-FRG 2-6).	Verify that waste gas emissions of the substances in Table 1-3 do not exceed the following limits: (2)(3) - Class I substances: 1 mg/m^3 at a mass flow of 10 g/h - Class II substances: 5 mg/m^3 at a mass flow of 50 g/h - Class III substances: 30 mg/m^3 at a mass flow of 300 g/h - Class IV substances: 500 mg/m^3 at a mass flow of 5 kg/h. (NOTE: The requirements with respect to NO_x do not apply to combustion engine test stands.)
1-27. Installations must meet specific criteria with regard to the content of certain carcinogens in waste gas (FGS-FRG 2-7).	Verify that the waste gas emissions of carcinogens do not exceed the following limits: (2)(3) - Class I carcinogens: 0.1 mg/m^3 at a mass flow of 500 mg/h or more - Class II carcinogens: 1 mg/m^3 at a mass flow of 5 g/h - Class III carcinogens: 5 mg/m^3 at a mass flow of 25 g/h. Verify that, if substances from more than one class are present, emissions do not exceed the following limits: - Class I and Class II together: a total of 1 mg/m^3 - Class I and Class III together or Class II and Class III together: a total of 5 mg/m^3.
Dust Emissions	
1-28. Total dust emissions in waste gas must not exceed certain limits (FGS-FRG 2-8a).	Verify that total dust emissions in waste gas do not exceed the following limits: (2)(3) - a mass concentration of 150 mg/m^3 at a mass flow of up to 500 g/h - a mass concentration of 50 mg/m^3 at a mass flow of more than 500 g/h.
1-29. Total emissions of inorganic dust particles must not exceed certain limits (FGS-FRG 2-8b(1) through 2-8b(5)).	Verify that the following limits are not exceeded, even if several substances of the same class are present: (2)(3) - Class I inorganic dust particles: 0.2 mg/m^3 at a mass flow of 1 g/h or more - Class II inorganic dust particles: 1 mg/m^3 at a mass flow of 5 g/h or more - Class III inorganic dust particles: 5 mg/m^3 at a mass flow of 25 g/h or more.

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1-29. (continued)	Verify that, if substances of more than one class are present, emissions do not exceed the following limits: - Class I and Class II together: a total of 1 mg/m^3 - Class I and Class III together or Class II and Class III together: a total of 5 mg/m^3. (NOTE: These requirements do not apply to oil-fired heating plants with a rated heat output of 5 MW to 50 MW that use low-ash oil if particulate emissions less than or equal to 50 mg/m^3 are achieved without using a dedusting system.) Verify that the installation also complies with the requirements of FGS-FRG 2-7 (see checklist item 1-27).
1-30. Certain factors must be monitored and controlled, if necessary to comply with the above emission limits (FGS-FRG 2-8b(6)).	Verify that temperature and pressure are monitored and controlled, within the bounds of current technology, during the discharge of waste gases, if doing so is necessary to comply with the above emissions limits. (2)(3)
Control of Particulate Emissions	(NOTE: The requirements of this section apply to the treatment, production, transport, handling, and storage of dusty materials. Installations that treat, produce, transport, handle, and/or store dusty materials must comply with emission reduction requirements. They should pay particular attention during planning to the harm that dust may cause, and to the following: - mass flow of emissions - duration of emissions - meteorological conditions - environmental conditions.)
1-31. Machinery, equipment, and other facilities used for processing or producing dusty goods must be completely enclosed (FGS-FRG 2-8c(2)).	Verify that machinery, equipment, and other facilities used for processing or producing dusty goods are completely enclosed. (2)(3) (NOTE: Crushing, sizing, mixing, heating, cooling, pelletizing, and briquetting are examples of processing.) Verify that, where dust-tight construction is impossible, waste gases that contain dust are collected and fed to a deduster.

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1-32. Closed facilities must be used for the transport of dusty materials (FGS-FRG 2-8c(3)).	Verify that closed facilities (e.g., conveyor belts, exhausters, or chain conveyors) are used for the transport of dusty materials. (3) Verify that, where complete enclosure is impossible, waste gas that contains dust is collected and fed to a dust collector.
1-33. Exhausters and dedusters must be installed for the handling of dusty materials at certain facilities (FGS-FRG 2-8c(4)).	Verify that the following have exhausters and dedusters: (3) - stationary reception, transfer, and discharge points of cribs, shovel loaders, and transport units - downspouts of loading facilities - dispersion systems that are parts of pneumatic or mechanical unloading facilities - pouring gutters of facilities used for unloading road and rail vehicles - siphons.
1-34. Certain adjustments must be made to equipment or operations in the event that waste gases that contain dust cannot be collected (FGS-FRG 2-8c(5)).	Verify that, in the event that waste gases that contain dust cannot be collected, the discharge height at the point of discharge is adjusted to the height of the pile. (3) Verify that the adjustment is accomplished automatically, if possible. Verify that the discharge velocity of bulk goods at the downspout is kept as low as possible.
1-35. The displacement air must be collected and fed to a dust collector when closed transport containers are being filled with dusty materials (FGS-FRG 2-8c(6)).	Verify that the displacement air is collected and fed to a dust collector when closed transport containers are being filled with dusty materials. (3)
1-36. Installations must take specific actions if dust emissions may result from the use of roadways (FGS-FRG 2-8c(7)).	Determine whether dust emissions may result from the use of roadways within the facility. (1) Verify that the roadways within the facility are covered with bituminous material, concrete, or an equivalent, and cleaned in accordance with their levels of pollution. (NOTE: This does not apply to roadways in quarries or to raw material extraction sites.)

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1-37. Pollution of roadways caused by vehicles after leaving the facility must be avoided (FGS-FRG 2-8c(7)).	Verify that pollution of roadways caused by vehicles after leaving the facility is avoided. (1) (NOTE: This requirement is understood to apply to vehicles that leave facilities on the installation that may be sources of particulate emissions and to vehicles that leave the installation itself.) (NOTE: Such pollution of roadways may be avoided by employing tire-washing systems or by cleaning vehicles regularly.)
1-38. Installations must meet specific requirements with regard to storage of dusty materials (FGS-FRG 2-8d).	Verify that heavily vegetated earth embankments, windbreak plantings, or windbreak hedges are established where possible. (1) Verify that an adequate level of moisture is maintained on the surface of piles. Verify that the following protective measures are considered when planning for the establishment or removal of piles that do not have a roof and complete side coverage or are not covered in some other way: - filling or removing goods behind embankments - sufficient wetting at the sites of piles - stopping work, if possible, during weather conditions that favor generating emissions (e.g., long-lasting droughts or high wind velocities) - aligning the longitudinal axis of piles with the direction of the prevailing winds.
HEATING PLANTS AND INCINERATORS **All Furnaces**	
1-39. Exhaust gases from combustion facilities must be discharged through a stack (FGS-FRG 2-12c(1)).	Verify that exhaust gases from combustion facilities are discharged through a stack. (1)(3)
1-40. The temperature of exhaust gases from combustion facilities with a rated heat output of 50 MW or more must be maintained at no less than 345 °K [≈ 161 °F] (FGS-FRG 2-12c(2)).	Verify that the temperature of exhaust gases from combustion facilities with a rated heat output of 50 MW or more is maintained at no less than 345 °K [≈ 161 °F]. (2)(3)

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Coal-fired Heating Plants	(NOTE: The requirements in this section do not apply to coal-fired heating plants that burn (lignite) brown coal, nor do they apply to temporary furnaces that are installed for a period of 3 mo or less.)
1-41. Heating plants with a rated heat output up to 15 kW must meet opacity standards (FGS-FRG 2-9a).	Verify that flue gas emissions from heating plants rated up to 15 kW have a Ringelmann Scale gray value less than one. (2)(3)
1-42. Coal-fired heating plants must meet specific particulate emission standards (FGS-FRG 2-9b).	Verify that particulate emissions from units with a rated output up to 5 MW do not exceed 150 mg/m^3 at 7 percent O_2. (2)(3) Verify that particulate emissions from units with a rated output of 5 to 50 MW do not exceed 50 mg/m^3 at 7 percent O_2. Verify that particulate emissions from units with a rated output of 50 MW or more do not exceed the following limits: - for units constructed before 7 January 1989: 125 mg/m^3 - for units constructed on or after 7 January 1989: 50 mg/m^3. (NOTE: These limits are based on the following O_2 contents: - 7 percent for grate firing and fluidized bed incineration - 6 percent for particulate combustion with dry ash removal - 5 percent for particulate combustion with wet ash removal.) (NOTE: All the above limitations also apply when cleaning the heating surfaces.)
1-43. Coal-fired heating plants must meet specific emission standards for SO_2 and SO_3, calculated as SO_2 (FGS-FRG 2-9c(1) and 2-9c(2)).	Verify that, for a unit with a rated output of 15 kW or less, the coal used has a sulfur content of 1 percent or less. (1)(3) (NOTE: Any resulting sulfur oxide emission from such a unit is acceptable in those circumstances.) Verify that SO_x emissions from fluidized bed combustion units with a rated output of 15 kW to 50 MW do not exceed 400 mg/m^3 at 7 percent O_2. (NOTE: If 400 mg/m^3 is not economically feasible, a sulfur emission ratio of 25 percent is allowed.) Verify that the emissions from other furnaces in which coal is used do not exceed 2.0 g/m^3. Verify that, when coal is used in other than fluidized beds, all reasonable measures are taken to reduce SO_x emissions.

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1-43. (continued)	(NOTE: In some cases, the addition of sorbents to the fuel or into the furnace can reduce the sulfur emission ratio up to 50 percent.)
1-44. Units with a rated output of 50 MW or more must operated in such a way that the SO_x emissions do not exceed 400 mg/m^3 and the sulfur emission ratio does not exceed 15 percent (FGS-FRG 2-9c(3)).	Verify that units with a rated output of 50 MW or more are operated in such a way that the emissions do not exceed 400 mg/m^3 and that the sulfur emission ratio does not exceed 15 percent, unless noted below. (2)(3) (NOTE: The following limits are based on the O_2 contents indicated here: - 7 percent for grate firing and fluidized bed incineration - 6 percent for particulate combustion with dry ash removal - 5 percent for particulate combustion with wet ash removal.) Verify that the desulfurizing facility is operated at its highest separation capacity if a reduction of SO_x emissions to these levels cannot be achieved using state-of-the-art technology because of an extremely high or inconsistent sulfur content in the fuel. Verify that a concentration of 650 mg/m^3 in the exhaust gas is not ever exceeded. Verify that combustion facilities with grate or coal dust firing and a heat output of up to 100 MW are operated in such a way that the SO_x emissions do not exceed a concentration of 2.0 mg/m^3. Verify that combustion facilities with grate or coal dust firing and a heat output of from 100 to 300 MW are operated in such a way that: - the SO_x emissions do not exceed a concentration of 2.0 mg/m^3 - the sulfur emission ratio does not exceed 40 percent. Verify that combustion facilities with fluidized bed combustion for coal and a heat output of up to 300 MW are operated in such a way that: - the SO_x emissions do not exceed a concentration of 400 mg/m^3 - the sulfur emission ratio does not exceed 25 percent. (NOTE: An emission of 2.5 g/m^3 is allowed for a period of up to 1 yr if it can be shown that suitable low sulfur coal was not available for the facility during that period and that the stack height is sufficient to handle the increased sulfur content of the exhaust gas.) (NOTE: A combustion facility may be operated during a failure of its desulfurizing equipment if the downtime does not exceed 72 consecutive hours and a total of 240 h during one calendar year. Emissions up to twice the stated standard are allowed during start up times if, for technical reasons, they cannot be avoided.)

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1-45. Coal-fired heating plants must meet specific emission standards for CO (FGS-FRG 2-9d).	Verify that the standards for CO given in Table 1-4 are met. (2)(3)
1-46. Coal-fired heating plants must meet specific emission standards for NO and NO_2, calculated as NO_2 (FGS-FRG 2-9e).	Verify that NO_x emissions from units with a rated output up to 50 MW do not exceed 500 mg/m^3 at 7 percent O_2, except for those in the immediately following two items. (2)(3) Verify that NO_x emissions from stationary fluidized bed combustion units with a rated output greater than 20 MW do not exceed 300 mg/m^3. Verify that NO_x emissions from circulating fluidized bed combustion units (regardless of rated) do not exceed 300 mg/m^3. (NOTE: The following limits are based on the O_2 contents indicated here: - 7 percent for grate firing and fluidized bed incineration - 6 percent for particulate combustion with dry ash removal - 5 percent for particulate combustion with wet ash removal.) Verify that NO_x emissions from units with a rated output of 50 MW or more that were constructed before 7 January 1989 do not exceed the following limits: - for hard coal dust firing with dry ash removal: 1.3 g/m^3 - for hard coal dust firing with wet ash removal: 2.0 g/m^3 - for all other instances where solid fuels are burned: 1.0 g/m^3. Verify that NO_x emissions from units with a rated output of 50 MW or more that were constructed on or after 7 January 1989 do not exceed 800 mg/m^3. Verify that NO_x emissions from combustion facilities that used hard coal dust firing and wet ash removal do not exceed 1.8 g/m^3 at 5 percent O_2. Verify that, in addition, operators take all reasonable measures to reduce NO_x emissions further by means of firing techniques.
1-47. Coal-fired heating plants must meet specific emission standards for halogenated compounds (FGS-FRG 2-9f).	(NOTE: No restrictions apply to units with a rated output capacity up to 50 MW and none apply to units with a rated output of 50 MW or more that were constructed before 7 January 1989.) (NOTE: The following limits are based on the O_2 contents indicated here: - 7 percent for grate firing and fluidized bed incineration - 6 percent for particulate combustion with dry ash removal - 5 percent for particulate combustion with wet ash removal.)

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1-47. (continued)	Verify that combustion facilities with grate firing or dust firing and a rated output of 50 MW or more that were constructed on or after 7 January 1989 are operated in such a way that the emissions of inorganic gaseous halogenated compounds do not exceed the following limits at a heat output up to and including 300 MW: (2)(3) - 200 mg of inorganic gaseous chlorine compounds per cubic meter of exhaust gas, calculated as hydrochloric acid - 30 mg of inorganic gaseous fluoride compounds per cubic meter of exhaust gas, calculated as hydrogen fluoride. Verify that combustion facilities with grate firing or dust firing and a rated output of 50 MW or more that were constructed on or after 7 January 1989 are operated in such a way that the emissions of inorganic gaseous halogenated compounds do not exceed the following limits at a heat output greater than 300 MW: - 100 mg of inorganic gaseous chlorine compounds per cubic meter of exhaust gas, calculated as hydrochloric acid - 15 mg of inorganic gaseous fluoride compounds per cubic meter of exhaust gas, calculated as hydrogen fluoride. (NOTE: A combustion facility may be operated during a failure of its dehalogenating equipment if the downtime does not exceed 72 consecutive hours and a total of 240 h during one calendar year. Emissions up to twice the stated standard are allowed during start up times if, for technical reasons, they cannot be avoided.)
1-48. Installations must take specific actions to limit particulate emissions during the movement and storage of coal (FGS-FRG 2-9g(1) and 2-9g(2)).	Verify that appropriate measures are taken to limit dust emissions based on the circumstances in each case. (1)(3) Verify that dust emissions that result from the emptying of filter plants are reduced by removing the dust in closed containers or by moistening it at the point(s) of discharge.
1-49. Enclosed conveying equipment and intermediate storage must be used for combustion residues in the form of dust (FGS-FRG 2-9g(3)).	Verify that enclosed conveying equipment and intermediate storage are used for combustion residues in the form of dust. (1)(3)

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Oil-fired Heating Plants	(NOTE: The requirements in this section apply to all oil-fired heating plants except those with open fireboxes, which are prohibited. They do not apply to temporary furnaces that are installed for a period of 3 mo or less.)
1-50. The use of oil-fired heating plants with open fireboxes is prohibited (FGS-FRG 2-10).	Verify that there are no oil-fired heating plants with open fireboxes in use on the installation. (1)(3)
1-51. Flue gas discharged into the atmosphere from oil-fired heating plants must meet specific opacity standards (FGS-FRG 2-10a).	Verify that emissions from a unit with a rated heat output of up to 15 kW have a Ringelmann Scale gray value less than one. (2)(3) Verify that the dust emissions in the flue gas (soot number) from evaporation burners with a rated heat output of 15 kW to 5 MW do not exceed two and are free of oil derivatives. Verify that the dust emissions in the flue gas (soot number) from atomizing burners with a rated heat output of 15 kW to 5 MW do not exceed two and are free of oil derivatives. Verify that the dust emissions in the flue gas (soot number) from burners with a rated heat output of 5 MW to 50 MW do not exceed one and are free of oil derivatives when using heating oil per DIN Standard 50603, Part 1 (December 1981). Verify that filter papers used for soot measurements do not show any visible signs of oil derivatives.
1-52. Oil-fired heating plants must meet particulate emissions standards (FGS-FRG 2-10b).	(NOTE: For units rated up to 5 MW, no standard exists other than that for opacity.) Verify that particulate emissions from oil-fired heating plants with a rated heat output of 5 MW to 50 MW do not exceed 80 mg/m^3 at 3 percent O_2. (2)(3) Verify that the particulate emissions from oil-fired heating plants with a rated heat output of 5 MW to 50 MW do not exceed 50 mg/m^3 if heating oil with a sulfur content of greater than 1 percent by weight is used. Verify that oil-fired heating plants with a rated heat output of 50 MW or more that were constructed before 7 January 1989 are operated in such a way that the particulate emissions do not exceed X mg/m^3 at 3 percent O_2 and after the removal of the adsorbed sulfuric acid, where X = 150 - volume flow of the waste gas in thousands of m^3/h. Verify that, for flows greater than 100,000 m^3/h, the particulate emissions do not exceed 50 mg/m^3 at 3 percent O_2 and after the removal of the adsorbed sulfuric acid.

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1-52. (continued)	Determine whether the either of the following fuels are used in facilities that were constructed before 7 January 1989: - fuel oils covered by DIN standard 51603, Part I (published October 1976) with a nickel content greater than 12 mg/kg of fuel - liquid fuels other than those covered by DIN standard 51603. Verify that particulate emissions of the following chemicals and/or their compounds (calculated as elements) do not exceed a total concentration of 2 mg/m^3 at 3 percent O_2 in the above circumstances: - arsenic - lead - cadmium - chromium - cobalt - nickel. (NOTE: The standard immediately above also applies when heating surfaces are being cleaned.) Verify that oil-fired heating plants with a rated heat output of 50 MW or more that were constructed on or after 7 January 1989 are operated in such a way that the particulate emissions do not exceed 50 mg/m^3 at 3 percent O_2 and after the removal of the adsorbed sulfuric acid. Determine whether either of the following fuels are used in facilities that were constructed on or after 7 January 1989: - fuel oils covered by DIN standard 51603, Part 1 (published December 1981) or DIN standard 51603, Part 2 (published October 1976) with a nickel content greater than 12 mg/kg of fuel - liquid fuels other than those covered by DIN standard 51603. Verify that particulate emissions of the following chemicals and/or their compounds (calculated as elements) do not exceed a total concentration of 2 mg/m^3 at 3 percent O_2 in the above circumstances: - arsenic - lead - cadmium - chromium - cobalt - nickel. (NOTE: The standard immediately above also applies when heating surfaces are being cleaned.)

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1-53. Oil-fired heating plants with a rated output of 50 MW or less must meet specific emission standards for SO_2 and SO_3, calculated as SO_2 (FGS-FRG 2-10c(1))	Verify that SO_x emissions from units with a rated output of 50 MW or less do not exceed 1.7 g/m^3 at 3 percent O_2. (2)(3) Verify that all reasonable measures (including the use of low-sulfur oil) are taken to reduce SO_x emissions. Verify that only heating oil with a sulfur mass content in accordance with the requirements of DIN 51603, Part 1 (December 1981) is used in furnaces with a firing thermal capacity of up to 5 MW. (NOTE: This requirement does not apply if the unit has desulfurization equipment that ensures that the levels of sulfur dioxide are not higher than they would be if a heating oil with a sulfur mass content in accordance with the requirements of DIN 51603, Part 1 (December 1981) were used.)
1-54. Units with a rated heat output of 50 MW or more must operated in such a way that the SO_x emissions do not exceed 400 mg/m^3 at 3 percent O_2 (FGS-FRG 2-10c(2)).	Verify that, unless another standard is given in this checklist item, units with a rated output of 50 MW or more are operated in such a way that the emissions do not exceed 400 mg/m^3 at 3 percent O_2. (2)(3) Verify that the desulfurizing facility is operated at its highest separation capacity if a reduction of SO_x emissions to these levels cannot be achieved using state-of-the-art technology because of an extremely high or inconsistent sulfur content in the fuel. Verify that a concentration of 650 mg/m^3 in the exhaust gas is not ever exceeded. Verify that combustion facilities for liquid fuels with a heat output from 100 MW to 300 MW are operated in such a way that: - the SO_x emissions do not exceed a concentration of 1.7 g/m^3 at 3 percent O_2 and - the sulfur emission ratio does not exceed 40 percent. (NOTE: A combustion facility may be operated if it uses a light fuel or diesel oil with a maximum content of sulfur compounds (calculated as sulfur) that does not exceed 0.20 percent of the fuel weight.) Verify that combustion facilities with a heat output up to 100 MW are operated in such a way that SO_x emissions do not exceed 1.7 g/m^3 of exhaust gas at 3 percent O_2. (NOTE: Emissions up to 3.4 g/m^3 are allowed for up to 6 mo if it can be shown that suitable low sulfur fuel oil was not available for the facility during that period and that the stack height is sufficient to handle the increased sulfur content in the exhaust gas.)

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1-54. (continued)	(NOTE: A combustion facility may be operated during a failure of its desulfurizing equipment if the downtime does not exceed 72 consecutive hours and a total of 240 h during one calendar year. Emissions up to twice the stated standard are allowed during start up times if, for technical reasons, they cannot be avoided.)
1-55. Oil-fired heating plants must meet limitations on emissions of CO (FGS-FRG 2-10d).	Verify that CO emissions from units with a rated heat output of less than 50 MW do not exceed 170 mg/m^3 at 3 percent O_2. (2)(3) Verify that CO emissions from units with a rated heat output of 50 MW or more do not exceed 175 mg/m^3 at 3 percent O_2.
1-56. Oil-fired heating plants must meet specific emission standards for NO and NO_2, calculated as NO_2 (FGS-FRG 2-10e).	Verify that NO_x emissions from units with a rated output up to 50 MW do not exceed: (2)(3) - 250 mg/m^3 at 3 percent O_2 when using heating oil that meets the requirements of DIN 51603, Part 1 (December 1981) - 450 mg/m^3 when using other heating oil. Verify that NO_x emissions from units with a rated output of 50 MW or more that were constructed before 7 January 1989 do not exceed 700 mg/m^3 at 3 percent O_2. Verify that NO_x emissions from units with a rated output of 50 MW or more that were constructed on or after 7 January 1989 do not exceed 450 mg/m^3 at 3 percent O_2. Verify that, in addition, operators take all reasonable measures to reduce NO_x emissions further by means of firing techniques.
1-57. Oil-fired heating plants must meet specific emission standards for halogenated compounds (FGS-FRG 2-10f).	(NOTE: No restrictions apply to units with a rated output capacity up to 50 MW and none apply to units with a rated output of 50 MW or more that were constructed before 7 January 1989.) Verify that units with a rated output of 50 MW or more that were constructed on or after 7 January 1989 are operated in such a way that the emissions of inorganic gaseous halogenated compounds do not exceed the following limits at 3 percent O_2: (2)(3) - 30 mg of inorganic gaseous chlorine compounds per cubic meter of exhaust gas, calculated as hydrochloric acid - 5 mg of inorganic gaseous fluoride compounds per cubic meter of exhaust gas, calculated as hydrogen fluoride. (NOTE: These emissions limits apply only when fuel oils *other* than those covered by DIN 51603, Part 1 (December 1981) or DIN 51603, Part 2 (October 1976) are burned.)

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1-57. (continued)	Verify that combustion facilities with grate firing or dust firing and a rated output of 50 MW or more that were constructed on or after 7 January 1989 are operated in such a way that the emissions of inorganic gaseous halogenated compounds do not exceed the following limits at a heat output greater than 300 MW: - 100 mg of inorganic gaseous chlorine compounds per cubic meter of exhaust gas, calculated as hydrochloric acid - 15 mg of inorganic gaseous fluoride compounds per cubic meter of exhaust gas, calculated as hydrogen fluoride.
1-58. The maximum allowable energy loss in the waste gas (as a percentage of the heating value of the fuel) must not exceed certain limits (FGS-FRG 2-10g).	Verify that the maximum allowable energy loss in the waste gas (as a percentage of the heating value of the fuel) does not exceed the limits in Table 1-5. (1)(3)
1-59. The content of sulfur compounds (calculated as sulfur) in light fuel oil and diesel oil that is burned in any heating unit must not exceed certain limits (FGS-FRG 2-10g).	Verify that the content of sulfur compounds (calculated as sulfur) in light fuel oil and diesel oil that is burned in any heating unit does not exceed 0.20 percent of the fuel weight. (1)(3)
Gas-fired Heating Plants	(NOTE: The requirements in this section apply to all gas-fired heating plants except those with open fireboxes, which are prohibited. They do not apply to temporary furnaces that are installed for a period of 3 mo or less.)
1-60. The use of gas-fired heating plants with open fireboxes is prohibited (FGS-FRG 2-11).	Verify that there are no gas-fired heating plants with open fireboxes in use on the installation. (1)(3)
1-61. Flue gas discharged into the atmosphere from gas-fired heating plants must meet specific opacity standards (FGS-FRG 2-11a).	Verify that emissions from a unit with a rated heat output of up to 15 kW have a Ringelmann Scale gray value less than one. (2)(3) (NOTE: No opacity standards exist for units with rated heat outputs above 15 kW.)

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1-62. Particulate emissions from gas-fired heating plants must not exceed certain limits (FGS-FRG 2-11b).	Verify that particulate emissions from gas-fired heating plants do not exceed 5 mg/m^3 at 3 percent O_2. (2)(3)
1-63. Gas-fired heating plants must meet specific emission standards for SO_2 and SO_3, calculated as SO_2 (FGS-FRG 2-11c).	Verify that SO_x emissions from gas-fired heating plants do not exceed 35 mg/m^3 at 3 percent O_2. (2)(3) Verify that, if liquid gas is used, SO_x emissions from gas-fired heating plants do not exceed 5 mg/m^3 at 3 percent O_2.
1-64. Gas-fired heating plants must meet specific emission standards for CO (FGS-FRG 2-11d).	Verify that CO emissions from gas-fired heating plants do not exceed 100 mg/m^3 at 3 percent O_2. (2)(3)
1-65. Gas-fired heating plants must meet specific emission standards for NO and NO_2, calculated as NO_2 (FGS-FRG 2-11e).	Verify that NO_x emissions from units with a rated output up to 100 MW do not exceed 0.20 g/m^3 at 3 percent O_2. (2)(3) Verify that NO_x emissions are reduced using the best available technology when process gases that contain additional nitrogen compounds are burned. Verify that NO_x emissions from units with a rated output of 100 MW or more do not exceed 350 mg/m^3. (NOTE: For units with a rated output of 100 MW constructed before 7 January 1989 NO_x emissions may be as high as 500 mg/m^3.)
1-66. The maximum allowable energy loss in the waste gas (as a percentage of the heating value of the fuel) must not exceed certain limits (FGS-FRG 2-11f).	Verify that the maximum allowable energy loss in the waste gas (as a percentage of the heating value of the fuel) does not exceed the limits in Table 1-5. (1)(3)

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Additional Standards for Heating Plants	
1-67. Certain heating plants must be inspected by competent authorities at specific intervals (FGS-FRG 2-12b).	Verify that units rated 4 kW or more are inspected by a competent authority within 4 wk of being installed. (1)(3) Verify that coal-burning furnaces rated at 4 kW or more are inspected annually by a competent authority. Verify that oil-burning furnaces rated at 11 kW or more are inspected annually by a competent authority. Verify that gas-burning furnaces rated at 11 kW or more are inspected annually by a competent authority. (NOTE: The *Bezirksschornsteinfegemeister* is a competent authority.)
Incinerators	(NOTE: The standards for incinerators depend on a large number of variables and coordination with appropriate German officials. The most recent survey of facilities disclosed that, with the exception of incinerators for small arms ammunition, DOD components do not currently operate incinerators in Germany. Therefore, only incinerators for small arms ammunition are covered here. Installations should contact the Executive Agent to determine the standards for any other type of incinerator.)
1-68. Existing small arms ammunition incinerators must comply with specific emissions limits (FGS-FRG 2-13a).	Verify that existing small arms ammunition incinerators comply with the emissions limits for the substances regulated in FGS-FRG 2-3 through 2-8, if those substances are emitted. (1)(2)(3) (NOTE: See checklist items 1-9, 1-11 through 1-18, and 1-26 through 1-30.) (NOTE: Incinerators with permits comply with the permit only, disregarding the requirements of FGS-FRG 2-3 through 2-8.)

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CONTROLLING EMISSIONS FROM FACILITIES AND ACTIVITIES **Spray Painting Facilities**	
1-69. Full use must be made of all possibilities to reduce emissions in paint spraying areas (FGS-FRG 2-14a).	(NOTE: The emission values for Class II and Class III substances do not apply to the waste gas of areas where spraying is done by hand.) Verify that full use is made of all possibilities to reduce emissions. (1)(3) (NOTE: For example, by employing painting systems that are low in or free of solvents, using highly effective coating procedures, having air circulation procedures, or by employing waste gas cleaning.)
1-70. The emissions of organic materials in the waste gas from paint driers must not exceed certain levels (FGS-FRG 2-14b).	Verify that emissions of organic materials in the waste gas from driers do not exceed 50 mg/m^3, calculated as total carbon. (2)(3) Verify that, if the waste gas is subjected to afterburning, the equipment used is capable of ensuring that the emission value meets the above standard under the most unfavorable conditions. (NOTE: This may be accomplished, for example, by continuously monitoring the corresponding mass concentrations of CO or the corresponding minimum combustion chamber temperature in connection with the minimum required retention time.)
1-71. Emissions of paint particles in the waste gas from spray painting must not exceed 3 mg/m^3 (FGS-FRG 2-14c).	Verify that emissions of paint particles in the waste gas do not exceed 3 mg/m^3. (2)(3)
Rotary Presses	
1-72. Emissions of ethanol from rotary presses must meet specific limits (FGS-FRG 2-15).	(NOTE: The use of the organic solvent ethanol is permitted when employing water-reducible inks if the mass content of the solvent does not exceed 25 percent.) Verify that ethanol emissions in the waste gas do not exceed 0.50 mg/m^3. (2)(3) Verify that full use is made of all possibilities to reduce the emissions further by employing printing inks that are lower in ethanol or by using gas cleaning facilities.

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Carpentry Shops	
1-73. Emissions of wood dust and chips in carpentry shops must be controlled (FGS-FRG 2-16a).	(NOTE: The requirements of this section apply to equipment that produces wood dust or chips in the workshop. Carpentry tools are included when creating lumber and processing timber.) Verify that there are facilities to clean waste air. (1)(3) (NOTE: This requirement does not apply if the emission values can be limited by mechanical or other means such as using water when sanding.) Verify that wood dust and chips are stored in bunkers, silos, or closed rooms. Verify that repositories are emptied without the emission of wood dust or chips. (NOTE: This may be accomplished by using closed containers or by using water to moisten the area.) Verify that the mass concentration of dust and chips in the waste air does not exceed 20 mg/m^3 at 0 °C and 1013 mbar.
POL Transfer/ Dispensing Points	(NOTE: The requirements of this section apply to nonpermitted fixed and nontactical mobile systems constructed after 7 October 1992 from which fuel (gasoline) may be transferred. Mobile systems in this instance are containers for the transport of gasoline, for example, street tanker vehicles, railroad tankers, and tank ships. Fixed systems with a capacity less than 1000 L or those whose total deliveries in 1 yr do not exceed 100,000 L are exempt. These standards apply to systems constructed on or before 7 October 1992 in accordance with the following schedule: - fixed systems that use the gas pendulum process and stationary aboveground systems: by 7 October 1994 - fixed systems that do not use the gas pendulum process: by 7 October 1995 - street tank vehicle: by 7 October 1995 - railroad tanks and barge tanks: by 7 October 1997.)
1-74. Systems that displace fuel vapors when being filled must be constructed and operated so that the fuel vapors are displaced by means of a gas pendulum system and returned to the filling system (FGS-FRG 2-17a(1)(a) and 2-17a(5)).	Verify that systems that displace fuel vapors when being filled are constructed and operated so that the fuel vapors are displaced by means of a gas pendulum system (*Gaspendelverfahren*) and returned to the filling system. (3)(4)(10) Verify that the gas pendulum system meets the following technical standards: - fuel is released only when connected to the gas pendulum system - no fuel vapors are discharged to the atmosphere during operation, except for qualified safety releases. Verify that, when a gas pendulum system cannot be used, the systems are erected and operated so that the displaced fuel vapors are captured and led to a static exhaust cleaning system.

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1-74. (continued)	Verify that the cleaning value of the static exhaust cleaning system is not less than 97 percent. Verify that, if a separator is used as an exhaust cleaning system, the emitted fuel vapors are recaptured. Verify that the system provides a sealed, lockable measurement opening in the exhaust duct both before and after the exhaust cleaning system. (NOTE: Other state-of-the-art systems may be used if they are at least equally effective in reducing emissions.)
1-75. The exhaust of the exhaust cleaning system must be discharged from a stack (FGS-FRG 2-17a(2)).	Verify that the exhaust of the exhaust cleaning system is ducted (discharged from a stack) so that it is disbursed by natural air currents. (3)(4)(10)
1-76. Stationary aboveground systems must be painted and equipped in accordance with specific requirements (FGS-FRG 2-17a(3)).	Verify that stationary aboveground systems are painted with a paint that reflects at least 70 percent of the sun's energy at the time of the painting and 50 percent of that energy on a permanent basis. (1)(3)(4)(10) Verify that stationary aboveground systems are equipped with vacuum/pressure valves, unless prohibited for safety or valid technical reasons.
1-77. Installations must meet inspection and testing requirements (FGS-FRG 2-17a(4)).	Verify that systems that use a gas pendulum system are inspected by a qualified person or organization before being placed into operation. (1)(3)(4)(10) Verify that such systems are inspected annually thereafter. Verify that any deficiencies discovered in the course of an inspection are corrected immediately. Verify that written records of the testing and corrective actions (if any) are maintained. Verify that installations test systems that do not use a gas pendulum system for compliance with relevant requirements no earlier than 3 mo nor later than 6 mo after bringing the system on-line. Verify that the condition of the system is inspected every 6 mo thereafter. Verify that the system is tested as to compliance at least every 3 yr after being put in service. Verify that the degree of cleaning is determined by at least 3 single measurements of the hydrocarbon content of the exhaust before and after the exhaust cleaning system.

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1-77. (continued)	(NOTE: The requirements are considered met when the medium (*sic*) value of the single measurements do (*sic*) not fall under the prescribed values.) Verify that all tests and inspections are conducted by a qualified person or organization. Verify that written records are kept of tests and inspections.
Gas Stations	(NOTE: The standards in this section apply to all gas stations constructed or substantially modified after 1 February 1993. They do not apply to gas station that were in existence on 1 February 1993 with an output of less than 1000 m^3/yr or to the filling of vehicles that cannot be filled using a gas restoring system. These standards apply to other gas stations in existence on 1 February 1993 in accordance with the following schedule: - those with an output of 5000 m^3/yr or more by 31 December 1995 - those with an output from 2500 to 5000 m^3/yr by 31 December 1996 - those with an output from 1000 to 2500 m^3/yr by 31 December 1997.)
1-78. Gas fumes emitted during the filling of motor vehicle tanks must be captured and returned to the storage tank by a system that meets specific requirements (FGS-FRG 2-17b(1)).	Verify that, for systems without negative pressure, faucet valves capable of gas restoration are used that ensure a tight connection with the filling pipe of the gas tank. (1)(3)(4)(10) Verify that the free passage of gas through the restoration system with low flow resistance is guaranteed. Verify that the counterpressure at the faucet valve does not exceed the maximum specified in the manufacturer's specifications/directions. Verify that the restoration pipes have a slope of at least 1 percent along the entire length from fuel pump to storage tank. Verify that the gasket collars of the pump valves are without cracks, holes, or other defects that would allow leaks. Verify that, for systems with negative pressure, the ratio of the volume of the returned fuel/air mixture and filled-up fuel does not exceed 1.05.
1-79. Gas station operators must ensure that an appropriate system is installed and used properly (FGS-FRG 2-17b(2)).	Verify that an appropriate system for capturing fumes and returning them to the storage tank has been installed. (1)(3)(4)(10) Verify that the system is used properly by those who dispense fuel.

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1-80. Gas stations must be inspected by a qualified person or organization (FGS-FRG 2-17b(3) through 2-17b(5)).	Verify that the operator of the gas station uses a qualified person or organization to ensure that the requirements of FGS-FRG 2-17a (see checklist items 1-74 through 1-77) are met no later than 6 wk after the restoration system has been installed. (1)(3)(4)(10) Verify that, if the inspector finds that the requirements are not being met, repairs are made immediately. Verify that the system is reinspected within 6 wk of the first inspection. Verify that a qualified person or organization inspects the system at least once per year thereafter to ensure its impeccable condition. Verify that defects are corrected immediately. Verify that a qualified person or organization inspects the station at least every 5 yr to ensure that the requirements of FGS-FRG 2-17a are still being met. Verify that, if the inspector finds that the requirements are not being met, repairs are made immediately. Verify that the system is reinspected within 6 wk of the first 5-yr inspection.
EMISSIONS FROM PETROLEUM-POWERED ENGINES/ VEHICLES **Motor Vehicles and Motor Vehicle Fuel**	
1-81. Fuels, lubricants, and additives that are used in the operation of aircraft, vessels, and motor vehicles must meet specific standards (FGS-FRG 2-18a).	(NOTE: These requirements apply insofar as such use is compatible with the technical requirements of the aircraft, vessels, and motor vehicles.) Verify that no chlorine or bromine compounds are used as fuel additives. (4)(5)(10) Verify that, when the motor octane number is under 85 and the research octane number is under 95, automobile fuels contain less than 0.013 g/L of lead. Verify that other automobile fuels contain less than 0.15 g/L of lead. Verify that the diesel oil used to operate diesel engines does not exceed 0.20 percent sulfur by weight (calculated as sulfur).

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1-82. Passenger and utility vehicles must meet certain exhaust gas emissions standards whenever practical (FGS-FRG 2-18b).	(NOTE: These standard apply especially to new vehicles.) Verify that motor vehicles with spark ignition engines, at least four wheels, a total weight of at least 400 kg, and a speed of at least 50 km/h are checked each year to test if the motor is adjusted correctly for the purpose of minimizing the emission of hazardous substances according to the manufacturer's specifications. (5) Verify that the check includes the following: - an analysis of the mass concentration of CO at idle - measurement of the idle speed and ignition timing - closing the angle of contacts in the ignition system. Verify that, if the manufacturer's specifications do not contain target values, the motor is adjusted to minimize the emission values of a safely operating motor vehicle according to the state-of-the-art technology. Verify that the mass concentration of CO at idle is as low as possible and not greater than 3.5 percent by volume (± 1 percent for testing error). (NOTE: The motor must be hot when tested, and the oil temperature must be at least 60 °C. Tests of motor vehicles with automatic transmissions may be started in the neutral or in the park position.) (NOTE: The probe of the exhaust gas extractor must be inserted at least 300 mm into the exhaust pipe or into a gathering pipe that is fixed to the exhaust pipe.) (NOTE: The ends of exhaust pipes are allowed to be directed upwards, to the back, to the back beneath, and to the left. The angle of the knee of the pipe is allowed to be a maximum of 45 degrees.) Verify that the ends of exhaust pipes are installed in such a way that exhaust gas cannot penetrate the car. Verify that exhaust pipes do not extend beyond the rear and sides of the car.
1-83. DOD-owned nontactical vehicles must comply with specific standards (FGS-FRG 2-19).	Verify that all vehicles are inspected biannually to ensure that all factory-installed emission control equipment is intact and operational. (5) Verify that only unleaded gasoline (if available on the local economy) is used in vehicles designed to use unleaded gasoline.
1-84. Internal combustion engines must meet specific emission limits (FGS-FRG 2-20).	(NOTE: All values are at an O_2 volume of 5 percent.) Verify that particulate emissions in the waste gas of compression ignition engines operated on liquid fuels do not exceed 0.13 g/m^3. (5)

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1-84. (continued)	Verify that soot filters are used if possible. Verify that CO emissions in waste gas do not exceed 0.65 g/m^3. Verify that NO_x emissions (calculated as NO_2) do not exceed: - 2.0 g/m^3 for compression ignition engines with a firing thermal power of 3 MW or more - 4.0 g/m^3 for compression ignition engines with a firing thermal power less than 3 MW - 0.50 g/m^3 for all other engines. Verify that, for compression ignition engines, all possible emission reduction measures with respect to design and other technical features are applied. (NOTE: NO_x emission standards do not apply to emergency power systems and other systems with internal combustion engines exclusively used during emergencies.) Verify that liquid fuels have a mass content of sulfur in accordance with DIN 51603, Part 1 (December 1981). Verify that, if liquid fuels do not have a mass content of sulfur in accordance with DIN 51603, Part 1 (December 1981), adequate emission reduction measures are applied.
1-85. Leaded gasoline should not be introduced into any motor vehicle that is labeled UNLEADED GASOLINE ONLY or that is equipped with a gasoline tank filler inlet designed for introduction of unleaded gasoline (MP).	Determine what grades of gasoline are used and where they are dispensed. (4)(5)(10) Verify that controls are in place to ensure proper fueling of vehicles. Verify that fuel pump nozzles are properly sized.
Combustion Engine Test Stands	
1-86. Combustion engine test stands are subject to emission limitations (FGS-FRG 2-21).	Verify that all possibilities to reduce NO_x emissions by engine-related or other measures using the current state of technology are utilized. (3)(5) (NOTE: The above requirement applies especially when a mass flow of NO_x of 5 kg/h (calculated as NO_2) is exceeded.)

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1-86. (continued)	Verify that special procedures for limiting the particulate and SO_x emissions are established for test stands in which engines are operated using residual oils or comparable fuels. Verify that all possibilities are exploited to reduce emissions of organic substances by engine-related or other measures according to the current state of technology.
Gas Turbines	(NOTE: All values are at an O_2 volume of 15 percent.)
1-87. Gas turbines are subject to specific emissions standards (FGS-FRG 2-22 and 2-28a).	Verify that the opacity of emissions from units with a mass flow of 60,000 m^3/h or more does not exceed the following values: (2)(3) - a Bacharach value 2 during continuous operation - a Bacharach value 3 during startup. (NOTE: The above opacity requirements also apply to large combustion facilities unless compliance must be demonstrated by continuous monitoring with specific equipment under FGS-FRG 2-28e (see checklist items 1-113 through 1-117).) Verify that the opacity of emissions from units with a mass flow less than 60,000 m^3/h does not exceed a Bacharach value 4 during any operational state. Verify that CO emission in the waste gas do not exceed 100 mg/m^3 during continuous operation. Verify that NO_x emissions in the waste gas from gas turbines do not exceed 300 mg/m^3 at a mass flow of 60,000 m^3/h or more. Verify that NO_x emissions in the waste gas from gas turbines do not exceed 350 mg/m^3 at a mass flow of less than 60,000 m^3/h. Verify that all possible means of reducing emissions through improved combustion are employed. (NOTE: For gas turbines with a thermal efficiency greater than 30 percent, the opacity emission standard is increased in accordance with the percentage of improvement in efficiency.) Verify that liquid fuels have a mass content of sulfur in accordance with DIN 51603, Part 1 (December 1981). Verify that, if liquid fuels do not have a mass content of sulfur in accordance with DIN 51603, Part 1 (December 1981), adequate emission reduction measures are applied.

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MEASURING AND MONITORING EMISSIONS **Individual Measurements**	(NOTE: The requirements of this section apply to any equipment, facility, or activity that emits pollutants into the atmosphere and for whose emissions limits have been established either in FGS-FRG or in a permit or license.)
1-88. Initial and confirming measurements must be made for certain facilities at specific times (FGS-FRG 2-24a(1)).	Verify that initial measurements are made not earlier than 3 mo nor later than 12 mo from the time at which a steady-state mode of operation is achieved: (2)(3) - after construction of a facility or start of an operation that emits pollutants - after a substantial modification to such a facility. Verify that confirming measurements are made at least every 3 yr thereafter. (NOTE: Individual measurements may be waived if the attainment of emission limits can be sufficiently demonstrated by other tests.) (NOTE: Neither initial nor confirming measurements are required if continuous measurements are required by FGS-FRG.)
1-89. Measurements for determining emissions must be carried out in such a way that the results are typical of the facility's emissions (FGS-FRG 2-24b(1)).	Verify that measurements for determining emissions are carried out in such a way that the results are typical of the facility's emissions and may be compared to similar facilities and operating conditions. (2)(3)
1-90. Measurement planning must comply with specific guidelines (FGS-FRG 2-24b(1)).	Verify that measurement planning is in compliance with the requirements of VDI Guideline 2066, Part 1 (October 1975). (2)(3)
1-91. Measurements of emissions at facilities with operating conditions that for the most part remain constant over time must meet specific standards (FGS-FRG 2-24b(2)).	Verify that, for such facilities, at least three individual measurements are made during undisturbed continuous operations with maximum emission. (2)(3) Verify that, for such facilities, at least one additional measurement is made during other operating conditions with changing emissions. (NOTE: The latter measurement could be during cleaning or regeneration operations or during relatively long start-up or shut-down periods.)

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1-92. Measurements of emissions at facilities with operating conditions that for the most part vary over time must meet specific standards (FGS-FRG 2-24b(3)).	Verify that measurements are made in sufficient number during periods which, from experience, may be expected to have the maximum emissions. (2)(3) Verify that no fewer than six measurements are taken.
1-93. The duration of individual measurements must not exceed 0.5 h and must be calculated in accordance with specific methods (FGS-FRG 2-24b(4)).	Verify that the duration of individual measurements does not exceed 0.5 h. (2)(3) Verify that the results of individual measurements are assessed and calculated as mean half-hour values. (NOTE: For special cases (such as batch operation or if different mean times are defined in FGS-FRG) the results of measurements should be adjusted accordingly.)
1-94. Measurements of particle emissions must ensure that the sampling time provides a sample amount equal to 1/1000 of the weight of the filter and at least 20 mg (FGS-FRG 2-24b(5)).	Verify that, for measurements of particle emissions, the sampling time provides a sample amount equal to 1/1000 of the weight of the filter and at least 20 mg. (2)(3) Verify that the results of the measurements are related to sampling time.
1-95. Special techniques must be used in the process of measuring substances that are present to a significant degree in vaporous or gaseous form (FGS-FRG 2-24b(6)).	Verify that special techniques are used in the process of measuring substances that are present to a significant degree in vaporous or gaseous form. (2)(3) (NOTE: The application of Impinger i.S. VDI 2452, Part 1, is an example of a special technique.)
1-96. Measuring procedures must be selected in accordance with specific requirements (FGS-FRG 2-24c).	Verify that measurements for determining emissions are carried out using methods and instruments corresponding to the current state to technology. (2)(3) (NOTE: This requirement will be met if measurements are made according to the methods described in the guidelines of VDI manual *Air Quality Control*, per Table 1-6.) Verify that, in general, sampling adheres to the principles of the guidelines in VDI 2066, Part 1 (October 1975).

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1-96. (continued)	Verify that, in addition, measurement methods and instruments are in accordance with the requirements of the VDI guidelines listed in Table 1-7. (NOTE: Other measurement methods are allowed if they are listed as suitable in the *Gemeinsames Ministerialblatt*.)
Continuous Measurements	(NOTE: Continuous measurements are not required if it can be shown by other methods that emission standards are met. Acceptable alternatives would include demonstrated continuous efficiency of the emission controls, analysis of the composition of the fuels or raw materials, or analysis of the processing conditions.) (NOTE: This waiver applies to SO_x emissions from small coal-fired combustion facilities only if the operator keeps a record of the sulfur content and the lower calorific value of the fuel used and the quantity and type of added sorbents and keeps those records for 5 yr.) (NOTE: If the air polluting substances in the waste gas are in a constant ratio to one another, continuous measurements may be limited to the lead component.)
1-97. Facilities or equipment with particle emission mass flows of 2 to 5 kg/h must be equipped with measuring instruments at the relevant sources that continuously determine waste gas opacity (FGS-FRG 2-25a(1) and 2-25b(1)).	Determine whether the particle emission mass flow exceeds 2 to 5 kg/h 10 percent or more of the operating time. (2)(3) Verify that the facilities or equipment have measuring instruments at the relevant sources that continuously determine waste gas opacity (e.g., through optical transmission).
1-98. Facilities or equipment with particle emission mass flows of more than 5 kg/h must be equipped with measuring instruments at the relevant sources that continuously determine particle emission mass concentrations (FGS-FRG 2-25a(1) and 2-25b(2)).	Determine whether the particle emission mass flow exceeds 5 kg/h 10 percent or more of the operating time. (2)(3) Verify that the facilities or equipment have measuring instruments at the relevant sources that continuously determine particle emission mass concentrations.

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1-99. Certain facilities must be equipped with measuring instruments that continuously determine the total particle concentrations (FGS-FRG 2-25a(1) and 2-25b(3)).	Determine whether the particle emission mass flow is five or more times the following mass flows 10 percent or more of the operating time: (2)(3) - for Class I substances in Table 1-2 - for Class I, Class II, or Class III carcinogens - for Class I, Class II, or Class III inorganic dust particles. Verify that the facilities have measuring instruments at the relevant sources that continuously determine the total particle concentrations.
1-100. Facilities that emit specific vaporous or gaseous substances in excess of certain emissions mass flows must be equipped with measuring instruments at the relevant sources that continuously determine the mass concentrations of the given substances (FGS-FRG 2-25a(1) and 2-25c(1) through 2-25c(3)).	Determine whether the emission mass flows of any of the substances below exceed the given rates 10 percent or more of the operating time: (2)(3) - SO_2: 50 kg/h - NO_x (calculated as NO_2): 30 kg/h - CO (as the lead indicator for evaluating the efficiency of a combustion process): 5 kg/h - CO (in all other cases): 100 kg/h - fluorine and gaseous inorganic fluorine compounds (calculated as hydrofluoric acid): 0.5 kg/h - gaseous inorganic chlorine compounds (calculated as hydrochloric acid): 3 kg/h - chlorine: 1 kg/h - hydrogen sulfide: 1 kg/h. Verify that the facilities have measuring instruments at the relevant sources that continuously determine the mass concentrations of the given substance(s). Verify that, if the mass concentrations of SO_2 are measured continuously, the mass concentrations of SO_3 are determined during calibration and included in the calculation. (NOTE: If individual measurements show that the NO_2 portions in the NO_x emissions are less than 10 percent, continuous measurements of NO_2 are waived and its portion may be determined by calculation.) (NOTE: These requirements do not apply to monitoring emissions of nitrogen and organic compounds from small coal-fired combustion facilities.) (NOTE: These requirements do not apply to SO_2 emissions from small oil-fired combustion facilities if heating oils with a sulfur mass content of less than 1 percent are used.)

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1-101. Facilities whose mass flow emissions of organic substances exceed certain limits must be equipped with measuring instruments at the relevant sources that continuously determine the total amount of carbon (FGS-FRG 2-25a(1) and 2-25c(4)).	Determine whether the emission mass flows of any of the substances below exceed the given rates (calculated as the amount of total carbon) 10 percent or more of the operating time: (2)(3) - Class I substances in Table 1-2: 1 kg/h - a total of Class I, Class II, and Class III substances in Table 1-2: 10 kg/h. Verify that the facilities have measuring instruments at the relevant sources that continuously determine the total amount of carbon.
1-102. Facilities whose emission mass concentrations require continuous monitoring must be equipped with measuring instruments for the continuous determination of operational parameters (FGS-FRG 2-25d).	Determine whether the facility is required to have CEM. (1)(2)(3) Verify that the facility is also equipped with measuring instruments for the continuous determination of operational parameters. (NOTE: The following are examples of operational parameters: - waste gas temperature - waste gas volume flow - moisture content - pressure - O_2 content.) (NOTE: Continuous measurement of operational parameters may be waived if experience has shown that deviations are slight and negligible for the purposes of assessing emissions or if the operational parameters may be determined with sufficient certainty by other methods.)
1-103. CEM equipment must meet specific criteria (FGS-FRG 2-25e).	Verify that CEM equipment allow permanent value determination and recording of the factors to be monitored. (2)(3) Verify that only qualified persons determine whether CEM equipment has been installed correctly. (NOTE: A source for qualified persons is an agency that has been determined by German state authorities to be so qualified. When dealing with CEM equipment, a helpful reference is the *Gemeinsames Ministerialblatt*, which identifies suitable measuring devices as well as guidelines for installing, testing, calibrating, and maintaining them.)

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1-104. Installations must meet specific requirements with regard to the evaluation and assessment of measurement results (FGS-FRG 2-25f).	Verify that, in general, measured values are used to form half-hour mean values for each successive half-hour. (2)(3) Verify that, if necessary, half-hour mean values are converted to the respective reference units, classified into at least 20 classes, and kept on file as frequency distribution. Verify that the establishment of frequency distribution starts anew at the beginning of each calendar year. Verify that frequency distributions are always readable and are recorded once a day. Verify that, for each calendar day, a daily mean value (related to the daily operating time) is formed from the half-hour mean values. Verify that daily mean values are kept on file as frequency distributions. (NOTE: A facility or operation is in compliance if the assessment of the frequency distribution for the operating hours of a calendar year shows that established emission standards are not exceeded.)
1-105. Installations must meet specific requirements with regard to calibration and functional testing of measuring instruments (FGS-FRG 2-25g).	Verify that measuring instruments that continuously determine and record mass concentrations of emissions are calibrated and tested with respect to their functioning once a year by a qualified person. (2)(3) Verify that the calibration of measuring instruments is referenced to 0.5 h. (NOTE: For special cases (e.g., during bulk operation) for calibration periods exceeding 0.5 h, for other averaging times, or for any specific standard set for any specific type of facility, the averaging time is adjusted accordingly.) Verify that measuring instruments are calibrated at least every 5 yr and whenever the facility is substantially altered. Verify that the measuring instruments are regularly maintained and tested.
1-106. Certain facilities must make daily determinations of the mass concentrations of specific substances (FGS-FRG 2-26a and 2-26b).	Determine whether the emission mass flows of any of the substances below is more than 10 times greater than the mass flows given for those substances: (2)(3) - for Class I substances in Table 1-2 - for Class I, Class II, or Class III carcinogens - for Class I, Class II, or Class III inorganic dust particles. Verify that the facility makes daily determinations of the mass concentrations of the substances in the waste gas, expressed as a daily mean value in relation to the daily operating time.

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1-106. (continued)	(NOTE: If experience has shown that there are only slight variations in the daily mean values of the mass concentration, it is permissible to lengthen the period between testing based on sound engineering judgement to a weekly, monthly, or annual basis. Separate determination of special substance emissions may be omitted if other tests (e.g., a continuous functional control of the waste gas purification plant) show with sufficient certainty that emission standards are not exceeded.)
Small Combustion Facilities	
1-107. Installations must meet specific requirements with regard to emissions measurement and monitoring of small coal-fired combustion facilities (FGS-FRG 2-27a).	Verify that individual furnaces with a firing thermal capacity of 5 to 25 MW are equipped with measuring instruments that continuously determine waste gas opacity (e.g., through optical transmission). (1)(3) Verify that individual furnaces with a firing thermal capacity of more than 25 MW are equipped with measuring instruments that continuously determine particulate mass concentrations. Verify that individual furnaces with a firing thermal capacity of more than 25 MW are equipped with measuring instruments that continuously determine CO mass concentrations. Verify that furnaces with a total thermal capacity of 10 MW or more have measurement systems that continuously measure the SO_2 mass concentration. (NOTE: The waiver of CEM applies without qualification to these facilities.)
1-108. Installations must meet specific requirements with regard to emissions measurement and monitoring of small oil-fired combustion facilities (FGS-FRG 2-27b).	(NOTE: For individual measurements, the provisions of FGS-FRG 2-24 apply when using heating oil according to DIN 51603 Part 1 (December 1981), except for those dealing with particulate and SO_x emissions. See checklist items 1-88 through 1-96.) Verify that individual furnaces with a firing thermal capacity of 5 to 25 MW are equipped with measuring instruments that continuously determine waste gas opacity (e.g., through optical transmission). (1)(3) Verify that individual furnaces with a firing thermal capacity of 5 MW or more that use heating oil according to DIN 51603 Part 1 (December 1981) are equipped with measuring instruments that continuously determine waste gas opacity (e.g., through optical transmission). Verify that the equipment indicates with sufficient precision the attainment of the Bacharach value 1. Verify that individual furnaces with a firing thermal capacity of more than 25 MW are equipped with measuring instruments that continuously determine particulate mass concentrations.

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1-108. (continued)	Verify that individual furnaces with a firing thermal capacity of more than 25 MW are equipped with measuring instruments that continuously determine CO mass concentrations. Verify that, when heating oil other than that defined in DIN 51603 Part 1 (December 1981), records of sulfur content are kept for 5 yr.
1-109. Installations must meet specific requirements with regard to emissions measurement and monitoring of small gas-fired combustion facilities (FGS-FRG 2-27c).	Verify that gas-fired combustion facilities with a firing thermal capacity of more than 50 MW are equipped with measuring instruments that continuously determine CO mass concentrations. (1)(3)
Large Combustion Facilities	
1-110. Operators of large combustion facilities must establish monitoring points that meet specific criteria (FGS-FRG 2-28a).	Verify that large combustion facilities have monitoring points that guarantee that the measurements of emission parameters are taken accurately and safely. (1)(3)
1-111. Installations must meet specific standards in the event that emission limits for liquid-fuel combustion facilities are adhered to by using appropriate fuel (FGS-FRG 2-28b(2)).	(NOTE: Combustion facilities for liquid fuel do not require emissions monitoring if the emission limits are adhered to by using an appropriate fuel.) Determine whether the emission limits for liquid-fuel combustion facilities are adhered to by using an appropriate fuel. (2)(3) Verify that records detailing the sulfur content and the net calorific value of the fuel used are kept for 3 yr.
1-112. Large combustion facilities must meet specific standards with regard to single-measurement monitoring (FGS-FRG 2-28c).	Verify that monitoring equipment and procedures are state-of-the-art. (2)(3) Verify that at least three single measurements for heat output are taken while the facility is in operation. Verify that no single measurement lasts more than 0.5 h. Verify that the result of such monitoring is indicated as a value per 0.5 h.

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1-112. (continued)	(NOTE: In especially difficult cases, an individual measurement may last up to 2 h.) (NOTE: Emission limits are considered to be complied with if the result of each single measurement does not exceed the set emission limits.)
1-113. Combustion facilities for solid or liquid fuels must be equipped with a monitoring device that continually monitors the concentration of particulate emissions in the exhaust gas (FGS-FRG 2-28e(1)).	Verify that combustion facilities for solid or liquid fuels are equipped with a monitoring device that continually monitors the concentration of particulate emissions in the exhaust gas. (1)(3)
1-114. Combustion facilities must be equipped with a monitoring device that continuously monitors the concentration of CO in the exhaust gas (FGS-FRG 2-28e(2)).	Verify that combustion facilities are equipped with a monitoring device that continuously monitors the concentration of CO in the exhaust gas. (1)(3)
1-115. Certain facilities must be equipped with a monitoring device that continuously monitors the concentration of NO_x in the exhaust gas (FGS-FRG 2-28e(3) and 2-28e(4)).	Determine whether the facility either: (1)(3) - burns solid or liquid fuel - burns gaseous fuels and has a heat output of more than 400 MW. Verify that the facility has a monitoring device that continuously monitors the concentration of NO_x in the exhaust gas. (NOTE: If the measurements show that the amount of NO_2 contained in the NO_x emissions is lower than 5 percent, continuous monitoring of NO_2 is not necessary, and its share may be estimated.) Verify that, if continuous monitoring of NO_2 is necessary, the combustion facility is equipped with a suitable monitoring device no later than 6 mo after the start of operation.

(1) BCE (Base Civil Engineering/Environmental Planning (2) BES (Bioenvironmental Engineering Services) (3) Air Pollution Source Operator (4) Fuels - Management Branch (5) Transportation - Maintenance Branch (6) LGS (Base Supply) (7) SV (Services Squadron) Auto Hobby Shop (8) Refrigeration Shops (BCE) (9) Equipment Maintenance Squadron (10) AAFES (Army/Air Force Exchange Service) Gas Station (11) Base Staff Judge Advocate

COMPLIANCE CATEGORY: AIR EMISSIONS MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
1-116. Combustion facilities for solid and liquid fuels must be equipped with a monitoring device that continuously measures the concentration of SO_2 in the exhaust gas (FGS-FRG 2-28e(5)).	Verify that combustion facilities for solid and liquid fuels have a monitoring device that continuously measures the concentration of SO_2 in the exhaust gas. (1)(3) Verify that the share of SO_3 is estimated when calibrating the device. (NOTE: This requirement does not apply to combustion facilities for liquid fuels that burn light fuel or diesel fuel that has a content of sulfur compounds (calculated as sulfur) that does not exceed 0.20 percent of the fuel weight, if it can be demonstrated that the sulfur emission limits in FGS-FRG 2-9c and 2-10c are not being exceeded (see checklist items 1-44 and 1-54). This is accomplished by constantly recording the appropriate quantities for the facility, or the degree of separation for final exhaust gas purification facilities.)
1-117. Combustion facilities must be equipped with a monitoring device that continuously monitors the percentage of O_2 in the exhaust gas (FGS-FRG 2-28e(6)).	Verify that combustion facilities have a monitoring device that continuously monitors the percentage of O_2 in the exhaust gas. (1)(3)
1-118. Installations must meet specific requirements for record-keeping and evaluation of continuous monitoring (FGS-FRG 2-28f and 2-28g).	Verify that, for continuous measurements, instantaneous values for the required quantities and for the efficiency of the furnace are recorded automatically and continuously by suitable measuring apparatus while the furnace is in operation. (2)(3) Verify that, for every consecutive half-hour and half-hour average and for every calendar day, the daily average is calculated related to the daily operational period. Verify that, if it is not possible to keep the duration of the calibration period down to 0.5 h, the average time for the half-hour average is adjusted to the minimum calibration time. Verify that the average time never exceeds 2 h. Verify that the averages obtained are converted to the appropriate reference O_2 content, graded, and filed as frequency distribution. Verify that, for the half-hour averages, there are at least 20 grades and that the 10th grade corresponds to the level of the emission value. Verify that the frequency distributions are determined afresh at the beginning of every calendar year. Verify that the frequency distribution is readable at any time and entered once per day.

(1) BCE (Base Civil Engineering/Environmental Planning (2) BES (Bioenvironmental Engineering Services) (3) Air Pollution Source Operator (4) Fuels - Management Branch (5) Transportation - Maintenance Branch (6) LGS (Base Supply) (7) SV (Services Squadron) Auto Hobby Shop (8) Refrigeration Shops (BCE) (9) Equipment Maintenance Squadron (10) AAFES (Army/Air Force Exchange Service) Gas Station (11) Base Staff Judge Advocate

COMPLIANCE CATEGORY: AIR EMISSIONS MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
1-118. (continued)	Verify that the records obtained pursuant to the above requirements are kept for 3 yr. (NOTE: Emission limits are considered to be complied with if the evaluation of the results for the operating hours within a calendar year show that: - none of the daily mean values exceed the emission limit - 97 percent of all half-hour mean values do not exceed 6/5 of the emission limit, and - no half-hour mean value exceeds twice the emission limit.)
1-119. Installations must meet specific criteria with regard to the calibration and inspection of monitoring facilities (FGS-FRG 2-28h).	Verify that monitoring devices that continuously monitor and record particulate or gaseous emissions are calibrated and inspected annually. (1)(2)(3) Verify that monitoring devices in combustion facilities with a heat output greater than 300 MW are recalibrated every 3 yr. Verify that, for all other facilities, monitoring devices are recalibrated every 5 yr.

(1) BCE (Base Civil Engineering/Environmental Planning (2) BES (Bioenvironmental Engineering Services) (3) Air Pollution Source Operator (4) Fuels - Management Branch (5) Transportation - Maintenance Branch (6) LGS (Base Supply) (7) SV (Services Squadron) Auto Hobby Shop (8) Refrigeration Shops (BCE) (9) Equipment Maintenance Squadron (10) AAFES (Army/Air Force Exchange Service) Gas Station (11) Base Staff Judge Advocate

Table 1-1

Class I and II Ozone-Depleting Substances
(FGS-FRG Table 2-2)

HC #	NAME

CLASS I

CFC-11 (R 11) *	Trichlorofluromethane
CFC-12 (R 12) *	Dichlorodifluoromethane
CFC-13 (R 13) *	Chlorotrifluoromethane
CFC-111	Pentachlorofluoroethane
CFC-112 (R 112) *	Tetrachlorodifluoroethane
CFC-113 (R 113) *	Trichlorotrifluoroethane
CFC-114 (R 114) *	Dichlortetrafluoroethane
CFC-115 (R 115) *	Chloropentafluoroethane
CFC-211	Heptachlorofluoropropane
CFC-212	Hexachlorodifluoropropane
CFC-213	Pentachlorotrifluoropropane
CFC-214	Tetrachlorotetrafluoropropane
CFC-215	Trichloropentafluoropropane
CFC-216	Dichlorohexafluoropropane
CFC-217	Chloroheptafluoropropane
R-500	R-500
R-502	R-502
HALON-1202	Dibromodifluoromethane
HALON-1211*	Bromochlorodifluoromethane
HALON-1301*	Bromotrifluoromethane
HALON-2402*	Dibromotetrafluoroethane
MB	Methyl Bromide
Carbon Tetrachloride*	Tetrachloromethane
Methyl Chloroform*	Trichloroethane (1, 1, 1 TCA)

(continued)

Table 1-1 (continued)

HC #	NAME

CLASS II

HCFC-21	Dichlorofluoromethane
HCFC-22 (R 22) *	Chlorodifluoromethane
HCFC-31	Chlorofluoromethane
HCFC-121	Tetrachlorofluoroethane
HCFC-122	Trichlorodifluoroethane
HCFC-123	Dichlorotrifluoroethane
HCFC-124	Chlorotetrafluoroethane
HCFC-131	Trichlorofluoroethane
HCFC-132	Dichlorodifluoroethane
HCFC-133	Chlorotrifluoroethane
HCFC-141	Dichlorofluoroethane
HCFC-142	Chlorodifluoroethane
HCFC-221	Hexachlorofluoropropane
HCFC-222	Pentachlorodifluoropropane
HCFC-223	Tetrachlorotrifluoropropane
HCFC-224	Trichloropentafluoropropane
HCFC-225	Dichloropentafluoropropane
HCFC-226	Chlorohexafluoropropane
HCFC-231	Pentachlorofluoropropane
HCFC-232	Tetrachlorodifluoropropane
HCFC-233	Trichlorotrifluoropropane
HCFC-234	Dichlorotetrafluoropropane
HCFC-235	Chloropentafluoropropane
HCFC-241	Tetrachlorofluoropropane
HCFC-242	Trichlorodifluoropropane
HCFC-243	Dichlorotrifluoropropane
HCFC-244	Chlorotetrafluoropropane
HCFC-251	Trichlorofluoropropane
HCFC-252	Dichlorodifluoropropane

Table 1-2

Organic Substances
(FGS-FRG Table 2-1)

Substance	Empirical formula	Class
Acetaldehyde	C_2H_4O	I
Acetone	C_2H_6O	III
Acrolein	cf: 2-Propenal	
Acrylic acid	$C_3H_4O_2$	I
Acrylic-acid ethyl esther	cf: Ethyl acrylate	
Acrylic-acid methyl esther	cf: Methyl acrylate	
Alkyl alcohols		III
Alkyl lead compounds		I
Formic acid	CH_2O_2	
Formic-acid methyl esther	cf: methyl formate	
Aniline	C_6H_7N	I
Benzyl chloride	cf: Chlorotoluene	
Biphenyl	$C_{12}H_{10}$	I
2-Butanone	C_4H_8O	III
2-Butoxyenthanol	$C_6H_{14}O_2$	II
Butyl acetate	$C_6H_{12}O_2$	III
Butylglycol	cf: 2-Butoxyethanol	
Butyric aldehyde	C_4H_8O	II
Chloroacetaldehyde	C_2H_3Cl0	I
Chlorobenzene	C_6H_5Cl	II
2-Chloro-1, 3-butadiene	C_4H_5Cl	II
Chloroacetic acid	$C_2H_3Cl0_2$	I
Chloroethane	C_2H_5Cl	III
Chloromethane	CH_3Cl	I
Chloroform	cf: Trichloromethane	
2-Chloroprene	cf: 2-Chloro-1, 3-butadiene	
2-Chloropropane	C_3H_7Cl	II

(continued)

Table 1-2 (continued)

Substance	Empirical formula	Class
Chlorotoluene	C_7H_7Cl	I
Cumene	cf: Isopropylbenzene	
Cyclohexanone	$C_6H_{10}O$	II
Diacetone alcohol	cf: 4-Hydroxy-4-methyl-2-pentanone	
Dibutylether	$C_8H_{18}O$	III
1, 2-Dichlorobenzene	$C_6H_4Cl_2$	I
1, 4-Dichlorobenzene	$C_6H_4Cl_2$	II
Dichlorodifluoromethane	CCl_2F_2	III
1, 1-Dichloroethane	$C_2H_4Cl_2$	II
1, 2-Dichloroethane	$C_2H_4Cl_2$	I
1, 1-Dichloroethylene	$C_2H_2Cl_2$	I
1, 2-Dichlorotheylene	$C_2H_2Cl_2$	III
Dichloromethane	CH_2Cl_2	III
Dichlorophenole	$C_6H_4Cl_2O$	I
Diethanolamine	cf: 2, 2'-Iminodiethanol	
Diethylamine	$C_4H_{11}N$	I
Diethylether	$C_4H_{10}O$	III
Di-(2-ethylhexyl)-phthalate	$C_{24}H_{38}O_4$	II
Diisopropyl ether	$C_6H_{14}O$	III
Diisopropylketone	cf: 2, 6-Dimethylheptane-4-on	
Dimethylamine	C_2H_7N	I
Dimethyl ether	C_2H_6O	III
N, N-Dimethyl formamide	C_3H_7NO	II
2, 6-Dimethylheptane-4-on	$C_7H_{14}O$	II
Dioctylphtalate	cf: Di-(2-ethylhexyl)-phtalate	
1, 4-Dioxan	$C_4H_8O_2$	I
Diphenyl	cf: Biphenyl	
Acetic ester	cf: Ethyl acetate	
Acetic acid	$C_2H_4O_2$	II
Acetic-acid butyl ester	cf: Butyl acetate	
Acetic-acid ethyl ester	cf: Ethyl acetate	

(continued)

Table 1-2 (continued)

Substance	Empirical formula	Class
Acetic-acid methyl ester	cf: Methyl acetate	
Acetic-acid vinyl ester	cf: Vinyl acetate	
Ethanol	cf: Alkyl alcohols	
Ether	cf: Diethyl ether	
2-Ethoxyethanol	$C_4H_{10}O_2$	II
Ethyl acetate	$C_4H_8O_2$	III
Ethylacrylate	$C_5H_8O_2$	I
Ethylamine	C_2H_7N	I
Ethylbenzene	C_8H_{10}	II
Ethyl chloride	cf: Chloroethane-Chlorethan	
Ethylene glycol	$C_2H_6O_2$	III
Ethylene glycol methyl ether	cf: 2-Methoxyethanol	
Ethylglycol	cf: 2-Ethoxyethanol	
Ethylmethylketone	cf: 2-Butanone	
Formaldehyde	CH_2O	I
2-Furylaldehyde	$C_5H_4O_2$	I
Furfural, Furfurol	cf: 2-Furylaldehyde	
Fufuryl alcohol	$C_5H_6O_6$	II
Glycol	cf: Ethylene glycol	
Respirable wood particles		I
4-Hydroxy-4-Methyl-2-pentanone	$C_6H_{12}O_2$	III
2, 2'-Iminodiethanol	$C_4H_{11}NO_2$	II
Isobutylmethylketone	cf: 4-Methyl-2-pentanone	
Isopropenylbenzene	C_9H_{10}	II
Isopropylbenzene	C_9H_{12}	II
Carbon disulfide	CS_2	II
Cresols	C_7H_8O	I
Maleic anhydride	$C_4H_2O_3$	I
Mercaptans	cf: Thioalcohols	
Methyl metacrylate	cf: Methylmetacrylate	
Methanol	cf: Alkyl alcohols	

(continued)

Table 1-2 (continued)

Substance	Empirical formula	Class
2-Methoxyethanol	$C_3H_8O_2$	II
Methyl acetate	$C_3H_6O_2$	II
Methyl acrylate	$C_4H_6O_2$	I
Methylamine	CH_5N	I
Methyl benzoate	$C_8H_8O_2$	III
Methyl chloride	cf: Chloromethane	
Methylchloroform	cf: 1, 1, 1-Trichlorethane	
Methlcyclohexanons	$C_7H_{12}O$	II
Methylen dichloride	cf: Dichloromethane	
Methylethylketone	cf: 2-Butanone	
Methyl formate	$C_2H_4O_2$	II
Methyl glycol	cf: 2-Methoxyethanol	
Methyl isobutyl ketone	cf: 4-Methyl-2-pentanone	
Methyl methacrylate	$C_5H_8O_2$	II
4-Methyl-2-pentanone	$C_6H_{12}O$	III
4-Methyl-m-phenylenediisocyanate	$C_9H_6N_2O_2$	I
N-Methylpyrrolidone	C_5H_9NO	III
Naphthaline	$C_{10}H_8$	II
Nitrobenzene	$C_6H_5NO_2$	I
Nitrocresols	$C_7H_7NO_3$	I
Nitrophenols	$C_6H_5NO_3$	I
Nitrotoluene	$C_7H_7NO_2$	I
Olefin hydrocarbons (except 1, 3-Butadiene)		III
Paraffin hydrocarbons (except Methane)		III
Perchloroethylene	cf: Tetrachloroethylene	
Phenon	C_6H_6O	I
Pinenes	$C_{10}H_{16}$	III
2-Propenal	C_3H_4O	I
Propionaldehyde	C_3H_6O	II
Propionic acid	$C_3H_6O_2$	II
Pyridine	C_5H_5N	I

(continued)

Table 1-2 (continued)

Substance	Empirical formula	Class
Sulfide of carbon	cf: Carbon disulfide	
Styrene	C_8H_8	II
1, 1, 2, 2-Tetrachlorethane	$C_2H_2Cl_4$	I
Tetrachlorethylene	C_2Cl_4	II
Carbon tetrachloride	cf: Tetrachloromethane	
Tetrachloromethane	CCl_4	I
Tetrahydrofuran	C_4H_8O	II
Thioalcohols		I
Thioether		I
o-Toluidine	C_7H_9N	I
Toluene	C_7H_8	II
Toluylene-2, 4-diisocyanate	cf: 4-Methyl-m-phenylendiisocyanate	
1, 1, 1-Trichloroethane	$C_2H_3Cl_3$	II
1, 1, 2-Trichloroethane	$C_2H_3Cl_3$	I
Trichlorethylene	C_2HCl_3	II
Trichlormethane	$CHCl_3$	I
Trichlorphenols	$C_6H_3OCl_3$	I
Triethylamine	$C_6H_{15}N$	I
Trichlorofluoromethane	CCl_3F	III
Trimethylbenzenes	C_9H_{12}	II
Vinyl acetate	$C_4H_6O_2$	II
Xylenois (except 2, 4-Xylenol)	$C_8H_{10}O$	I
2, 4-Xylenol	$C_8H_{10}O$	II
Xylenes	C_8H_{10}	II

Table 1-3

Classes of Vaporous or Gaseous Inorganic Substances

(FGS-FRG Fig. 2-1)

CLASS I	CLASS II	CLASS III	CLASS IV
Arsine	Bromine and its vaporous or gaseous compounds, indicated as hydrogen bromide	Vaporous or gaseous inorganic chlorine compounds, if not in Class I, indicated as hydrochloric acid	Sulfur oxide (sulfur dioxide and sulfur trioxide) indicated as sulfur dioxide
Cyanogen chloride	Chlorine		Nitrogen oxide (nitrogen monoxide and nitrogen dioxide), indicated as nitrogen dioxide
Phosgene	Hydrocyanic acid		
Hydrogen phosphide	Fluorine and its vaporous or gaseous compounds, indicated as hydrofluoride acid		
	Hydrogen sulfide		

Table 1-4

Allowable Carbon Monoxide (CO) Emissions

(FGS-FRG Fig. 2-2)

RATED OUTPUT OF FURNACE	MAX CO ALLOWED Until 31 Dec 1995	MAX CO ALLOWED After 31 Dec 1995
Up to 50 kilowatts (Note 1)	8 g/m^3	4 g/m^3
50 up to 150 kilowatts (Note 1)	4 g/m^3	2 g/m^3
150 up to 500 kilowatts (Note 1)	2 g/m^3	1 g/m^3
0.5 up to 2.5 megawatts (Note 1)	1 g/m^3	0.5 g/m^3
2.5 up to 50 megawatts (Note 2)	0.25 g/m^3	0.25 g/m^3
Larger than 50 megawatts (Note 3)	0.25 g/m^3	0.25 g/m^3

Note 1: Based on 8 percent oxygen in the flue gas. [2]
Note 2: Based on 7 percent oxygen in the flue gas. [9]
Note 3: This concentration is based on an oxygen content of 7 percent for grate firing and fluidized bed incineration, 6 percent for particulate combustion with dry ash removal and 5 percent for particulate combustion with wet ash removal. [5]

Table 1-5

Maximum Energy Loss Permitted as a Percentage of the Heating Value of the Fuel

(FGS-FRG Fig. 2-3)

UNITS RATED HEAT OUTPUT IN KILOWATTS	INSTALLED PRIOR TO 1983	INSTALLED PRIOR TO OCT 1988	INSTALLED AFTER 1 OCT 1988
4 to 25	16	14	12
25 to 50	15	13	11
50 to 120	14	12	10
120 +	13	12	10

Table 1-6

VDI Guidelines Governing Exhaust Gas Cleaning and Dust Control

(FGS-FRG Table 2-3)

Title	VDI No.
Operation and Maintenance of Dust Separators	2264
Pressure Release of Dust Explosions	3673
Guaranty of Performance of Dust Separators	2260
Cyclons	3676
Fabric Filters	3677
Electrostatic Precipitators	3679
Prevention of Dust Fires and Dust Explosions	2263
Handling and Conveying Dusty Goods	3470
Collection of Air Impurities	3801
Waste Gas Cleaning by Absorption, Surface Reaction and Heterogene Catalysis	3674
Waste Gas Purification by Absorption	3675
Waste Gas Purification by Combustion	2442
Waste Gas Purification by Oxidative Scrubbing	2443
Waste Gas Purification by Catalytic Processes	3476
Biological Waste Air Purification - Biofilters	3477
Biological Waste Air Purification - Bioscrubbers	3478
Separation of Vapors	3475
Emission Control - Marketing Installation Tank Farms	3479
Emission Control - Degreasing of Metallic and Non-metallic Items by Chlorinated Hydro-carbons	2589
Emission Control - Wood Working Industries	3462
Emission Control - Pulverized Coal Fired Steam Generators	2091
Emission Control - Supplemental Units for Solid Fuel Fired Steam Generators	2113
Emission Control - Oil-fired Steam and Hot Water Generators	2297
Emission Control - Steam Generator Grate Firing	2300
Emission Control - Incinerators with a Capacity Exceeding 750 Kg/hour	2114
Emission Control - Incinerators with a Maximum Capacity of 750 Kg/hour	2301

(continued)

Table 1-6 (continued)

Title	VDI No.
Emission Control - Incinerators for Special Solid and Liquid Wastes, Especially Containing Oil Wastes	3460
Emission Control - Printing Facilities for Consumer Goods	2287
Emission Control - Volatile Organic Compounds, Particularly Solvents	2280

Table 1-7

VDI Guidelines on Gaseous Emission Measurement Techniques

(FGS-FRG Table 2-4)

Substance	VDI guideline	and edition
Chlorine	3488, Part 1	(Dec 79)
	3488, Part 2	(Nov 80)
Hydrogen Chloride	3480, Part 1	(Jul 84)
Fluorine Compounds	2470, Part 1	(Oct 75)
	2286	(Mar 74)
Carbon Monoxide	2459, Part 6	(Nov 80)
Carbon Disulfide	3487, Part 1	(Nov 78)
Organic Substances	2460, Part 1	(Mar 73)
	2460, Part 2	(Jul 74)
	2460, Part 3	(Jun 81)
	2466, Part 1	(Mar 73)
	3481, Part 1	(Aug 75)
	3481, Part 2	(Apr 80)
	2457, Part 2	(Feb 74)
	2457, Part 3	(May 76)
	2457, Part 4	(Dec 76)
	2457, Part 5	(Jun 81)
	2457, Part 6	(Jun 81)
	2457, Part 7	(Jun 81)
Sulfur Dioxide	2462, Part 1	(Feb 74)
	2462, Part 2	(Feb 74)
	2462, Part 3	(Feb 74)
	2462, Part 4	(Aug 75)
	2462, Part 5	(Jul 79)
	2462, Part 6	(Jan 74)
Sulfur Trioxide	2463, Part 7	(Mar 85)
Hydrogen Sulfide	3486, Part1	(Apr 79)

(continued)

Table 1-7 (continued)

Substance	VDI guideline	and edition
Hydrogen Sulfide	3486, Part 2	(Apr 79)
	3486, Part 3	(Nov 80)
Dust	2066, Part 1	(Oct 75)
	2066, Part 2	(Jun 81)
	3491, Part 1	(Sep 80)
Nitrogen Oxides	2456, Part 1	(Dec 73)
	2456, Part 2	(Dec 73)
	2456, Part 3	(May 75)
	2456, Part 4	(May 76)
	2456, Part 5	(May 78)
	2456, Part 6	(May 78)
	2456, Part 7	(May 78)
Nitrogen Compounds, Basic	3496, Part1	(Apr 82)
Vinyl Chloride	3493, Part 1	(Nov 82)

INSTALLATION:	COMPLIANCE CATEGORY: AIR EMISSIONS MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		

SECTION 2

CULTURAL RESOURCES MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 2

CULTURAL RESOURCES MANAGEMENT

A. Applicability of this Section

This chapter, relevant to all Air Force (AF) installations, includes plans and programs needed to ensure proper protection and management of cultural resources (which includes historic and prehistoric properties under Department of Defense (DOD) control), and properties on the World Heritage List or on the Federal Republic of Germany's (FRG's) list equivalent to the U.S. National Register of Historic Places.

The regulatory requirements in this section are based on DOD regulations and Air Force Instructions (AFIs) that apply at overseas installations. Management Practices (MPs) are derived from DOD regulations and other documents that are not mandatory overseas but are important to follow to preserve the health and safety of AF employees and protect the environment.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 12 contains criteria for the plans and programs needed for the protection and management of cultural resources.

C. U.S. Air Force Documents

- AFI 32-7062, *Air Force Comprehensive Planning*, 18 April 1994, requires installations to comply with the specifications contained in the Master Statement of Work, the AF document that provides specific details regarding the structure, content, symbology, and other guidance for preparing AF comprehensive plan documents, maps, and databases. The Master Statement of Work (developed by the Air Force Center for Environmental Excellence (AFCEE)) requires that installations maintain maps that address specific environmental issues, including natural and cultural resources issues.

- The *National Historic Preservation Act* of 1966 (16 U.S. Code (USC) 470a-2) requires Installation Commanders (ICs) to inform the Secretary of the AF of property listed on the FRG's equivalent of the U.S. National Register prior to approval of any Federal undertaking that may directly and adversely affect such property.

D. Responsibility for Compliance

- Base Civil Engineering (BCE) is responsible for funding, supervising, controlling, and managing installation historic preservation programs.

- The Base Cultural Resources Manager is responsible for implementing the historic preservation program, and for locating, inventorying, and evaluating installation cultural resources. This is usually an additional duty assignment within BCE.

E. Definitions

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Action* - all activities or programs of any kind authorized, funded, or carried out, in whole or in part, on DOD-controlled installations (FGS-FRG, Appendix A).

- *Adverse Effect* - changes that reduce the quality of the natural environment or diminish the quality or value of archaeological resources or cultural resources or properties (FGS-FRG, Appendix A).

- *Archaeological Resource* - any material remains of prehistoric or historic human life or activities. Such resources include, but are not limited to: pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal materials, or any portion of any of the foregoing items (FGS-FRG, Appendix A).

- *Commander* - the person responsible for controlling the actions under discussion. This may be a person other than an accommodation or installation commander. Such would be the case, for example, if the action dealt with a non-base operations function (FGS-FRG, Appendix A).

- *Cultural Mitigation* - specific steps designed to lessen the adverse effects of a DOD action on a cultural or archeological resource, including (FGS-FRG, Appendix A):
  1. limiting the magnitude of the action
  2. relocating the action in whole or in part
  3. repairing, rehabilitating, or restoring the affected property
  4. recovering and recording data from cultural properties that may be destroyed or substantially altered.

- *Cultural Property or Resource* - physical remains of any prehistoric or historic district, site, building, structure, or object significant in world, national, or local history, architecture, archeology, engineering, or culture. The term includes artifacts, records, and remains that are related to such a district, site, building, structure, or object (FGS-FRG, Appendix A).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Inventory of Cultural Resources* - to determine the location of cultural resources that may have world, national, or local significance (FGS-FRG, Appendix A).

- *Management Practices (MPs)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *Material Remains* - physical evidence of human habitation, occupation, use, or activity, including the site, loci, or context in which such evidence is situated, including (FGS-FRG, Appendix A):
    1. Surface or subsurface structures
    2. Surface or subsurface artifact concentrations or scatters
    3. Whole or fragmentary tools, implements, containers, weapons, clothing, and ornaments
    4. By-products, waste products, or debris resulting from manufacture or use
    5. Organic waste
    6. Human remains
    7. Rock carvings, rock paintings, and intaglios
    8. Rock shelters and caves
    9. All portions of shipwrecks
    10. Any portion or piece of any of the foregoing.

- *Monument* - a cultural property or resource, natural or man-made, that appears on a state (*Land*) list of cultural or historic properties or sites (FGS-FRG, Appendix A).

- *Natural Cultural or Historic Monument* - a natural, as opposed to a man-made, item or place designated as a cultural or historic monument by either the German federal government or state governments (FGS-FRG, Appendix A).

- *Preservation* - the act or process of applying measures to sustain the existing form, integrity, and material of a building or structure and the existing form and vegetative cover of a site. It may include initial stabilization work where necessary, as well as ongoing maintenance of the historic building materials (FGS-FRG, Appendix A).

- *Property* - a site, building, object, structure, or collection of such items (FGS-FRG, Appendix A).

- *Protection* - the act or process of applying measures designed to affect the physical condition of a property by safeguarding it from deterioration, loss, attack, or alteration, or to cover or shield the property from danger or injury. In the case of buildings and structures, such treatment is generally temporary and anticipates future historic preservation treatment; in the case of archaeological sites, the protective measure may be temporary or permanent (FGS-FRG, Appendix A).

- *State* - the political subdivision referred to as a *Land* in Germany (FGS-FRG, Appendix A).

CULTURAL RESOURCES MANAGEMENT

GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
All Installations	2-1 through 2-5	(1)(2)
Cultural Resources Management		
General	2-6 through 2-10	(1)
Listed Monuments	2-11 through 2-13	(1)
Protective Action	2-14 through 2-16	(1)

(a) **CONTACT/LOCATION CODE:**

(1) Cultural Resources Manager (or Environmental Coordinator)
(2) Base Staff Judge Advocate

CULTURAL RESOURCES MANAGEMENT

Records To Review

- Historic Preservation Plan
- Inventories of cultural property and archaeological resources, if any
- Base Environmental Maps

Physical Features To Inspect

- Construction sites
- Site or landmark of historic or archaeological interest

People To Interview

- Cultural Resources Manager (or Environmental Coordinator)
- Base Staff Judge Advocate

COMPLIANCE CATEGORY: CULTURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
ALL INSTALLATIONS	
2-1. Copies of all relevant DOD directives/ instructions, U.S. Air Force (USAF) directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF directives. (2) (NOTE: Among the relevant documents is AFI 32-7062, *Air Force Comprehensive Planning*, 18 April 1994.)
2-2. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning cultural resources have been issued since the finalization of the manual. (1) Verify that the installation is in compliance with newly issued regulations.
2-3. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to cultural resources management. (1)(2) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
2-4. The installation Cultural Resources Manager should be included in the coordination process for all actions that may affect the installation's cultural resources (MP).	Verify that the Cultural Resources Manager is included in the coordination process for all actions that may affect the installation's cultural resources. (1)

(1) Cultural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: CULTURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**

2-5. Installations must develop base environmental maps that address particular topics (AFI 32-7062, para 2.4).	Verify that the installation is developing the following maps: (1)
	
	- Map A: Natural and Cultural Resources
	  - Map A-1: Areas of Critical Concern
	  - Map A-2: Management Areas
	- Map B: Environmental Quality
	  - Map B-1: Environmental Regulatory Issues
	  - Map B-2: Environmental Emission Sources.
	
	(NOTE: These maps are specified in the Master Statement of Work developed by AFCEE.)

HISTORICAL AND CULTURAL RESOURCES MANAGEMENT **General**	
2-6. Personnel who perform cultural or archaeological resource functions must have the required expertise in world, national, and local history and culture (FGS-FRG 12-3).	Verify that personnel who perform cultural or archaeological resource functions have the requisite expertise in world, national, and local history and culture. (1)
2-7. Installations must inventory cultural property and resources and archaeological resources in areas under DOD control, if financially and otherwise practical (FGS-FRG 12-4).	Verify that, if financially and otherwise practical, the installation inventories cultural property in areas under DOD control. (1) Verify that, if financially and otherwise practical, the installation inventories archaeological resources in areas under DOD control. (NOTE: Assistance in carrying out the archaeological resources inventory may be available from the state upon request.)

(1) Cultural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: CULTURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
2-8. ICs have specific responsibilities with regard to properties on the host nation's equivalent of the United States' National Register (16 USC 470a-2, Section 402).	Determine whether any Federal undertaking may directly and adversely affect a property that is on the host nation's equivalent of the United States' National Register. (1) Verify that the IC informs the Secretary of the Air Force (SAF/MIQ) of such property. (NOTE: This notification is to be made so that the Secretary of the Air Force may take into account the effect of the undertaking on such property for purposes of avoiding or mitigating any adverse effects.) Verify that the IC takes the above action prior to the approval of the undertaking.
2-9. ICs must develop a plan for the protection and preservation of cultural resources and for mitigation of any adverse effects (FGS-FRG 12-5).	Verify that the installation has developed a plan for the protection and preservation of cultural resources identified on the installation inventory and for mitigation of any adverse effects. (1) Verify that the installation's planning for major actions includes consideration of possible effects on cultural or archaeological property or resources. Verify that planners have incorporated the requirements of FGS-FRG 12-5a, 5b, 5d, and 5e (see checklist items 2-10 through 2-12 and 2-16) into their plans.
2-10. No one may excavate or build on or near an archaeological site without the permission of the state (FGS-FRG 12-5a).	Verify that no one excavates or builds on or near an archaeological site without the permission of the state. (1)
Listed Monuments	(NOTE: The responsible state authority determines what must be done to protect and preserve listed monuments. In some cases, funds are available from the state to assist in these efforts. Failure to protect or preserve these monuments can result in the state government taking action to do so. Such action may not be impeded and can be the subject of a claim.)
2-11. Listed monuments must be used for their original purpose if possible (FGS-FRG 12-5b).	Verify that listed monuments are used for their original purpose if possible. (1)

(1) Cultural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: CULTURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
2-12. Listed monuments may not be modified or demolished without permission (FGS-FRG 12-5d).	Verify that listed monuments are not modified or demolished without permission from the appropriate state authority and the property owner (if other than the state). (1) (NOTE: Any modification made without approval will have to be returned to the condition specified by the state at the expense of the person or organization who made the modification.)
2-13. ICs must inform the state if a listed monument suffers damage or deterioration (FGS-FRG 12-6b).	Determine whether the installation has any listed monuments that have suffered damage or deterioration. (1) Verify that the IC informs the state of such damage or deterioration.
Protective Action	
2-14. ICs must establish measures sufficient to protect known cultural or archaeological resources until appropriate mitigation or preservation can be completed (FGS-FRG 12-6a).	Verify that measures have been established that are sufficient to protect known cultural or archaeological resources until appropriate mitigation or preservation can be completed. (1)
2-15. The discovery of any probable archaeological resource or cultural property must be followed by specific actions (FGS-FRG 12-6c).	Determine whether any potential cultural property or archaeological resources have been discovered. (1) Verify that the IC is notified of the discovery of potential cultural property or archaeological resources. Verify that the IC in turn notifies the appropriate state authorities. Verify that the IC takes action to preserve and protect the property or resources and to ensure that they are not removed or disturbed until the state authorities decide their status. (NOTE: The property belongs to the state unless clear title can be established for someone else. Since DOD components do not own anything that existed on an accommodation when it was provided to them by the German government, neither a DOD component nor a member thereof can be the owner of any such property.)

(1) Cultural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: CULTURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
2-16. Religious, historic, or cultural resources in Rheinland-Pfalz must be protected and preserved with deference to the religion (FGS-FRG 12-5e).	Determine whether the installation is located in Rheinland-Pfalz. (1) Verify that religious, historic, and cultural resources are protected and preserved with deference to the religion. (NOTE: If the religion has an active and recognized body (authority) in Germany, no actions may be taken with respect to the monument without the permission of that body. Inspections and studies are included.)

(1) Cultural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

INSTALLATION:	COMPLIANCE CATEGORY: CULTURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		

SECTION 3

HAZARDOUS MATERIALS MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 3

HAZARDOUS MATERIALS MANAGEMENT

A. Applicability of this Section

Most Air Force (AF) installations handle many chemicals and substances that may be considered hazardous if not handled, stored, or used properly. A complete list of chemicals used at AF installations would be too lengthy to include in this section, but many of the materials are hazardous, i.e., toxic chemicals, flammable substances, reactive substances, and corrosive materials.

This section primarily addresses the proper storage and handling of chemicals. Oil, pesticides, and asbestos are hazardous materials that require special management practices at AF installations and are addressed in separate sections. Radioactive substances and the general category of hazardous wastes are also not included in this section of the manual, and it does not focus on individual hazardous chemicals or substances used at AF installations. It deals, instead, with the generic requirements and Management Practices (MPs) associated with minimizing impacts on the environment from spills or releases of hazardous materials as a result of improper storage and handling. As a general rule, most subsections of this section will be applicable to most AF installations.

The regulatory requirements in this section are based on Department of Defense (DOD) Directives and Instructions, Air Force Occupational Safety and Health Standards (AFOSH STD), and Air Force Regulations (AFRs) and Air Force Instructions (AFIs) that apply at overseas installations. MPs are derived from U.S. Environmental Protection Agency (USEPA) regulations and National Fire Protection Association (NFPA) publications that are not mandatory overseas but are important to follow to preserve the health and safety of AF employees and to protect the environment.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 5, contains criteria for the storage, handling, and disposition of hazardous materials used by DOD installations. It address such issues as classification, storage, handling, transportation, use, labeling, purchasing, training, and the security of storage facilities.

- DOD 4145.19-R-1, *Storage and Materials Handling*. Chapter 5, Section 4, *Hazardous Commodities*, dated September 1979, addresses the storage and handling of compressed gases and other hazardous commodities.

- DOD Directive (DODD) 6050.8, *Storage and Disposal of Non-DOD Owned Hazardous or Toxic Materials on DOD Installations*, dated 27 February 1986, does not allow the storage of non-DOD owned toxic or hazardous materials onsite.

C. U.S. Air Force Documents

- Air Force Manual (AFM) 67-1, *Storage and Related Operations*, requires that the installation have a comprehensive list of all chemicals used or generated onsite.

- AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Prevention, and Health (AFOSH) Program.* This AFI, dated 1 June 1996, outlines the Air Force's Occupational and Environmental Safety, Fire Prevention, and Health Program. It specifically requires the Bioenvironmental Engineering Services (BES) to maintain material safety data sheets (MSDSs) and other related information.

- AFOSH STD 127-43, *Flammable and Combustible Liquids*, 21 September 1980, applies to the storage, use, and handling of flammable and combustible liquids in containers or tanks of 60 gal [≈227 L] or less and in portable tanks of up to 660 gal [≈2498 L] capacity. The standard implements those portions of Title 29, Code of Federal Regulations (29 CFR) 1910.106, *Flammable and Combustible Liquids*, that are applicable to AF operations. In addition, it covers several items not addressed in the Occupational Safety and Health Administration (OSHA) standard.

- AFOSH STD 161-21, *Hazard Communication*, 23 January 1989, contains minimum requirements for an effective hazard communication program for activities that handle or use hazardous materials. It implements 29 CFR 1910.1200, *Hazard Communication.*

D. Responsibility for Compliance

- Base Supply (Logistics) has primary responsibility for receiving, storing, and issuing all hazardous commodities. Base Supply reviews all items that have a potential health hazard and determines if an issue exception code should be assigned to the item before being placed in storage. The receipt of hazardous materials with the proper documentation and shipping papers is also the responsibility of Base Supply. The proper maintenance and operation of flammable/combustible materials storage facilities, acid storage facilities, and compressed gas storage facilities is also the responsibility of Base Supply.

- The Director of Base Medical Services, through the BES, is responsible for reviewing the issue exception codes for hazardous materials assigned by Base Supply and for approving or disapproving the recommendations.

- The Base Civil Engineer (BCE) is responsible for the storage and handling of all hazardous materials used by the civil engineering shops.

- The Base Fire Department provides support in emergency response, spill events, exercises, and fire protection activities. In addition, the department is responsible for making periodic fire safety inspections of flammable/combustible storage and handling areas on the installation.

- The Base Safety Manager is responsible for conducting workplace safety evaluations and inspections of the handling and storage of hazardous materials. The Safety Manager provides the appropriate manager with a report of findings and recommended corrective actions. He or she is also responsible for ensuring the prompt and accurate investigation of any hazardous material mishaps that result in injury or property damage.

E. Definitions

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Combustible Liquid* - a liquid having a flashpoint at or above 100 °F (37.8 °C). Combustible liquids are categorized as Class II or Class III liquids and are further subdivided as follows (AFOSH STD 127-43, para 2f):
  1. Class II liquids are those having a flashpoint at or above 100 °F (37.8 °C) and below 140 °F (60 °C) .
  2. Class IIIA liquids are those having flashpoints at or above 140 °F (60 °C) and below 200 °F (93.3 °C), except any mixture having components with flashpoints of 200 °F (93.3 °C).
  3. Class IIIB liquids are those having flashpoints at or above 200 °F (93.4 °C).

- *Competent* - an agency, authority, individual, official, person, etc., who meets one of the following criteria: (FGS-FRG, Appendix A)
  1. specifically designated as competent by FGS-FRG
  2. specifically designated as competent by the authority of a German government [agency]
  3. specifically designated as competent by or meets the qualifications of competency of a recognized German trade organization or association
  4. based on experience, training, and/or authority granted per DOD/component policy or regulations, judged by the responsible commander to be a capable and appropriated organization/ individual to accomplish the task in question.

- *Discharge (of a pollutant)* - any addition of any pollutant or combination of pollutants to waters of the host nation from any point source (FGS-FRG, Appendix A).

- *Environment* - the natural and physical environment, excluding social, economic, and other environments (FGS-FRG, Appendix A).

- *Flammable Liquid* - a liquid with a flashpoint below 100 °F (37.8 °C) with a vapor pressure not exceeding 40 psia at 100 °F (37.8 °C). Flammable liquids are categorized as Class I liquids, and are further subdivided as follows (AFOSH STD 127-43, para 2i):
  1. Class IA are those that have a flashpoint below 73 °F (22.8 °C) and boiling point below 100 °F (37.8 °C).
  2. Class IB are those that have flashpoints below 73 °F (22.8 °C) and boiling points at or above 100 °F (37.8 °C).
  3. Class IC are those that have flashpoints at or above 73 °F (22.8 °C) and below 100 °F (37.8 °C).

- *Hazardous Chemical Warning Label* - a label, tag, or marking on a container that is prepared in accordance with DOD 6050.5-H, *DOD Hazardous Chemical Warning Labeling System,* and that provides the following information (FGS-FRG, Appendix A):

1. identification/name of hazardous chemicals
2. appropriate hazard warnings
3. the name and address of the manufacturer, importer or other responsible party.

- *Hazardous Material* - material containing one or more hazardous substances (FGS-FRG, Appendix A).

- *Hazardous Material Information System (HMIS)* - the computer-based information system developed to accumulate, maintain, and disseminate important information on hazardous material used by DOD (FGS-FRG, Appendix A).

- *Hazardous Material Shipment* - any movement of hazardous materials in a DOD land or air vehicle either from an installation to a final destination off the installation, or from a point of origin off the installation to a final destination on the installation, in excess of any of the following quantities (FGS-FRG, Appendix A):
  1. for hazardous material identified as a result of inclusion in Table 4-1, Part 1, any quantity in excess of the reportable quantity listed in Table 4-1, Part 1
  2. for other liquid or semi-liquid hazardous material, in excess of 410 L (110 gal)
  3. for other solid hazardous material, in excess of 225 kg (500 lb)
  4. for combinations of liquid, semi-liquid and solid hazardous materials, in excess of 340 kg (750 lb).

- *Hazardous Material Storage Area (HMSA)* - outdoor storage sheds, storage warehouses, indoor storage rooms, and storage lockers used for the purpose of storing hazardous materials (FGS-FRG, Appendix A).

  (NOTE: According to FGS-FRG 5-4, hazardous material storage facilities that store less than 200 kg of toxic materials or oxidizers (as identified by MSDS or competent component authorities) or less than 50 kg of very toxic materials (see definition) are not classified as HMSAs.)

- *Hazardous Substance* - any substance that is capable of posing an unacceptable risk to health, safety, or the environment if improperly handled, stored, issued, transported, labeled, or disposed of. Such substances display a characteristic listed in Table 3-1 or contain one or more of the substances listed in Table 4-1 or in the *Joint Transportation of Hazardous Materials* (USAREUR Reg. 55-4 and USAFE Reg. 75-3) (FGS-FRG, Appendix A).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Leak or Leaking* - any instance in which an article, container, or piece of equipment has an opening, no matter what its size, that has allowed the unintentional release of any of its contained substances (FGS-FRG, Appendix A).

- *Material Safety Data Sheet* - a form used by manufacturers of chemical products to communicate to the users the chemical, physical, and hazardous properties of their product (FGS-FRG, Appendix A).

- *Petroleum, Oil, Lubricant (POL)* - a class of hazardous materials that includes, but is not limited to, petroleum and petroleum-based substances comprised of complex blends of hydrocarbons derived from crude oil through process of separation, conversion, upgrading, and finishing; such as motor fuels, residual fuel oils, lubricants, petroleum solvents, and used oils that have not been contaminated with other hazardous substances. Uncontaminated used oils are to be treated as POL products unless classified as waste by a competent authority. Once so classified, the used oil becomes a hazardous waste (FGS-FRG, Appendix A).

- *Qualified* - see *Competent.*

- *Spill* - for hazardous substances, an uncontained release of a hazardous substance, to include Petroleum, Oil, and Lubricants (POL), onto the land or into the water (FGS-FRG, Appendix A).

- *State* - the political subdivision referred to as *Land* in Germany (FGS-FRG, Appendix A).

- *Toxic* - a chemical falling within any of the following categories (29 CFR 1910.1200, Appendix A, para 6, via AFJMAN 23-201 and AFJMAN 23-209):
  (a) a chemical that has a median lethal dose (LD_{50}) of more than 50 mg/kg but not more than 500 mg/kg of body weight when administered orally to albino rats weighing between 200 and 300 g each
  (b) a chemical that has a median lethal dose (LD_{50}) of more than 200 mg/k but not more than 1,000 mg/k of body weight when administered by continuous contact for 24 h (or less if death occurs within 24 h) with the bare skin of albino rabbits weighing between 2 and 3 kg each
  (c) a chemical that has a median lethal concentration (LC_{50}) in air of more than 200 ppm but not more than 2,000 ppm by volume of gas or vapor, or more than 2 mg/L but not more than 20 mg/L of mist, fume, or dust, when administered by continuous inhalation for 1 h (or less if death occurs within 1 h) to albino rats weighing between 200 and 300 g each.

- *Very Hazardous Material* - a material that contains a hazardous substance that (FGS-FRG, Appendix A):
  1. has a WGK number of three in Table 4-1, Part 2
  2. is listed as belonging to group S in Table 4-1, Part 3, or
  3. has a "P" in the USEPA Waste Number column of Table 4-1, Part 1.

- *Very Toxic Material* - a toxic material that is defined as a very hazardous material (FGS-FRG 5-4).

(NOTE: HQ USAFE/JAM takes the term 'very toxic' to be synonymous with the term 'highly toxic' as defined in 29 CFR 1910.1200, Appendix A, para 6:

Highly toxic - a chemical falling within any of the following categories:
(a) a chemical that has a median lethal dose (LD_{50}) of 50 mg or less per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each
(b) a chemical that has a median lethal does (LD_{50}) of 200 mg or less per kg of body weight when administered by continuous contact for 24 h (or less if death occurs within 24 h) with the bare skin of albino rabbits weighing between 2 and 3 kg each
(c) a chemical that has a median lethal concentration (LC_{50}) in air of 200 ppm by volume or less of gas or vapor, or 2 mg/L or less of mist, fume, or dust, when administered by continuous inhalation for 1 h (or less if death occurs within 1 h) to albino rats weighing between 200 and 300 g each.)

HAZARDOUS MATERIALS MANAGEMENT

GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
All Installations	3-1 through 3-3	(2)(8)
Excess Hazardous Materials	3-4 and 3-5	(1)(2)(4)(5)
Training	3-6	(1)(2)(3)(4)(5)(6)(7)
Releases	3-7 through 3-13	(1)(2)(3)(4)(5)(6)(7)(8)
General Operating Requirements	3-14 through 3-19	(1)(2)(3)(4)(5)
General Storage Requirements	3-20 and 3-21	(1)(2)(4)(5)
Documentation	3-22 through 3-28	(1)(2)(3)(4)(5)(6)(7)
Flammable/Combustible Liquids		
Handling	3-29	(1)(2)(4)
General Storage Requirements	3-30 through 3-35	(1)(2)(4)(5)
Storage Cabinets	3-36 through 3-39	(1)(2)(4)(5)
Storage Rooms	3-40	(1)(2)(4)(5)
Storage Buildings	3-41 through 3-43	(1)(2)(4)(5)
Outdoor Storage	3-44 and 3-45	(1)(2)(4)(5)
Industrial Storage Areas	3-46 through 3-48	(1)(2)(4)(5)
Batteries	3-49	(2)
Oxidizers and Toxic Substances	3-50 through 3-54	(1)(2)(3)(4)(5)
Compressed Gases	3-55 through 3-57	(1)(2)(4)(5)
Acid Storage	3-58 and 3-59	(1)(2)(4)(5)
Hazardous Material Storage Areas		
Design Requirements	3-60 through 3-65	(2)(3)(4)
Operating Procedures	3-66 through 3-73	(2)(4)
Additional Requirements for Warehouse HMSAs	3-74	(2)(4)
Additional Requirements for Outdoor HMSAs	3-75	(2)(4)
Special Hazardous Materials Storage Areas		
Design Requirements	3-76	(2)(3)(4)
Operating Procedures	3-77 and 3-78	(2)(3)(4)(5)
Fire Suppression	3-79 through 3-82	(2)(4)
Documentation	3-83 through 3-86	(2)(3)(4)(5)
Transportation	3-87 through 3-89	(2)(4)(5)(7)

(a) **CONTACT/LOCATION CODE:**

(1) Logistics Supply (LGS (Base Supply))
(2) BCE (Base Civil Engineering)
(3) Fire Department
(4) Safety Officer
(5) BES (Bioenvironmental Engineering Services)
(6) Disaster Preparedness Office
(7) LGT (Transportation Officer)
(8) Base Staff Judge Advocate

HAZARDOUS MATERIALS MANAGEMENT

Records To Review

- Emergency Plan documents
- MSDSs
- Inventory records
- Training records
- Inspection records
- Shipping papers
- Placarding of hazardous materials
- HMSA operations plans
- HMSA fire protection plans
- HMSA emergency evacuation plans

Physical Features To Inspect

- Hazardous material storage areas
- Shop activities
- Shipping and receiving area

People To Interview

- LGS (Base Supply)
- BCE (Base Civil Engineering)
- Fire Department
- Safety Officer
- BES (Bioenvironmental Engineering Services)
- Disaster Preparedness Office
- LGT (Transportation Officer)
- Base Staff Judge Advocate

COMPLIANCE CATEGORY: HAZARDOUS MATERIALS MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
ALL INSTALLATIONS	(NOTE: Hazardous substance USTs are addressed in Section 10, *Storage Tank Management*.)
3-1. Copies of all relevant DOD directives/ instructions, U.S. Air Force (USAF) directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (8) (NOTE: Among the relevant documents are the following: - DOD 4145.19-R-1, Chapter 5, Section 4, *Hazardous Commodities*, September 1979 - DODI 6050.5-H, *DOD Hazardous Chemical Warning Label System*, June 1989 - DODD 6050.8, *Storage and Disposal of Non-DOD Owned Hazardous or Toxic Materials on DOD Installations*, 27 February 1986 - AFM 67-1, Vol. 2, Part Two, Chapter 14, *Storage and Related Operations* - AFM 67-1, Vol. 2, Part Two, Chapter 21, *Special Logistical Support Procedures* - AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Prevention, and Health (AFOSH) Program*, 1 June 1996 - AFOSH STD 127-43, *Flammable and Combustible Liquids*, 21 September 1980 - AFOSH STD 161-21, *Hazard Communication*, 23 January 1989 - International Civil Aviation Organization, *Technical Instructions for the Safe Transport of Dangerous Goods by Air.*)
3-2. Installations must meet regulatory and AF requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning hazardous materials have been issued since the finalization of the manual. (2) Verify that the installation is in compliance with newly issued regulations.
3-3. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to hazardous materials management. (2)(8) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it.

(1) LGS (Base Supply) (2) BCE (Base Civil Engineering) (3) Fire Department (4) Safety Officer (5) BES (Bioenvironmental Engineering Services) (6) Disaster Preparedness Office (7) LGT (Transportation Officer) (8) Base Staff Judge Advocate

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3-3. (continued)	(NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
EXCESS HAZARDOUS MATERIALS	
3-4. All excess hazardous materials must be processed through the Defense Reutilization and Marketing Service (DRMS) (FGS-FRG 5-14).	Verify that excess hazardous materials are processed through DRMS. (1)(2)(4)(5)
3-5. DRMS must donate, transfer, or sell hazardous material to environmentally responsible parties only (FGS-FRG 5-14).	Verify that DRMS donates, transfers, or sells hazardous materials to responsible parties only. (NOTE: This is the responsibility of DRMS, not that of the generating installation; this issue would therefore arise only if a DRMO were in the scope of the assessment.)
TRAINING	
3-6. Personnel who use, handle, or store hazardous materials must be trained (FGS-FRG 5-15a, 5-15b, and AFOSH STD 161-21, para 5e).	Verify that employees who are dealing with hazardous substances receive training in operating instructions and safety practices prior to starting work and at least annually after that. (1)(2)(3)(4)(5)(6)(7) Verify that all personnel who use, handle, or store hazardous materials are trained. Verify that the installation provides personnel with effective information and training on the hazardous chemicals in their work area. Verify that information and training are provided at the time of initial assignment and whenever a new physical or health hazard on which personnel have not been trained is introduced into the work area. Verify that personnel are informed of the following: - any operations in their work area where hazardous chemicals are present - the location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and MSDSs.

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3-6. (continued)	Verify that the training provided to personnel includes at least the following: - methods and observations that may be used to detect the presence of or release of a hazardous chemical in the work area (such as monitoring conducted by the installation, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.) - the physical and health hazards of the chemicals in the work area - the measures that personnel can take to protect themselves from these hazards, including specific procedures implemented to protect personnel from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used - the details of the hazard communication program developed by the installation, including an explanation of the labeling system and the MSDS, and how personnel can obtain and use the appropriate hazard information.
RELEASES	
3-7. Installations must follow certain priorities in responding to a spill (FGS-FRG 18-5b).	Verify that the following priorities are adhered to in the course of responding to a spill: (1)(2)(3)(4)(5)(6)(7)(8) - rescue any persons and animals that are in danger - protect the human and animal populations - protect emergency crews - protect waters - prevent the spread of damage - recover dead persons and animals - recover objects that are in immediate danger.
3-8. Installation spill response must meet specific criteria (FGS-FRG 18-5b(1) through 18-5b(3)).	Verify that, if the ultimate response depends on the concentration of the spilled substance, the concentration is determined by the appropriate analytical method or equipment. (1)(2)(3)(4)(5)(6)(7)(8) Verify that, upon discovering a spill, action is taken to determine how best to: - approach the spill site - place response vehicles, equipment, and personnel - control access to the site.

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3-8. (continued)	(NOTE: Other immediate response measures may include the following: - warning the people in the vicinity of the site - rescuing people - fighting fires - preventing the spread of fire or the possibility of explosion - avoiding sources of ignition - making timely requests for additional personnel and equipment - informing the competent information organization (e.g., the local poison information center) and treatment facilities of accidents that involve poisons - warning the authorities responsible for the water supply and the disposal of wastewater.) Verify that the following measures are taken, where necessary, after those that save lives: - sealing leaking containers - collecting substances that are harmful to water - preventing further spreading - preventing poisoning and burns from caustics - collecting and disposing of grit, absorbents, and damming materials - preventing penetration into the sewage system and/or open water - collecting substances that are harmful to water and have enter into water by using booms, etc. - suppressing gases, vapors, and dusts - transferring substances from damaged tanks until the danger of further leaks has passed - determining the substance's type and potential for harm - determining the extent of the endangered area - notifying and warning the population.
3-9. The DOD organization that owns/controls the facility or container from which a substance is leaking must remove any polluted soil and treat or dispose of it properly (FGS-FRG 18-5a(4)).	Verify that the DOD organization that owns/controls the facility or container from which a substance is leaking removes any polluted soil and treats or disposes of it properly. (1)(2) (NOTE: If the DOD organization is not able to do so, the German local district authorities may take the necessary measures. The cost incurred by such German authorities to clean up a spill caused by a DOD component is reimbursable.)

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3-10. Interim storage facilities for residual substances from spill response actions must be designed in such a way that neither ground- nor surface water are endangered (FGS-FRG 18-4g(2)).	Verify that interim storage facilities for residual substances from spill response action are designed in such a way that even an extended storage period does not endanger either ground- or surface water. (1)(2) (NOTE: Interim storage facilities for residual substances are not required but may be necessary. The design safety requirement applies only if it is necessary to use such facilities.)

3-11. The IOSC or OBSC must be notified immediately in certain circumstances (FGS-FRG 18-7b).	Verify that the IOSC or OBSC is notified immediately if: (1)(2)(6)(7)
	
	- the spill exceeds an RQ
	- the spill occurs inside a DOD accommodation and cannot be contained within a required berm or secondary containment
	- the spill occurs outside a DOD accommodation and:
	  - immediate cleanup is not accomplished, or
	  - German government or private assistance is used to respond to the spill, or
	  - private property (including soil) is damaged or is removed as part of the cleanup actions
	- a water resource is polluted or threatened with pollution.

3-12. The IOSC or OBSC must notify the appropriate military department and/or defense agency and the Executive Agent in certain circumstances (FGS-FRG 18-7c).	Verify that the IOSC or OBSC notifies the appropriate military department and/or defense agency and the Executive Agent in the following circumstances: (1)(2)
	
	- the spill contains POL products or POL wastes that exceed 416 L (110 gal)
	- the spill occurs inside a DOD accommodation and cannot be contained within a required berm or secondary containment
	- the spill occurs outside a DOD accommodation and:
	  - immediate cleanup is not accomplished, or
	  - German government or private assistance is used to respond to the spill, or
	  - private property (including soil) is damaged or is removed as part of the cleanup actions
	- a water resource is polluted or threatened with pollution
	- if the IOSC or OBSC determines that the spill is significant.
	
	Verify that the IOSC or OBSC submits a written follow-up report of such spills.

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3-13. German authorities must be notified of spills in certain circumstances (FGS-FRG 18-5a(1) through 18-5a(3) and FGS-FRG 18-7d).	Verify that the person in charge at a scene outside of a DOD accommodation immediately notifies the German police to obtain necessary assistance if the spill exceeds the following amounts: (1)(2)
	
	- the spill contains a hazardous substance listed in Table 4-1, parts 2 or 3, and the amount spilled exceeds:
	  - 450 g (1 lb) of a substance with a WGK number of 3 (acutely hazardous)
	  - 4.5 kg (10 lb) of a substance with a WGK number of 2 (hazardous)
	  - 450 kg (100 lb) of a substance with a WGK number of 1 (marginally hazardous)
	- the spill contains POL products or POL wastes that exceed 416 L (110 gal).
	
	Verify that the German police are immediately notified of accidents associated with hazardous substances in the following circumstances:
	
	- if assistance from German agencies (such as the fire department) is required
	- if any effect of the accident will affect civilians, persons and/or property outside the boundaries of the accommodation, or ground- and/or surface water.
	
	(NOTE: The German emergency number is 110.)
	
	(NOTE: If assistance is requested from German authorities, immediate response is the responsibility of the local German fire department, supported by whatever expert assistance is available.)
	
	Verify that the local German water district authorities are notified if a spill of a hazardous substance could be expected to result in concentrations that could change the quality of ground- or surface water in such a way that human health or the environment could be threatened or otherwise seriously affected, or if the local use of water could be impaired.
	
	(NOTE: If time permits, these authorities should be consulted and should agree on the remediation action that will be taken.)

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GENERAL OPERATING REQUIREMENTS	
3-14. Installations must reduce the use of hazardous materials through resource recovery, recycling, source reduction, acquisition, or other minimization strategies (FGS-FRG 5-13).	Verify that the installation has a Hazardous Materials Minimization Program and that it addresses hazardous material management through the use of: (1)(2) - resource recovery - recycling - source reduction - acquisition, etc.
3-15. Installations must make every effort to determine whether a material is hazardous and must handle materials in accordance with that determination (FGS-FRG 5-3).	Verify that the installation makes every effort to determine whether a material is hazardous or not. (1)(2)(3)(4)(5) (NOTE: Table 3-1 lists the typical characteristics of hazardous materials. Materials that exhibit these characteristics should be considered hazardous.) (NOTE: Table 4-1 contains lists that identify substances considered hazardous by DOD, the German federal government, and the German states of Hessen and Rheinland-Pfalz. Table P-2 of the *Joint Transportation of Hazardous Materials* (USAREUR Reg. 55-4 and USAFE Reg. 75-3) also contains a listing of hazardous substances.) Determine whether the installation has chemicals with any of the characteristics listed in Table 3-1. Verify that all chemicals with any of those characteristics are managed as hazardous materials. Verify that all materials that have not been determined to be nonhazardous are managed as hazardous materials.
3-16. All hazardous materials on DOD installations must be labeled and have MSDS information readily available (FGS-FRG 5-12 and AFOSH STD 161-21, para 5d).	Verify that all hazardous materials are labeled with a Hazardous Chemical Warning Label. (2)(4)(5) Verify that MSDSs (or equivalent documents) are readily available in binders or in the HMIS. Verify that labels provided by chemical manufacturers, importers, or distributors are not removed, defaced, or changed. Verify that container labels and all related signs and instructions are in both English and German.

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3-16. (continued)	(NOTE: These requirements apply throughout the life cycle of the hazardous materials.)
3-17. Installations should coordinate with the fire department concerning the types of hazardous chemicals used at the installation, the areas in which they are used, what they are used for, and the quantities used in a given operation (MP).	Verify that the fire department is aware of areas that are at high risk for chemical incidents. (3)
3-18. Specific persons should be designated responsible for areas in which hazardous materials are stored, and the precise nature of their responsibilities should be specified (MP).	Verify that specific individuals have been designated responsible for hazardous material storage areas. (2)(5) Verify that the individuals designated responsible for hazardous material storage areas are aware of the precise nature of their responsibilities.
3-19. Installations must maintain hazardous materials dispensing areas properly (FGS-FRG 5-6).	Verify that drums and containers in hazardous materials dispensing areas are not leaking. (2)(4) Verify that drip pans/absorbent materials are placed under containers as needed in order to collect drips or spills. Verify that container contents are clearly marked. Verify that dispensing areas are located away from catch basins and storm drains.

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GENERAL STORAGE REQUIREMENTS	
3-20. Installations must not allow the storage of non-DOD-owned toxic or hazardous materials onsite (DOD Directive 6050.8, para D).	Verify that the installation does not allow the storage of non-DOD-owned toxic or hazardous materials onsite. (1)(2)(5) (NOTE: This does not apply to: - agreements with the General Services Administration (GSA) for storage of strategic and critical materials in the National Stockpile Program - agreements between DOD Components and other Federal agencies for temporary storage or disposal of explosives - emergency lifesaving assistance to civil authorities involving temporary storage or disposal of explosives - excess explosives generated under a DOD contract - arrangements with the Department of Energy (DOE) for the temporary storage of nuclear materials or nonnuclear classified materials - military resources used during peacetime civil emergencies - assistance and refuge for commercial carriers containing material of other Federal agencies during transportation emergencies.)
3-21. Liquid hazardous materials must be stored in such a way that they will not leak out in an uncontrolled manner (FGS-FRG 5-4).	Verify that liquid hazardous substances are stored in such a way that they will not leak out in an uncontrolled manner. (2)(4) Verify that liquid hazardous materials stored in quantities over 200 kg have secondary containment. (NOTE: Secondary containment may be formed by depressions, dams/berms, sturdy walls, curbs, or other suitable structures.) Verify that the volume of the secondary containment is at least 10 percent of the liquid volume of all stored packages and moveable vessels and at least 100 percent of the volume of the largest vessel that contains a liquid.
DOCUMENTATION	
3-22. The installation must have a comprehensive list of all chemicals used or generated onsite and an assessment of their hazards (AFM 67-1, Volume 2, Part Two, Chapters 14 and 21).	Verify that the installation has a comprehensive list of all chemicals used or generated onsite and an assessment of their hazards. (1)(2)(3)(4)(5)

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3-23. Installations must maintain a master listing of all storage facilities for hazardous materials and an inventory of all hazardous materials contained therein (FGS-FRG 5-7).	Verify that the installation maintains a master listing of all storage facilities for hazardous materials and the hazardous materials contained therein. (1)(2)(3)(4)
3-24. Each work area that has hazardous materials must keep an inventory of all the hazardous materials used within the work area (AFOSH STD 161-21, para 5f).	Verify that each work area has an inventory of its hazardous chemicals and that the inventory is attached to the Workplace Hazard Communication Program. (2)(4)(5) Verify that supervisors maintain the inventory and update it as necessary. Verify that BES reviews the inventory annually. (NOTE: This requirement does not apply to areas in which personnel only handle materials in sealed containers.)
3-25. Installations must have a written Hazard Communication Program that details specific information at each workplace where hazardous materials are used or handled (AFOSH STD 161-21, para 5a).	Verify that each workplace has a copy of the written Hazard Communication Program that includes the following: (1)(2)(4)(5)(6)(7) - location and access to MSDSs - requirements for personnel training - availability of personnel training - work area hazardous chemical inventory - standard operation procedures, operating instructions, or technical orders concerning nonroutine tasks that involve hazardous materials - any contractor operations/interface.
3-26. Installations must ensure that the most current MSDS data is available for all hazardous materials on the installation (FGS-FRG 5-12; AFI 91-301, paras 2.10.1.17 and 2.10.1.18).	Verify that the installation maintains a current copy of DOD List 6050.5-L, *Hazardous Material Information System (HMIS) Hazardous Item Listing*, on compact disc. (5) Verify that the installation maintains copies of other MSDSs for items: - not listed in the HMIS - locally purchased through base supply, medical supply, or civil engineering supply channels. Verify that BES maintains a file of MSDSs for all hazardous materials used in the industrial facilities on the installation.

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3-27. Installations must have MSDSs for each hazardous chemical procured, stored, or used onsite (FGS-FRG 5-11; AFOSH STD 161-21, para 5c).	Verify that an MSDS is readily accessible for each hazardous chemical in the workplace during each work shift. (4)(5) Verify that each work center maintains a file of MSDSs for each hazardous material procured, stored, or used at the work center. (NOTE: FGS-FRG permits documents equivalent to MSDSs to be kept in work areas.)

3-28. The contents of MSDSs must meet specific criteria (FGS-FRG 5-10.)	Verify that the MSDSs (or equivalent documents) are maintained in both English and German and contain at least the following information: (2)(5)
	
	- the identity used on the label:
	  - if the hazardous chemical is a single substance, the chemical and common name of the substance
	  - if the hazardous chemical is a mixture that has been tested as a whole to determine its hazards, the chemical and common name(s) of the ingredients that contribute to these known hazards and the common names(s) of the mixture itself
	  - if the hazardous chemical is a mixture that has not been tested as a whole:
	  - the chemical and common name(s) of all ingredients that have been determined to be health hazards and that comprise 1 percent or greater (0.1 percent or greater for carcinogens) of the composition
	  - the chemical and common name(s) of all ingredients that have been determined to be health hazards and that comprise less than 1 percent (0.1 percent for carcinogens) of the mixture, if there is evidence that the ingredient(s) could be released from the mixture in concentrations that would exceed an established OSHA permissible exposure limit (PEL), or could present a health hazard to personnel
	  - the chemical and common name(s) of all ingredients that have been determined to present a physical hazard when present in the mixture
	- physical and chemical characteristics of the hazardous chemical (such as vapor pressure, flash point, etc.)
	- physical hazards of the chemical, including the potential for fire, explosion, and reactivity
	- health hazards of the chemical, including signs and symptoms of exposure and any medical conditions that are generally recognized as being aggravated by exposure to the chemical
	- primary route(s) of entry (e.g., inhalation, skin absorption, ingestion, etc.)
	- OSHA PELs and any other pertinent exposure limit
	- whether the chemical has been found to be a potential carcinogen
	- any generally applicable precautions for safe handling and use, including appropriate hygienic practices, protective measures during repair and maintenance of contaminated equipment, and procedures for cleanup of spills and leaks

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3-28. (continued)	- any generally applicable control measures, such as appropriate engineering controls, work practices, or personal protective equipment - emergency and first aid procedures - date of preparation or last change - name, address, and telephone number of the chemical manufacturer, importer, employer, or other responsible party preparing or distributing the MSDS who can provide additional information on the chemical and appropriate emergency procedures.
FLAMMABLE/ COMBUSTIBLE LIQUIDS	(NOTE: The requirements of DOD 4145.19-R-1 and AFOSH STD 127-43 apply whether or not the storage area under consideration is classified as a HMSA. FGS-FRG incorporates the requirements of DOD 4145.19-R-1 by reference. Therefore, since the requirements of the AFOSH STD are substantially identical to those of DOD 4145.19-R-1, all citations to the AFOSH STD must be considered to be requirements of FGS-FRG as well. DOD 4145.19-R-1 is cited directly only where its requirements are not found in the AFOSH STD.)
Handling	

3-29. Flammable/combustible liquids must be handled according to specific procedures (FGS-FRG 5-4 and AFOSH STD 127-43, para 4g).	Verify that the following procedures are followed when flammable/combustible materials are handled: (1)(2)(4)
	- transfer of liquids from or into vessels, containers, or portable tanks within a building takes place only by means of the following methods:
	  - a closed piping system
	  - safety cans
	  - a device drawing from the top
	  - from a container or tank by gravity through an approved self-closing valve
	- transfer of liquids from a safety can is by means of a device drawing through the top
	- transfer of liquids from a container or tank is done by gravity through an approved self-closing valve
	- approved safety cans are used for transporting and dispensing flammable liquids in quantities of 19 L (5 gal) or less
	- flammable liquids are kept in covered containers when not actually in use
	- Class I liquids are only used when there are no open flames or other sources of ignition.
	
	Verify that safety cans and other portable containers of flammable liquids having a flashpoint at or below 80 °F [26 °C] are painted red with some additional clearly visible identification either in the form of a yellow band around the can or the name of the contents conspicuously stenciled or painted on the can in yellow.
	
	(NOTE: This provision does not apply to shipping containers.)

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FLAMMABLE/ COMBUSTIBLE LIQUIDS **General Storage Requirements**	
3-30. Flammable or combustible liquids must not be stored in ways that limit the use of exits, stairways, or areas normally used for the safe egress of people (FGS-FRG 5-4 and AFOSH STD 127-43, para 4d(1)).	Verify that exits or common traffic routes are not blocked. (1)(4)
3-31. Specific MPs should be considered when storing and handling flammable/ combustible materials (MP).	Verify that the installation observes the following MPs: (1)(4) - no positive sources of ignition (open flames, welding, radial heat, mechanical sparks) are in the immediate area - no items are stored against pipes or coils that produce heat - paint drums that are stored horizontally are rolled a half turn every 90 days - containers of paint are palletized prior to storage - aerosol containers are stored in well ventilated areas. (NOTE: These MPs are suggested in DOD 4145.19-R-1.)
3-32. Containers of flammable and combustible liquids must meet specific design and capacity standards (FGS-FRG 5-4 and AFOSH STD 127-43, para 4a).	Verify that containers meet the design and capacity standards in Table 3-2. (1)(2)(4)
3-33. Plastic containers should not be used to store certain liquids in general purpose warehousing (MP).	Verify that plastic containers are not used to store Class I or II liquids in general purpose warehousing. (1)

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3-34. Containers of flammable/combustible materials must be stored and handled in accordance with specific requirements (FGS-FRG 5-4 and DOD 4145.19-R-1, para 5-404i).	Verify that containers are stored and handled such that: (1)(2)(4)(5) - open flame devices are not in use in the storage area - combustible materials, other than wood pallets used in the storage of flammable/combustibles, are not stored in the storage facility - labels are not damaged - materials received without a date of manufacture label are marked with the shipping document date - leaking containers are removed from the storage area immediately - containers are stored so that they are issued or used in the order of dates of manufacture, with the oldest material used first - there are no open containers - containers are inspected periodically while in storage.
3-35. Flammable/combustible storage areas must meet certain fire protection standards (FGS-FRG 5-4 and AFOSH STD 127-43, para 4f).	Verify that flammable/combustible storage locations meet the following requirements: (1)(2)(4)(5) - at least one portable fire extinguisher rated not less than 10-BC is located outside the door of any room used for storage and within 3 m (10 ft) of the door opening - at least one portable fire extinguisher rated not less than 20-BC is located within 3 to 7.5 m (10 to 25 ft) of any Class I or Class II liquid storage area outside of a storage room, but inside a building - fire extinguishing systems are sprinklers, water spray, or other USAF approved systems - open flames and smoking are not permitted within 15 m (50 ft) of flammable/combustible liquid storage areas - water reactive materials are not stored in the same room with flammable/combustible liquids, except for small quantities that can be stored in laboratories - containers and portable tanks used for Class I liquids are electrically bonded and grounded during transfer of liquids - liquid containers are protected from heat sources. Verify that the installation takes positive measures to eliminate sources of ignition, such as open flames, electrical smoking, cutting and welding, hot surfaces, static, mechanical sparks, radiant heat, and spontaneous ignition.

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FLAMMABLE/ COMBUSTIBLE LIQUIDS **Storage Cabinets**	
3-36. Flammable and combustible liquid storage cabinets must meet specific structural requirements (FGS-FRG 5-4 and AFOSH STD 127-43, para 4b(2)).	Verify that flammable and combustible storage cabinets meet the following structural requirements: (1)(2)(4)(5) - all cabinets are constructed to limit internal temperature to no more than 163 °C (325 °F) when subject to the standard 10-min fire test specified in NFPA 251-196 - the bottom, top, door, and sides of metal cabinets are at least 18 gauge sheet steel and double-walled with 1.5 in. [3.81 cm] air space, and joints are riveted or welded - the doors of metal cabinets have a three-point lock and the door sill is raised at least 2 in. [5.08 cm] above the bottom of the steel cabinet - existing wood cabinets are knot free and of at least 1 in. [2.54 cm] nominal thickness, and all joints are rabbeted and fastened in two directions with flat-head wood screws.
3-37. Flammable and combustible liquid storage cabinets are subject to specific limitations on their contents (FGS-FRG 5-4 and AFOSH STD 127-43, para 4b(1)).	Verify that the following storage requirements are met: (1)(2)(4)(5) - no more than 455 L (120 gal) of Class I, Class II, and Class IIIA liquids are stored in any cabinet - no more than 227 L (60 gal) of the 455 L (120 gal) are Class I or II liquids.
3-38. Flammable/combustible liquid storage cabinets should meet specific requirements (MP).	Verify that cabinets are fire resistant. (1)(2)(4)(5) Verify that newly purchased cabinets are of steel rather than wood. Verify that materials within storage cabinets are segregated. Verify that there are no open containers within cabinets. Verify that all containers in cabinets are labeled. Verify that cabinets are constantly closed. Verify that cabinets are conspicuously labeled: FLAMMABLE--KEEP FIRE AWAY.

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3-39. Installations must not have more than three cabinets in a single fire area (FGS-FRG 5-4 and AFOSH STD 127-43, para 4b(1)).	Verify that no more than three cabinets are located in a single fire area. (1)(2)(4)(5) (NOTE: This requirement does not apply to industrial areas.) (NOTE: The limit of three cabinets in a single area may be increased where small cabinets are used; however, the maximum amount of flammable storage cannot exceed 1365 L (360 gal) total.) (NOTE: Additional cabinets may be located in the same fire area of an industrial area if the additional cabinet, or group of not more than three 455 L (120-gal) cabinets, is separated from other cabinets or group of cabinets by at least 30.5 m (100 ft).)
FLAMMABLE/ COMBUSTIBLE LIQUIDS **Storage Rooms**	
3-40. Indoor flammable/ combustible storage rooms must meet specific standards (FGS-FRG 5-4 and AFOSH STD 127-43, para 4c).	Verify that the installation's flammable/combustible storage rooms have: (1)(2)(4) - walls that meet fire resistance test NFPA 251-1969 - liquid tight wall/floor joints - self-closing fire doors (NFPA 80) - one clear aisle at least 3 ft [0.91 m] wide - a continuous mechanical exhaust ventilation system. Verify that a 4-in. [10.16-cm] raised sill or ramp is provided to adjacent rooms or buildings or that the floor of the storage area is 4 in. [10.16 cm] lower than the surrounding floors. Verify that, if a sill or ramp is not present, the building has an open grated trench that drains to a safe area. Verify that wooden shelving, flooring, dunnage, scuffboards, and/or floor overlay is at least 1 in. [2.54 cm] thick. Verify that electrical wiring and equipment meet NFPA 70 requirements. Verify that dispensing is done by an approved pump or self-closing faucet. Verify that storage in the rooms meets the requirements in Table 3-3. Verify that mechanical exhaust systems are controlled by a switch outside the door and have exhaust outlets on exterior walls. Verify that makeup and exhaust air openings are within 12 in. [30.48 cm] above the floor on one side of the room with one or more makeup air inlets located on the opposite wall.

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3-40. (continued)	Verify that air movement occurs across all portions of the floor, as far as practical. Verify that containers of over 114 L (30 gal) capacity are not stacked one upon the other.
FLAMMABLE/ COMBUSTIBLE LIQUIDS **Storage Buildings**	
3-41. Flammable/combustible liquids stored in buildings where storage rooms or cabinets are not used must meet specific standards (FGS-FRG 5-4 and AFOSH STD 127-43, para 4d(2) and 4d(4)).	Verify that containers in indoor storage areas are tightly sealed. (1)(2)(4) (NOTE: This provision does not apply when container contents are transferred, poured, or applied.) Verify that flammable paints, oils, and varnishes in 3.8-L or 19-L (1-gal or 5-gal) containers used for building maintenance are stored temporarily in closed containers at the job site for fewer than 10 calendar days. Verify that the storage of flammable/combustible liquids does not physically obstruct means of egress from the building or area.
3-42. Flammable and combustible liquid storage buildings must meet specific structural requirements (FGS-FRG 5-4 and AFOSH STD 127-43, para 4d(3)).	Verify that flammable/combustible storage buildings are one story and devoted principally to the handling and storing of flammable or combustible liquids. (1)(2)(4) Verify that such buildings have 2-h fire-rated exterior walls with no openings within 3 m (10 ft) of the storage area.

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3-43. The storage of flammable/combustible liquids in warehouses or storage buildings must meet specific requirements (FGS-FRG 5-4 and AFOSH STD 127-43, para 5d).	Verify that the following requirements are met: (1)(2)(4)(5) - if the storage building is located 15 m (50 ft) or fewer from a building or line of adjoining property that may be built upon, the wall facing the building or property line is a blank wall with a fire-resistance rating of at least 2 h - any quantity of liquids may be stored as long as the storage arrangements outlined in Table 3-4 are met - stacked containers are separated by pallets or dunnage when necessary to provide stability and prevent excess stress on container walls - portable tanks stored over one tier high are designed to nest securely - no stack is closer than 1 m (3 ft) to the nearest beam, chord, girder, or other obstruction - piles are 1 m (3 ft) below sprinkler deflectors or discharge points of water spray or other fire protection system - containers have clearly legible labels that identify contents and indicate hazards - aisles are at least 1 m (3 ft) wide when necessary for access to doors, windows, or standpipe connections.
FLAMMABLE/ COMBUSTIBLE LIQUIDS **Outdoor Storage**	
3-44. Installations must meet specific requirements with regard to flammable/combustible materials stored outside (FGS-FRG 5-4 and AFOSH STD 127-43, para 4e).	Verify that no more than 4169 L (1100 gal) of flammable/combustible liquids are stored adjacent to buildings. (1)(2)(4)(5) Verify that the quantity and arrangement of materials is in accordance with Table 3-4. Verify that the storage area is graded to divert spills or is surrounded by a curb at least 15 cm (6 in.) high. Verify that drains terminate in a safe location.
3-45. When flammable/ combustible liquids are stored outside, specific procedures and practices should be followed (MP).	Verify that no leaking or severely corroded drums are present. (1)(2)(4)(5) Verify that drums stored in outdoor storage areas are placed horizontally (on sides) in double rows, butt-to-butt, with closures (bungs and vents) facing outward. Verify that the end drum of the bottom tier is braced to prevent rolling.

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FLAMMABLE/ COMBUSTIBLE LIQUIDS	
Industrial Storage Areas	(NOTE: Checklist items 3-46 through 3-48 pertain to industrial areas in which the use of flammable or combustible liquid is incidental to the principal business or where flammable or combustible liquids are handled or used only in unit physical operations that do not involve chemical reactions.)

3-46. Areas in which flammable/combustible materials are stored, dispensed, or used in industrial plants should meet specific guidelines (MP).	Verify that the following requirements are met: (1)(2)(4)(5)
	- portable fire extinguishers and fire control equipment are in place in quantity and type as needed for the hazards of operation and storage at the site
	- adequate precautions are taken to prevent sources of ignition at the site
	- Class I liquids are not dispensed into containers unless nozzles and containers are electrically interconnected
	- operations such as welding and cutting for repairs to equipment are done under the supervision of an individual in charge
	- maintenance and operating practices control leakage and prevent the accidental escape of flammable or combustible liquids:
	  - adequate aisles are maintained
	  - combustible waste materials and residues are kept to a minimum, stored in covered metal containers, and disposed of daily
	  - the grounds area around the buildings and unit operating areas are kept free of weeds, trash, or other unnecessary combustibles
	- tank vehicle and tank car loading or unloading facilities are separated from aboveground tanks, warehouses, and other plant buildings or nearest line of adjoining property by a distance of 25 ft [≈7 m] for Class I liquids and 15 ft [≈5 m] for Class II and III liquids.

3-47. Installations must meet specific requirements with regard to incidental storage of flammable/combustible liquids in industrial areas (FGS-FRG 5-4 and AFOSH STD 127-43, para 4h).	Verify that the following requirements are met in industrial areas: (1)(2)(4)(5) - storage is in metal cabinets stenciled FLAMMABLE--KEEP FIRE AWAY - storage is limited to 4 L (1 gal) of Class I or 40 L (10 gal) of Class II and III liquids - amount of liquid stored in the cabinet does not exceed 40 L (10 gal) - containers in the cabinet are closed - storage is limited to a 5-day supply - each work center has only one cabinet. Verify that the fire department was consulted prior to the establishment of incidental storage areas in industrial shops.

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3-48. Areas in which flammable/combustible liquids are used in unit operations, such as mixing, drying, evaporating, filtering, or distilling, should meet specific operating standards (MP).	Verify that the following requirements are met: (1)(2)(4)(5) - areas are located so that each building or unit of equipment is accessible from at least one side for fire fighting - areas in which unstable liquids are handled or small scale unit chemical processes are carried on are separated from the remainder of the area by a fire wall of 2 h minimum fire resistance rating - emergency drainage systems direct leakage and fire protection water to a safe location - emergency drainage systems, if connected to public sewers or discharged into public waterways, are equipped with traps or a separator - when Class I liquids are being used, ventilation is provided at a rate of not less than 1 $ft^3/min/ft^2$ of solid floor area through either natural or mechanical means - equipment is designed to limit flammable vapor-air mixtures.
BATTERIES	
3-49. Lead-acid batteries that are to be recycled must be managed as hazardous material (FGS-FRG 6-10).	Verify that lead-acid batteries that are to be recycled are managed as hazardous material. (2) (NOTE: It is the goal of the German government to have all lead-acid batteries recycled.)
OXIDIZERS AND/OR TOXIC SUBSTANCES	(NOTE: The requirements of this section apply whether or not the storage facility is classified as a HMSA.)
3-50. Packages or containers of oxidizers must not be filled in a storage area if the process generates dust (FGS-FRG 5-5a(1)).	Verify that no packages or containers of oxidizers are filled in a storage area if the process generates dust. (1)(2)(4)(5)
3-51. Leaked or spilled oxidizers must be handled in accordance with specific criteria (FGS-FRG 5-5a(3)).	Verify that combustible substances are not used to absorb leaked or spilled oxidizers. (2)(3)(4) (NOTE: Suitable binding materials include silica, sand, and cement.) Verify that material that has leaked out of packages is disposed of immediately as hazardous waste. Verify that contaminated water and/or absorption materials are disposed of as hazardous waste.

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3-51. (continued)	(NOTE: See Section 4, *Hazardous Waste Management.*)
3-52. Vessels of certain types that contain oxidizers or toxic substances must be handled in accordance with specific criteria (FGS-FRG 5-5a(4)).	Verify that breakable containers (e.g. glass, china, stone) of oxidizers or toxic substances are stacked higher than 0.4 m from the floor only if such containers are surrounded by a solid webbed package. (1)(2)(4) Verify that nonbreakable packages of oxidizers or toxic substances are stacked in such a way that they will not fall more than 1.5 m.
3-53. Installations must comply with specific criteria if packages of oxidizers or toxic substances have to be stacked in such a way that they may fall more than 1.5 m (FGS-FRG 5-5a(5)).	Verify that the installation considers the following prior to such storage: (1)(2)(4) - *Occupational Guidelines for Storage Institutions and Instruments* (ZH 1/428) - *M-19: Securing of Palletized Storage Units.* (NOTE: FGS-FRG gives an address from which these documents may be obtained.) Verify that only trained forklift operators are used for operations involving the stacking of packages of oxidizers or toxic substances that have to be stacked in such a way that they may fall more than 1.5 m. Verify that, if the installation uses contracted forklift operators, such operators are trained in accordance with the Chemical Industry Cooperative guidelines *Principles for Choosing, Training, and Certification of Forklift Drivers.* Verify that barrels are stacked only by forklifts that are equipped with a barrel-gripper device.
3-54. Toxic substances that are flammable must be separated from certain reactive materials (FGS-FRG 5-5b).	Verify that toxic substances that are flammable are separated from the following reactive materials: (1)(2)(4) - very active oxidizers - oxidizers - self-igniting substances - organic peroxides - substances that develop flammable gases if they come into contact with water - pressurized gases - frozen, liquefied gases - ammonium nitrate fertilizer.

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COMPRESSED GASES	
3-55. Installations must meet specific requirements with regard to storage of compressed gases in roofed, open-sided sheds (FGS-FRG 5-4 and DOD 4145.19-R-1, para 5-405d(1)).	Verify that the compressed gas storage sheds meet the following requirements: (1)(2)(4)(5) - they are on concrete slabs above grade - they are located in a secured area - they are separated from other buildings by at least 15 m (50 ft) - if they have one or more sides, provisions are made to ensure complete change of air at least six times per hour - they are unheated. Verify that flammable gases and gases that support combustion are stored in separate sheds with at least 15 m (50 ft) between sheds. Verify that, if necessary, stationary or rotating roof vents are used to lower temperature near ceilings to ambient conditions during warm weather. Verify that cylinders and portable tanks have pressure relief devices installed.
3-56. Storage of compressed gas cylinders in enclosed storage facilities must meet certain criteria (FGS-FRG 5-4 and DOD 4145.19-R-1, para 5-405d(2)).	Verify that the compressed gases storage areas meet the following requirements: (1)(2)(4)(5) - buildings are one story in height, above grade, of noncombustible construction - separate storage compartments or rooms are available for flammable gases and gases that support combustion - at least one wall of each storage room or compartment for combustible gases is an exterior wall - every storage room or compartment is provided with either a gravity or a mechanical exhaust ventilation system designed to provide complete change of air at least six times per hour - buildings are not heated - cylinders and portable tanks have pressure relief devices installed.
3-57. Compressed gases must be handled in accordance with specific good practices (FGS-FRG 5-4 and DOD 4145.19-R-1, para 5-405c(6) through 5-405c(9), para 5-405c(14), and para 5-405c(22)).	Verify that the following practices and procedures are observed in the handling of compressed gases: (1)(2)(4)(5) - oxygen cylinders are free from grease or oil - numbers or markings that are stamped on the cylinders are not altered or defaced - additional markings are not applied to cylinders without approval - empty cylinders are stored separately but in the same manner as full cylinders - valves on empty cylinders are closed - NO SMOKING signs are posted in and around compressed gas storage sheds.

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ACID STORAGE	
3-58. Installations must meet specific requirements with regard to the storage and handling of acids in bulk (FGS-FRG 5-4 and DOD 4145.19-R-1, para 5-406).	Verify that the bulk acid storage areas meet the following: (1)(2)(4)(5) - buildings are one story in height, of noncombustible or fire-resistant construction - permanent louvered openings at floor and ceiling levels or other gravity ventilation methods are provided - safety equipment is available and operational (eye wash, deluge shower, self-contained breathing apparatus, protective clothing) - buildings are heated to prevent freezing (if applicable) - different acids are stored separately in designated areas - NO SMOKING signs are posted - there are either floor drains or wall scuppers, if the building has automatic sprinkler protection - workers are provided with protective safety equipment and a copious, flowing supply of fresh, clean water for first aid. (NOTE: Acid storage buildings should have automatic sprinkler protection.) (NOTE: In lieu of aisle space, noncombustible barriers that are at least 3 ft [≈ 1 m] high and sealed at floor level may be used to obtain maximum storage space.)
3-59. Workers in facilities where acids are stored in bulk should be provided with a copious, flowing supply of fresh, clean water for first aid (MP).	Verify that workers in facilities where acids are stored in bulk are provided with a copious, flowing supply of fresh, clean water for first aid. (2)(4)
HAZARDOUS MATERIAL STORAGE AREAS	(NOTE: Hazardous material storage facilities that store less than 200 kg of toxic materials or oxidizers (as identified by MSDS or competent component authorities) or less than 50 kg of very toxic materials (see definition) are not classified as HMSAs.)
Design Requirements	
3-60. HMSAs must meet security and sign requirements (FGS-FRG 5-16).	Verify that the unauthorized entry of persons or livestock into HMSAs is prevented. (2)(4) Verify that the HMSA is secure against unauthorized entry and theft. Verify that each HMSA has a sign posted in English and German that reads as follows: ACCESS TO UNAUTHORIZED PERSONNEL IS FORBIDDEN.

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3-61. HMSAs must be configured in such a way that surface waters and groundwater are not endangered (FGS-FRG 5-4a(2)).	Verify that the HMSA is configured in such away that surface waters and groundwater are not endangered. (2)(4) Verify that the HMSA is protected from high water and flooding.
3-62. HMSAs must have adequate systems to exhaust smoke and heat (FGS-FRG 5-4a(5)).	Verify that the HMSA has adequate systems to exhaust smoke and heat. (2)(4)
3-63. HMSAs that store toxic materials must meet specific requirements (FGS-FRG 5-4a(3), 5-4a(4), and 5-4a(8)).	Verify that HMSAs that store toxic materials are well lit. (2)(4) Verify that the lighting system does not heat the toxic substances. Verify that all lights are at least 0.5 m from the toxic materials. Verify that the floor of the HMSA is leakproof. Verify that toxic substances are kept in closed packages or containers that do not leak. Verify that, if leaks are detected, the packages or containers are removed and the substances repackaged. Verify that smoking, open flames, and fires are prohibited in areas in which toxic substances are stored.
3-64. Certain HMSAs must have automatic fire alarm systems (FGS-FRG 5-4a(10) and 5-4a(11)).	Verify that HMSAs that store over 200 kg of toxic substances and have more than 20 metric tons per storage section have an automatic fire alarm system. (2)(4) Verify that HMSAs that store over 50 kg of very toxic substances and have more than 10 metric tons per storage section have an automatic fire alarm system. (NOTE: The above requirement does not apply if the fire department has approved another fire detection system.)
3-65. Certain HMSAs must have lightning protection systems (FGS-FRG 5-4d).	Verify that HMSAs where oxidizers (over 200 kg) and combustible goods are stored have suitable lightning protection systems. (2)(4) Verify that, unless all the stored materials are noncombustible, buildings where toxic and/or very toxic substances with a total weight of more than 5 metric tons are stored have suitable lightning protection systems.

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3-65. (continued)	Verify that all such lightning protection systems are tested every 3 yr.
HAZARDOUS MATERIAL STORAGE AREAS	
Operating Procedures	
3-66. No medicine, food, food additives, tobacco products, consumable alcohol, or cosmetics may be stored in an HMSA (FGS-FRG 5-5a(2)).	Verify that no medicine, food, food additives, tobacco products, consumable alcohol, or cosmetics are stored in an HMSA. (2)(4)
3-67. HMSAs must be operated in such a way that surface waters and groundwater are not endangered (FGS-FRG 5-4a(2)).	Verify that the HMSA is operated in such away that surface waters and groundwater are not endangered. (2)(4)
3-68. All safety devices and systems must be regularly certified to be in good working order (FGS-FRG 5-4a(5)).	Verify that all safety devices and systems are regularly certified to be in good working order. (2)(4) (NOTE: The following are examples of safety devices and systems: - fire alarms - fire extinguisher plants (= fire extinguishing equipment?) - smoke and heating take-off devices (*sic*) - fire doors - lightning rods.)
3-69. HMSAs must not be operated if any defects are present that may endanger human health or the environment (FGS-FRG 5-4a(5)(a)).	Verify that no HMSA is operated if any defects are present that may endanger human health or the environment. (2)(4)

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3-70. Required maintenance work must be done without delay and with appropriate safety measures (FGS-FRG 5-4a(5)(b)).	Verify that required maintenance of HMSAs is done without delay. (2)(4) Verify that maintenance personnel take appropriate safety precautions.
3-71. POL from machinery used in HMSAs that store oxidizers must be cleaned up and disposed of immediately (FGS-FRG 5-4a(6)).	Verify that POL from machinery (such as fork lifts) used in HMSAs that store oxidizers is cleaned up and disposed of immediately. (2)(4) (NOTE: See Section 8, *POL Management*.)
3-72. Installations must meet specific requirements with regard to the compatibility of certain materials stored in HMSAs (FGS-FRG 5-4a(7) and 5-4a(9)).	Verify that combustible materials that are easily ignited (such as paper, textiles, wood, excelsior, hay, straw, cartons) are not stored either with oxidizers or with toxic materials. (2)(4) Verify that, where oxidizers are stored, items such as pallets, dunnage, packing fill, and the like are either made of nonflammable materials or treated to be nonflammable. (NOTE: The above requirement does not apply to the actual packaging that these hazardous materials come in.) Verify that flammable substances are stored with substances that are both toxic (or very toxic) and combustible only if the requirements for the storage of both toxics and combustibles are met. Verify that extremely flammable substances are stored with substances that are both toxic (or very toxic) and flammable only if the requirements for the storage of both toxics and flammables are met.
3-73. Emergency drills must be conducted annually at each HMSA (FGS-FRG 5-15c).	Verify that emergency drills are conducted annually at each HMSA. (2)(4)

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HAZARDOUS MATERIAL STORAGE AREAS **Additional Requirements for Hazardous Material Warehouses**	
3-74. Installations must meet specific requirements with regard to hazardous material warehouses (FGS-FRG 5-4b(1)).	Verify that oxidizing substances are not stored in multi-story buildings. (2)(4) Verify that toxic substance storage sections are separated from other storage sections, rooms, and buildings by fire-resistant walls and ceilings made of noncombustible materials with a 90-min fire rating. Verify that liquid oxidizing substances are stored in such a way that they will not leak out in an uncontrolled manner and mix with other hazardous material. Verify that there is secondary containment with a volume that will contain at least 10 percent of the liquid volume of all stored packages and moveable vessels and at least 100 percent of the volume of the largest liquid-containing vessel. Verify that buildings where toxic materials are stored are ventilated in such a way that fumes or other emissions will never reach a level that could be considered dangerous or a health hazard. (NOTE: It is the opinion of HQ USAFE/JAM that the definition of 'toxic' which applies *in this instance only* is the following, from 29 CFR 1910.20(c)(13) via AFJMAN 23-201 and AFJMAN 23-209: " 'Toxic substance or harmful physical agent' means any chemical substance, biological agent (bacteria, virus, fungus, etc.), or physical stress (noise, heat, cold, vibration, repetitive motion, ionizing and non-ionizing radiation, hypo - or hyperbaric pressure, etc.) which: (i) Is listed in the last printed edition of the National Institute for Occupational Safety and Health (NIOSH) Registry of Toxic Effects of Chemical Substances (RTECS); or (ii) Has yielded positive evidence of an acute or chronic health hazard in testing conducted by, or known to, the employer; or (iii) Is the subject of a material safety data sheet kept by or known to the employer indicating that the material may pose a hazard to human health.) (NOTE: Any ventilation system that results in an emission into the atmosphere must meet the requirements of FGS-FRG Chapter 2, *Air Emissions*. See Section 1, *Air Quality Management*, of this manual.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
HAZARDOUS MATERIAL STORAGE AREAS **Additional Requirements for Outdoor HMSAs**	
3-75. Outdoor HMSAs must meet specific requirements with regard to (FGS-FRG 5-4b(2)).	Verify that outdoor storage areas for toxic substances are separated from other adjacent storage areas or buildings by fire-resistant walls made of noncombustible materials with a 90-min fire wall rating. (2)(4) Verify that the walls are at least 1 m higher than the stored material. Verify that toxic materials are at least 5 m from the doorway to any building. Verify that outdoor toxic material storage of more than 20 metric tons per storage section without an automatic fire alarm system is patrolled hourly by someone with a communications device such as a telephone, fire-alarm, or radio set. Verify that oxidizers and toxic substances have secondary containment with a volume that will contain at least 10 percent of the liquid volume of all stored packages and moveable vessels and at least 100 percent of the volume of the largest liquid-containing vessel.
SPECIAL HAZARDOUS MATERIAL STORAGE AREAS **Design Requirements**	(NOTE: The requirements of this section apply only to HMSAs in which more than 200 kg of toxic materials or 50 kg of very toxic materials are stored. They apply in addition to the requirements of all previous sections.)
3-76. HMSAs where more than 200 kg of toxic materials or 50 kg of very toxic materials are stored must have an approach road for the fire department and must be accessible on two sides (FGS-FRG 5-4c(11)).	Verify that such HMSAs have an approach road for the fire department and are accessible on two sides. (2)(3)(4)

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COMPLIANCE CATEGORY: HAZARDOUS MATERIALS MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
SPECIAL HAZARDOUS MATERIAL STORAGE AREAS **Operating Procedures**	
3-77. Substances that require different fire-extinguishing agents must not be stored together in HMSAs where more than 200 kg of toxic materials or 50 kg of very toxic materials are stored (FGS-FRG 5-4c(3)).	Verify that substances that require different fire-extinguishing agents are not stored together in HMSAs where more than 200 kg of toxic materials or 50 kg of very toxic materials are stored. (2)(4)
3-78. Approval must be sought before certain kinds of work take place in or near HMSAs where more than 200 kg of toxic or 50 kg of very toxic wastes are stored (FGS-FRG 5-4c(12)).	Verify that work in such HMSAs which involves the following has the approval of the IC or his/her designated representative: (2)(3)(4)(5) - welding - flame-cutting torches - abrasive friction cutting tools - open flame.
SPECIAL HAZARDOUS MATERIAL STORAGE AREAS **Fire Suppression**	
3-79. HMSAs for toxic materials with an area of 50 m^2 or more must be equipped with fire extinguishers (FGS-FRG 5-4c(4)).	Verify that HMSAs for toxic materials with an area of 50 m^2 or more are equipped with at least a 12 kg powder extinguisher (ABC powder). (2)(4) Verify that, for each additional 100 m^2 of area, there is an additional 10 kg powder extinguisher. Verify that an HMSA with an area greater than 2000 m^2 also has a moveable 5 kg powder extinguisher.

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COMPLIANCE CATEGORY: HAZARDOUS MATERIALS MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
3-80. Installations must meet specific requirements for HMSAs where toxic or very toxic materials are stored and where water is used as the primary fire suppression system (FGS-FRG 5-4c(5) through 5-4c(8)).	Determine whether the HMSA meets both the following conditions: (2)(4) - more than 200 kg of toxic materials or 50 kg of very toxic materials are present - water is used as the primary fire suppression system. Verify that there is appropriate equipment. (NOTE: The following are examples of appropriate equipment: - wall hydrants with rolling hoses/tubes - pipes with a diameter of 50 mm or more.) Verify that there is a sufficient quantity of water. Verify that hydrants are installed outside the HMSA. Verify that hydrants are accessible and functional at all times. Verify that hydrants are secured against freezing. Verify that, for each 100 m^2 of storage area, a water flow of 200 L/min at a pressure of 3 bar is maintained at the discharge point. Verify that the volume of an independent fire fighting water supply (e.g., from fire-fighting storage ponds or tanks) contains an amount equivalent to at least 200 L/min for each 100 m^2 of storage area for 2 h. (NOTE: The preceding requirement with respect to an independent fire-fighting water supply does not apply to high-bay storage areas.) Verify that the stored material is directly reached by the extinguishing agent in high-bay storage areas that have automatic extinguishing devices (such as sprinklers or spray water extinguishing systems).
3-81. Sprinkler nozzles, smoke detectors, and other fire suppression equipment must be installed in such a way that they will not be damaged by the movement of pallets (FGS-FRG 5-4c(9)).	Verify that sprinkler nozzles, smoke detectors, and other fire suppression equipment are installed in such a way that they will not be damaged by the movement of pallets. (2)(4)

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COMPLIANCE CATEGORY: HAZARDOUS MATERIALS MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
3-82. Certain facilities that store highly reactive substances must keep appropriate extinguishing agents on hand (FGS-FRG 5-4c(10)).	Determine whether the facility meets both the following conditions: (2)(4) - more than 200 kg of toxic materials or 50 kg of very toxic materials is present - the facility is used to store highly reactive substances (see Table 3-5). Verify that appropriate extinguishing agents are on hand and readily available in sufficient quantity to fight a fire. (NOTE: Consult with the fire department if there are questions as to what extinguishing agents are appropriate for different hazardous materials.)
SPECIAL HAZARDOUS MATERIAL STORAGE AREAS **Documentation**	
3-83. Each HMSA that stores over 200 kg of toxic materials or 50 kg of very toxic materials must have an operations plan that meets specific requirements (FGS-FRG 5-4a(1)).	Verify that each such HMSA has an operations plan. (2)(4) Verify that the operations plan contains information on the following: - the maximum admissible storage amount (based on the design and operational capacity of the facility) - the separation of materials - the type and amount of stored goods within the facility - personnel protection practices - available equipment. Verify that the plan corresponds to the HMSA building design. Verify that the plan is kept up-to-date and is checked at least once each month to ensure that it accurately represents what is stored in the HMSA. Verify that a copy is kept outside the HMSA in an accessible place.
3-84. Each HMSA that stores over 200 kg of toxic materials or 50 kg of very toxic materials must have a fire protection plan that meets specific requirements (FGS-FRG 5-4c(1)).	Verify that each such HMSA has a fire protection plan. (2)(4) Verify that the plan contains the following: - the specific DOD HMSA fire protection requirements - special considerations due to the location of the HMSA (e.g., near a residential area) - the degree of danger associated with the stored substances.

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COMPLIANCE CATEGORY: HAZARDOUS MATERIALS MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
3-84. (continued)	Verify that the fire department is consulted when developing the fire protection plan.

3-85. Each HMSA that stores over 200 kg of toxic materials or 50 kg of very toxic materials must have an emergency evacuation plan that meets specific requirements (FGS-FRG 5-4c(2)).	Verify that each such HMSA has an emergency evacuation plan. (2)(3)(4)
	
	Verify that the emergency evacuation plan contains the following:
	
	- the telephone numbers of the fire department, hospital, police, and other key agencies
	- the telephone numbers of the IC and other key persons
	- statements explaining the following:
	  - alarm signals
	  - place of assembly
	  - how and where to turn off the power to the HMSA
	  - evacuation routes
	  - location of fire extinguishing devices.
	- short instructions for personnel to follow during special incidents like fire, earthquake, accidental leakage of stored hazardous materials.
	
	Verify that the emergency evacuation plan is posted in several conspicuous places in and around the storage area.

3-86. A written fire permission document should be created for use in those instances were approval must be sought before certain kinds of work take place at HMSAs where toxic and/or very toxic substances are stored (MP).	Verify that the installation has developed a written fire permission document (such as a permit) for use in those instances were approval must be sought before certain kinds of work take place at HMSAs where toxic and/or very toxic substances are stored. (2)(3)(4)(5) Verify that the document include the following information: - where the work will be performed - the type of work - when the work will be performed - the names of the personnel involved in the work - the name of the supervising expert - the purpose of the work - security measures - the signature of the IC or his/her designated representative. (NOTE: This MP is based on FGS-FRG 5-4c(12).)

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COMPLIANCE CATEGORY: HAZARDOUS MATERIALS MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
TRANSPORTATION	
3-87. Hazardous materials shipments must meet specific standards (FGS-FRG 5-8).	Verify that hazardous materials shipments are accompanied throughout by shipping papers that clearly describe the quantity and identity of the material and include an MSDS. (2)(4)(5)(7) Verify that all drivers of hazardous material shipments are trained and briefed on the hazardous materials in the shipment, including: - health risks of exposure - physical hazards of the material, including the potential for fire, explosion and reactivity. Verify that hazardous materials are identified as "Ignitable," "Corrosive," "Reactive," or "Toxic" in both the shipping papers and the briefing for the driver. Verify that supervisory personnel do a walk-around inspection of the vehicles before and after the material is loaded. Verify that all packages are labeled in accordance with USAFE Reg 75-3, *Joint Transportation of Hazardous Materials.*
3-88. International air shipments of hazardous materials originating from a DOD installation must meet specific standards (FGS-FRG 5-9).	Determine whether the installation ships hazardous materials internationally by air. (7) Verify that international air shipments are accomplished in accordance with the following: - the International Civil Aviation Organization Rules - appropriate DOD and component instructions. (NOTE: FGS-FRG refers the reader to AFR 71-4, which has been superceded by AFJMAN 24-204, *Preparing Hazardous Materials for Military Air Shipments*, of November 1994.)
3-89. Certain practices should be carried out in the course of onsite transportation of hazardous materials between buildings (MP).	Verify that procedures exist to manage movement of hazardous materials throughout the installation. (7) Verify that drivers are trained in spill control procedures. Verify that provisions have been made for securing hazardous materials in vehicles when transporting.

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Table 3-1

Typical Hazardous Material Characteristics

(FGS-FRG Appendix B)

B-1	The item is a health or physical hazard. Health hazards include carcinogens, corrosive materials, irritants, sensitizers, toxic materials, and materials that damage the skin, eyes, or internal organs. Physical hazards include combustible liquids, compressed gases, explosives, flammable materials, organic peroxides, oxidizers, pyrophoric materials, unstable (reactive) materials, and water-reactive materials.
B-2	The item and/or its disposal is regulated by the host nation because of its hazardous nature.
B-3	The item contains asbestos, mercury, or polychlorinated biphenyls (PCBs).
B-4	The item has a flashpoint below 93 °C (200 °F) closed cup, or is subject to spontaneous heating, or is subject to polymerization with release of large amounts of energy when handled, stored, and shipped without adequate control.
B-5	The item is a flammable solid, or is an oxidizer, or is a strong oxidizing or reducing agent with a standard reduction potential of greater than 1.0 V or less than -1.0 V.
B-6	In the course of normal operations, accidents, leaks, or spills, the item may produce dusts, gases, fumes, vapors, mists, or smokes with one or more of the above characteristics.
B-7	The item has special characteristics that, in the opinion of the manufacturer or the DOD Components, could cause harm to personnel if used or stored improperly.

Table 3-2

Maximum Allowable Capacity of Containers and Portable Tanks for Hazardous Materials

(AFOSH STD 127-43, Table 1)

Container Type	Flammable Liquids			Combustible Liquids	
	IA	*IB*	*IC*	*II*	*II*
Glass or approved plastic[1]	1 pt[2]	1 qt[2]	1[3]	1	1
Metal (other than Department of Transportation (DOT drums)	1	5	5	5	5
Safety cans	2	5	5	5	5
Metal drums (DOT specifications)	60	60	60	60	60
Approved portable tanks	660	660	660	660	660

[1] Nearest metric size is also acceptable for the glass and plastic containers listed.

[2] One gallon or nearest metric equivalent size may be used if metal containers must be avoided because of chemical reaction with their contents.

[3] Quantities are in gallons for the rest of this table.

Table 3-3

Storage of Hazardous Materials in Inside Rooms

(AFOSH STD 127-43, Table 2)

Fire Protection Provided[1]	Fire Resistance	Maximum Size	Total Allowable Quantities[2] (gal/ft^2 floor area)
Yes	2 h	500 ft^2	10
No	2 h	500 ft^2	4
Yes	1 h	150 ft^2	5
No	1 h	150 ft^2	2

[1] Fire protection system will be sprinkler, water spray, or other approved method.

[2] If metric containers are being stored, use the nearest metric equivalent.

Table 3-4

Indoor/Outdoor Storage for Flammable/Combustible Materials

(DOD 4145.19-R-1, Tables 5-1 through 5-4)

Indoor Container Storage			
Class Liquid	*Storage Level*	**Protected Storage Maximum per Pile In Gallons*	*Unprotected Storage Maximum per Pile In Gallons*
IA	Ground and upper floors	2750 (50)	600 (12)
	Basement	Not permitted	Not permitted
IB	Ground and upper floors	5500 (100)	1375 (25)
	Basement	Not permitted	Not permitted
IC	Ground and upper floors	16,500 (300)	4125 (25)
	Basement	Not permitted	Not permitted
II	Ground and upper floors	16,500 (300)	4125 (75)
	Basement	5500 (100)	Not permitted
III	Ground and upper floors	55,000 (1000)	13,750 (250)
	Basement	8250 (450)	Not permitted

*A sprinkler or equivalent fire protection system installed in accordance with NFPA Standard 30.

NOTES:

1. When two or more classes of materials are stored in a single pile, the maximum gallonage permitted in that pile must be the smallest of the two or more separate maximum gallonages.

2. Aisles must be provided so that no container is more than 4 m (12 ft) from an aisle. Main aisles must be at least 2-m (8-ft) wide and side aisles at least 1-m (4-ft) wide. (Numbers in parentheses indicate the number of 55-gal drums.)

3. Each pile must be separated from each other by at least 1 m (4 ft).

(continued)

Table 3-4 (continued)

Outdoor Container Storage				
Class Liquid	*Maximum per pile* [1] *(gal)*	*Distance between piles* [2] *(ft)*	*Distance to property line that can be built upon* [1,3] *(ft)*	*Distance to street, alley, public way* [4] *(ft)*
IA	1100	5	20	10
IB	2200	5	20	10
IC	4400	5	20	10
II	8800	5	10	5
III	22,000	5	10	5

[1] When two or more classes of materials are stored in a single pile, the maximum gallonage permitted in that pile must be the smallest of the two or more separate maximum gallonages.

[2] Within 200 ft [60.96 m] of each container, there must be a 12-ft [3.66-m] wide accessway to permit access to fire control apparatus.

[3] The distances listed apply to properties that have protection for exposures as defined. If there are exposures, and such protection for exposures does not exist, the distances in column 4 must be doubled.

[4] When total quantity stored does not exceed 50 percent of maximum per pile, the distance in columns 4 and 5 may be reduced 50 percent, but not to less than 3 ft [0.91 m].

(continued)

Table 3-4 (continued)

Indoor Portable Tank Storage			
Class Liquid	*Storage Level*	**Protected Storage Maximum per Pile In Gallons*	*Unprotected Storage Maximum per Pile In Gallons*
IA	Ground and upper floors Basement	Not permitted Not permitted	Not permitted Not permitted
IB	Ground and upper floors Basement	20,000 Not permitted	2000 Not permitted
IC	Ground and upper floors Basement	40,000 Not permitted	5500 Not permitted
II	Ground and upper floors Basement	40,000 20,000	5500 Not permitted
III	Ground and upper floors Basement	60,000 20,000	22,000 Not permitted

*A sprinkler or equivalent fire protection system installed in accordance with NFPA Standard 30.

NOTES:

1. When two or more classes of materials are stored in a single pile, the maximum gallonage permitted in that pile must be the smallest of the two or more separate maximum gallonages.

2. Aisles must be provided so that no container is more than 4 m (12 ft) from an aisle. Main aisles must be at least 2-m (8-ft) wide and side aisles at least 1-m (4-ft) wide.

3. Each pile must be separated from each other by at least 1 m (4 ft).

(continued)

Table 3-4 (continued)

Outdoor Portable Tank Storage				
Class Liquid	*Maximum per pile* [1] *(gal)*	*Distance between piles* [2] *(ft)*	*Distance to property line that can be built upon* [1,3] *(ft)*	*Distance to street, alley, public way* [4] *(ft)*
IA	2200	5	20	10
IB	4400	5	20	10
IC	8800	5	20	10
II	17,600	5	10	5
III	44,000	5	10	5

[1] When two or more classes of materials are stored in a single pile, the maximum gallonage permitted in that pile must be the smallest of the two or more separate maximum gallonages.

[2] Within 200 ft of each container, there must be a 12-ft [4-m] wide accessway to permit access to fire control apparatus.

[3] The distances listed apply to properties that have protection for exposures as defined. If there are exposures, and such protection for exposures does not exist, the distances in column 4 must be doubled.

[4] When total quantity stored does not exceed 50 percent of maximum per pile, the distance in columns 4 and 5 may be reduced 50 percent, but not to less than 3 ft [0.91 m].

Table 3-5

Reactive substances that must be separated from flammable materials

(Source: FRG-FGS, Appendix D)

UN Number	German Name	English Name
Highly Reactive Substances		
1442	Ammoniumperchlorat	Ammonium perchlorate
1445	Bariumchlorat	Barium chlorate
1447	Bariumperchlorat	Barium perchlorate
1449	Bariumperoxid	Barium peroxide
1450	Bromate, Anorganisch, N.A.G.	Inorganic Bromate (all forms)
1452	Calciumchlorat	Calcium chlorate
1453	Calciumchlorit	Calcium chlorite
1455	Calciumperchlorat	Calcium perchlorate
1461	Chlorate; Anorganisch, N.A.G.	Inorganic chlorate (all forms)
1462	Chlorite; Anorganisch, N.A.G.	Inorganic chlorite (all forms)
1470	Bleiperchlorat	Lead perchlorate
1471	Lithiumhypochlorit, trocken oder Lithiumhypochlorit-mischungen mit mehr als 39% avtivem Chlor (8.8% aktivem Sauerstoff)	Lithium hypochlorite, dry or lithium hypochlorite mixture with more than 39% active Chlorate (8.8 active oxygen)
1472	Lithiumperoxid	Lithium peroxide
1475	Magnesiumperchlorat	Magnesium perchlorate
1479	Entzündend (oxydierend) Wirkende Stoffe, fest, N.A.G.	Flammable (oxidizing) acting materials, solid
1481	Perchlorate; Anorganisch, N.A.G.	Inorganic perchlorate (all forms)
1483	Peroxide, Anorganisch, N.A.G.	Inorganic peroxide (all forms)
1484	Kaliumbromat	Potassium bromate
1485	Kaliumchlorat	Potassium chlorate
1489	Kaliumperchlorat	Potassium perchlorate
1491	Kaliumperoxid	Potassium peroxide
1494	Natriumbromat	Sodium bromate
1495	Natriumchlorat	Sodium chlorate

(continued)

Table 3-5 (continued)

UN Number	German Name	English Name
1496	Natriumchlorit	Sodium chlorite
1502	Natriumperchlorat	Sodium perchlorate
1504	Natriumperoxid	Sodium peroxide
1506	Strontiumchlorat	Strontium chlorate
1508	Strontiumperchlorat	Strontium perchlorate
1510	Tetranitromethan	Tetra nitromethane
1513	Zinkchlorat	Zinc chlorate
1745	Brompentafluorid	Bromine pentafluoride
1746	Bromtrifluorid	Bromine trifluoride
1748	Calciumhypochlorit, trocken oder Calciumhypochloritmischungen mit mehr als 39% aktivem Chlor (8.8% aktivem Sauerstoff)	Calcium hypochlorite, dry or Calcium hypochlorite mixture with more than 39% active chlorine (8.8% active oxygen)
1873	Perchlorsäure, mit mehr als 50%, aber hochstens 72% Säure	Perchloric acid with more than 50%, but less than 72% acid
2015	Wasserstoffperoxid, Stabilisiert oder Wasserstoff peroxid, Wässerige Lösungen, stabilisiert, mit mehr als 60% Wasserstoffperoxid	Hydrogen peroxide stabilized or a water solution of hydrogen peroxide stabilized, with more than 60% hydrogen peroxide
2466	Kaliumsuperoxid	Potassium peroxide
2495	Jopentafluorid	Iodine pentafluoride
2547	Natriumsuperoxid	Sodium peroxide
2723	Magnesiumchlorat	Magnesium chlorate
2741	Bariumhypochlorit	Barium hypochlorite
2880	Calciumhypochlorit wasserhaltig oder Calciumhypochlorit wasserhaltige michungen, mit nicht weniger als 5.5%, jedoch nicht mehr als 10% Wasser	Calcium hypochlorite water solution or calcium hypochlorite water solution mixture, with no less than 5.5% but no more than 10% water
3085	Entzündend (oxydierend) wirkende stoffe, fest, ätzend, N.A.G.	Flammable (oxidizing) acting materials, solid, waste (or spent) (all forms)
3087	Entzündend (oxydierend) wirkende stoffe, fest, giftig, N.A.G.	Flammable (oxidizing) acting materials, solid, poisonous (all forms)
3098	Entzündend (oxydierend) wirkende stoffe, flüssig, ätzend, N.A.G.	Flammable (oxidizing) acting materials, liquid, waste (or spent) (all forms)

(continued)

Table 3-5 (continued)

UN Number	German Name	English Name
3099	Entzündend (oxydierend) wirkende stoffe, flüssig, giftig, N.A.G.	Flammable (oxidizing) acting materials, liquid, poisonous (all forms)
3139	Entzündend (oxydierend) wirkende stoffe, flüssig, N.A.G.	Flammable (oxidizing) acting materials, liquid, (all forms)
3212	Hypochlorite, anorganisch, N.A.G.	Inorganic Hypochlorite (all forms)
-	Kaliummetaperjodat	Potassium periodate
-	Natriummetaperjodat	Sodium periodate
-	Perjodsäure	Periodic acid

Mildly Reactive Substances

1438	Aluminumnitrat	Aluminum nitrate
1439	Ammoniumdichromat	Ammonium dichromate
1444	Ammoniumpersulfat	Ammonium persulfate
1446	Bariumnitrat	Barium nitrate
1448	Bariumpermanganat	Barium permanganate
1454	Calciumnitrat	Calcium nitrate
1456	Calciumpermanganat	Calcium permanganate
1457	Calciumperoxid	Calcium peroxide
1458	Chlorat und Borat, mischungen	Chlorate and borate mixtures
1459	Chlorat und Magnesiumchlorid, mischung ein spezifiziertes hygroskopisches Chlorid oder und Calciumchlorid oder und Natriumchlorid, mischung	Chlorate and magnesium chloride mixtures, a specified water-absorbing chloride or calcium chloride or sodium chloride mixture
1463	Chromtrioxid	Chromium trioxide
1469	Bleinitrat	Lead nitrate
1473	Magnesiumbromat	Magnesium bromate
1476	Magnesiumperoxid	Magnesium peroxide
1477	Nitrate; anorganisch, N.A.G.	Inorganic nitrates (all forms)
1482	Permanganate, anorganisch, N.A.G.	Inorganic permanganate (all forms)
1486	Kaliumnitrat	Potassium nitrate
1487	Kaliumnitrat und natriumnitrit, mischungen	Potassium and sodium mixtures

(continued)

Table 3-5 (continued)

UN Number	German Name	English Name
1488	Kaliumnitrit	Potassium nitrite
1490	Kaliumpermanganat	Potassium permanganate
1498	Natriumnitrat	Sodium nitrate
1199	Natriumnitrat und kaliumnitrat	Sodium nitrate and potassium nitrate
1500	Natriumnitrit	Sodium nitrite
1503	Natriumpermanganat	Sodium permanganate
1509	Strontiumperoxid	Strontium peroxide
1515	Zinkpermanganat	Zinc permanganate
1516	Zinkperoxid	Zinc peroxide
1796	Nitriersäure, mischungen	Mixtures of nitric acid and sulfur acid
1802	Persclorsäure, hochstens 50 Gew.-% säure	Perschloric acid with less than 50% acid by weight
1826	Abfallnitriersäure, mischungen	Waste nitric and sulfuric acid mixtures
2014	Wasserstoffperoxid, wasserige lösungen, mit mindestens 20%, jedoch nicht mehr als 60% wasserstoffperoxid (stabilisiert, wenn erforderlich)	Hydrogen peroxide water solution with more than 20%, but less than 60% of hydrogen peroxide (stabilized when necessary)
2032	Salpetersäure mit mehr als 70% säure	Nitrous acid with more than 70% acid
2427	Kaliumchlorat, wässerige lösung	Potassium chlorate water solutions
2428	Natriumchlorat, wässerige lösung	Sodium chlorate water solutions
2429	Calciumchlorat, lösung, wässerig	Calcium chlorate water solutions
2469	Zinkbromat	Zinc bromate
2573	Thalliumchlorat	Thallium chlorate
2626	Chlorsaure; wasserige lösung mit nicht mehr als 10% chlorsäure	Chloric acid water solutions with no more than 10% chloric acid
2627	Nitrite, anorganisch, N.A.G.	Inorganic nitrite (all forms)
2719	Bariumbromat	Barium bromate
2721	Kupferchlorat	Copper chlorate
2722	Lithiumnitrat	Lithium nitrate
2726	Nickelnitrit	Nickel nitrite
2976	Thoriumnitrat, fest	Thorium nitrate, solid

(continued)

Table 3-5 (continued)

UN Number	German Name	English Name
2981	Uranylnitrat, fest	Uranyl nitrates, solid
3084	Ätzende stoffe, fest, entzündend (oxydierend wirkend)	Etching substances, solid, flammable (oxidation effect)
3086	Giftige stoffe, fest, entzündend (oxydierend wirkend)	Hazardous substances, solid, flammable (oxidation effect)
3093	Atzende stoffe, flussig, entzundend (oxydierend wirken)	Etching substances, liquid, flammable (oxidation effect)
3122	Giftige stoffe, flussig, entzündend (oxydierend wirkend)	Hazardous substances, liquid, flammable (oxidation effect)
3210	Chlorate, anorganisch, wässerige lösungen	Inorganic chlorate water solutions
3211	Perchlorate, anorganisch, wässerige lösungen	Inorganic perchlorate water solutions
3213	Bromate, anorganisch, wässerige lösungen	Inorganic Bromate water solutions
3214	Permanganate, anorganisch, wässerige lösungen	Inorganic permanganate water solutions
3218	Nitrate, anorganisch, wässerige lösungen	Inorganic nitrate water solutions
3219	Nitrite, anorganisch, wässerige lösungen	Inorganic nitrite water solutions
3247	Natriumperborat, wasserfrei	Sodium perborate, anhydrous
337	Chromylchlorid	Chromyl chloride
-	Kaliumjodat	Potassium iodate
-	Natriumjodat	Sodium iodate

Weak Reactive Substances

1451	Cäsiumnitrat	Cessium nitrate
1456	Didymiumnitrat	Didymiumnitrate
1466	Eisennitrat	Iron nitrate
1474	Magnesiumnitrat	Magnesium nitrate
1492	Kaliumpersulfat	Potassium persulfate
1493	Silbernitrat	Silver nitrate
1505	Natriumpersulfat	Natrium persulfate
1507	Strontiumnitrat	Strontium nitrate

(continued)

Table 3-5 (continued)

UN Number	German Name	English Name
1514	Zinknitrat	Zinc nitrate
1872	Bleidioxid	Lead oxide
2014	Wasserstoffperoxid, wässerige Lösungen mit mindestens 20%, jedoch nicht mehr als 60% wasserstoffperoxid (Stabilisiert, wenn erforderlich)	Hydrogen peroxide water solution with more than 20%, but less than 60% of hydrogen peroxide (stabilized when necessary)
2208	calciumhypochloritmischungen, trocken, mit mehr als 10%, jedoch nicht mehr als 39% aktivem chlor	Calcium hypochlorite dry mixtures with more than 10%, but less than 39% active chloride
2464	Berylliumnitrat	Beryllium nitrate
2465	Dichlorisocyanursäure, trocken oder dichlor-isochyanursäure salze	Dichlorisocyanuric acid dry dichlor-isocyanuric acid
2467	Natriumpercarbonat	Sodium carbonate peroxyhydrate (or sodium percarbonate)
2468	Trichlorisocyanursäure, trocken	Trichlorisocyanuric acid, dry
2720	Chromnitrat	Chromium
2724	Mangannitrat	Manganese nitrate
2725	Nickelnitrat	Nickel nitrate
2727	Thalliumnitrat	Thallium nitrate
2728	Zirkoniumnitrat	Zirconium nitrate
3215	Persulfate, anorganisch, N.A.G.	Inorganic persulfate (all forms)
3217	Percarbonate, anorganisch, N.A.G.	Inorganic percarbonate (or carbonate peroxyhydrate) (all forms)
3247	Natriumperborat-monohydrat	Sodium perborate, monohydrate
-	Jodsäure	Iodic acid
-	Calciumjodat	Calcium iodate
-	Jodpentoxid	Iodine pentaoxide

INSTALLATION:	COMPLIANCE CATEGORY: HAZARDOUS MATERIALS MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		

SECTION 4

HAZARDOUS WASTE MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 4

HAZARDOUS WASTE MANAGEMENT

A. Applicability of this Section

This section applies to U.S. Air Force (USAF) installations that generate, store, treat, or dispose of any type of hazardous waste.

The regulatory requirements in this section are based on Department of Defense (DOD) regulations, Air Force Regulations (AFRs), and Air Force Instructions (AFIs) that apply at overseas installations. Management practices (MPs) are derived from U.S. Environmental Protection Agency (USEPA) regulations that are not mandatory overseas but are important to follow to preserve the health and safety of AF employees and protect the environment.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 6, addresses the management of hazardous waste. It includes criteria for the identification, accumulation, storage, transportation, and disposal of hazardous waste.

- *Overseas Environmental Baseline Guidance Document* (OEBGD), October 1992, on which FGS-FRG was based, is cited in those instances in which it contains valid requirements that were not taken up into the Final Governing Standards for Germany.

C. U.S. Air Force Documents

- AFI 48-119, *Medical Service Environmental Quality Programs*, 25 July 1994, provides directive requirements for the Medical Service Environmental Quality Programs. Included are responsibilities in cleanup, compliance, conservation, and pollution prevention.

- AF Hazardous Waste Management Policy Letter, 6 June 1991, provides guidance on the management of hazardous waste, employee training, turn-in and disposal procedures, contracting, and pollution prevention.

- AF Policy Letter, 21 January 1994, *Air Force Policy on the Application of the Resources Conservation and Recovery Act to Conventional Explosive Ordnance Operations*, addresses the issue of when waste ordnance is to be handled as a hazardous waste; only that portion of the letter that specifies the procedures for identifying when conventional explosive ordnance becomes a waste is applicable to AF components located outside the United States and its territories.

D. Responsibility for Compliance

- The Installation Commander (IC) - The installation commander is responsible for establishing and maintaining an active surveillance program of users, generators, transporters, and storers of hazardous wastes; for the waste minimization program; and for disposal activities. By DOD direction, the IC is responsible for compliance with German regulations involving host and tenant organizations

on the installation. In either case, operational responsibility for the hazardous waste program rests with the activities that generate, treat, store, transport, or dispose of the waste and the activities responsible for implementing health, safety, and environmental protection programs.

- The Installation Environmental Protection Committee (EPC) - The EPC is responsible for reviewing and coordinating the IC's hazardous waste program. The EPC reviews summary data on waste generation, personnel training, and disposal practices.

- The Base Civil Engineer (BCE) or designated Environmental Management Office (EMO) - The BCE/EMO develops installation-specific policy for all aspects of hazardous waste management for all activities on the installation, including AF and non-AF tenants. The BCE/EMO: manages the hazardous waste program; reviews all hazardous waste storage, treatment, and disposal facilities and ensures their compatibility with hazardous waste regulations; serves as Office of Primary Responsibility (OPR) for developing and implementing the hazardous waste management plan; identifies to the contracting office those hazardous wastes that the installation elects to dispose of by local contract, along with the necessary conditions the contractor is required to meet; and approves siting and design of all hazardous waste management facilities.

- Base Fire Department - This department provides support in emergency response, spill events, exercises, and fire protection activities. In addition, the department will be responsible for making periodic fire safety inspections of hazardous waste storage areas and accumulation points on the installation.

- Civil Engineering Environmental Planning Function or EMO Subgroup - The environmental planner is responsible for monitoring day-to-day hazardous waste management activities, maintaining hazardous waste files, and establishing procedures for transfer of accountability and/or custody of hazardous waste from the generating activity to the Defense Reutilization and Marketing Office (DRMO).

- Bioenvironmental Engineering Services (BES) - BES reviews workplace processes and practices to ensure all hazardous materials/wastes are identified; conducts or arranges for environmental monitoring as required; interprets monitoring results for health risks; reviews plans to build or modify facilities used to treat, store, or dispose of hazardous wastes; reviews all material requests for issues of stock classes listed in Federal Standard 313; and maintains a master file of material safety data sheets (MSDSs).

- The Environmental Health Officer (EHO) - The EHO conducts Hazardous Communication Training for all supervisors who have personnel who handle hazardous materials.

- The Supply Officer - The supply officer: receives, stores, and issues hazardous materials; ensures that turn-in hazardous waste documents contain information necessary to comply with all regulatory requirements; and ensures all hazardous materials are properly labeled.

- The Ground Safety Officer - The ground safety officer performs workplace safety inspections, monitors hazardous conditions, and performs occupational safety training.

- The Transportation Officer - The transportation officer coordinates as necessary with shipping activities to ensure hazardous wastes are properly labeled, packaged, manifested, and transported in appropriate vehicles (contract or AF-owned vehicles).

- The Deputy Commander for Maintenance (DCM)/Chief of Maintenance - The DCM ensures that nonhazardous/nontoxic materials are used where possible; maintains a list of hazardous materials used in the work area by shop and maintenance-related task; ensures personnel are properly trained in ordering, using, handling, controlling, and storing hazardous materials and wastes; and ensures hazardous waste is properly labeled.

- Hazardous Waste Generators - Generators manage hazardous waste in their custody, including proper storage, inspection, recordkeeping, labeling of containers, and transfer for disposal.

- Hazardous Waste Storage Area (HWSA) Managers - Each HWSA manager is responsible for ensuring compliance with hazardous waste regulations applicable to the facility, including maintaining operational and training records.

- Defense Reutilization and Marketing Office (DRMO) - This agency may or may not be located on the installation, but it is the single agency designated by DOD to provide hazardous waste disposal service on a pay for services rendered basis to the installation. The DRMO is responsible for compliance with all German national and local regulations, and AF (including base guidance) regulations at its storage/disposal facility. The DRMO is not in the scope of the assessment unless it is located on the installation.

E. Definitions

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Chemical Waste Dump* - a facility where hazardous wastes are disposed of by subsurface burial or internment (*sic*) (FGS-FRG, Appendix A).

- *Chemical Waste Landfill* - a landfill at which a high level of protection against risk of injury to human health or the environment from migration of deposited hazardous wastes to land, water, or the atmosphere is provided by incorporating special methods for locating, engineering, and operating the landfill (FGS-FRG, Appendix A).

- *Combustible Liquid* - a liquid having a flashpoint at or above 100 °F (37.8 °C). Combustible liquids are categorized as Class II or Class III liquids and are further subdivided as follows (AFOSH STD 127-43, para 2f):
    1. Class II liquids are those having a flashpoint at or above 100 °F (37.8 °C) and below 140 °F (60 °C).
    2. Class IIIA liquids are those having flashpoints at or above 140 °F (60 °C) and below 200 °F (93.3 °C), except any mixture having components with flashpoints of 200 °F (93.3 °C).
    3. Class IIIB liquids are those having flashpoints at or above 200 °F (93.4 °C).

- *Competent* - an agency, authority, individual, official, person, etc., who meets any of the following criteria: (FGS-FRG, Appendix A)
    1. specifically designated as competent by FGS-FRG
    2. specifically designated as competent by the authority of a German government [agency]
    3. specifically designated as competent by or meets the qualifications of competency of a recognized German trade organization or association
    4. based on experience, training, and/or authority granted per DOD/component policy or regulations, judged by the responsible commander to be a capable and appropriated organization/ individual to accomplish the task in question.

- *Disposal Facility for Hazardous Waste* - refers to any facility not located on a DOD installation that is licensed by the appropriate German authorities and is used for the treatment or disposal of hazardous waste (FGS-FRG, Appendix A).

- *DOD Hazardous Waste Generator* - a generator is considered to be the installation or activity on an installation that produces a regulated hazardous waste (FGS-FRG, Appendix A).

- *Environment* - the natural and physical environment, excluding social, economic, and other environments (FGS-FRG, Appendix A).

- *Flammable Liquid* - a liquid with a flashpoint below 100 °F (37.8 °C) with a vapor pressure not exceeding 40 psia at 100 °F (37.8 °C). Flammable liquids are categorized as Class I liquids, and are further subdivided as follows (AFOSH STD 127-43, para 2i):
    1. Class IA are those that have a flashpoint below 73 °F (22.8 °C) and boiling point below 100 °F (37.8 °C).
    2. Class IB are those that have flashpoints below 73 °F (22.8 °C) and boiling points at or above 100 °F (37.8 °C).
    3. Class IC are those that have flashpoints at or above 73 °F (22.8 °C) and below 100 °F (37.8 °C).

- *Hazardous Chemical Warning Label* - a label, tag, or marking on a container that is prepared in accordance with DOD 6050.5-H, *DOD Hazardous Chemical Warning Labeling System,* and that provides the following information (FGS-FRG, Appendix A):
    1. identification/name of hazardous chemicals
    2. appropriate hazard warnings
    3. the name and address of the manufacturer, importer or other responsible party.

- *Hazardous Waste (HW)* - a discarded material that may be solid, semisolid, liquid, or contain gas and either exhibits a characteristic of a hazardous waste as described in Appendix B, and/or contains a substance listed as hazardous in Table 4-1 or Table P-2 of the *Joint Transportation of Hazardous Materials* (USAFE Reg 75-3). Any waste that meets this definition must be handled as a hazardous waste unless competent U.S. and German authorities both agree that it may be handled and disposed of as a non-hazardous waste (FGS-FRG, Appendix A and FGS-FRG 6-3a).

- *Hazardous Waste Accumulation Point (HWAP)* - an area at or near the point of generation for collecting and storing hazardous waste. A HWAP may not store more than a total of 200 kg of hazardous waste or 50 kg of very hazardous waste. A HWAP may be a shop, a site, or other work center dealing with one or more waste streams (FGS-FRG, Appendix A).

- *Hazardous Waste Generation* - any act or process that produces hazardous waste as defined in FGS-FRG (FGS-FRG, Appendix A).

- *Hazardous Waste Profile Sheet* - a document that identifies and characterizes the waste by using the generator's knowledge of the waste and/or laboratory analysis. It also provides physical, chemical, and other descriptive properties and/or information on the processes that created the hazardous waste (FGS-FRG, Appendix A).

- *Hazardous Waste Storage Area (HWSA)* - a location on a DOD installation where more than a total of 200 kg of hazardous waste and/or 50 kg of very hazardous waste is stored (FGS-FRG, Appendix A).

- *Hazardous Waste Storage Area Manager* - a person or agency on the installation assigned the operational responsibility for receiving, storing, inspecting, and general management of a HWSA (FGS-FRG, Appendix A).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Leak or Leaking* - any instance in which an article, container, or piece of equipment has an opening, no matter the size, that has allowed the unintentional release of any of its contained substance(s) (FGS-FRG, Appendix A).

- *Management Practices (MPs)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *Recycle* - to reprocess what would otherwise be waste so that substances in the waste may be used again (e.g., to recycle aluminum cans) (FGS-FRG, Appendix A).

- *State* - the political subdivision referred to as *Land* in Germany (FGS-FRG, Appendix A).

- *Toxic* - a chemical falling within any of the following categories (29 CFR 1910.1200, Appendix A, para 6, via AFJAM 23-201 and AFJAM 23-209):
  (a) a chemical that has a median lethal dose (LD_{50}) of more than 50 mg/kg but not more than 500 mg/kg of body weight when administered orally to albino rats weighing between 200 and 300 g each
  (b) a chemical that has a median lethal dose (LD_{50}) of more than 200 mg/k but not more than 1,000 mg/k of body weight when administered by continuous contact for 24 h (or less if death occurs within 24 h) with the bare skin of albino rabbits weighing between 2 and 3 kg each
  (c) a chemical that has a median lethal concentration (LC_{50}) in air of more than 200 ppm but not more than 2,000 ppm by volume of gas or vapor, or more than 2 mg/L but not more than 20 mg/L of mist, fume, or dust, when administered by continuous inhalation for 1 h (or less if death occurs within 1 h) to albino rats weighing between 200 and 300 g each.

(NOTE: HQ USAFE/JAM takes the term 'very toxic' to be synonymous with the term 'highly toxic' as defined in 29 CFR 1910.1200, Appendix A, para 6:

Highly toxic - a chemical falling within any of the following categories:

(a) a chemical that has a median lethal dose (LD_{50}) of 50 mg or less per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each

(b) a chemical that has a median lethal does (LD_{50}) of 200 mg or less per kg of body weight when administered by continuous contact for 24 h (or less if death occurs within 24 h) with the bare skin of albino rabbits weighing between 2 and 3 kg each

(c) a chemical that has a median lethal concentration (LC_{50}) in air of 200 ppm by volume or less of gas or vapor, or 2 mg/L or less of mist, fume, or dust, when administered by continuous inhalation for 1 h (or less if death occurs within 1 h) to albino rats weighing between 200 and 300 g each.)

- *Treatment* - any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste nonhazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume (FGS-FRG, Appendix A).

- *Used Oil Burned for Energy Recovery* - used oil that is burned for energy recovery is termed "used oil fuel." Used oil fuel includes any fuel produced from used oil by processing, blending, or other treatment. "Used oil" means any oil or other waste POL product that has been refined from crude oil, or is a synthetic oil, has been used, and as a result of such use, is contaminated by physical or chemical impurities. Used oil exhibiting the characteristics of reactivity, ignitability, and corrosivity is still considered used oil, unless it has been mixed with other hazardous waste. However, used oil that exhibits the characteristic of toxicity as described in Appendix B is a hazardous waste and will be managed as such. In addition, used oil mixed with hazardous waste is a hazardous waste and will be managed as such (FGS-FRG, Appendix A).

- *Very Hazardous Waste* - a waste that contains a hazardous substance that meets any of the following criteria: (FGS-FRG, Appendix A)
  1. has a WGK number of three in Table 4-1, Part 2
  2. is listed as belonging to Group S in Table 4-1, Part 3
  3. has a "P" in the USEPA waste number in Table 4-1, Part 1.

- *Water Protection Area* - an area established by a German state to protect public water supplies, supplement groundwater, or prevent harmful runoff of precipitation and flooding, as well as to prevent entry into the water of soil constituents or substances used to treat manure and plants. The state will publish a set of restrictions for each area designated applicable to all, including DOD components (FGS-FRG, Appendix A).

HAZARDOUS WASTE MANAGEMENT

GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
All Installations		
General	4-1 through 4-8	(1)(2)(3)(4)(5)(7)(8)(9)(11)
Plans/Surveys	4-9 through 4-16	(1)(2)(5)(10)
Waste Identification	4-17 and 4-18	(1)(9)(10)
Training	4-19 through 4-24	(1)(2)(3)(4)(5)(6)(7)(9)(10)
Hazardous Waste Generators		
Operating Procedures	4-25 through 4-28	(2)(9)
Specific Wastes	4-29 through 4-32	(1)(3)(5)
HWAPs		
General	4-33	(1)(3)
Design Requirements	4-34 through 4-41	(1)(3)
Operating Procedures	4-42 through 4-45	(3)
Containers	4-46 and 4-47	(3)
Flammable/Combustible Liquids	4-48 through 4-62	(1)(2)(3)
Halogenated Solvents	4-63	(3)
Documentation	4-64 through 4-67	(3)(7)
Closure	4-68 and 4-69	(1)(3)
Hazardous Waste Storage Areas		
General	4-70 through 4-72	(1)(2)(3)(4)(5)
Design Requirements	4-73 through 4-88	(1)(2)(4)(5)
Operating Procedures	4-89 through 4-110	(1)(2)(3)(5)
Containers	4-111 and 4-112	(5)(7)
Additional Requirements for Warehouse HWSAs	4-113	(2)(5)
Additional Requirements for Outdoor HWSAs	4-114	(2)(5)
Documentation	4-115 through 4-118	(2)(3)(4)(5)(7)
Closure	4-119 through 4-121	(5)
Special Hazardous Waste Storage Areas		
Design Requirements	4-122	(2)(3)(4)(5)
Operating Procedures	4-123 and 4-124	(2)(5)
Fire Suppression	4-125 through 4-128	(2)(5)
Documentation	4-129 through 4-132	(2)(3)(4)(5)
Transportation	4-133 through 4-136	(1)(3)(5)(7)
Hazardous Waste Disposal	4-137 through 4-142	(1)(2)(5)

(a) **CONTACT/LOCATION CODE:**

(1) BCE (Environmental Planning)
(2) DRMO (Defense Reutilization and Marketing Office)
(3) HWAP Manager
(4) Fire Department
(5) HWSA Manager
(6) Safety Manager
(7) Transportation Officer
(8) Base Supply
(9) Generating Activities
(10) BES (Bioenvironmental Engineering Services)
(11) Base Staff Judge Advocate

HAZARDOUS WASTE MANAGEMENT

Records To Review

- Generators:

  Hazardous Waste Profile Sheets
  Hazardous Waste Management Plan
  Hazardous Waste Log
  Personnel training documentation
  Contingency plan
  Notifications of hazardous waste oil fuel marketing or blending activity
  Hazardous waste disposal turn-in document (DD Form 1348-1)

- HWSAs (in addition to the above records):

  Manifests
  Unmanifested waste reports
  Fire Protection Plan
  Emergency Evacuation Plan
  Waste analysis plan(s)
  Operating record
  Groundwater monitoring records and annual reports
  Closure/post-closure plans
  Closure/post-closure notices (where applicable)

Physical Features To Inspect

- Disposal sites
- Generating areas
- Accumulation points
- Incinerators
- Vehicles used for transport
- Storage facilities (including drums)

People To Interview

- BCE (Environmental Planning)
- DRMO (Defense Reutilization and Marketing Office)
- Accumulation Point Managers
- Fire Department
- TSDF Officer
- Safety Manager
- Transportation Officer
- Base Supply
- Generating Activities
- BES (Bioenvironmental Engineering Services)
- Base Staff Judge Advocate

COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
ALL INSTALLATIONS **General**	
4-1. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Advocate has available the host-nation FGS and relevant USAF documents. (1)(11) (NOTE: Among the relevant documents are the following: - AF Hazardous Waste Management Policy Letter, 6 June 1991 - AF Policy Letter, 21 January 1994.)
4-2. Installations must maintain copies of certain U.S. laws and applicable host nation hazardous waste laws (AF Hazardous Waste Management Policy Letter, 6 June 1991, para (IIa)).	Verify that the installation maintains copies of the following laws: (1)(11) - *Occupational Safety and Health Act* - *Hazardous Material Transportation Act* (HMTA) - *Resource Conservation and Recovery Act* and Hazardous and Solid Waste Amendments (RCRA/HSWA) - *Comprehensive Environmental Restoration, Compensation, and Liability Act* (CERCLA) and *Surperfund Amendment and Reauthorization Act* (SARA) - *Hazardous Materials Transportation Uniform Safety Act* - AFI 48-119, *Medical Service Environmental Quality Programs*, 25 July 1994. Verify that the installation maintains copies of applicable German hazardous waste laws.
4-3. Installations must meet regulatory and AF requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulations as a basis of finding).	Determine whether any new regulations concerning hazardous waste have been issued since the finalization of the manual. (1) Verify that the installation is in compliance with newly issued regulations.
4-4. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to hazardous waste management. (1) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it.

(1) BCE (Environmental Planning) (2) DRMO (Defense Reutilization and Marketing Office) (3) HWAP Manager (4) Fire Department (5) HWSA Manager (6) Safety Manager (7) Transportation Officer (8) Base Supply (9) Generating Activities (10) BES (Bioenvironmental Engineering Services) (11) Base Staff Judge Advocate

COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-4. (continued)	(NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
4-5. Installations must recycle or reuse hazardous waste to the maximum extent practical (OEBGD Chapter 6, Section 11, Criterion 6).	Verify that hazardous waste is recycled or reused to the maximum extent practical. (1)(8)(9) Verify that safe and environmentally acceptable methods are used to identify, store, prevent leakage of, and dispose of hazardous wastes in order to minimize risks to health and the environment. (NOTE: This requirement is not included in FGS-FRG.) (NOTE: FGS-FRG states that the primary objective in managing hazardous waste is to minimize it.)
4-6. Hazardous waste must not be used for dust suppression or road treatment (FGS-FRG 6-9d and OEBGD, Chapter 6, Section 9, Criterion 2).	Verify that neither used oil, nor hazardous waste, nor used oil contaminated with any hazardous waste is used for dust suppression or road surface treatment. (1)(7) (NOTE: FGS-FRG addresses used oil only; the broader OEBGD requirement is included here.)
4-7. Installations with HWSAs should provide specific information to certain agencies (MP).	Verify that police, fire departments, and emergency response teams are familiar with the layout of the facility, properties of the waste being handled, and general operations. (4)(5) Verify that the hospital is familiar with the site and the types of injuries that could result in an emergency.
4-8. Installations must inspect HWSAs for malfunction, deterioration, operator errors, and discharges (OEBGD, Chapter 6, Section 3, Criterion 8).	Verify that inspections are conducted according to a written schedule that is kept at the HWSA and at a sufficient frequency to identify problems in time to correct them before they harm human health or the environment. (5) Verify that the schedule identifies the type of problems that are to be looked for during the inspection. Verify that inspections cover all equipment and areas involved in the storage and handling of hazardous waste. Verify that areas subject to spills, such as loading and unloading areas, are inspected daily when in use.

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COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-8. (continued)	(NOTE: The frequency at which equipment/facilities other than containers are inspected should be based on the rate of possible deterioration of the equipment and probability of an environmental or human health incident if the deterioration or malfunction or any operator error goes undetected between inspections. In addition, containers are inspected weekly by the HWSA manager (see checklist item 4-89).) Verify that the installation remedies any deterioration or malfunction of equipment or structures that the inspection reveals on a schedule that ensures that the problem does not lead to an environmental or human health hazard. Verify that, when an imminent hazard is identified or one has already occurred, the installation takes immediate action. Verify that inspections are recorded in an inspection log or summary that is kept for at least 3 yr from the date of inspection and that includes at least: - the date and time of inspection - the name of the inspector - notation of the observations made - the date and nature of any repairs or other remedial actions.
ALL INSTALLATIONS **Plans/Surveys**	
4-9. Installations that generate hazardous waste must have a Hazardous Waste Management Plan (AF Hazardous Waste Management Policy 6 June 1991, para III(b)).	Verify that the installation has a Hazardous Waste Management Plan that includes the following: (1)(2) - letter of instruction - information and emergency contacts - introductory materials - introduction - responsibilities - organizational chart - location maps - waste inventory - waste analysis plan - recordkeeping - reporting - training - contingency plan preparedness and spill prevention - pollution prevention.

(1) BCE (Environmental Planning) (2) DRMO (Defense Reutilization and Marketing Office) (3) HWAP Manager (4) Fire Department (5) HWSA Manager (6) Safety Manager (7) Transportation Officer (8) Base Supply (9) Generating Activities (10) BES (Bioenvironmental Engineering Services) (11) Base Staff Judge Advocate

COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-10. Installations must develop a waste analysis plan that meets specific criteria (*Overseas Environmental Baseline Guidance Document* (OEBGD) Chapter 6, Section 3, Criterion 3(a)).	Verify that the installation, in conjunction with the HWSA manager, has developed a plan to determine how and when wastes are to be analyzed. (1)(2)(5)(10) Verify that the plan includes: - procedures for characterizing and verifying the testing of both onsite and offsite hazardous waste - testing parameters and the rationale for selecting them - frequency of analysis - test and sampling methods. (NOTE: These requirements are not included in FGS-FRG.)
4-11. The hazardous waste analysis plan must be updated every 3 yr (AFI 48-119, para 9.3.1).	Verify that BES updates the hazardous waste analysis plan at least every 3 yr. (1)(10)
4-12. BES must conduct annual surveys of industrial processes and waste storage facilities (AFI 48-119, para 9.3.7).	Verify that BES conducts annual surveys of industrial processes and waste storage facilities to assess compliance with applicable worker and environmental protection requirements. (10)
4-13. Installations must maintain an HWPS for each waste stream handled by each HWSA (OEBGD, Chapter 6, Section 3, Criterion 3(b)).	Verify that the installation maintains a file of HWPSs. (5) Verify that the HWSA accepts no waste for storage unless it has received an HWPS.
4-14. Installations must have a contingency plan to manage spills and releases of hazardous waste (FGS-FRG 6-11a).	Verify that the installation has a contingency plan to manage spills and releases of hazardous waste. (1)(2)(5) (NOTE: See Section 8, *Petroleum, Oil, and Lubricant Management* for the contents of this plan. That section of the manual details specific requirements for the contents of plans that must be developed by installations that store hazardous waste.) Verify that a current copy of the plan has been provided to all emergency response providers, U.S. and German, identified in the plan.

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COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	
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4-15. The contingency plan should be available in both English and German (MP).	Verify that the plan is available in both English and German. (1)(2)(5) (NOTE: This MP is derived from FGS-FRG 6-11a.)
4-16. Each installation must maintain a master listing of all HWSAs and an inventory of all hazardous waste contained therein (FGS-FRG 6-4d).	Verify that the installation has a master listing of all HWSAs and an inventory of all hazardous waste contained therein. (1)(5)(6)
ALL INSTALLATIONS **Waste Identification**	
4-17. Generators must identify and characterize the wastes generated at their sites (FGS-FRG 6-3b through 6-3f; AF Hazardous Waste Management Policy, 6 June 1991, para III(c); AFI 48-119, para 9.3.1 and 9.3.4).	Determine whether the installation generates, transports, treats, stores, or disposes of any hazardous waste (see Table 4-1 for guidance). (1)(9)(10) Verify that the generators identify and characterize their wastes. (NOTE: Used oil must also be characterized.) (NOTE: Wastes may be identified and characterized on the basis of knowledge of the materials and processes that generated the waste, or on the basis of laboratory analysis of the waste.) Verify that wastes have been identified according to: - the inherent hazardous characteristics associated with the waste in terms of its physical state (e.g., solid, liquid, contained gas, etc.) and its undesirable physical or chemical properties (e.g., ignitability, corrosiveness, reactivity, toxicity, etc.) and/or - the waste's physical and/or chemical make-up (e.g., the chemical constituents, component chemical or technical name(s), component trade name(s). Verify that an HWPS is used to identify each hazardous waste stream. Verify that each generator keeps a copy of the HWPS for his/her waste stream(s). Verify that BES maintains copies of HWPSs after completing the health sections. Verify that the installation has a hazardous waste inventory that identifies all waste streams and a hazardous waste analysis plan that identifies and characterizes the hazardous waste streams.

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4-17. (continued)	Verify that the following are classified as hazardous waste:
	- packing materials, protective clothing, and cleaning rags that are contaminated with hazardous materials
	- filters, absorbing materials, and activated charcoal that are contaminated with hazardous materials
	- hazardous material discarded either:
	  - by the generating installation because it is no longer a useful product
	  - by the Defense Reutilization and Marketing Region-Europe (DRMR-E) because it has failed the reutilization, transfer, or sales cycles.
	(NOTE: All wastes must be considered hazardous until determined otherwise.)

4-18. Installations must meet specific requirements with regard to samples sent out for analysis (FGS-FRG 6-4e(4)).	Verify that, if a sample is sent out for analysis, a back-up sample is prepared at the same time. (10) Verify that the back-up sample is kept under conditions that ensure that it remains a viable sample until the results of the analysis of the first sample are obtained.
TRAINING	
4-19. All personnel whose duties involve actual or potential work relating to hazardous waste must be qualified (FGS-FRG 6-7a, 6-7a(1) and 6-7a(2)).	Verify that all personnel whose duties involve actual or potential work relating to hazardous waste are qualified. (1)(2)(3)(4)(5)(6)(7)(9)(10) (NOTE: Qualification is based on both appropriate experience and training.) (NOTE: A person is considered to be qualified if he/she has current certification to accomplish the duties or tasks in question issued by an agency of the German national or state governments or by a recognized German technical or professional organization. DOD military and civilian employees do not seek host nation certification of their hazardous waste management qualifications.) (NOTE: The employees of contractors licensed/permitted by a German government agency to accomplish hazardous waste activities may be assumed to be qualified workers. There is no requirement for a DOD component to verify this.) (NOTE: DOD employees, both civilian and military, may also be judged competent if, in the opinion of the IC, they possess the experience and training necessary to ensure that they accomplish the duties in question properly.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-20. Installations must ensure that employees of contractors who are not required to be licensed/ permitted, but who do perform functions that involve actual or potential work relating to hazardous waste, are qualified to do the work (FGS-FRG 6-7a(1)).	Verify that there is a procedure in place to ensure that employees of contractors who are not required to be licensed/permitted, but who do perform functions that involve actual or potential work relating to hazardous waste, are qualified to do the work. (1)
4-21. Installation personnel who are not fully qualified must meet specific requirements (FGS-FRG 6-7a(2)(a)).	Verify that DOD employees who are not fully qualified complete an appropriate training program prior to assuming full responsibility for the duties in question. (1)(2)(3)(4)(5)(6)(7) Verify that they work under direct supervision when performing the duties in question until they have completed the training program. (NOTE: Additional guidance may be found in DODI 6050.5, *The DOD Hazard Communication Program.*)
4-22. All DOD personnel must successfully complete annual hazardous waste refresher training (FGS-FRG 6-7a(2)(a)).	Verify that all DOD personnel successfully complete appropriate annual refresher training. (1)(2)(3)(4)(5)(6)(7)(9)(10)
4-23. Training programs for DOD employees must meet specific requirements (FGS-FRG 6-7a(2)(b)).	Verify that the training program for DOD employees is conducted by qualified persons. (1)(2)(3)(4)(5)(6)(7) Verify that the training program includes sufficient information to enable personnel to comply fully with and carry out requirements in FGS-FRG and other appropriate DOD and/or component policies and directives. Verify that the program is designed to ensure that personnel understand the possible dangers in dealing with hazardous waste and their roles in the following: - effective response to emergencies - hazardous waste handling, storage, and shipping - the safe use of equipment - personal protection.

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COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-23. (continued)	Verify that each employee participates in at least one emergency response exercise each year. Verify that training for generators and for the operators of HWAPs and HWSAs addresses the following: - recordkeeping - security - inspections - contingency plans - storage and transportation requirements. Verify that women of child-bearing age are instructed in the possible dangers and occupational restrictions for expectant mothers.
4-24. All hazardous waste training for DOD employees assigned duties involving actual or potential exposure to hazardous waste must be documented (FGS-FRG 6-7b; Hazardous Waste Management Policy, 6 June 1991, para III(d)(2)).	Verify that all hazardous waste training for each DOD employee assigned duties involving actual or potential exposure to hazardous waste is documented. (1)(2)(5)(6)(9) Verify that up-to-date training records are kept by the HWSA manager or the responsible installation office. Verify that training records are retained for 3 yr after termination of duty of these personnel.
HAZARDOUS WASTE GENERATORS **Operating Procedures**	
4-25. Generators must use a unique identification number for all recordkeeping, reports, and manifests for hazardous wastes (OEBGD, Chapter 6, Section 1, Criterion 3).	Verify that each generator uses a unique identification number for all recordkeeping, reports, and manifests for hazardous waste. (9)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
4-26. Generators must maintain an audit trail of hazardous waste from the point of generation to disposal (FGS-FRG 6-5d(1) and 6-5d(2)).	Verify that generators maintain an audit trail of hazardous waste from the point of generation to disposal. (9) Verify that generators that have hazardous waste picked up by a direct removal contract administered by DRMR-E obtain a signed copy of the manifest (*Begleitschein*) from the transporter/disposer and maintain a copy on file. Verify that generators that take hazardous materials to DRMR-E for sale/disposal use DD Form 1348-1 as the record of transfer. Verify that a copy of the DD Form 1348-1 is retained on file by the generator. (NOTE: DRMR-E must obtain and retain a copy of the manifest (*Begleitschein*) for the ultimate transport and disposal of the waste.)

4-27. Installations that generate hazardous wastes and use the DRMO for disposal of hazardous waste must follow established procedures (AFI 48-119, para 9.3.6; AF Hazardous Waste Management Policy, 6 June 1991, para III(e)(2) and Appendix C, Section B).	Verify that: (2)(9)
	
	- generators provide an HWPS along with the waste
	- generators hand-carry AF Form 2005 to Base Supply to initiate timely action
	- generators hand-carry DD Form 1348-1 when received from Base Supply, to BCE for certification
	- generators hand-carry certified DD Form 1348-1 from BCE to the DRMO.
	
	(NOTE: HQ USAF/CEV 25 September Memorandum, *Hazardous Waste Disposal*, allows installations to use alternate procedures in which the installation hazardous waste managers prepare and certify the DD Form 1348-1 instead of Base Supply. The Hazardous Waste Management Plan needs to indicate what procedure is used. In the approved alternate procedure no AF Form 2005 is prepared, and the hazardous waste managers also maintain records of all transactions.)
	
	Verify, by examining records and interviewing the staff at Base Supply (Customer Service Unit), that:
	
	- computer records of all hazardous waste transfer actions are maintained
	- a DD Form 1348-1 is processed for each transaction and includes:
	  - the hazardous waste stock number
	  - waste quantity
	  - applicable disposal cost and funding information.

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COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-27. (continued)	Verify, by examining records and interviewing BCE personnel, that: - a letter identifying personnel eligible to certify hazardous waste disposal turn-in documents (DD Form 1348-1) is current and on file at the servicing DRMO - all DD Forms 1348-1 are properly certified, indicating that hazardous waste is properly identified (USEPA identification number), labeled, and packaged - DD Form 448, Military Interdepartmental Purchase Request (MIPR), has been executed with DRMO, and the Accounting and Finance Office (AFO) maintains DD Form 448 after execution - billings from DRMO are on a standard form (SF) 1080 and are reviewed and certified for payment by BCE through the AFO. Verify, by examining records and interviewing BES personnel, that: - BES conducts a semiannual review of the health hazard listing to review all issue exception code (IEX) 8 and 9 items and determines whether health hazard items produce a specific hazardous waste - nomenclatures are included in the health hazard listing - BES reviews all plans to build or modify facilities used to treat, store, or dispose of hazardous waste.
4-28. Generators must update HWPSs as needed to reflect new waste streams or process modifications (OEBGD, Chapter 6, Section 3, Criterion 3(b)).	Verify that the generator updates the HWPS as needed to reflect any new waste streams or process modifications that change the character of the hazardous waste being handled at the storage area. (9)
HAZARDOUS WASTE GENERATORS **Specific Wastes**	
4-29. Lead-acid batteries that are not recycled must be managed as hazardous waste (FGS-FRG 6-10).	Determine whether the generator has lead-acid batteries that have exhausted their life-cycle and are not recycled. (1)(3)(5) Verify that the generator manages such batteries as hazardous waste. (NOTE: It is the goal of the German government to have all lead-acid batteries recycled.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-30. Mercury, nickel-cadmium, lithium, and lead-acid batteries must be processed prior to disposal (OEBGD, Chapter 6, Section 11, Criterion 9e).	Verify that mercury, nickel-cadmium, lithium, and lead-acid batteries are being processed prior to disposal to stabilize, fix, or recover heavy metals and neutralize any corrosives. (1)(5)
4-31. Installations must identify conventional explosive ordnance as hazardous waste in specific circumstances (AF Policy Letter, 21 January 1994, para IV.c.2, IV.c.3, and IV.c.7).	Verify that the installation identifies conventional explosive ordnance as hazardous waste when: (1)(9) - an authorized official records in writing a determination that the conventional explosive ordnance will be discarded - custodians of the conventional explosive ordnance receive this written determination. (NOTE: The authorized official is identified by being designated in writing.) (NOTE: Prior written authorization is not required if safety or other considerations (such as an emergency response conducted by an Explosive Ordnance Disposal Unit or a response to mitigate an imminent hazard) preclude obtaining prior written authorization.) (NOTE: An authorized official may make a written designation that conventional explosive ordnance that has previously been designated as waste, but for which a legitimate use is subsequently identified, is no longer waste. If the official cannot make this redesignation, the waste remains a hazardous waste until it ceases to exhibit a characteristic of a hazardous waste, or until it has been specifically excluded by regulation (i.e., delisted).) (NOTE: Generally, conventional explosive ordnance manufacture, assembly, testing, training, intended use, or range management do not constitute hazardous waste management.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-32. Authorized individuals must take into account the facts and circumstances applicable to each situation in making a determination to discard (AF Policy Letter, 21 January 1994, para IV.c.4).	Verify that decisions to discard conventional explosive ordnance are based on the facts and circumstances applicable to each situation. (1)(9) (NOTE: The following guidelines should be used in making the determination to discard: - a determination to discard excess conventional explosive material that is safe and stable in normal logistical environments may be made only after all efforts have been exhausted to reuse, recycle, recover, or sell such material - a determination to discard conventional explosive ordnance that may be unstable or unsafe to store or transport should be made by an authorized official after conducting appropriate testing or inspection, if conditions allow, or if it is readily apparent that there is no reasonable alternative to discarding the material.)
HAZARDOUS WASTE ACCUMULATION POINTS **General** **4-33.** HWAPs must meet general design and operating criteria (FGS-FRG 6-4a).	Verify that each HWAP is designed, constructed, maintained, and operated to minimize the possibility of fire, explosion, or an unplanned release of hazardous waste that might: (3) - endanger human health or reduce physical comfort - endanger livestock, birds, game, or fish - harm water, soil, or useful plants - cause damage to the environment by air or noise pollution - fail to protect nature conservation or city planning efforts - endanger or disturb the public.
HAZARDOUS WASTE ACCUMULATION POINTS **Design Requirements** **4-34.** HWAPs must be at or near the point of generation for collecting and storing hazardous waste (FGS-FRG 6-4b(1)).	Verify that the HWAP is at or near the point of generation. (1)(3)

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COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-35. HWAPs that have containers holding ignitable or reactive waste must be located at least 15 m (50 ft) inside the installation boundary (OEBGD, Chapter 6, Section 2, Criterion 3 and Section 4, Criterion 3).	Determine whether the HWAP holds ignitable or reactive waste. (3) Verify that containers which hold ignitable or reactive waste are at least 15 m (50 ft) inside the installation boundary.
4-36. HWAPs must be designed to provide appropriate segregation for different waste streams (FGS-FRG 6-4c(1)).	Verify that each HWAP is designed to provide appropriate segregation for different waste streams, including those that are chemically incompatible. (1)(3) (NOTE: See Table 4-2 for a list of incompatible wastes.)
4-37. Storage at HWAPs must be configured in accordance with specific requirements (FGS-FRG 6-4c(3), 6-4c(4), 6-4d(2), and 6-4d(10)(b)).	Verify that storage is so configured that a leak from a single container may not find its way into another storage area. (1)(3) Verify that single-walled tanks or containers are set up in collecting basins that will not allow the mixing of different types of hazardous wastes in the event of a leak. Verify that such basins are sufficiently far apart to ensure that in the event of a leak there is no fire or safety risk. Verify that all tanks or containers used to store hazardous waste that contains liquids have containment basins (drip pans) that have sufficient capacity to contain at least 10 percent of the volume of all the tanks or containers placed in them or 100 percent of the largest tank or container, whichever is greater. Verify that separated and labeled storage areas are established for hazardous wastes that are incompatible. Verify that separated storage areas are sufficiently far apart to ensure that different types of wastes will not be mixed.
4-38. Floor areas of HWAPs where volatile hydrocarbons are dealt with must meet specific criteria (FGS-FRG 6-4c(3) and 6-4d(10)(a)).	Verify that floor areas where volatile hydrocarbons are dealt with are constructed of or coated with materials that are resistant to those substances. (1)(3) Verify that such floors are also constructed in such a way that they can be checked for leaks.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-39. Hazardous waste work areas at HWAPs must have devices for properly opening filling, emptying, and cleaning containers as required (FGS-FRG 6-4c(3) and 6-4d(9)(b)).	Verify that hazardous waste work areas in the HWAP have devices for properly opening filling, emptying, and cleaning containers as required. (3)
4-40. Each HWAP must have warning signs appropriate to the waste being accumulated at the site (OEBGD, Chapter 6, Section 2, Criterion 1).	Verify that each HWAP has warning signs appropriate to the waste being accumulated at the site. (3)
4-41. Storage or work areas for containers that are opened during the normal course of activities must be covered (FGS-FRG 6-4c(3) and 6-4d(4)).	Verify that storage or work areas for containers that are opened during the normal course of activities are covered. (3) (NOTE: This statement is interpreted to mean that such areas must have a roof.)
HAZARDOUS WASTE ACCUMULATION POINTS **Operating Procedures**	
4-42. HWAPs must comply with limits on the amounts of hazardous waste present (FGS-FRG 6-4b and 6-4c(2)).	Verify that no more than 200 kg of hazardous waste or 50 kg of very hazardous waste from each waste stream is accumulated at any given HWAP. (3) Verify that, when the above accumulation limits are reached, the generator makes arrangements either to move the hazardous waste to an HWSA or to ship it offsite for treatment or disposal. (NOTE: HWAPs that exceed the above limitations on quantity and do not either move the waste to an HWSA or ship it offsite for treatment or disposal are in fact HWSAs and must meet all the requirements for HWSAs.)

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4-43. HWAPs must be inspected weekly for leaking containers and deterioration of the containment system caused by corrosion and other factors (OEBGD, Chapter 6, Section 2, Criterion 3 and Section 4, Criteria 1(e)).	Verify that a weekly inspection is performed for leaking containers and for deterioration of containers and the containment system. (3) Verify that secondary containment systems are inspected for defects and emptied of accumulated releases.
4-44. Liquid hazardous wastes must be stored in such a way that they will not leak out in an uncontrolled manner (FGS-FRG 5-4 and 6-4c(3)).	Verify that liquid hazardous wastes are stored in such a way that they will not leak out in an uncontrolled manner. (3)
4-45. Particular care must be exercised to ensure that ignitable, reactive, or incompatible wastes are not handled in a manner that could result in conditions that might threaten human health or the environment (FGS-FRG 6-4c(3) and 6-4d(7) and OEBGD, Chapter 6, Section 2, Criterion 3 and Section 4, Criterion 4).	Verify that particular care is exercised to ensure that ignitable, reactive, or incompatible wastes are not handled in a manner that could result in conditions that might threaten human health or the environment. (3) (NOTE: The following criteria are taken from the OEBGD.) Verify that incompatible wastes and materials are not placed in the same container. Verify that hazardous waste is not placed in an unwashed container that previously held an incompatible waste or material. Verify that storage containers holding a hazardous waste that is incompatible with any waste or other materials stored nearby in containers, piles, open tanks, or surface impoundments are separated from the other materials or protected from them by means of a dike, berm, wall, or other device.

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HAZARDOUS WASTE ACCUMULATION POINTS **Containers**	

4-46. Containers at HWAPs must be labeled in accordance with specific requirements (FGS-FRG 6-4c(3) and 6-4d(9)(a)).	Verify that each container is labeled in either of the following ways: (3)
	
	- when applicable, the Hazardous Chemical Warning Label may be used
	- in lieu of the above, or when it does not apply, each container has a label that indicates the following:
	  - the contents of the container
	  - the source of the waste (a generator identification code or some other reference code)
	  - the amount of waste
	  - appropriate warnings as to the dangers of the waste (poison, carcinogenic, toxic, flammable, etc.)
	  - any special handling or safety requirements.
	
	Verify that any additional information required by waste utilization or disposal institutions who will receive the waste are added to the label.
	
	Verify that, during surface transport, hazardous waste containers are labeled in accordance with the requirements of *Joint Transportation of Hazardous Materials* (USAFE Reg. 75-3).
	
	Verify that, during air transport, labeling is in accordance with International Civil Air Organization rules and appropriate DOD or component instructions.
	
	(NOTE: FGS-FRG refers the reader to AFR 71-4, which has been superceded by AFJMAN 24-204, *Preparing Hazardous Materials for Military Air Shipments*, of November 1994.)

4-47. Containers that hold hazardous waste must be closed during storage (FGS-FRG 6-4c(3) and 6-4d(9)(c)).	Verify that containers that hold hazardous waste are closed during storage. (3) (NOTE: This requirement does not apply when it is necessary to add waste to or remove waste from the container.)

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HAZARDOUS WASTE ACCUMULATION POINTS	
Flammable/ Combustible Liquids	(NOTE: FGS-FRG incorporates the requirements of DOD 4145.19-R-1 by reference. Therefore, since the requirements of AFOSH STD 127-43 are substantially identical to those of DOD 4145.19-R-1, all citations to the AFOSH STD must be considered to be requirements of FGS-FRG as well.)

4-48. Flammable/combustible liquids must be handled according to specific procedures (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4g).	Verify that the following procedures are followed when flammable/combustible wastes are handled: (1)(2)(3)
	- transfer of liquids from or into vessels, containers, or portable tanks within a building takes place only by means of the following methods:
	  - a closed piping system
	  - safety cans
	  - a device drawing from the top
	  - from a container or tank by gravity through an approved self-closing valve
	- transfer of liquids from a safety can is by means of a device drawing through the top
	- transfer of liquids from a container or tank is done by gravity through an approved self-closing valve
	- approved safety cans are used for transporting and dispensing flammable liquids in quantities of 19 L (5 gal) or less
	- flammable liquids are kept in covered containers when not actually in use
	- Class I liquids are only used when there are no open flames or other sources of ignition.
	
	Verify that safety cans and other portable containers of flammable liquids having a flashpoint at or below 80 °F [26 °C] are painted red with some additional clearly visible identification either in the form of a yellow band around the can or the name of the contents conspicuously stenciled or painted on the can in yellow.
	
	(NOTE: This provision does not apply to shipping containers.)

4-49. Flammable or combustible liquids must not be stored in ways that limit the use of exits, stairways, or areas normally used for the safe egress of people (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4d(1)).	Verify that exits or common traffic routes are not blocked. (1)(3)

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4-50. Specific MPs should be considered when storing and handling flammable/ combustible wastes (MP).	Verify that the HWAP observes the following MPs: (1)(3) - no positive sources of ignition (open flames, welding, radial heat, mechanical sparks) are in the immediate area - no items are stored against pipes or coils that produce heat - paint drums that are stored horizontally are rolled a half turn every 90 days - containers of paint are palletized prior to storage - aerosol containers are stored in well ventilated areas. (NOTE: These MPs are suggested in DOD 4145.19-R-1.)
4-51. Containers of flammable and combustible liquids must meet specific capacity standards (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4a).	Verify that containers meet the capacity standards in Table 4-3. (1)(2)(3)
4-52. Containers of flammable/combustible wastes must be stored and handled according to specific requirements (FGS-FRG 6-4c(3) and DOD 4145.19-R-1, para 5-404i).	Verify that containers are stored and handled such that: (1)(2)(3) - open flame devices are not in use in the storage area - combustible materials, other than wood pallets used in the storage of flammable/combustibles, are not stored in the storage facility - labels are not damaged - materials received without a date of manufacture label are marked with the shipping document date - leaking containers are removed from the storage area immediately - containers are stored so that they are issued or used in the order of dates of manufacture, with the oldest material used first - there are no open containers - containers are inspected periodically while in storage.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-53. Flammable/combustible storage areas must meet certain fire protection standards (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4f).	Verify that flammable/combustible storage locations meet the following requirements: (1)(2)(3) - at least one portable fire extinguisher rated not less than 10-BC is located outside the door of any room used for storage and within 3 m (10 ft) of the door opening - at least one portable fire extinguisher rated not less than 20-BC is located within 3 to 7.5 m (10 to 25 ft) of any Class I or Class II liquid storage area outside of a storage room, but inside a building - fire extinguishing systems are sprinklers, water spray, or other USAF approved systems - open flames and smoking are not permitted within 15 m (50 ft) of flammable/combustible liquid storage areas - water reactive wastes are not stored in the same room with flammable/combustible liquids, except for small quantities that can be stored in laboratories - containers and portable tanks used for Class I liquids are electrically bonded and grounded during transfer of liquids - liquid containers are protected from heat sources. Verify that positive measures are taken to eliminate sources of ignition, such as open flames, electrical smoking, cutting and welding, hot surfaces, static, mechanical sparks, radiant heat, and spontaneous ignition.
4-54. Flammable and combustible liquid storage cabinets must meet specific structural requirements (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4b(2)).	Verify that storage cabinets for flammable and combustible liquids meet the following structural requirements: (1)(2)(3) - all cabinets are constructed to limit internal temperature to no more than 163 °C (325 °F) when subject to the standard 10-min fire test specified in NFPA 251-196 - the bottom, top, door, and sides of metal cabinets are at least 18 gauge sheet steel and double-walled with 1.5 in. [3.81 cm] air space, and joints are riveted or welded - the doors of metal cabinets have a three-point lock and the door sill is raised at least 2 in. [5.08 cm] above the bottom of the steel cabinet - existing wood cabinets are knot free and of at least 1 in. [2.54 cm] nominal thickness, and all joints are rabbeted and fastened in two directions with flathead wood screws.

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4-55. Flammable and combustible liquid storage cabinets are subject to specific limitations on their contents (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4b(1)).	Verify that the following storage requirements are met: (1)(2)(3) - no more than 455 L (120 gal) of Class I, Class II, and Class IIIA liquids are stored in any cabinet - no more than 227 L (60 gal) of the 455 L (120 gal) are Class I or II liquids.
4-56. Installations must not have more than three cabinets in a single fire area (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4b(1)).	Verify that no more than three cabinets are located in a single fire area. (1)(2)(3) (NOTE: This requirement does not apply to industrial areas.) (NOTE: The limit of three cabinets in a single area may be increased where small cabinets are used; however, the maximum amount of flammable storage cannot exceed 1365 L (360 gal) total.) (NOTE: Additional cabinets may be located in the same fire area of an industrial area if the additional cabinet, or group of not more than three 455 L (120-gal) cabinets, is separated from other cabinets or group of cabinets by at least 30.5 m (100 ft).)
4-57. Indoor flammable/combustible storage rooms must meet specific standards (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4c).	Verify that the HWAP's flammable/combustible storage rooms have: (1)(2)(3) - walls that meet fire resistance test NFPA 251-1969 - liquid tight wall/floor joints - self-closing fire doors (NFPA 80) - one clear aisle at least 3 ft [0.91 m] wide - a continuous mechanical exhaust ventilation system. Verify that a 4-in. [10.16-cm] raised sill or ramp is provided to adjacent rooms or buildings or that the floor of the storage area is 4 in. [10.16 cm] lower than the surrounding floors. Verify that, if a sill or ramp is not present, the building has an open grated trench that drains to a safe area. Verify that wooden shelving, flooring, dunnage, scuffboards, and/or floor overlay is at least 1 in. [2.54 cm] thick. Verify that electrical wiring and equipment meet NFPA 70 requirements. Verify that dispensing is done by an approved pump or self-closing faucet. Verify that storage in the rooms meets the requirements in Table 4-4. Verify that mechanical exhaust systems are controlled by a switch outside the door and have exhaust outlets on exterior walls.

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4-57. (continued)	Verify that makeup and exhaust air openings are within 12 in. [30.48 cm] above the floor on one side of the room with one or more makeup air inlets located on the opposite wall. Verify that air movement occurs across all portions of the floor, as far as practical. Verify that containers of over 114 L (30 gal) capacity are not stacked one upon the other.
4-58. Flammable/combustible liquids stored in buildings where storage rooms or cabinets are not used must meet specific standards (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4d(2) and 4d(4)).	Verify that containers in indoor storage areas are tightly sealed. (1)(2)(3) (NOTE: This provision does not apply when container contents are transferred, poured, or applied.) Verify that flammable paints, oils, and varnishes in 3.8-L or 19-L (1-gal or 5-gal) containers used for building maintenance are stored temporarily in closed containers at the job site for fewer than 10 calendar days. Verify that the storage of flammable/combustible liquids does not physically obstruct means of egress from the building or area.
4-59. Flammable and combustible liquid storage buildings must meet specific structural requirements (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4d(3)).	Verify that flammable/combustible storage buildings are one story and devoted principally to the handling and storing of flammable or combustible liquids. (1)(2)(3) Verify that such buildings have 2-h fire-rated exterior walls with no openings within 3 m (10 ft) of the storage area.

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4-60. The storage of flammable/combustible liquids in warehouses or storage buildings must meet specific requirements (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 5d).	Verify that the following requirements are met: (1)(2)(3) - if the storage building is located 15 m (50 ft) or fewer from a building or line of adjoining property that may be built upon, the wall facing the building or property line is a blank wall with a fire-resistance rating of at least 2 h - any quantity of liquids may be stored as long as the storage arrangements outlined in Table 4-5 are met - stacked containers are separated by pallets or dunnage when necessary to provide stability and prevent excess stress on container walls - portable tanks stored over one tier high are designed to nest securely - no stack is closer than 1 m (3 ft) to the nearest beam, chord, girder, or other obstruction - piles are 1 m (3 ft) below sprinkler deflectors or discharge points of water spray or other fire protection system - containers have clearly legible labels that identify contents and indicate hazards - aisles are at least 1 m (3 ft) wide when necessary for access to doors, windows, or standpipe connections.
4-61. HWAPs must meet specific requirements with regard to flammable/ combustible wastes stored outside (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4e).	Verify that no more than 4169 L (1100 gal) of flammable/combustible liquids are stored adjacent to buildings. (1)(2)(3) Verify that the quantity and arrangement of wastes is in accordance with Table 4-5. Verify that the storage area is graded to divert spills or is surrounded by a curb at least 15 cm (6 in.) high. Verify that drains terminate in a safe location.
4-62. HWAPs must meet specific requirements with regard to incidental storage of flammable/ combustible liquids in industrial areas (FGS-FRG 6-4c(3) and AFOSH STD 127-43, para 4h).	(NOTE: This checklist item pertains to industrial areas where the use of flammable or combustible liquid is incidental to the principal business or where flammable or combustible liquids are handled or used only in unit physical operations that do not involve chemical reactions.) Verify that the following requirements are met in industrial areas: (1)(2)(3) - storage is in metal cabinets stenciled FLAMMABLE--KEEP FIRE AWAY - storage is limited to 4 L (1 gal) of Class I or 40 L (10 gal) of Class II and III liquids - amount of liquid stored in the cabinet does not exceed 40 L (10 gal) - containers in the cabinet are closed - storage is limited to a 5-day supply - each work center has only one cabinet.

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4-62. (continued)	Verify that the fire department was consulted prior to the establishment of incidental storage areas in industrial shops.
HAZARDOUS WASTE ACCUMULATION POINTS **Halogenated Solvents**	
4-63. Halogenated solvents must not be mixed with any other waste (FGS-FRG 6-4c(3) and 6-4d(3)).	Verify that halogenated solvents are not mixed with any other waste. (3)
HAZARDOUS WASTE ACCUMULATION POINTS **Documentation**	
4-64. Operators of HWAPs must maintain an audit trail for all hazardous wastes that pass through their facilities (FGS-FRG 6-4e(1)).	Verify that operators of HWAPs maintain an audit trail for all hazardous wastes that pass through their facilities. (3)
4-65. HWAPs must maintain a hazardous waste log (FGS-FRG 6-4e(2) and OEBGD Chapter 6, Section 5).	Verify that the each HWAP maintains a written hazardous waste log that is an accurate portrayal of happenings at the facility. (3)(7) Verify that the log records the following: - actions identifying hazardous wastes or waste streams - receipt or shipment of any hazardous waste - significant operational or procedural activities - incidents (spills, fires, etc.) - inspections - any other significant happenings that affected the facility. (NOTE: There is no required format for these logs. Log entries may refer to other documentation and need not be a complete record of the event.) (NOTE: The following requirements are taken from the OEBGD.)

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4-65. (continued)	Verify that the hazardous waste log includes the following information: - name and address of generator - description and hazard class of the hazardous waste - number and type of containers - quantity of hazardous waste - date stored - storage location - disposition data, including dates received, sealed, and transported, and the transporter used. Verify that the hazardous waste log is available to emergency personnel in the event of a fire or a spill. Verify that the hazardous waste log is maintained until closure of the installation. (NOTE: FGS-FRG 6-4e(2) requires that the logs for HWAPs be maintained only until 3 yr after the last entry and that those for HWSAs be maintained only until 3 yr after the HWSA has been closed.) Verify that the installation retains manifests of incoming and outgoing hazardous wastes for 3 yr. Verify that the installation retains waste analysis/characterization records until 3 yr after closure. (NOTE: FGS-FRG 6-4e(3) requires that waste analysis/characterization records be maintained only until 3 yr after completion of the action involved.)
4-66. A copy of the spill plan must be maintained at all HWAPs (OEBGD, Chapter 6, Section 6, Criterion 2(a)).	Verify that each HWAP maintains a current copy of the spill plan. (3)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-67. All documents relating to the operation of an HWAP must be kept on file for 3 yr after the completion of the action involved (FGS-FRG 6-4e(3)).	Verify that all documents relating to the operation of the HWAP are kept on file for 3 yr after the completion of the action involved. (3) (NOTE: This requirement does not apply if another portion of FGS-FRG specifies a longer retention time.) (NOTE: The following are examples of records that must be maintained: - certifications of equipment or facilities - operations plans and/or procedures - the flow analysis of a waste stream - laboratory analysis of a waste - inspection reports - inventories - copies of *Entsorgungsnachweise* - manifests or transfer documents - accident or fire reports - closure reports.) Verify that logs for HWAPs are maintained until 3 yr after the last entry
HAZARDOUS WASTE ACCUMULATION POINTS **Closure**	
4-68. Appropriate planning must be accomplished when closing an HWAP (FGS-FRG 6-4f).	Verify that the installations plans appropriately for the closure of HWAPs. (1)(3)
4-69. Specific actions must be taken when closing an HWAP (FGS-FRG 6-4f).	Verify that all hazardous waste and hazardous waste residues are removed from the HWAP, including the storage and containment systems. (1)(3) Verify that closure is carried out in such a way as to eliminate or minimize the need for future maintenance and the potential for any release of hazardous waste, now or in the future.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
HAZARDOUS WASTE STORAGE AREAS **General**	(NOTE: Hazardous waste storage areas (HWSAs) are facilities for storing more than 200 kg of a hazardous waste stream or more than 50 kg of a very hazardous waste stream.)
4-70. HWSAs must meet general design and operating criteria (FGS-FRG 6-4a).	Verify that the HWSA is designed, constructed, maintained, and operated to minimize the possibility of fire, explosion, or an unplanned release of hazardous waste that might: (1)(5) - endanger human health or reduce physical comfort - endanger livestock, birds, game, or fish - harm water, soil, or useful plants - cause damage to the environment by air or noise pollution - fail to protect nature conservation or city planning efforts, or - endanger or disturb the public.
4-71. HWSAs must be configured and operated in such a way that surface waters and groundwater are not endangered (FGS-FRG 5-4a(2)i as implemented by FGS-FRG 6-4d).	Verify that the HWSA is configured and operated in such away that surface waters and groundwater are not endangered. (2)(5) Verify that the HWSA is protected from high water and flooding.
4-72. HWSAs must not be operated if any defects are present that may endanger human health or the environment (FGS-FRG 5-4a(5)(a) as implemented by FGS-FRG 6-4d).	Verify that no HWSA is operated if any defects are present that may endanger human health or the environment. (2)(5)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
HAZARDOUS WASTE STORAGE AREAS **Design Requirements**	
4-73. New HWSAs must be located so as to minimize the risk of a release due to seismic activity, floods, or other natural events (OEBGD, Chapter 6, Section 3, Criterion 1).	Verify that new HWSAs are (to the maximum extent possible) located so as to minimize the risks of release due to seismic activity, floods, or other natural events. (1)(5) Verify that, for storage areas located where such risks may be encountered, the installation spill prevention and control plan addresses the risk.
4-74. HWSAs that have containers holding ignitable or reactive waste must be located at least 15 m (50 ft) inside the installation boundary (OEBGD, Chapter 6, Section 4, Criterion 3).	Verify that containers which hold ignitable or reactive waste are at least 15 m (50 ft) from the installation boundary. (5)
4-75. Storage or work areas for containers that are opened during the normal course of activities must be covered (FGS-FRG 6-4d(4)).	Verify that storage or work areas for containers that are opened during the normal course of activities are covered. (5) (NOTE: This statement is interpreted to mean that such areas must have a roof.)
4-76. Floor areas of HWSAs where volatile hydrocarbons are dealt with must meet specific criteria (FGS-FRG 6-4d(10)(a)).	Verify that floor areas where volatile hydrocarbons are dealt with are constructed of or coated with materials that are resistant to those substances. (1)(5) Verify that such floors are also constructed in such a way that they can be checked for leaks.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-77. HWSAs must meet specific security requirements (OEBGD, Chapter 6, Section 3, Criterion 4).	Verify that the installation prevents the unknowing entry, and minimizes the possibility of unauthorized entry, of people or livestock onto HWSA grounds. (1)(5) Verify that the HWSA security system consists of either: - a 24-h surveillance system (e.g., television monitors, surveillance by guards) that continuously monitors and controls entry - an artificial or natural barrier (e.g., a fence in good repair or a fence combined with a cliff) that completely surrounds the area, combined with a means to control entrance at all times (e.g., an attendant, television monitors, locked gate, or controlled roadway access).
4-78. HWSAs must have signs that meet specific requirements (FGS-FRG 6-4d(8) and OEBGD, Chapter 6, Section 3, Criterion 4).	Verify that NO SMOKING signs in both English and German are conspicuously posted in HWSAs. (5) (NOTE: The following requirements are taken from the OEBGD.) Verify that a sign is posted with the words DANGER--UNAUTHORIZED PERSONNEL KEEP OUT at each entrance and at other locations in sufficient numbers to be seen from any approach to the HWSA. Verify that the legend is written in English and German. Verify that signs are legible from 25 ft [7.5 m]. (NOTE: Existing signs with a legend other than the above may be used if the legend indicates that only authorized personnel are allowed to enter, and that entry can be dangerous.)
4-79. All work areas within the HWSA must be labeled according to their function (FGS-FRG 6-4d(11)).	Verify that all work areas within the HWSA are labeled according to their function. (5)

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4-80. Specific equipment must be present at each HWSA and must be tested (FGS-FRG 6-4d(1) and FGS-FRG 5-4a(5)).	Verify that the following equipment is easily accessible to personnel in HWSAs and in working condition: (2)(4)(5) - an internal communications or alarm system capable of providing immediate instruction to facility personnel - an intrinsically safe telephone (immediately available at the scene of operations) or hand-held two-way radio capable of summoning emergency assistance from police, fire departments, and ERTs - fire control equipment appropriate to the substances in storage - spill control equipment - personal protective equipment (PPE). Verify that all equipment is periodically tested and properly maintained. (NOTE: The following are examples of safety devices and systems that should also be tested: - fire alarms - fire extinguisher plants (= fire extinguishing equipment?) - smoke and heating take-off devices (*sic*) - fire doors - lightning rods.)
4-81. HWSAs must meet protective design and equipment standards (OEBGD, Chapter 6, Section 3, Criteria 5 and 7).	Verify that sufficient aisle space is maintained to allow unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the facility operation. (5) Verify that no containers obstruct exits. Verify that the HWSA has the following: - decontamination equipment - water at adequate volume and pressure to supply water hose streams, foam producing equipment, automatic sprinklers, or water spray systems - eyewash and shower facilities. Verify that the equipment is tested and maintained as necessary to ensure proper operation in an emergency.
4-82. HWSAs must have adequate systems to exhaust smoke and heat (FGS-FRG 5-4a(5) as implemented by FGS-FRG 6-4d).	Verify that the HWSA has adequate systems to exhaust smoke and heat. (2)(5)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-83. Hazardous waste work areas must have devices for properly opening, filling, emptying, and cleaning containers as required (FGS-FRG 6-4d(9)(b)).	Verify that hazardous waste work areas have devices for properly opening, filling, emptying, and cleaning containers as required. (5)
4-84. Storage at HWSAs must be configured in accordance with specific requirements (FGS-FRG 6-4d(10)(b) and OEBGD, Chapter 6, Section 4, Criterion 2).	Verify that storage is so configured that a leak from a single container may not find its way into another storage area. (5) Verify that single-walled tanks or containers are set up in collecting basins that will not allow the mixing of different types of hazardous wastes in the event of a leak. Verify that such basins are sufficiently far apart to ensure that in the event of a leak there is no fire or safety risk. (NOTE: The following requirements are taken from the OEBGD.) Verify that the container storage area has a containment system that has sufficient capacity to contain 10 percent of the volume of the containers or the volume of the largest container, whichever is greater. (5) Verify that the HWSA is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed. (NOTE: Storage areas that store containers holding only wastes that do not contain free liquids need not have such a containment system, provided that the storage area is sloped or otherwise designed and operated to drain and remove liquid from precipitation, or the containers are elevated or otherwise protected from contact with accumulated liquid.)
4-85. Certain HWSAs must have suitable lightning protection systems (FGS-FRG 5-4d as implemented by FGS-FRG 6-4d).	Verify that HWSAs where over 200 kg of oxidizers and combustible waste are stored have suitable lightning protection systems. (2)(5) Verify that buildings where toxic and/or very toxic waste with a total weight of more than 5 metric tons are stored have suitable lightning protection systems.) (NOTE: The above requirement does not apply if all the stored wastes are noncombustible.) Verify that all such lightning protection systems are tested every 3 yr.

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4-86. Certain HWSAs must have automatic fire alarm systems (FGS-FRG 5-4a(10) and 5-4a(11) as implemented by FGS-FRG 6-4d).	Verify that HWSAs that store over 200 kg of toxic substances and have more than 20 metric tons per storage section have an automatic fire alarm system. (2)(5) Verify that HWSAs that store over 50 kg of very toxic substances and have more than 10 metric tons per storage section have an automatic fire alarm system. (NOTE: The above requirement does not apply if the fire department has approved another fire detection system.)
4-87. HWSAs that store toxic wastes must meet specific lighting requirements (FGS-FRG 5-4a(3) as implemented by FGS-FRG 6-4d).	Verify that HWSAs that store toxic wastes are well lit. (2)(5) Verify that the lighting system does not heat the toxic substances. Verify that all lights are at least 0.5 m from the toxic wastes.
4-88. HWSAs that store toxic wastes must have leak-proof floors FGS-FRG 5-4a(4) as implemented by FGS-FRG 6-4d).	Verify that the floor of any HWSA that stores toxic wastes is leak-proof. (2)(5)
HAZARDOUS WASTE STORAGE AREAS **Operating Procedures**	
4-89. HWSAs must be inspected weekly for leaking containers and for deterioration of containers and the containment system caused by corrosion and other factors (OEBGD, Chapter 6, Section 4, Criterion 1(e)).	Verify that a weekly inspection is performed. (5) Verify that secondary containment systems are inspected for defects and emptied of accumulated releases.

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4-90. HWSA managers must conduct periodic verification testing of the hazardous waste in storage (OEBGD, Chapter 6, Section 3, Criterion 3(b)).	Verify that periodic testing is carried out to ensure that the generator has accurately identified the stored hazardous wastes. (5)
4-91. Prior to accepting waste from a generator, the HWSA manager must follow specific procedures (OEBGD, Chapter 6, Section 3, Criterion 3(c)).	Verify that, prior to accepting waste from generators, the HWSA manager: (5) - inspects the waste to ensure that it matches the description provided - requests a new HWPS from the generator if there is reason to believe that the process generating the waste has changed - analyzes waste shipments to see if they match the waste description on the accompanying manifest and documents - rejects shipments that do not match the accompanying waste descriptions, unless the generator provides an accurate description.
4-92. Required maintenance work must be done without delay and with appropriate safety measures (FGS-FRG 5-4a(5)(b) as implemented by FGS-FRG 6-4d).	Verify that required maintenance of HWSAs is done without delay. (2)(5) Verify that maintenance personnel take appropriate safety precautions.
4-93. Medicine, food, food additives, tobacco products, consumable alcohol, or cosmetics must not be stored in HWSAs (FGS-FRG 5-5a(2) as implemented by FGS-FRG 6-4d).	Verify that no medicine, food, food additives, tobacco products, consumable alcohol, or cosmetics are stored in HWSAs. (2)(5)
4-94. Liquid hazardous wastes must be stored in such a way that they will not leak out in an uncontrolled manner (FGS-FRG 5-4 as implemented by FGS-FRG 6-4d).	Verify that liquid hazardous wastes are stored in such a way that they will not leak out in an uncontrolled manner. (2)(5) Verify that liquid hazardous wastes stored in quantities over 200 kg have secondary containment. (NOTE: Secondary containment may be formed by depressions, dams/berms, sturdy walls, curbs, or other suitable structures.)

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4-94. (continued)	Verify that the volume of the secondary containment is at least 10 percent of the liquid volume of all stored packages and moveable vessels and at least 100 percent of the volume of the largest vessel that contains a liquid.
4-95. Certain types of separation must be maintained at HWSAs (FGS-FRG 6-4d(2) and FGS-FRG 6-4d(6)).	Verify that hazardous wastes are stored in separate containers from reusable hazardous wastes. (5) Verify that separated and labeled storage areas are established for hazardous wastes that are incompatible. Verify that separated storage areas are sufficiently far apart to ensure that different types of wastes will not be mixed. Verify that the following types of hazardous waste are stored in multicompartmented facilities: - solid and pasty hazardous wastes in containers - sludge waste. (NOTE: Alternatively, sludge waste may be stored in aboveground storage tanks.) Verify that containers for solid and pasty hazardous wastes have leak detectors.
4-96. The storage of ignitable and/or reactive wastes at HWSAs must not threaten human health or the environment (FGS-FRG 6-4d(7) and OEBGD, Chapter 6, Section 3, Criterion 10).	Verify that particular care is exercised to ensure that ignitable and/or reactive wastes are not handled in a manner that could result in conditions that might threaten human health or the environment. (5) (NOTE: The following requirements are taken from the OEBGD.) Verify that the storage of ignitable and/or reactive wastes is accomplished so as to prevent threats to human health or the environment. Verify that the HWSA manager takes precautions to prevent accidental ignition or reaction of ignitable or reactive wastes. Verify that ignitable and/or reactive waste are separated and protected from sources of ignition or reaction. (NOTE: Sources of ignition or reaction include but are not limited to, open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat.) Verify that while ignitable and/or reactive waste is being handled, smoking and open flames are confined to specially designated areas.

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4-96. (continued)	Verify that water reactive waste is not stored in the same area as flammable and combustible liquids.
4-97. HWSAs must meet the same requirements for the handling and storage of flammables/combustibles as HWAPs (FGS-FRG 6-4d).	Verify that the HWSA stores flammables/combustibles in accordance with the requirements of checklist items 4-48 through 4-62. (5) (NOTE: Findings written against checklist items 4-48 through 4-62 should use the question number of this checklist item and cite the question number from the HWAP section in the details portion of the finding sheet.)
4-98. HWSAs must handle incompatible wastes in accordance with specific requirements (OEBGD Chapter 6, Section 3, Criterion 10 and Chapter 6, Section 4, Criterion 4).	Verify that the storage of incompatible wastes is accomplished so as to prevent threats to human health or the environment. (5) Verify that incompatible wastes are not placed in the same container. Verify that hazardous waste is not placed in an unwashed container that previously held an incompatible waste or material. Verify that storage containers holding a hazardous waste that is incompatible with any waste or other materials stored nearby in containers, piles, open tanks, or surface impoundments are separated from the other materials or protected from them by means of a dike, berm, wall, or other device.
4-99. Combustible materials must not be stored with oxidizers or with toxic wastes (FGS-FRG 5-4a(7) and 5-4a(9) as implemented by FGS-FRG 6-4d).	Verify that combustible materials are not stored either with oxidizers or with toxic wastes. (2)(5) Verify that, where oxidizers are stored, items such as pallets, dunnage, packing fill, and the like are either made of nonflammable materials or treated to be nonflammable.
4-100. Vessels of certain types that contain oxidizers or toxic substances must be handled in accordance with specific criteria (FGS-FRG 5-5a(4) as implemented by FGS-FRG 6-4d).	Verify that breakable containers (e.g. glass, china, stone) of oxidizers or toxic substances are stacked higher than 0.4 m from the floor only if such containers are surrounded by a solid webbed package. (1)(2)(5) Verify that nonbreakable packages of oxidizers or toxic substances are stacked in such a way that they will not fall more than 1.5 m.

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4-101. Installations must comply with specific criteria if packages of oxidizers or toxic wastes have to be stacked in such a way that they may fall more than 1.5 m (FGS-FRG 5-5a(5) as implemented by FGS-FRG 6-4d).	Verify that the installation considers the following prior to such storage: (1)(2)(5) - *Occupational Guidelines for Storage Institutions and Instruments* (ZH 1/428) - *M-19: Securing of Palletized Storage Units.* (NOTE: FGS-FRG gives an address from which these documents may be obtained.) Verify that only trained forklift operators are used for operations involving the stacking of packages of oxidizers or toxic wastes that have to be stacked in such a way that they may fall more than 1.5 m. Verify that, if the installation uses contracted forklift operators, such operators are trained in accordance with the Chemical Industry Cooperative guidelines *Principles for Choosing, Training, and Certification of Forklift Drivers.* Verify that barrels are stacked only by forklifts that are equipped with a barrel-gripper device.
4-102. Packages or containers of oxidizers must not be filled in a storage area if the process generates dust (FGS-FRG 5-5a(1) as implemented by FGS-FRG 6-4d).	Verify that no packages or containers of oxidizers are filled in a storage area if the process generates dust. (1)(2)(5)
4-103. Leaked or spilled oxidizers must be handled in accordance with specific criteria (FGS-FRG 5-5a(3) as implemented by FGS-FRG 6-4d).	Verify that combustible substances are not used to absorb leaked or spilled oxidizers. (2)(3)(5) (NOTE: Suitable binding materials include silica, sand, and cement.) Verify that material that has leaked out of packages is disposed of as hazardous waste. Verify that contaminated water and/or absorption materials are disposed of as hazardous waste.
4-104. POL from machinery used in HWSAs that store oxidizers must be cleaned up and disposed of immediately (FGS-FRG 5-4a(6) as implemented by FGS-FRG 6-4d).	Verify that POL from machinery (such as fork lifts) used in HWSAs that store oxidizers is cleaned up and disposed of immediately. (2)(5) (NOTE: See Section 8, *POL Management.*)

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4-105. Toxic wastes must kept in closed packages or containers that do not leak (FGS-FRG 5-4a(4) as implemented by FGS-FRG 6-4d).	Verify that toxic substances are kept in closed packages or containers that do not leak. (2)(5) Verify that, if leaks are detected, the packages or containers are removed and the substances repackaged.
4-106. Smoking, open flames, and fires are absolutely prohibited in areas where toxic waste is stored (FGS-FRG 5-4a(8) as implemented by FGS-FRG 6-4d).	Verify that smoking, open flames, and fires do not occur in areas where toxic waste is stored. (2)(5)
4-107. Flammable substances must never be stored with toxic or very toxic substances that are not combustible (FGS-FRG 5-4a(9) as implemented by FGS-FRG 6-4d).	Verify that flammable substances are not stored with toxic or very toxic substances unless the toxic or very toxic substances are also combustible. (2)(5)
4-108. Extremely flammable substances must not be stored with substances that are both toxic (or very toxic) and flammable unless specific requirements are met (FGS-FRG 5-4a(9) as implemented by FGS-FRG 6-4d).	Verify that extremely flammable substances are stored with substances that are both toxic (or very toxic) and flammable only if the requirements for the storage of both toxics and flammables are met. (2)(5)

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4-109. Toxic wastes that are flammable must be separated from certain reactive wastes (FGS-FRG 5-5b as implemented by FGS-FRG 6-4d).	Verify that toxic wastes that are flammable are separated from the following reactive wastes: (1)(2)(5) - very active oxidizers - oxidizers - self-igniting substances - organic peroxides - substances that develop flammable gases if they come into contact with water - pressurized gases - frozen, liquefied gases - ammonium nitrate fertilizer.
4-110. Halogenated solvents must not be mixed with any other waste (FGS-FRG 6-4d(3)).	Verify that halogenated solvents are not mixed with any other waste. (5)
HAZARDOUS WASTE STORAGE AREAS **Containers**	

4-111. Installations must meet specific requirements with regard to labels on containers in HWSAs (FGS-FRG 6-4d(9)(a)).	Verify that each container is labeled in either of the following ways: (5)(7)
	- when applicable, the Hazardous Chemical Warning Label may be used
	- in lieu of the above, or when it does not apply, each container has a label that indicates the following:
	  - the contents of the container
	  - the source of the waste (a generator identification code or some other reference code)
	  - the amount of waste
	  - appropriate warnings as to the dangers of the waste (poison, carcinogenic, toxic, flammable, etc.)
	  - any special handling or safety requirements.
	Verify that any additional information required by waste utilization or disposal institutions who will receive the waste are added to the label.
	Verify that, during surface transport, hazardous waste containers are labeled in accordance with the requirements of *Joint Transportation of Hazardous Materials* (USAFE Reg. 75-3).

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4-111. (continued)	Verify that, during air transport, labeling is in accordance with International Civil Air Organization rules and appropriate DOD or component instructions. (NOTE: FGS-FRG refers the reader to AFR 71-4, which has been superceded by AFJMAN 24-204, *Preparing Hazardous Materials for Military Air Shipments*, of November 1994.)
4-112. Containers at HWSAs must meet specific standards (FGS-FRG 6-4d(9)(c) and OEBGD, Chapter 6, Section 4, Criteria 1(a) and 1(c)(ii)).	Verify that containers that hold hazardous waste are closed during storage. (5) (NOTE: This requirement does not apply when it is necessary to add waste to or remove waste from the container.) (NOTE: The following requirements are taken from the OEBGD.) Verify that containers are in good condition and free from severe rusting, bulging, or structural defects. Verify that containers, including overpack containers, are compatible with the materials stored. Verify that containers are not opened, handled, or stored in a manner that could cause a rupture or a leak.
HAZARDOUS WASTE STORAGE AREAS **Additional Requirements for Warehouse HWSAs**	
4-113. Installations must meet specific requirements with regard to hazardous waste warehouses (FGS-FRG 5-4b(1) as implemented by FGS-FRG 6-4d).	Verify that oxidizing substances are not stored in multi-story buildings. (2)(5) Verify that toxic substance storage sections are separated from other storage sections, rooms, and buildings by fire-resistant walls and ceilings made of noncombustible materials with a 90-min fire rating. Verify that liquid oxidizing substances are stored in such a way that they will not leak out in an uncontrolled manner and mix with other hazardous material. Verify that there is secondary containment with a volume that will contain at least 10 percent of the liquid volume of all stored packages and moveable vessels and at least 100 percent of the volume of the largest liquid-containing vessel.

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4-113. (continued)	Verify that buildings where toxic wastes are stored are ventilated in such a way that fumes or other emissions will never reach a level that could be considered dangerous or a health hazard. (NOTE: Any ventilation system that results in an emission into the atmosphere must meet the requirements of FGS-FRG Chapter 2, *Air Emissions*. See Section 1, *Air Quality Management*, of this manual.)
HAZARDOUS WASTE STORAGE AREAS **Additional Requirements for Outdoor HWSAs**	
4-114. Outdoor HWSAs must meet specific requirements (FGS-FRG 5-4b(2) as implemented by FGS-FRG 6-4d).	Verify that outdoor storage areas for toxic substances are separated from other adjacent storage areas or buildings by fire-resistant walls made of noncombustible materials with a 90-min fire wall rating. (2)(5) Verify that the walls are at least 1 m higher than the stored material. Verify that toxic wastes are at least 5 m from the doorway to any building. Verify that the outdoor storage of more than 20 metric tons of toxic waste per storage section without an automatic fire alarm system is patrolled hourly by someone with a communications device such as a telephone, fire-alarm, or radio set. Verify that oxidizers and toxic substances have secondary containment with a volume that will contain at least 10 percent of the liquid volume of all stored packages and moveable vessels and at least 100 percent of the volume of the largest liquid-containing vessel.
HAZARDOUS WASTE STORAGE AREAS **Documentation**	
4-115. Operators of HWSAs must maintain an audit trail for all hazardous wastes that pass through their facilities (FGS-FRG 6-4e(1)).	Verify that operators of HWSAs maintain an audit trail for all hazardous wastes that pass through their facilities. (5)

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4-116. HWSAs must maintain a hazardous waste log (FGS-FRG 6-4e(2) and OEBGD Chapter 6, Section 5).	Verify that the each HWSA maintains a written hazardous waste log that is an accurate portrayal of happenings at the facility. (2)(5)(7) Verify that the log records the following: - actions identifying hazardous wastes or waste streams - receipt or shipment of any hazardous waste - significant operational or procedural activities - incidents (spills, fires, etc.) - inspections - any other significant happenings that affected the facility. (NOTE: There is no required format for these logs. Log entries may refer to other documentation and need not be a complete record of the event.) (NOTE: The following requirements are taken from the OEBGD.) Verify that the hazardous waste log includes the following information: (2)(5)(7) - name and address of generator - description and hazard class of the hazardous waste - number and type of containers - quantity of hazardous waste - date stored - storage location - disposition data, including dates received, sealed, and transported, and the transporter used. Verify that the hazardous waste log is available to emergency personnel in the event of a fire or a spill. Verify that the hazardous waste log is maintained until closure of the installation. (NOTE: FGS-FRG 6-4e(2) requires that the logs for HWAPs be maintained only until 3 yr after the last entry and that those for HWSAs be maintained only until 3 yr after the HWSA has been closed.) Verify that the installation retains manifests of incoming and outgoing hazardous wastes for 3 yr. Verify that the installation retains waste analysis/characterization records until 3 yr after closure. (NOTE: FGS-FRG 6-4e(3) requires that waste analysis/characterization records be maintained only until 3 yr after completion of the action involved.)

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4-117. A copy of the spill plan must be maintained at all HWSAs (FGS-FRG 18-6).	Verify that a current copy of the spill plan is maintained at all HWSAs. (5)
4-118. All documents relating to the operation of an HWSA must be kept on file for 3 yr after the completion of the action involved (FGS-FRG 6-4e(3)).	Verify that all documents relating to the operation of an HWSA are kept on file for 3 yr after the completion of the action involved. (2)(5)(7) (NOTE: This requirement does not apply if another portion of FGS-FRG specifies a longer retention time.) (NOTE: The following are examples of records that must be maintained: - certifications of equipment or facilities - operations plans and/or procedures - the flow analysis of a waste stream - laboratory analysis of a waste - inspection reports - inventories - copies of *Entsorgungsnachweise* - manifests or transfer documents - accident or fire reports - closure reports.) Verify that logs for HWAPs are maintained until 3 yr after the last entry and that those for HWSAs be maintained until 3 yr after the HWSA has been closed.
HAZARDOUS WASTE STORAGE AREAS **Closure**	
4-119. The installation must develop detailed plans to close HWSAs (FGS-FRG 6-4f and OEBGD, Chapter 6, Section 5, Criterion 6).	Verify that the installation has detailed plans to close its HWSAs. (5) (NOTE: The following requirements are taken from the OEBGD.) Verify that the HWSA has a closure plan that includes: (5) - estimates of the storage capacity of hazardous waste - the steps to be taken to remove or decontaminate all waste residues - an estimate of the expected date of closure. Verify that the installation develops a closure plan prior to opening a new HWSA.

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4-120. Installations must meet specific criteria when closing an HWSA (FGS-FRG 6-4f).	Verify that all hazardous waste residues are removed from an HWSA, including the storage and containment systems. (5) Verify that the facility is closed in such a way that the need for future maintenance and the potential for any release of hazardous waste at present or in the future are eliminated or minimized. Verify that a record of the closure of an HWSA remains on file as long as the U.S. forces occupy the accommodation.
4-121. At the closure of an HWSA, all hazardous waste and hazardous waste residues must be removed (OEBGD, Chapter 6, Section 7).	Verify that containers are in good condition, and free from severe rusting, bulging, or structural defects. (5) Verify that containers, including overpack containers, are compatible with the wastes stored. Verify that containers are not opened, handled, or stored in a manner that could cause a rupture or a leak.
SPECIAL HAZARDOUS WASTE STORAGE AREAS **Design Requirements**	(NOTE: These requirements apply to HWSAs where more than 200 kg of toxic waste or 50 kg of very toxic waste is stored. They apply in addition to all other requirements for HWSAs.)
4-122. HWSAs where more than 200 kg of toxic wastes or 50 kg of very toxic wastes are stored must have an approach road for the fire department and must be accessible on two sides (FGS-FRG 5-4c(11) as implemented by FGS-FRG 6-4d).	Verify that such HWSAs have an approach road for the fire department and are accessible on two sides. (2)(3)(4)(5)

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SPECIAL HAZARDOUS WASTE STORAGE AREAS **Operating Procedures**	
4-123. Substances that require different fire-extinguishing agents must not be stored together (FGS-FRG 5-4c(3) as implemented by FGS-FRG 6-4d).	Verify that substances that require different fire-extinguishing agents are not stored together. (2)(5)
4-124. Approval must be sought before certain kinds of work take place in or near HWSAs where more than 200 kg of toxic wastes or 50 kg very toxic wastes are stored (FGS-FRG 5-4c(12) as implemented by FGS-FRG 6-4d).	Verify that work which involves the following has the approval of the IC or his/her designated representative: (2)(5) - welding - flame-cutting torches - abrasive friction cutting tools - open flame.
SPECIAL HAZARDOUS WASTE STORAGE AREAS **Fire Suppression**	
4-125. HWSAs for toxic wastes must be equipped with fire extinguishers (FGS-FRG 5-4c(4) as implemented by FGS-FRG 6-4d).	Verify that HWSAs for toxic wastes with an area of at least 50 m^2 are equipped with at least a 12 kg powder extinguisher (ABC powder). (2)(4)(5) Verify that, for each additional 100 m^2 of area, there is an additional 10 kg powder extinguisher. Verify that an HWSA with an area greater than 2000 m^2 also has a moveable 5 kg powder extinguisher.

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4-126. Installations must meet specific requirements for HWSAs where water is used as the primary fire suppression system (FGS-FRG 5-4c(5) through 5-4c(8) as implemented by FGS-FRG 6-4d).	Determine whether the HWSA meets both the following conditions: (2)(5) - more than 200 kg of toxic wastes or 50 kg of very toxic wastes are present - water is used as the primary fire suppression system. Verify that there is appropriate equipment. (NOTE: The following are examples of appropriate equipment: - wall hydrants with rolling hoses/tubes - pipes with a diameter of 50 mm or more.) Verify that there is a sufficient quantity of water. Verify that hydrants are installed outside the HWSA. Verify that hydrants are accessible and functional at all times. Verify that hydrants are secured against freezing. Verify that, for each 100 m^2 of storage area, a water flow of 200 L/min at a pressure of 3 bar is maintained at the discharge point. Verify that the volume of an independent fire fighting water supply (e.g., from fire fighting storage ponds or tanks) contains an amount equivalent to at least 200 L/min for each 100 m^2 of storage area for 2 h. (NOTE: The preceding requirement with respect to an independent fire fighting water supply does not apply to high-bay storage areas.) Verify that the stored material is directly reached by the extinguishing agent in high-bay storage areas that have automatic extinguishing devices (such as sprinklers or spray water extinguishing systems).
4-127. Sprinkler nozzles, smoke detectors, and other fire suppression equipment must be installed in such a way that they will not be damaged by the movement of pallets (FGS-FRG 5-4c(9)as implemented by FGS-FRG 6-4d).	Verify that sprinkler nozzles, smoke detectors, and other fire suppression equipment are installed in such a way that they will not be damaged by the movement of pallets. (2)(5)

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4-128. HWSAs that store highly reactive substances must keep appropriate extinguishing agents on hand (FGS-FRG 5-4c(10) as implemented by FGS-FRG 6-4d).	Determine whether the HWSA meets both the following conditions: (2)(5) - more than 200 kg of toxic wastes or 50 kg of very toxic wastes are present - highly reactive substances are present (see Table 4-6). Verify that appropriate extinguishing agents are on hand and readily available in sufficient quantity to fight a fire. (NOTE: Consult with the fire department if there are questions as to what extinguishing agents are appropriate for different hazardous materials.)
SPECIAL HAZARDOUS WASTE STORAGE AREAS **Documentation**	
4-129. Each HWSA that stores more than 200 kg of toxic wastes or 50 kg of very toxic wastes must have an operations plan that meets specific requirements (FGS-FRG 5-4a(1) as implemented by FGS-FRG 6-4d).	Verify that each such HWSA has an operations plan. (2)(5) Verify that the operations plan contains information on the following: - the maximum admissible storage amount (based on the design and operational capacity of the facility) - the separation of wastes - the type and amount of stored goods within the facility - personnel protection practices - available equipment. Verify that the plan corresponds to the HWSA building design. Verify that the plan is kept up-to-date and is checked at least once each month to ensure that it accurately represents what is stored in the HWSA. Verify that a copy is kept outside the HWSA in an accessible place.
4-130. Each HWSA that stores more than 200 kg of toxic wastes or 50 kg of very toxic wastes must have a fire protection plan that meets specific requirements (FGS-FRG 5-4c(1) as implemented by FGS-FRG 6-4d).	Verify that each such HWSA has a fire protection plan. (2)(5) Verify that the plan contains the following: - the specific DOD HWSA fire protection requirements - special considerations due to the location of the HWSA (e.g., near a residential area) - the degree of danger associated with the stored substances. Verify that the fire department is consulted when developing the fire protection plan.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**

4-131. Each HWSA that stores more than 200 kg of toxic wastes or 50 kg of very toxic wastes must have an emergency evacuation plan that meets specific requirements (FGS-FRG 5-4c(2) as implemented by FGS-FRG 6-4d).	Verify that the fire department is consulted when developing the fire protection plan. (2)(3)(4)(5)
	
	Verify that each HWSA has an emergency evacuation plan.
	
	Verify that the emergency evacuation plan contains the following:
	- the telephone numbers of the fire department, hospital, police, and other key agencies
	- the telephone numbers of the IC and other key persons
	- statements explaining the following:
	  - alarm signals
	  - place of assembly
	  - how and where to turn off the power to the HWSA
	  - evacuation routes
	  - location of fire extinguishing devices.
	- short instructions for personnel to follow during special incidents like fire, earthquake, accidental leakage of stored hazardous wastes.
	
	Verify that the emergency evacuation plan is posted in several conspicuous places in and around the storage area.

4-132. A written fire permission document should be created for use in those instances were approval must be sought before certain kinds of work take place at HWSAs that store more than 200 kg of toxic wastes or 50 kg of very toxic wastes (MP).	Verify that the installation has developed a written fire permission document (such as a permit) for use in those instances were approval must be sought before certain kinds of work take place at HWSAs where toxic and/or very toxic substances are stored. (2)(3)(4)(5) Verify that the document include the following information: - where the work will be performed - the type of work - when the work will be performed - the names of the personnel involved in the work - the name of the supervising expert - the purpose of the work - security measures - the signature of the IC or his/her designated representative. (NOTE: This MP is based on FGS-FRG 5-4c(12) as implemented by FGS-FRG 6-4d.)

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COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
TRANSPORTATION	
4-133. Anyone who transports hazardous waste off the installation must do so in accordance with the requirements with specific requirements (FGS-FRG 6-5a).	Verify that hazardous waste shipments are accompanied throughout by shipping papers that clearly describe the quantity and identity of the waste and include an MSDS. (1)(3)(5)(7) Verify that all drivers of hazardous waste shipments are trained and briefed on the hazardous wastes in the shipment, including: - health risks of exposure - physical hazards of the waste, including the potential for fire, explosion and reactivity. Verify that hazardous wastes are identified as "Ignitable," "Corrosive," "Reactive," or "Toxic" in both the shipping papers and the briefing for the driver. Verify that supervisory personnel do a walk-around inspection of the vehicles before and after the waste is loaded. Verify that all packages are labeled in accordance with USAFE Reg 75-3, *Joint Transportation of Hazardous Materials*. Determine whether the installation ships hazardous waste internationally by air. Verify that the following shipping standards are met: - the International Civil Aviation Organization Rules - appropriate DOD and component instructions.
4-134. Before shipment can take place an acceptance of the hazardous waste by the final disposal or treatment site must be agreed to and documented (FGS-FRG 6-5b).	Verify that the generator initiates action to ensure that an *Entsorgungsnachweis* (or, if appropriate, a *Sammelentsorgungsnachweis*) is completed prior to any shipment leaving the accommodation. (1)(3)(5)(7) (NOTE: The *Entsorgungsnachweis* (which is valid for up to 5 yr) consists of a declaration of responsibility by the waste produce and an acceptance by the disposal/treatment site. DRMR-E may act in lieu of the actual generator in initiating and processing the *Entsorgungsnachweis*, but it is the responsibility of the original generator to ensure that DRMR-E has obtained the *Entsorgungsnachweis* when this method is used.)
4-135. All hazardous waste must be properly packaged or sealed during transportation (FGS-FRG 6-5c).	Verify that all hazardous waste is properly packaged or sealed during transportation. (1)(3)(5)(7) Verify that, if packaging is damaged or a seal is broken, transportation ceases until the situation is remedied.

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COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-136. Installations should ensure that transportation of hazardous wastes between buildings is accomplished so as to help prevent spills, releases, and accidents (MP).	Verify that procedures exist to manage movement of hazardous wastes throughout the installation. (1)(3)(5)(7) Verify that drivers are trained in spill control procedures. Verify that provisions are made to secure wastes in vehicles during transport.
HAZARDOUS WASTE DISPOSAL	(NOTE: The Executive Agent has determined that the German hazardous waste disposal system is at least as protective of the environment as the minimum criteria established for overseas disposal by DOD. Therefore, components may used any German agency or commercial organization permitted to treat or dispose of hazardous waste by competent German authorities without conducting studies as to its acceptability.)
4-137. No DOD component is authorized to run a hazardous waste disposal facility in Germany (FGS-FRG 6-6a).	Verify that the installation does not run a hazardous waste disposal facility. (1) (NOTE: This prohibition does not apply to permitted small-arms ammunition disposal facilities, which are normally incinerators. See Section 1, *Air Emissions Management*.)
4-138. DRMR-E activities that accept hazardous materials/wastes must maintain a system to cross-reference incoming DD Forms 1348-1 with documentation of the sale of the materials or the manifest (*Begleitschein*) for the disposal of wastes (FGS-FRG 6-5d(2)).	Verify that DRMR-E activities that accept hazardous materials/wastes maintain a system to cross-reference incoming DD Forms 1348-1 with documentation of the sale of the materials or the manifest (*Begleitschein*) for the disposal of wastes. (2)
4-139. DOD hazardous waste must normally be disposed of through the DRMR-E (FGS-FRG 6-6c and 6-6d; AF Hazardous Waste Management Policy 6 June 1991, para III(f)).	Verify that the installation normally disposes of its DOD hazardous waste through the DRMR-E. (1)(5) (NOTE: A decision not to use the DRMR-E for hazardous waste disposal may be made for best accomplishment of the mission, but the decision should be agreed to by the component chain of command to ensure that installation contracts and disposal criteria are at least as protective of the environment as the criteria used by the DRMR-E.)

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COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
4-139. (continued)	(NOTE: In some instances, hazardous waste may be returned to the German producer or vendor if, under German law, he is required to accept and dispose of it. Such is the case with halogenated solvents, which must be accepted back for disposal by the manufacturer. Waste oil must also be accepted for proper disposal by the vendor who sold the oil originally.)
4-140. Activities that dispose of their waste outside the DRMR-E system must develop their own manifest tracking system in accordance with specific requirements (FGS-FRG 6-5d(3)).	Determine whether the activity disposes of its waste outside the DRMR-E system. (1)(5) Verify that the activity has developed its own manifest tracking system. Verify that the manifest tracking system provides an audit trail from point of generation to point of disposal. Verify that the component has approved the manifest tracking system. Verify that the generator ensures that all hazardous waste generated is disposed of in accordance with the requirements of FGS-FRG 6-6. (NOTE: See checklist items 4-137, 4-139, 4-141, and 4-142.)
4-141. All hazardous waste that is disposed of in Germany must be disposed of in a treatment or disposal facility permitted by the appropriate German authorities (FGS-FRG 6-6a).	Verify that hazardous waste that is disposed of in Germany is disposed of in a treatment or disposal facility permitted by the appropriate German authorities. (1)(5)
4-142. Installations must meet specific requirements in the event that hazardous waste cannot be disposed of in Germany (FGS-FRG 6-6b).	Verify that, when hazardous waste cannot be disposed of in accordance with FGS-FRG in Germany, the waste is either: (1) - retrograded to the U.S. - transferred, if permissible under international agreements, to another country where it can be disposed of in an environmentally sound manner and in compliance with the FGS for that country, if they exist. Verify that, at a minimum, DOD has approved the shipment of hazardous waste from one country to another.

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Table 4-1, Part 1

LIST OF HAZARDOUS WASTE/SUBSTANCES/MATERIALS

(FGS-FRG, Appendix C - Part 1)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Acenaphthene	83329			100
Acenaphthylene	208968			5000
Acetaldehyde (i)	75070		U001	1000
Acetaldehyde, chloro-	107200		P023	1000
Acetaldehyde, trichloro-	75876		U034	5000
Acetamide, N-(aminothioxomethyl)-	591082		P002	1000
Acetamide, N-(4-ethoxyphenyl)-	62442		U187	100
Acetamide, 2-fluoro-	640197		P057	100
Acetamide, N-9H-fluoren-2-yl-	53963		U005	1
Acetic acid	64197			5000
Acetic acid (2,4-dichlorophenoxy)-	94757		U240	100
Acetic acid, lead(2+) salt	301042		U144	$
Acetic acid, thallium(1+) salt	563688		U214	100
Acetic acid, ethyl ester (I)	141786		U112	5000
Acetic acid, fluoro-, sodium salt	62748		P058	10
Acetic anhydride	108247			5000
Acetone (I)	67641		U002	5000
Acetone cyanohydrin	75865	1000	P069	10
Acetone thiosemicarbazide	1752303	1000/10,000		1
Acetonitrile (I,T)	75058		U003	5000
Acetophenone	98862		U004	5000
2-Acetylaminofluorene	53963		U005	1
Acetyl bromide	506967			5000
Acetyl chloride (C,R,T)	75365		U006	5000
1-Acetyl-2-thiourea	591082		P002	1000
Acrolein	107028	500	P003	1
Acrylamide	79061	1000/10,000	U007	5000
Acrylic acid (I)	97107		U008	5000
Acrylonitrile	107131	10,000	U009	100
Acrylyl chloride	814686	100		1
Adipic acid	124049			5000
Adiponitrile	111693	1000		1
Aldicarb	116063	100/10,000	P070	1
Aldrin	309002	500/10,000	P004	1
Allyl alchol	107186	1000	P005	100

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Allylamine	107119	500		100
Ally chloride	107051			1000
Aluminum phosphide (R,T)	20859738	500	P005	100
Aluminum sulfate	10043013			5000
5-(Aminomethyl)-3-isoxazolol	2763964		P007	1000
Aminoptenn	54626	500/10,000		1
4-Aminopyndine	504245		P008	1000
Amiton	78535	500		1
Amiton oxalate	3734972	100/10,000		1
Amitrole	61825		U011	10
Ammonia	7664417	500		100
Ammonium acetate	631618			5000
Ammonium benzoate	1863634			5000
Ammonium bicarbonate	1066337			5000
Ammonium bichromate	7789095			10
Ammonium bifluonde	1341497			100
Ammonium bisulfite	10192300			5000
Ammonium carbamate	1111780			5000
Ammonium carbonate	506876			5000
Ammonium chloride	12125029			5000
Ammonium chromate	778989			10
Ammonium citrate, dibasic	3012655			5000
Ammonium fluoborate	13826830			5000
Ammonium fluoride	12125018			100
Ammonium hydroxide	1336216			1000
Ammonium oxalate	6009707 5972736 14258492			5000
Ammonium picrate (R)	131748		P009	10
Ammonium silicofluoride	16919190			1000
Ammonium sulfamate	7773060			5000
Ammonium sulfide	12135761			100
Ammonium tartrate	14307438 3164292			5000
Ammonium thiocyanate	1762954			5000
Ammonium vanadate	7803556		P119	1000
Amphetamine	300629	1000		1
Amyl acetate iso-Amyl acetate Sec-Amyl acetate tert-Amyl acetate	628637 123922 626380 625161			5000

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Aniline (I,T)	62533	1000	U012	5000
Aniline, 2,4,6- trimethyl	88051	500		1
Anthracene	120127			5000
Antimony++	7440360			5000
Antimony pentachloride	7647189			1000
Antimony pentafluoride	7783702	500		1
Antimony potassium tartrate	28300745			100
Antimony tribromide	7789619			1000
Antimony trichloride	10025919			1000
Antimony trifluoride	7783564			1000
Antimony trioxide	1309644			1000
Antimycine A	1397940	1000/10,000		1
ANTU	86884	500/10,000		100
Argentate(1-), bis(cyano-C)-, potassium	506616		P099	1
Aroclor 1016	12674112			1
Aroclor 1221	11104282			1
Arcolor 1232	11141165			1
Aroclor 1242	53469219			1
Aroclor 1248	12672296			1
Aroclor 1254	11097691			1
Aroclor 1260	11096825			1
Arsenic++	7440382			1
Arsenic acid H_3AsO_4	1327522 7778394		P010	1
Arsenic disulfide	1303328			1
Arsenic oxide As_2O_3	1327533		P012	1
Arsenic oxide As_2O_5	1303282		P011	1
Arsenic pentoxide	1303282	100/10,000	P011	1
Arsenic trichloride	7784341			1
Arsenic trioxide	1327533		P012	1
Arsenic trisulfide	1303339			1
Arsenous trichloride	7784341	500		5000
Arsine	7784421	100		1
Arsine, diethyl-	692422		P038	1
Arsinic acid, dimethyl-	75605		U136	1
Arsorous dichloride, phenyl-	696286		P036	1
Asbestos+++	1332214			1
Auramine	492808		U014	100
Azasenne	115028		U015	1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Azindine	151564		P054	1
Azindine, 2-methyl-	75558		P067	1
Azinno[2',3',3,4]pyrrolo[1,2-a] indole-4, 7-dione,6-amino-8- [(aminocarbonylooxy) methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-,[1aS-(1a-alpha,8-beta, 8a-alpha, 8b-alpha)]-	50077		U010	10
Aziphos-ethyl	2642719	100/10,000		1
Azinphos-methyl	86500	10/10,000		1
Banum cyanide	542621		P013	10
Benz[1]aceanthrylene, 1,2-dihydro-3-methyl-	56421		U157	10
Benz[c]acridine	225514		U016	100
Benzal chloride	98873	500	U017	5000
Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	23950595		U192	5000
Benz[a]anthracene	56553		U018	10
1,2-Benzathracene	56553		U018	10
Benz[a]anthracene, 7,12-dimethyl-	57976		U094	1
Benzenamine (I,T)	62533		U012	5000
Benzenamine, 3-(Trifluoromethyl)	98168	500		1
Benzenamine, 4,4'-carbonimidoylbis (N,N-dimethyl-	492808		U014	100
Benzenamine, 4-chloro-	106478		P024	1000
Benzenamine 4-chloro-2-methyl-hydrochloride,	3165933		U049	100
Benzenamine, N,N-dimethyl-4-(phenylazo-)	60117		U093	10
Benzenamine, 2-methyl-	95534		U328	100
Benzenamine, 4-methyl-	106490		U353	100
Benzenamine, 4,4'-methylenebis(2-chloro-	101144		U158	10
Benzenamine, 2-methyl-, hydrochloride	636215		U222	100
Benzenamine, 2-methyl-5-nitro-	99558		U181	100
Benzenamine, 4-nitro-	100016		P077	5000
Benzene (I,T)	71432		U109	10
Benzene, 1-(Chloromethyl)-4-Nitro-	100141	500/10,000		1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester	510156		U038	1
Benzene, 1-bromo-4-phenoxy-	101553		U030	100
Benzenearsonic Acid	98055	10/10,000		1
Benzenebutanoic acid, 4-[bis (2-chloroethyl)amino]-	305033		U035	10
Benzene, chloro-	108907		U037	100
Benzene, chloromethyl-	100447		P028	100
Benzenediamin, ar-methyl-	95807 496720 823405		U221	10
1,2-Benzenedicarboxylic acid, dioctyl ester	117840		U107	5000
1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)]-ester	117817		U028	100
1,2-Benzenedicarboxylic acid, dibutyl ester	84742		U069	10
1,2-Benzenedicarbosylic acid, diethyl ester	84662		U088	1000
1,2-Benzenedicarbosylic acid, dimethyl ester	131113		U102	5000
Benzene, 1,2-dichloro-	95501		U070	100
Benzene, 1,3-dichloro-	541731		U071	100
Benzene, 1,4-dichloro-	106467		U072	100
Benzene, 1,1'-(2,2-dichloroethylidene) bis[4-chloro-	72548		U060	1
Benzene, dichloromethyl-	98873		U017	5000
Benzene, 1,3-diisocyanotomethyl- (R,T)	584849 91087 264716254		U223	100
Benzene, dimethyl (I,T) m-Benzene, dimethyl o-Benzene, dimethyl p-Benzene, dimethyl	1330207 108383 95476 106423		U239	1000
1,3-Benzenediol	108463		U201	5000
1,2-Benzenediol, 4-[1 -hydroxy-2-(methylamino)ethyl]- (R)	51434		P042	1000
Benzeneethanamine, alpha, alpha-dimethyl-	122098		P046	5000
Benzene, hexachloro-	118741		U127	10

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Benzene, hexahydro- (I)	110827		U056	1000
Benzene, hydroxy-	108952		U188	1000
Benzene, methyl-	108883		U220	1000
Benzene, 2-methyl-1,3-dinitro-	606202		U106	100
Benzene, 1-methyl-2,4-dinitro-	121142		U105	10
Benzene, 1-methylethyl- (I)	98828		U055	5000
Benzene, nitro-	98953		U169	1000
Benzene, pentachloro	608935		U183	10
Benzene, pentachloronitro-	82688		U185	100
Benzenesulfonic acid chloride (C,R)	98099		U020	100
Benzenesulfonyl chloride	98099		U020	100
Benzene, 1,2,4,5-tetrachloro-	95943		U207	5000
Benzenethiol	108985		P014	100
Benzene, 1,1'-(2,2,2-tri-chloroethylidene)bis[4-chloro-	50293		U061	1
Benzene, 1,1'-(2,2,2-tri-chloroethylidene)bis[4-methoxy-	72435		U247	1
Benzene,(trichloromethyl)-	98077		U023	10
Benzene, 1,3,5-trinitro-	99354		U234	10
Benzidine	92875		U021	1
Benzimidazole, 4,5-Dichloro-2-(Trifluormethyl)-	3615212	500/10,000		1
1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide	81072		U202	100
Benzo[a]anthracene	56553		U018	10
Benzo[b]fluoranthene	205992			1
Benzo[k]fluoranthene	207089			5000
Benzo[j,k]fluorene	206440		U120	100
1,3-Benzodioxole, 5-(1-propenyl)-	120581		U141	100
1,3-Benzodioxole, 5-(2-propenyl)-	94597		U203	100
1,3-Benzodioxole, 5-propyl	94586		U090	10
Benzoic acid	65850			5000
Benzonitrile	100470			5000
Benzo[rst]pentaphene	189559		U064	10
Benzo[ghi]perylene	191242			5000
2H-1-Benzophyran-2-one, 4-hydroxy-3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations greater than 0.3%	81812		P001	100
Benzo[a]pyrene	50328		U022	1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
3,4-Benzopyrene	50328		U022	1
p-Benzoquinone	106514		U197	10
Benzotrichloride (C,R,T)	98077	100	U023	10
Benzoyl chloride	98884			1000
1,2-Benzphenanthrene	218019		U050	100
Benzyl chloride	100447	500	P028	100
Benzy cyanide	140294	500		1
Beryllium++	7440417		P015	10
Beryllium chloride	7787475			1
Beryllium fluoride	7787497			1
Beryllium nitrate	13597994 7787555			1
alpha-BHC	319846			10
beta-BHC	319857			1
delta-BHC	319868			1
gamma-BHC	58899		U129	1
Bicyclo [2,2,1]Heptane-2-carbonitrile, 5-chloro-6-(((Methylamino)Carbonyl)Oxy-lmino)-, (1s-(1-alpha, 2-beta, 4-alpha, 5-alpha, 6E))-	15271417	500/10,000		1
2,2'-Bioxirane	1464535		U085	10
(1,1'-Biphenyl)-4,4'diamine	92875		U021	1
(1,1'-Biphenyl)-4,4'diamine, 3,3'dichloro-	91941		U073	1
(1,1'-Biphenyl)-4,4'diamine, 3,3'dimethoxy-	119904		U091	100
(1,1'-Biphenyl)-4,4'diamine, 3,3'dimethyl-	119937		U095	10
Bis(chloromethyl) ketone	534076	10/10,000		1
Bis(2-chloroethyl)ether	111444		U025	10
Bis(2-chloroethoxy)methane	111911		U024	1000
Bis(2-ethylhexyl)phthalate	117817		U028	100
Bitoscanate	4044659	500/10,000		1
Boron trichloride	10294345	500		1
Boron trifluoride	7637072	500		1
Boron trifluoride compound with methyl ether (1:1)	353424	1000		1
Bromoacetone	598312		P017	1000
Bromadiolone	28772567	100/10,000		1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Bromine	7726956	500		1
Bromoform	75252		U225	100
4-Bromophenyl phenyl ether	101553		U030	100
Brucine	357573		P018	100
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	87683		U128	1
1-Butanamine, N-butyl-N-nitroso-	924163		U172	1
1-Butanol	71363		U031	5000
2-Butanone	78933		U159	5000
2-Butanone peroxide (R,T)	1338234		U160	10
2-Butanone, 3,3-dimethyl-1-(methylthio)-, O[(methylamno) carbonyl] oxime	3916184		P045	100
2-Butenal	123739 4170303		U053	100
2-Butene, 1,4-dichloro- (I,T)	764410		U074	1
2-Butenoic acid, 2-methyl-, 7[[2, 3-dihydroxy-2-(1-meth- oxyethyl)-3-methyl-1-oxobutoxy]methyl]-2,3,5, 7a-tetrahydro-1H- pyrrolizine-1-yl ester, [1S-[1- alpha(Z), 7(2S*,3R*), 7a-alpha]]-	303344		U143	10
Butyl acetate iso-Butyl acetate sec-Butyl acetate tert-Butyl acetate	123864 110190 105464 540885			5000
n-Butyl alcohol (I)	71363		U031	5000
Butylamine iso-Butylamine sec-Butylamine tert-Butylamine	109739 78819 513495 13952846 75649			1000
Butyl benzyl phthalate	85687			100
n-Butyl phthalate	84742		U069	10
Butyric acid	107926			5000
iso Butyric acid	79312			
Cacodylic acid	75605		U136	1
Cadmium++2^{+}	7440439			10
Cadmium acetate	543908			10
Cadmium bromide	7789426			10
Cadmium chloride	10108642			10
Cadmium oxide	1306190	100/10,000		1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Cadmium stearate	2223930	1000/10,000		1
Calcium arsenate	7778441	500/10,000		1
Calcium arsenite	52740166			1
Calcium carbide	75207			10
Calcium chromate	13765190		U032	10
Calcium cyanide Ca(CN)2	592018		P0221	10
Calcium dodecylbenzenesulfonate	26264062			1000
Calcium hypochlorite	7778543			10
Camphechlor	8001352	500/10,000		1
Camphene, octachloro-	8001352		P123	1
Cantharidin	56257	100/10,000		1
Carbachol chloride	51832	500/10,000		1
Captan	133062			10
Carbamic acid, ethyl ester	51796		U238	100
Carbamic acid, methylnitroso-, ethyl ester	615532		U178	1
Carbamic acid, Methyl-, 0-(((2,4-Dimethyl-1, 3-Dithiolan-2-yl)Methyliene)Amino)-	26419738	100/10,000		1
Carbamic chloride, dimethyl-	79447		U097	1
Carbamodithioic acid, 1,2-ethaneiylbis, salts & esters	111546		U114	5000
Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	2303164		U062	100
Carbaryl	63252			100
Carbofuran	1563662	10/10,000		10
Carbon disulfide	75150	10,000	P022	100
Carbon oxyfluoride (R,T)	353504		U033	1000
Carbon tetrachloride	56235		U211	10
Carbonic acid, dithallium(1+)salt	6533739		U215	100
Carbonic dichloride	75445		P095	10
Carbonic difluoride	353504		U033	1000
Carbonochloridic acid, methyl ester	79221		U156	1000
Carbophenothion	786196	500		1
Chloral	75876		U034	5000
Chlorambucil	305033		U035	10
Chlordane	57749	1000	U036	1
Chlordane, alpha & gamma isomers	57749		U036	1
Chlordane, technical	57749		U036	1
Chlorfenvinfos	470906	500		1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Chlorine	7782505	100		10
Chlormephos	24934916	500		1
Chlormequat chloride	999815	100/10,000		1
Chlornaphazine	494031		U026	100
Chloroacetaldehyde	107200		P023	1000
Chloroacetic acid	79118	100/10,000		1
p-Chloroaniline	106478		P024	1000
Chlorobenzene	108907		U037	100
Chlorobenzilate	510156		U038	10
p-Chloro-m-cresol	59507		U039	5000
Chlorodibromomethane	124481			100
Chloroethane	75003			100
Chloroethanol	107073	500		1
Chlorethyl chlorofomate	627112	1000		1
2-Chloroethyl vinyl ether	110758		U042	1000
Chloroform	67663	10,000	U044	10
Chloromethyl ether	542881	100		1
Chloromethyl methyl ether	107302	100	U046	10
beta-Chloronaphthalene	91587		U047	5000
2-Chloronaphthalene	91587		U047	5000
Chlorophacinone	3691358	100/10,000		1
o-Chlorophenol (2)	95578		U048	100
4-Chlorophenol phenyl ether	7005723			5000
1-(o-Chlorophenyl)thiourea	5344821		P026	100
3-Chloropropionitrile	542767		P027	1000
Chlorosulfonic acid	7790945			1000
4-Chloro-o-toluidine, hydrochloride	3165933		U049	100
Chlorphyrifos	2921882			1
Chloroxuron	1982474	500/10,000		1
Chlorthiophos	21923239	500		1
Chromic acetate	1066304			1000
Chromic acid	11115745 7738945			10
Chromic acid H_2CrO_4, calcium salt	13765190		U032	10
Chromic chloride	10025737	1/10,000		1
Chromic sulfate	10101538			1000
Chromium++	7440473			5000
Chromous chloride	10049055			1000
Chrysene	218019		U050	100

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Colbalt, ((2,2'-(1,2-ethanediylbis (Nitrilomethylidyne)) Bis(6-fluoro-phenolato))(2-)-N,N',O,O')-,	62207765	100/10,000		1
Cobaltous bromide	7789437			1000
Colbalt carabonyl	10210681	10/10,000		1
Cobaltous formate	544183			1000
Colbaltous sulfamate	14017415			1000
Coke Oven Emissions	NA			1
Colchicine	64868	10/10,000		1
Copper cyanide	544923		P029	10
Coumaphos	56724	100/10,000		10
Coumatetralyl	5836293	500/10,000		1
Creosote	8001589		U051	1
Cresol(s) m-Cresol o-Cresol p-Cresol	1319773 108394 95487 106445	1000/10,000	U052	1000 1000
Cresylic acid m-Cresol o-Cresol p-Cresol	1319773 108394 95487 106445		U052	1000
Crimidine	535897	100/10,000		1
Crotonaldehyde	123739 4170303	1000 100	U053	100 100
Cumene (I)	98828		U055	5000
Cupric acetate	142712			100
Cupric acetoarsenite	12002038			1
Cupric chloride	7447394			10
Cuprice nitrae	3251238			100
Cupric oxalate	5893663			100
Cupric sulfate	7758987			10
Cupric sultate, ammoniated	10380297			100
Cupric tartrate	815827			100
Cyanides (soluble salts and complexes) not otherwise specified	57125		P030	10
Cyanogen	460195		P031	100
Cyanogen bromide	506683	500/10,000	U246	1000
Cyanogen chloride	506774		P033	10
Cyanogen iodide	506785	1000/10,000		1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Cyanophos	2636262	1000		1
Cyanuric fluoride	675149	100		1
2,5-Cyclohexadiene-1,4-dione	106514		U197	10
Cyclohexane (I)	110827		U056	1000
Cyclohexane, 1,2,3,4,5,6-hexachloro, (1-alpha, 2-alpha, 3-beta, 4-alpha, 5-alpha, 6-beta)-	58899		U129	1
Cyclohexanone (I)	108941		Y057	5000
2Cyclohexanone	131895		P034	100
Cycloheximide	66819	100/10,000		1
Cyclohexylamine	108918	10,000		1
1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	77474		U130	10
Cyclophosphamide	50180		U058	10
2,4-D Acid	94757		U240	100
2,4-D Ester	94111 94791 94804 1320189 1928387 1928616 1929733 2971382 25168267 53467111			100
2,4-D, salts & esters	94757		U240	100
Daunomycin	20830813		U059	10
Decarborane(14)	17702419	500/10,000		1
Demeton	8065483	500		1
Demeton-S-Methyl	919868	500		1
DDD, 4,4'DDD	72548		U060	1
DDD, 4,4'DDE	72559			1
DDT, 4,4'DDT	50293		U061	1
Diallate	2303164		U062	100
Dialifor	10311849	100/10,000		1
Diazinon	333415			1
Dibenz[a,h]anthracene	53703		U063	1
1,2:5,6-Dibenzanthracene	53703		U063	1
Dibenzo[a,h]anthracene	53703		U063	1
Dibenz[a,i]pyrene	189559		U064	10
1,2-Dibromo-3-chloropropane	96128		U066	1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Diborane	19287457	100		1
Dibutyl phthalate	84742		U069	10
Di-n-butyl phthalate	84742		U069	10
Dicamba	1918009			1000
Dichlobenil	119456			100
Dichlone	117806			1
Dichlorobenzene	25321226			100
m-Dichlorobenzene (1,3)	541731		U071	100
o-Dichlorobenzene (1,2)	95501		U070	100
p-Dichlorobenzene (1,4)	106467		U072	100
3,3'-Dichlorobenzidine	91941		U073	1
Dichlorobromomethane	75274			5000
1,4-Dichloro-2-butene (I,T)	764410		U074	1
Dichloroifluoromethane	75718		U075	5000
1,1-Dichloroethane	75343		U076	1000
1,2-Dichloroethane	107062		U077	100
1,1-Dichloroethylene	75354		U078	100
1,2-Dichloroethylene	156605		U079	1000
Dichloroethyl ether	11444	10,000	U025	10
Dichloroisopropyl ether	108601		U027	1000
Dichloromethoxy ethane	111911		U024	1000
Dichloromethyl ether	542881		P016	10
Dichloromethylphenylsilane	149746	1000		1
2,4-Dichlorophenol	120832		U081	100
2,6-Dichlorophenol	87650		U082	100
Dichlorophenylarsine	696286		P036	1
Dichloropropane 1,1-Dichloropropane 1,3-Dichloropropane	26638197 78999 142289			1000
1,2-Dichloropropane	78875		U083	1000
Dichloropropane-Dichloropropene (mixture)	8003198			100
Dichloropropene 2,3-Dichloropropene	26952238 78886			100
1,3-Dichloropropene	542756		U084	100
2,2-Dichloropropionic acid	75990			5000
Dichlorvos	62737	1000		100
Dicofol	115322			10
Dicrotophos	141662	100		1
Dieldrin	60571		P037	1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
1,2:3,4-Diepoxybutane (I,T)	1464535	500	U085	10
Diethyl chlorophospate	814493	500		1
Diethylamine	109897			100
Diethylarsine	692422		P038	1
Diethylcarbmazine citrate	1642542	100/10,000		1
1,4-Diethylenedioxide	123911		U108	100
Diethylhexyl phthalate	117817		U028	100
N,n'-Diethylhydrazine	1615801		U086	10
O,O-Diethyl S-methyl dithiophosphate	3288582		U087	5000
Diethyl-p-nitrophenyl phosphate	311455		P041	100
Diethyl phthalate	84662		P088	1000
O,O-Diethyl O-pyrazinyl phosphorothioate	297972		P040	100
Diethylstilbestrol	56531		U089	1
Digitoxin	71636	100/10,000		1
Diglycidyl Ether	2238075	1000		1
Digoxin	20830755	10/1000		1
Dihydrosafrole	94586		U090	10
Diisopropylfluorophosphate, 1,2,3,4, 10,10-10-hexa-chloro-1,4,4a,5,8, 8a-hexahydro-(1-alpha, 4-alpha, 4-beta, 5-alpha, 8-alpha,	309002		U004	1
8a-beta)1,4,5,8-Dimethanonaphtha-lene, 1,2,3,4,10,10-hexachloro-1,4,4a,5, 8,8a-hexahydro, (1-alpha, 4-alpha, 4a-beta, 5a-beta, 8-beta,	465736		P060	1
8a-beta)-2,7:3,6-Dimethanon-aphth[2,3 b]oxirene,3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1a-alph, 2-beta, 2a-alpha, 3-beta, 6-beta	60571		P037	1
6a-alpha, 7beta, 7a-alpha)-2,7:3,6 Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a, 3,6,6a,7,7a-octa-hydro-, (1a-alpha, 2-beta, 2a-beta, 3-alpha, 6-alpha,	72206		P051	1
6a-beta, 7-beta, 7a-alpha)-Dimethoate	60515		P044	10
3,3'-Dimethoxybenzidine	119904		U091	100

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Dimefox	115264	500		1
Dimethoate	60515	500/10,000		10
Dimethyl Phosphorochloridothioate	2524030	500		1
Dimethyl sulfate	77781	500		1
Dimethyl sulfide	75183	100		1
Dimethylamine (I)	124403		U092	1000
p-Dimethylaminoazobenzene	60117		U093	10
7,12-Dimethylbenz[a]anthracene	57976		U094	1
3,3'Dimethylbenzidine	119937		U095	10
alpha, alpha-Dimethylbenzylhydroperoxide (R)	80159		U096	10
Dimethylcarbamoyl chloride	79447		U097	1
Dimethyldichlorosilane	75785	500		1
1,1-Dimethylhydrazine	57147	1000	U098	1
1,2-Dimethylhydrazine	540738		U099	1
alpha, alph-Dimethylphenethylamine	122098		P046	5000
Dimethyl-p-phenylenediamine	99989	10/10,000		1
2,4-Dimethylphenol	105679		U101	100
Dimethyl phthalate	131113		U102	5000
Dimethyl sulfate	77781		U103	100
Dimetilian	644644	500/10,000		1
Dinitrobenzene (mixed) m-Dinitrobenzene o-Dinitrobenzene p-Dinitrobenzene	25154545 99650 528290 100254			100
4,6-Dinitro-o-cresol and salts	534521	10/10,000	P047	10
Dinitrophenol 2,5-Dinitrophenol 2,6-Dinitrophenol	25550587 329715 573568			10
2,4-Dinitrophenol	51285		P048	10
Dinitrotoluene 3,4-Dinitrotoluene	25321146 610399			10
2,4-Dinitrotoluene	121142		U105	10
2,6-Dinitrotoluene	606202		U106	100
Dinoseb	88857	100/10,000	P020	1000
Dinoterb	1420071	500/10,000		1
Di-n-octyl phthalate	117840		U107	5000
1,4-Dioxane	123911		U108	100
Dioxathion	78342	500		1
Diphacinone	82666	10/10,000		1
1,2-Diphenylhydrazine	122667		U109	10

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Disphosphoramide, octamethyl-	152169	100	P085	100
Diphosphoric acid, tetraethyl ester	107493		P111	10
Dipropylamine	142847		U110	5000
Di-n-propylnitrosamine	621647		U111	10
Diquat	85007 2764729			1000
Disulfoton	298044	500	P039	1
Dithiazanine iodine	514738	500/10,000		1
Dithiobiuret	541537	100/10,000	P049	100
Diuron	330541			100
Dodecylbenzenesulfonic acid	27176870			1000
Emetine, Dihydrochloride	316427	1/10,000		1
Endosulfan	115297	10/10,000	P050	1
alpha-Endosulfan	959988			1
beta-Endosulfan	33213659			1
Endosulfant sulfate	1031078			1
Endothall	145733		P088	1000
Endothion	2778043	500/10,000		1
Endrin	72208	500/1000	P051	1
Endrin aldehyde	742934			1
Endrin & metabolites	72208		P051	1
Epichlorohydrin	106898	1000	U041	1000
Epinephrine	51434		P042	1000
EPN	2104645	100/10,000		1
Ergocalciferol	50146	1000/10,000		1
Ergotamine tartrate	379793	500/10,000		1
Ethanal	75070		U001	1000
Ethanamine, N-ethyl-N-nitroso-	55185		U174	1
1,2-Ethanediamine, N,N-dimethyl-N'- 2-pyridinyl-N'-(2-thienylmethyl)-	91805		U155	5000
Ethane, 1,2-dibromo-	106934		U067	1
Ethane, 1,1-dichloro-	75343		U076	1000
Ethane, 1,2-dichloro-	107062		U077	100
Ethanedinitrile	460195		P031	100
Ethane, hexachloro-	67721		U131	100
Ethane, 1,1'-[methylenebis(oxy)] bis(2-chloro-	111911		U024	1000
Ethane, 1,1'-oxybis-	60297		U117	100
Ethane, 1,1'-oxybis(2-chloro-	111444		U025	10

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Ethane, pentachloro-	76017		U184	10
Ethanesulfonyl chloride, 2-chloro	1622328	500		1
Ethane, 1,1,1,2-tetrachloro-	630206		U208	100
Ethane, 1,1,2,2-tetrachloro-	79345		U209	100
Ethanethioamide	62555		U218	10
Ethane, 1,1,1-trichloro-	71556		U226	1000
Ethane, 1,1,2-trichloro-	79005		U227	100
Ethanimidothioic acid, N-[[(methylamino) carbonyl]oxy]-, methyl ester	16752775		P066	100
Ethanol, 1,2-Dichloro-, acetate	10140871	1000		1
Ethanol, 2-ethoxy-	110805		U359	1000
Ethanol, 2,2'-(nitrosoimino)bis-	1116547		U173	1
Ethanone, 1-phenyl-	98862		U004	5000
Ethene, chloro-	75014		U043	1
Ethene, 2-chloroethoxy-	110758		U042	1000
Ethene, 1,1-dichloro-	75354		U078	100
Ethene, 1,2-dichloro- (E)	156605		U079	1000
Ethene, tetrachloro-	127184		U210	100
Ethene, trichloro-	79016		U228	100
Ethion	563122	1000		10
Ethoprophos	13194484	1000		1
Ethyl acetate (I)	141786		U112	5000
Ethyl acrylate (I)	140885		U113	1000
Ethylbenzene	100414			1000
Ethylbis(2-Chloroethyl)amine	538078	500		1
Ethyl carbamate (urethane)	51796		U238	100
Ethyl cyanide	107120		P101	10
Ethylenebisdithiocarbamic acid, salts & esters	111546		U114	5000
Ethylenediamine	107153			5000
Ethylenediamine-tetraacetic acid (EDTA)	60004			5000
Ethylene dibromide	106934		U067	1
Ethylene dichloride	107062		U077	100
Ethylene fluorohydrin	371620	10		1
Ethylene glycol monoethyl ether	110805		U359	1000
Ethylene oxide (I,T)	75218	1000	U115	10
Ethylenediamine	107153	10,000		5000
Ethylenethiourea	96457		U116	10

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Ethylenimine	151564	500	P054	1
Ethyl ether (I)	60297		U117	100
Ethylthiocyanate	542905	10,000		1
Ethylidene dichloride	75343		U076	1000
Ethyl methacrylate	97632		U118	1000
Ethyl methanesulfonate	62500		U119	1
Famphur	52857		P097	1000
Fenamiphos	22224926	10/10,000		1
Fenitrothion	122145	500		1
Fensulfothion	115902	500		1
Ferric ammonium citrate	1185575			1000
Ferric ammonium oxalate	2944674 55488874			1000
Ferric chloride	7705080			100
Ferric fluoride	7783508			1000
Ferric nitrate	10421484			1000
Ferric sulfate	10028225			1000
Ferrous ammonium sulfate	10045893			1000
Ferrous chloride	7758943			100
Ferrous sulfate	7720787 7782630			1000
Fluentil	4301502	100/10,000		1
Fluoranthene	206440		U120	100
Fluorene	86737			5000
Fluorine	7782414	500	P056	10
Fluoroacentamide	640197	100/10,000	P057	100
Fluoracetic acid	144490	10/10,000		1
Fluoroacetic acid, sodium salt	62786		P058	10
Fluoroacetyl chloride	359068	10		1
Fluorouracil	51218	500/10,000		1
Fonofos	944229	500		1
Formaldehyde	50000	500	U122	100
Formaldehyde cyanohydrin	107164	1000		1
Formetanate hydrochloride	23422539	500/10,000		1
Formothion	2540821	100		1
Formparanate	17702577	100/10,000		1
Formic acid (C,T)	64186		U123	5000
Fosthietan	21548323	500		1
Fuberidazole	3878191	100/10,000		1
Fulminic acid, mercury(2) salt (R,T)	628864		P065	10

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Fumaric acid	110178			5000
Furan (I)	110009	500	U124	100, 100
Furan, tetrahydro- (I)	109999		U213	1000
2-Furancarboxaldehyde (I)	98011		U125	5000
2,5-Furandione	108316		U147	5000
Furfural (I)	98011		U125	5000
Furfuran (I)	110009		U124	100
Gallium trichloride	13450903	500/10,000		1
Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-	18883664		U206	1
D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)-carbonyl]amino]-	18883664		U206	1
Glycidylaldehyde	765344		U126	10
Guanidine, N-methyl-N'-nitro-N-nitroso-	70257		U163	10
Guthion	86500			1
Heptachlor	76448		P059	1
Heptachlor epoxide	1024573			1
Hexachlorobenzene	118741		U127	10
Hexachlorobutadiene	87683		U128	1
Hexachlorocyclohexane (gamma isomer)	58899		U129	1
Hexachlorocyclopentadiene	77474	100	U130	10
Hexachloroethane	67721		U131	100
Hexachlorophene	70304		U132	100
Hexachloropropene	1888717		U243	1000
Hexaethyl tetraphosphate	757584		P062	100
Hexamethylenediamine, N,N'-Dibutyl	4835114	500		1
Hydrazine (R,T)	302012	1000	U133	1
Hydrazine, 1,2-diethyl-	1615801		U086	10
Hydrazine, 1,1-dimethyl-	57147		U098	10
Hydrazine, 1,2-dimethyl-	540738		U099	1
Hydrazine, 1,2-diphenyl-	122667		U109	10
Hydrazine, methyl-	60344		P068	10
Hydrazinecarbothioamide	79196		P116	100
Hydrochloric acid	7647010			5000
Hydrocyanic acid	74908	100	P063	10
Hydrofluoric acid	7664393		U134	100
Hydrogen chloride (gas only)	7647010	500		5000

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Hydrogen cyanide	74908		P063	10
Hydrogen fluoride	7664393	100	U134	100
Hydrogen peroxide (Conc > 52%)	7722841	1000		1
Hydrogen selenide	7783075	10		1
Hydrogen sulfide	7783064	500	U135	100
Hydroperoxide, 1-methyl-1-phenylethyl-	80159		U096	10
Hydroquinone	123319	500/10,000		1
2-Imidazoliainethione	96457		U116	10
Indeno(1,2,3-cd)pyrene	193395		U137	100
Iron, Pentacarbonyl-	13463406	100		1
Isobenzan	297789	100/10,000		1
1,3-Isobenzofurandione	85449		U190	5000
Isobutyronitrile	78820	1000		1
Isobutyl alcohol (I,T)	78831		U140	5000
Isocyanic acid, 3,4-Dichlorophenyl ester	102363	500/10,000		1
Isodrin	465736	100/10,000	P060	1
Isofluorphate	55914	100		100
Isophorone	78591			5000
Isophorone Diisocyanbate	4098719	100		1
Isoprene	78795			100
Isopropanolamine dodecylbenzene sulfonate	42504461			1000
Isopropyl chloroformate	108236	1000		1
Isopropyl formate	625558	500		1
Isoproplymethylpryrazolyl dimethylcarbamate	119380	500		1
Isosafrole	120581		U141	100
3(2H)-Isoxazolone, 5-(aminomethyl)-	2763964		P007	1000
Kepone	143500		U142	1
Lactonitrile	78977	1000		1
Lasiocarpine	303344		U143	10
Lead acetate	301042		U144	#
Lead arsenate	7784409 7645252 10102484			1
Lead, bis(acetato-O)tetrahydroxytri	1335326		U146	100
Lead chloride	7758954			100
Lead fluoborate	13814965			100
Lead iodide	10101630			100

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Lead nitrate	10099748			100
Lead phosphate	7446277		U145	#
Lead stearate	7428480 1072351 52652592 56189094			5000#
Lead subacetate	1335326		U146	100
Lead sulfate	15739807 7446142			100
Lead sulfide	1314870			5000#
Lead thiocyanate	592870			100
Leptophos	21609905	500/10,000		1
Lewisite	541253	10		1
Lindane	58899	1000/10,000	U129	1
Lithium chromate	14307358			10
Lithium hydride	7580678	100		1
Malathion	121755			100
Maleic acid	110167			5000
Maleic anhydride	108316		U147	5000
Maleic hydrazide	123331		U148	5000
Malononitrile	109773	500/10,000	U149	1000
Manganese, tricarbonyl methylcyclopentadienyl	12108133	100		1
Mechlorethamine	51752	10		1
Melphalan	148823		U150	1
Mephosfolan	950107	500		1
Mercaptodimethur	2032657			10
Mercuric acetate	1600277	500/10,000		1
Mercuric chloride	747947	500/10,000		1
Mercuric cyanide	592041			1
Mercuric nitrate	10045940			10
Mercuric oxide	21908532	500/10,000		1
Mercuric sulfate	7783359			10
Mercuric thiocyanate	592858			10
Mercurous nitrate	10415755 7782867			10
Mercury	7439976		U151	1
Mercury (acetate-O)phenyl-	62384		P092	100
Mercury fulminate	628864		P065	10
Methacrolein diacetate	10476956	1000		1
Methacrylic anhydride	760930	500		1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Methacrylonitrile (I,T)	126987	500	U152	1000
Methacryloyl chloride	920467	100		1
Methacryloyloxyethyl isocyanate	30674807	100		1
Methamidophos	10265926	100/10,000		1
Methanamine, N-methyl-	124403		U092	1000
Methanamine, N-methyl-N-nitroso-	62759		P082	10
Methane, bromo-	74839		U029	1000
Methane, chloro- (I,T)	74873		U045	100
Methane, chloromethoxy-	107302		U046	10
Methane, dibromo-	74953		U068	1000
Methane, dichloro-	75092		U080	1000
Methane, dichlorodifluoro-	75718		U075	5000
Methane, iodo-	74884		U138	100
Methane, isocyanato-	624839		P064	##
Methane, oxybis(chloro-	542881		P016	10
Methanesulfenyl chloride, trichloro-	594423		P118	100
Methanesulfonyl fluoride	558258	1000		1
Methanesulfonic acid, ethyl ester	62500		U119	1
Methane, tetrachloro-	56235		U211	10
Methane, tetranitro- (R)	509148		P112	10
Methane, tribromo-	75252		U225	100
Methane, trichloro-	67663		U044	10
Methane, trichlorofluoro-	75694		U121	5000
Methanethiol (I,T)	74931		U153	100
6,9-Methano-2,4,3-benzodioxathi-epin, 6,7,8,9,10,10-hexa-chloro-1,5,5a, 6,9,9a-hexahydro-, 3-oxide	115297		P050	1
1,3,4-Metheno-2H-cyclobutal[cd] pentalen-2-one,1,1a,3,3a,4, 5,5a,5b,6-decachlorocatahydro-	143500		U142	1
4,7-Methano-1H-indene, 1,4,5,6,7,8,8 heptachloro-3a, 4,7,7a-tetrahydro-	76448		P059	1
4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8 octachloro-2,3, 3a,4,7,7a-hexahydro-	57749		U036	1
Methanol (I)	67561		U154	5000
Methapyrilene	91805		U155	5000

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Methidathion	950378	500/10,000		1
Methiocarb	2032657	500/10,000		10
Methomyl	16752775	500/10,000	P066	100
Methoxychlor	72435		Y247	1
Methoxyethylmercuric acetate	151382	500/10,000		1
Methyl alcohol (I)	67561		U154	5000
Methyl bromide	74839	1000	U029	1000
1-Methylbutadiene (I)	504609		U186	100
Methyl chloride (I,T)	74873		U045	100
Methyl 2-chloroacrylate	80637	500		1
Methyl chlorocarbonate (I,T)	79221		U156	1000
Methyl chloroform	71556		U226	1000
Methyl chloroformate	79221	500	U156	1000
Methyl disulfide	624920	100		1
3-Methylcholanthrene	56495		U157	10
4,4'-Methylenebis(2-chloroaniline)	101144		U158	10
Methylene bromide	74953		U068	1000
Methylene chloride	75092		U080	1000
Methyl ethyl ketone (MEK) (I,T)	78933		U159	5000
Methyl ethyl ketone peroxide (R,T)	1338234		U160	10
Methyl hydrazine	60344	500	P068	10
Methyl iodide	74884		U138	100
Methyl isobutyl ketone	108101		U161	5000
Methyl isocyanate	624839	500	P064	##
Methyl isothiocyante	556616	500		1
2-Methyllactonitrile	75865		P069	10
Methyl mercaptan	74931	500	U153	100
Methyl methacrylate (I,T)	80626		U162	1000
Methyl parathion	298000		P071	100
Methyl phenkapton	3735237	500		1
Methyl phosphoric dichloride	676971	100		1
4-Methyl-2-pentanone (I)	108101		U161	5000
Methyl thiocyanate	556649	10,000		1
Methylthiouracil	56042		U164	10
Methyl vinyl ketone	78944	10		1
Methylmercuric dicyanamide	502396	500/10,000		1
Methyltrichlorosilane	75796	500		1
Metolcarb	1129415	100/10,000		1
Mevinphos	7786347	500		10
Mexacarbate	315184	500/10,000		1000

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Mitomycin C	50077	500/10,000	U010	10
MNNG	70257		U163	10
Monocrotophos	6923224	10/10,000		1
Monoethylamine	75047			100
Monomethylamine	73895			100
Muscimol	2763964	10,000	P007	1000
Mustard gas	505602	500		1
Naled	300765			10
5,12-Naphthaacenedione, 8-acetyl-10-[3 amino-2,3,6-tri-deoxy-alpha-L-lyxo-hexopyranosyl)-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-	20830813		U059	10
1-Naphthalenamine	134327		U167	100
2-Naphthalenamine	91598		U169	10
Naphthalenamine, N,N'-bis(2-chloroethyl)-	494031		U026	100
Naphthalene, 2-chloro-	91587		U047	5000
1,4-Naphthalenedione	130154		U166	5000
2,7-Naphthalenedisulfonic acid, 3,3' [(3,3'-dimethyl-(1,1'-biphenyl)-4,4'-dryl)-bis(azo)]bis(5-amino-4-hydroxy)-tetrasodium salt	72571		U236	10
Naphthenic acid	1338245			100
1,4-Naphthoquinone	130154		U166	5000
alpha-Naphthylamine	134327		U167	100
beta-Naphthylamine	91598		U168	10
alpha-Naphthylthiourea	86884		P072	100
Nickel++	7440020			100
Nickel ammonium sulfate	15699180			100
Nickel carbonyl	13463393	1	P073	10
Nickel carbonyl Ni(CO)4, (T-4)-	13463393		P073	10
Nickel chloride	7718549 37211055			100
Nickel cyanide	557197		P074	10
Nickel hydroxide	12054487			10
Nickel nitrate	14216752			100
Nickel sulfate	7786814			100
Nicotine & salts	54115	100	P075	100

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Nicotine sulfate	65305	100/10,000		1
Nitric acid	7697372	1000		1000
Nitric acid, thallium(1+) salt	10102451		U217	100
Nitric oxide	10102439	100	P076	10
p-Nitroaniline	100016		P077	5000
Nitrobenzene (I,T)	98953	10,000	U169	1000
Nitrocyclohexane	1122607	500		1
Nitrogen dioxide	10102440 10544726	100	P078	10
Nitrogen oxide	10102439		P076	10
Nitroglycenne	55630		P981	10
Nitrophenol (mixed) m-Nitrophenol o-Nitrophenol (2) p-Nitrophenol (4)	25154556 554847 88755 100027		 U170	100 100 100 100
2-Nitropropane (I,T)	96469		U171	10
N-Nitrosodi-n-butylamine	924163		U172	10
N-Nitrosodiethanolamine	1116547		U173	1
N-Nitrosodiethylamine	55185		U174	1
N-Nitrosodimethylamine	62759	1000	P082	10
N-Nitrosodiphenylamine	86306			100
N-Nitroso-N-ethylurea	759739		U176	1
N-Nitroso-N-methylurea	684935		U177	1
N-Nitroso-N-methylurethane	615532		U178	1
N-Nitrosomethylvinylamine	4549400		P084	10
N-Nitrosopipendine	199754		U179	10
N-Nitrosopyrrolidine	930552		U180	1
Nitrotoluene m-Nitrotoluene o-Nitrotoluene p-Nitrotoluene	1321126 99081 88722 99990			1000
5-Nitro-o-toluidine	99558		U181	100
Norbormide	991424	100/10,000		1
Octamethylpyrophosphoramide	152169		P085	100
Organorhodium complex (PMN-82-147)	0	10/10,000		1
Osmium tetroxide	20816120		P087	1000
Ouabain	630604	100/10,000		1
7-Oxabicyclo[2,2,1]heptane-s,3-dicarboxylic acide	145733		P088	1000
Oxamyl	23135220	100/10,000		1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
1,2-Oxathiolane, 2,2-dioxide	1120714		U193	10
2H-1,3,2-Oxazaphosphorin-2-amine, N,N bis(2-chloroethyl)tetrahydro-, 2-oxide	50180		U058	10
Oxetane, 3,3-bis(chloromethyl)-	78717	500		
Oxirane (I,T)	75218		U115	10
Oxiranecarboxyaldehyde	765344		U126	10
Oxirane, (chloromethyl)-	106898		U041	100
Oxydisulfoton	2497076	500		1
Ozone	10028156	100		1
Paraformaldehyde	30525894			1000
Paraldehyde	123637		U182	1000
Paraquat	1910425	10/10,000		1
Paraquat methosulfate	2074502	10/10,000		1
Parathion	56382	100	P089	10
Parathion-methyl	298000	100/10,000		100
Paris green	12002038	500/10,000		100
Pentaborane	19624227	500		1
Pentachlorobenzene	608935		U183	10
Pentachlorethane	76017		U184	10
Pentachlorophenol	87865		U242	10
Pentachloronitrobenzene (PCNB)	82688		U185	100
Pentadecylamine	2570265	100/10,000		1
Peracetic acid	79210	500		1
1,3-Pentadiene (I)	504609		U186	100
Perachloroethylene	127184		U210	100
Perchloromethylmercaptan	594423	500		100
Phenacetin	62442		U187	100
Phenanthrene	85018			5000
Phenol	108952	500/10,000	U188	1000
Phenol, 2-chloro-	95578		U048	100
Phenol, 4-chloro-3-methyl-	59507		U039	5000
Phenol, 2-cyclohexyl-4,6-dinitro-	131895		P034	100
Phenol, 2,4-dichloro	120832		U081	100
Phenol, 2,6-dichloro-	87650		U082	100
Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)	56531		U089	1
Phenol, 2,4-dimethyl-	105679		U101	100
Phenol, 2,4-dinitro-	51285		P048	10

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Phenol, methyl- m-Cresol o-Cresol p-Cresol	1319773 108394 95487 106445		U052	1000
Phenol, 2-methyl-4,6-dinitro-	534521		P047	10
Phenol, 2,2'-methylenebis[3,4,6-trichloro-	70304		U132	100
Phenol, 2,2'-thiobis(4,6-dichloro-	97187	100/10,000		1
Phenol, 2,2'-thiobis(4-chloro-6-methyl)-	4418660	10/10,000		1
Phenol, 2-(1-methylpropyl)-4,6-dinitro	88857		P020	1000
Phenol, 3-(1-methylethyl)-, methylcarbamate	64006	500/10,000		1
Phenol, 4-nitro-	100027		U170	100
Phenol, pentachloro-	87865		U242	10
Phenol, 2,3,4,6-tetrachloro-	58902		U212	10
Phenol, 2,4,5-trichloro-	95954		U230	10
Phenol, 2,4,6-trichloro-	88062		U231	10
Phenol, 2,4,6-trinitro-, ammonium salt	131748		P009	10
Phenoxarsine, 10,10'-oxydi-	58366	500/10,000		1
L-Phenylalanine, 4-[bis(2-chloroethyl) aminol]	148823		U150	1
Phenyl dichloroarsine	696286	500		1
1,10-(1,2-Phenylene)pyrene	193395		U137	100
Phenylhydrazine hydrochloride	59881	1000/10,000		1
Phenylmercury acetate	62384	500/10,000	P092	100
Phenylsilatrane	2097190	100/10,000		1
Phenylthiourea	103855	100/1000	P093	100
Phorate	298022	10	P094	1010
Phosacetim	4104147	100/10,000		1
Phosfolan	947024	100/10,000		1
Phosgene	75445	10	P095	10
Phosmet	732116	10/10,000		1
Phosphamidon	13171216	100		1
Phosphine	7803512	500		100
Phosphonothioic acid, methyl-, o-ethyl o-(4-(methylthio)phenyl) ester	2703131	500		1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Phosphonothioic acid, methyl-, s-(2-(bis(1- methylethyl)amino) ethyl o-ethyl ester	50782699	100		1
Phosphonothioic acid, methyl-, 0-(4-nitrophenyl) o-phenyl ester	2665307	500		1
Phosphoric acid	7664382			5000
Phosphoric acid, diethyl 4-nitrophenyl ester	311455		P041	100
Phosphoric acid, dimethyl 4-(methylthio) phenyl ester	3254635	500		1
Phosphoric acid, lead(2+) salt (2:3)	7446277	500	U145	#
Phosphorodithioic acid, O,O-diethyl S-[2(ethylthio)ethyl]ester	298044		P039	1
Phosphorodithioic acid, O,O-diethyl S(ethylthio), methyl ester	298022		P094	10
Phosphorodithioic acid, O,O-diethyl S-methyl ester	3288582		U087	5000
Phosphorodithoic acid, O,O-dimethyl S-[2(methyl-amino)-2-oxoethyl] ester	60515		P044	10
Phosphorofluondic acid, bis(1-methylethyl)ester	55914		P043	100
Phsphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester	56382		P089	10
Phosphorothioic acid, O,[4[(dime-thylamino)sulfonyl]phenyl]O,O-dimethyl ester	52857		P097	1000
Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	298000		P071	100
Phosphorus	7723140	100		1
Phosphorus oxycloride	10025873	500		1000
Phosphorous pentachloride	10026138	500		1
Phosphorus pentasulfide (R)	1314803		U189	100
Phosphorus pentoxide	1314563	10		1
Phosphorus trichloride	7719122	1000		1000
Phthalic anhydride	85449		U190	5000
Physostigmine	57476	100/10,000		1
Phosostigmine, salicylate (1:1)	57647	100/10,000		1
2-Picoline	109068		U191	5000
Picotoxin	124878	500/10,000		1
Piperidine	110894	1000		1
Piperidine, 1-nitroso-	100754		U179	10

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Piprotal	5281130	100/10,000		1
Primifos-ethyl	23505411	1000		1
Plumbane, tetraethyl-	78002		P110	10
Polychlorinated biphenyls (PCBs) (See Aroclor)	1336363			1
Potasium arsenate	7784410			1
Potassium arsenite	10124502	500/10,000		1000
Potassium bichromate	7778509			10
Potassium chromate	7789006			10
Potassium cyanide	151508	100	P098	10
Potassium hydroxide	1310583			1000
Potassium permanganate	7722647			100
Potassium silver cyanide	506516	500	P099	1
Promecarb	2631370	500/10,000		1
Pronamide	23950585		U192	5000
Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl] oxime	116063		P070	1
1-Propanamine (I,T)	107108		U194	5000
1-Propanamine, N-propyl-	142847		U110	5000
1-Propanamine, N-nitroso-N-proply-	621647		U111	10
Propane, 1,2-dibromo-2-chloro	96128		U066	1
Propane, 2-intro- (I,T)	79469		U171	10
1,3-Propane sultone	1120714		U193	10
Propane 1,2-dichloro-	78875		U083	1000
Propanedinitrile	109773		U149	100
Propanenitrile	107120		P101	10
Propanenitrile, 2-chloro-	542767		P027	1000
Propanenitrile, 2-hydroxy-2-methyl-	75865		P069	10
Propane, 2,2'-oxybis[2-chloro-	108601		U027	1000
1,2,3-Propanetnol, trinitrate- (R)	55630		P081	10
1-Propanol, 2,3-dibromo-, phosphate (3:1)	126727		U235	10
1-Propanol, 2-methyl- (I,T)	78831		U140	5000
2-Propanone (I)	67641		U002	5000
2-Propanone, 1-bromo-	598312		P017	1000
Propargite	2312358			10
Propargyl alcohol	107197		P102	1000
Propargyl bromide	106967	10		1
2-Propenal	107028		P003	1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
2-Propenamide	79061		U007	5000
1-Propene, 1,1,2,3,3,3-hexachloro-	1888717		U243	1000
1-Propene, 1,3-dichloro-	542756		U084	100
2-Propenenitrile	107131		U009	100
2-Propenenitrile, 2-methyl- (I,T)	126987		U152	1000
2-Propenoic acid (I)	79107		U008	5000
2-Prepenoic acid, ethyl ester (I)	140885		U113	1000
2-Prepenoic acid, 2-methyl-, ethyl ester	97632		U118	1000
2-Prepenoic acid, 2-methyl-, methyl ester (I,T)	80626		U162	1000
2-Propen-1-o1	107186		P005	100
Propiolactone, beta-	57578	500		1
Propionic acid	79094			5000
Propionic acid, 2-(2,4,5-trichlorophenoxyl)-	93721		U233	100
Propionic anhydride	123626			5000
Propiolactone, beta	57578	500		1
Propionitrile	107120	500		10
Propionitrile, 3-chloro-	542767	1000		1000
Propiophenone, 4-amino	70699	100/10,000		1
n-Propylamine	107108		U194	5000
Propyl chloroformate	109615	500		1
Propylene dichloride	78875		U083	1000
Propylene oxide	75569	10,000		100
1,2-Propylenimine	75558	10,000	P067	1
2-Propyn-1-o1	107197		P102	1000
Prothoate	2275185	100/10,000		1
Pyrene	129000	1000/10,000		5000
Pyrethrins	121299 121211 8003347			1
3,6-Pyridazinedione, 1,3-dihydro-	123331		U148	5000
4-Pyridinamine	504245		P008	1000
Pyridine	110861		U196	1000
Pyridine, 2-methyl-	109068		U191	5000
Pyridine, 2-methyl-5-vinyl-	140761	500		1
Pyridine, 4-amino-	504245	500/10,000		1000
Pyridine, 4-nitro-, 1-oxide	1124330	500/10,000		1
Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)	54115		P075	100

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-	66751		U237	10
4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	56042		U164	10
Pyriminil	53558251	100/10,000		1
Pyrrolidine, 1-nitroso-	930552		U180	1
Quinoline 91225	91225			5000
Reserpine	50555		U200	5000
Resorcinol	106463		U201	5000
Sacchann and salts	81072		U202	100
Salcomine	14167181	500/10,000		1
Sarin	107448	10		1
Satrole	94597		U203	100
Selenious acid	7783008	1000/10,000	U204	10
Selenious acid, dithallium (1+) salt	12039520		P114	1000
Selenium ++	7782492			100
Selenium dioxide	7446084		U204	10
Selenium oxychloride	7791233	500		1
Selenium sulfide (R,T)	7488564		U205	10
Selenourea	630104		P103	1000
Semicarbazide hydrochloride	56417	1000/10,000		1
L-Senne, diazoacetate (ester)	115026		U015	1
Silane, (4-aminobutyl)diethoxyme-thyl-	3037727	1000		1
Silver++	7440224			1000
Silver cyanide	506649		P104	1
Silver nitrate	7761888			1
Silvex (2,4,5-TP)	93721		U233	100
Sodium	7440235			10
Sodium arsenate	7631892	1000/10,000		1
Sodium arsenite	7784465	500/10,000		1
Sodium azide	26628228	500	P105	1000
Sodium bichromate	10588019			10
Sodium bifluoride	1333831			100
Sodium bisulfite	7631905			5000
Sodium Cacodylate	124652	100/10,000		1
Sodium chromate	7775113			10
Sodium cyanide	143339		P106	10
Sodium dodecylbenzenesulfonate	25155300			1000
Sodium fluoride	7681494			1000

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Sodium fluoroacetate	62748	10/10,000		10
Sodium hydrosulfide	16721805			5000
Sodium hydroxide	1310732			1000
Sodium hypochlorite	7681529 10022705			1000
Sodium methylate	124414			1000
Sodium nitrite	763200			100
Sodium prentachlorophenate	131522	100/10,000		1
Sodium phosphate, dibasic	7558794 10039324 10140655			5000
Sodium phosphate, tribasic	7601549 7758294 7785844 10101890 10124568 10361894			5000
Sodium selenate	13410010	100/10,000		1
Sodium selenite	10102188 7782823	100/1000		100
Sodium tellurite	10102202	500/10,000		1
Stannane, acetoxytriphenyl	900958	500/10,000		1
Streptozotocin	18883664		U206	1
Strontium chromate	7789062			10
Strychnidin-1-one, 2,3-dimethoxy-	357573		P018	100
Strychnine, & salts	572494	100/10,000	P018	10
Strychnine, sulfate	60413	100/10,000		1
Styrene	100425			1000
Sulfotep	3689245	500		100
Sulfoxide, 3-chlorophpropyl octyl	3569571	500		1
Sulfur monochloride	12771083			1000
Sulfur dioxide	7446095	500		1
Sulfur phosphide (R)	1314803		U189	100
Sulfur tetrafluoride	7783600	100		1
Sulfur trioxide	7446119	100		1
Sulfuric acid	7664939 8014957	1000		1000
Sulfuric acid, dithallium (1^+) salt	7446186 10031591		P115	100
Sulfuric acid, dimethyl ester	77781		U103	100
Tabun	77816	10		1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
2,4,5-T acid	93765		U232	1000
2,4,5-T amines	2008460 1319728 3813147 6369966 6369977			5000
Tellurium	13494809	500/10,000		1
Tellurium hexafluoride	7783804	100		1
2,4,5-T esters	93798 1928478 25168154 61792072			1000
2,4,5-T salts	13560991			1000
2,4,5-T	93765		U232	1000
TDE	72548		U060	1
TEPP	10749	100		10
Terbufos	13071799	100		1
1,2,4,5-Tetrachlorobenzene	95943		U207	5000
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746016			1
1,1,1,2-Tetrachlorethane	630206		U208	100
1,1,2,2-Tetrachloroethane	79345		U209	100
Tetrachloroethene	127184		U210	100
Tetrachloroethylene	127184		U210	100
2,3,4,6-Tetrachlorophenol	58902		U212	10
Tetraethyl lead	78002	100	P110	10
Tetraethyl pyrophosphate	107493		P111	10
Tetraethyldithiopyrophosphate	3589245		P109	100
Tetraethyltin	597648	100		1
Tetramethyllead	75741	100		1
Tetrahydrofuran (I)	109999		U213	1000
Tetranitromethane (R)	509148	500	P112	10
Tetraphosphoric acid, hexaethyl ester	757584		P062	100
Thallic oxide	1314325		P113	100
Thallium ++	7440280			1000
Thallium acetate	563688		U214	100
Thallium carbonate	6533739		U215	100
Thallium chloride	7791120		U216	100
Thallium nitrate	10102451		U217	100
Thallium oxide	1314325		P113	100

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Thallium selenite	12039520		P114	1000
Thallium sulfate	7446186 10031591	100/10,000	P115	100
Thallous carbonate	6533739	100/10,000		100
Thallous chloride	7791120	100/10,000		100
Thallous malonate	2757188	100/10,000		1
Thallous sulfate	7446186	100/10,000		100
Thioacetamide	62555		U218	10
Thiocarbazide	2231574	1000/10,000		1
Thiodiphosphoric acid, tetraethyl ester	3689245		P109	100
Thiofanox	39196184	100/10,000	P045	100
Thioimidodicarbonic diamide [(H2N)C(S)] 2NH	541537		P049	100
Thiomethanol (I,T)	74931		U153	100
Thionazin	297972	500		100
Thioperoxydicarbonic diamide [(H2N)C(S)] 2S2, tetra-methyl-	137268		U244	10
Thiophenol	108985	500	P104	100
Thiosemicarbazide	79196	100/10,000	P116	100
Thiourea	62566		U219	10
Thiourea, (2-chlorophenyl)-	5344821	100/10,000	P026	100
Thiourea, (2-methylphenyl)-	614788	500/10,000		1
Thiourea, 1-naphthalenyl-	86884		P072	100
Thiourea, phenyl-	103855		P093	100
Thiram	137268		U244	10
Titanium tetrachloride	7550450	100		1
Toluene	108883		U220	1000
Toluenediamine	95807 496720 823405 25376458		U221	10
Toluene diisocyanate (R,T)	584849 91087 26471625	500 100	U223	100 100
o-Toluidine	95534		U238	100
p-Toluidine	106490		U353	100
o-Toluidine hydrochloride	636215		U222	100
Toxaphene	8001352		P123	1
2,4,5-TP acid	93721		U233	100
2,4,5-TP esters	32534955			100

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
1H-1,2,4-Triazol-3-amine	61825		U011	10
Trans-1,4-dichlorobutene	110576	500		1
Triamiphos	1031476	500/10,000		1
Triazofos	24017478	500		1
Trichloroacety chloride	76028	500		1
Trichlorfon	52686			100
1,2,4-Trichlorobenzene	120821			100
1,1,1-Trichloroethane	71556		U226	1000
1,1,2-Trichloroethane	79005		U227	100
Trichloroethene	79016		U228	100
Trichloroethylene	79016		U228	100
Trichloroethylsilane	115219	500		1
Trichloronate	327980	500		1
Trichloromethanesulfenyl chloride	594423		P118	100
Trichloromonofluoromethane	75694		U121	5000
2,3,4-richlorophenol	15950660			
2,3,5-Trichlorophenol	933788			
2,3,6-Trichlorophenol	933755			
2,4,5-Trichlorophenol	95954		U230	10
2,4,6-Trichlorophenol	88062		U231	10
3,4,5-Trichlorophenol	609198			
2,4,5-Trichlorophenol	95954		U230	10
2,4,6-Trichlorophenol	88062		I231	10
Trichlorphenylsilane	98135	500		1
Trichloro(chloromethyl)silane	1558254	100		1
Trichloro(dichlorophenyl)silane	27137855	500		1
Triethanolamine dodecylbenzene-sulfonate	27323417			1000
Triethoxysilane	998301	500		1
Triethylamine	121448			5000
Trimethylamine	75503			100
Trimethylchlorosilane	75774	1000		1
Trimethylolpropane phosphite	824113	100/10,000		1
Trimethyltin chloride	1066451	500/10,000		1
1,3,5-Trinitrobenzene (R,T)	99354		U234	10
1,3,5-Trioxane, 2,4,6-trimethyl-	123637		U182	1000
Triphenyltin chloride	639587	500/10,000		1
Tris(2-chloroethyl)amine	555771	100		1
Tris(2,3-dibromopropyl) phosphate	126727		U235	10
Trypan blue	72571		U236	10

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Unlisted Hazardous Wastes Characteristic of Corrosivity	NA		D002	100
Unlisted Hazardous Wastes Characteristic:	NA			
Arsenic (D004)	NA		D004	1
Barium (D005)	NA		D005	1000
Cadmium (D006)	NA		D006	10
Chromium (D007)	NA		D007	10
2,4-D (D016)	NA		D016	100
Endrin (D9012)	NA		D012	1
Lead (D008)	NA		D008	
Lindane (D013)	NA		D013	1
Mercury (D009)	NA		D009	1
Metoxychlor (D014)	NA		D014	1
Selenium (D010)	NA		D010	10
Silver (D011)	NA		D011	1
Toxaphene (D015)	NA		D015	1
2,4,5-TP (D017)	NA		D017	100
Vinyl chloride (D043)	NA		D043	1
Unlisted Hazardous Wastes Characteristic of Ignitability	NA		D001	00
Unlisted Hazardous Wastes Characteristic Reactivity	NA		D003	00
Uracil mustard	66751		U237	10
Uranyl acetate	541093			100
Uranyl nitrate	10102064 36478769			100
Urea, N-ethyl-N-nitroso	759739		U176	1
Urea, N-methyl-N-nitroso	684935		U177	1
Valinomycin	2001958	1000/10,000		1
Vanadic acid, ammonium salt	7803556		P119	1000
Vanadic oxide V_2O_5	1314621		P120	1000
Vanadic pentoxide	1314621		P120	1000
Vanadium pentoxide	1314621	100/10,000		1000
Vanadyl sulfate	27774136			1000
Vinyl chloride	75014		U043	1
Vinyl acetate	108054			5000
Vinyl acetate monomer	108054	1000		5000
Vinylamine, N-methyl-N-nitroso-	4549400		P084	10
Vinylidene chloride	75354		U078	100
Warfarin, & salts, when present at concentrations greater than 0.3%	81812	500/10,000	P001	100
Warfarin sodium	129066	100/10,000		1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Xylene (mixed) m-Benzene, dimethyl o-Benzene, dimethyl p-Benzene, dimethyl	1330207 108383 95476 106423		U239	1000
Xylenol	1300716			1000
Xylylene dichloride	28347139	100/10,000		1
Yohimban-16-carboxylic acid, 11,17 dimethosy-18-[(3,4,5-trimethoxy-benzoyl)oxy]-, methyl ester (3-beta, 16-beta,17-alpha, 18-beta,20-alpha)-	50555		U200	5000
Zinc	7440666			1000
Zinc acetate	557346			1000
Zinc ammonium chloride	52628258 14639975 14639986			1000
Zinc borate	1332076			1000
Zinc bromide	7699458			1000
Zinc carbonate	3486359			1000
Zinc chloride	7646857			1000
Zinc cyanide	557211		P121	10
Zinc, dichloro(4,4-dimethyl-5(((((methylamino)carbonyl) oxy)imino)pentaenitrile)-,(t-4)-	58270089	100/1000		1
Zinc fluoride	7783495			1000
Zinc formate	557415			1000
Zinc hydrosulfite	7779864			1000
Zinc nitrate	7779886			1000
Zinc phenosulfonate	127822			5000
Zinc phosphide	1314847	500	P122	100
Zinc phosphide Zn_3P_2' when present at concentrations greater than 10%	1314847		P122	100
Zinc silicofluoride	16871719			5000
Zinc sulfate	7733020			1000
Zirconium nitrate	13746899			5000
Zirconium potassium fluoride	16923958			1000
Zirconium sulfate	14644612			5000
Zirconium tetrachloride	10026116			5000
F001			F001	10

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
The following spent halogenated solvents used in degreasing; all spent solvent mixtures/blends used in degreasing containing, before use, a total of 10 percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.				
a. Tetrachlorethylene	127184		U210	100
b. Trichloroethylene	79016		U228	100
c. Methylene chloride	75092		U080	1000
d. 1,1,1-Trichloroethane	71556		U226	1000
e. Carbon tetrachloride	56235		U211	10
f. Chlorinated fluorocarbons	NA			5000
F002			F002	10
The following spent halogenated solvents: all spent solvent mixtures/blends containing, before use, a total of 10 percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.				
a. Tetrachloroethylene	127184		U210	100
b. Methylene chloride	75092		U080	1000
c. Trichloroethylene	79016		U228	100
d. 1,1,1-Trichloroethane	71556		U226	1000
e. Chlorobenzene	108907		U037	100
f. 1,1,2-Trichloro-1,2,2 trifluoroethane	76131			5000
g. o-Dischlorobenzene				
h. Trichlorofluoromethane	95501		U070	100
i. 1,1,2-Trichloroethane	75694		U121	5000
	79005		U227	100
F003			F003	100
The following spent nonhalogenated solvents and the still bottoms from the recovery of these solvents:				
a. Xylene	1330207	1000		
b. Acetone	67641	5000		
c. Ethyl acetate	141786	5000		
d. Ethylbenzene	100414	1000		
e. Ethyl ether	60297	100		
f. Methyl isobutyl ketone	108101	5000		
g. n-Butyl alcohol	71363	5000		
h. Cyclohexanone	108941	5000		
i. Methanol	67561	5000		

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
F004			F004	1000
The following spent nonhalogenated solvents and the still bottoms from the recovery of these solvents:				
a. Cresols/Cresylic acid	131773		U052	1000
b. Nitrobenzene	98953		U169	1000
F005			F005	100
The following spent nonhalogenated solvents and the still bottoms from the recovery of these solvents:				
a. Toluene	108883		U220	1000
b. Methyl ethyl ketone	78933		U159	5000
c. Carbon disulfide	75150		P022	100
d. Isobutanol	78831		U140	5000
e. Pyndine	110861		U196	1000
F006			F006	10
Wastewater treatment sludges from electroplating operations except from the following: (1) sulfuric acid anodizing aluminum, (2) tin plating on carbon steel, (3) zinc plating (segregated basis) on carbon steel, (4) aluminum or zinc-aluminum plating on carbon steel, (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel, and (6) chemical etching and milling of aluminum.				
F007			F007	10
Spent cyanide plating bath solutions from electroplating operations.				
F008			F008	10
Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.				
F009			F009	10
Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.				
F010			F010	10
Quenching bath residues from oil baths from metal heat operations where cyanides are used in the process.				
F011			F011	10
Spent cyanide solution from salt bath pot cleaning from metal heat treating operations.				
F012			F012	10
Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.				
F019			F019	10
Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive coating process.				
F020			F020	1
Waste (except wastewater and spent carbon from hydrogen chloride purification) from the production of manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or-tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.)				
F021			F021	1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.				
F022			F022	1
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) or tetra-, penta-, or hexachlorobenzenes under alkaline conditions.				
F023			F023	1
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of hexa-chlorophene from highly purified, 2,4,5-tri-chlorophenol.)				
F024			F024	1
Wastes, including but not limited to distillation residues, heavy ends, tars, and reactor cleanout wastes, from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes. (This listing does not include light ends, spent filters and filter aids, spent desicants, wastewater, wastewater treatment sludges, spent catalysts, and wastes listed in Section 261.32.)				
F025			F025	1
Condensed light ends, spent filters and filter aids, and spent desicant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.				
F026			F026	1
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetrapenta-, or hexachlorobenzene under alkaline conditions.				
F027			F027	1
Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-tri-chlorophenol as the sole component.)				
F028			K028	1
Residues resulting from the incineration or thermal treatment of soil contaminated with USEPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027				
K001			K001	1
Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.				
K002			K002	#
Wastewater treatment sludge from the production of chrome yellow and orange pigments.				
K003			K003	#

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Wastewater treatment sludge from the production of molyodate orange pigments.				
K004			K004	10
Wastewater treatment sludge from the production of zinc yellow pigments.				
K005			K005	#
Wastewater treatment sludge from the production of chrome green pigments.				
K006			K006	10
Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).				
K007			K007	10
Wastewater treatment sludge from the production of iron blue pigments.				
K008			K008	10
Oven residue from the production of chrome oxide green pigments.				
K009			K009	10
Distillation bottoms from the production of acetaldehyde from ethylene.				
K010			K010	10
Distillation side cuts from the production of acetaldehyde from ethylene.				
K011			K011	10
Bottom stream from the wastewater stripper in the production of acrylonitrile.				
K013			K013	10
Bottom stream from the acetonitrile column in the production of acrylonitrile.				
K014			K014	5000
Bottom from the acetonitrile purification column in the production of acrylonitrile.				
K015			K015	10
Still bottoms from the distillation of benzyl chloride.				
K016			K016	1
Heavy ends or distillation residues from the production of carbon tetrachloride.				
K017			K017	10
Heavy ends (still bottoms) from the purification column in the production of epi-chlorohydrin.				
K018			K018	1
Heavy ends from the fractionation column in ethyl chloride production.				
K019			K019	1
Heavy ends from the distillation of ethylene dichloride in ethylene chloride production.				
K020			K020	1
Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.				
K021			K021	10
Aqueous spent antimony catalyst waste from fluoromethanes production.				
K022			K022	1
Distillation bottom tars from the production of phenol/acetone from cumene.				
K023			K023	5000
Distillation light ends from the production of ophthalic anhydride from naphthalene.				

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
K024			K024	5000
Distillation bottoms from the production of phthalic anhydride from naphthalene.				
K025			K025	10
Distillation bottoms from the production of nitrobenzene by the nitration of benzene.				
K026			K026	1000
Stripping still tails from the production of methyl ethyl pyndines.				
K027			K027	10
Centrifuge and distillation residues from toluene diisocyanate production.				
K028			K028	1
Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.				
K029			K029	1
Waste from the product steam stripper in the production of 1,1,1-trichloroethane.				
K030			K030	1
Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.				
K031			K031	1
By-product salts generated in the production of MSMA and cacodylic acid.				
K032			K032	10
Wastewater treatment sludge from the production of chlordane.				
K033			K033	10
Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.				
K034			K034	10
Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.				
K035			K035	1
Wastewater treatment sludges generated in the production of creosote.				
K036			K036	1
Still bottoms from toluene reclamation distillation in the production of disulfoton.				
K037			K037	1
Wastewater treatment sludges from the production of disulfoton.				
K038			K038	10
Wastewater from the washing and stripping of phorate production.				
K039			K039	10
Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.				
K040			K040	10
Wastewater treatment sludge from the production of phorate.				
K041			K041	1
Wastewater treatment sludge from the production of toxaphene.				
K042			K042	10
Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.				

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
K043			K043	10
2,6-Dichlorophenol waste from the production 2,4-D.				
K044			K044	10
Wastewater treatment sludges from the manufacturing and processing of explosives.				
K045			K045	10
Spent carbon from the treatment of wastewater containing explosives.				
K046			K046	100
Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.				
K047			K047	10
Pink/red water from TNT operations.				
K048			K048	#
Dissolved air flotation (DAF) float from the petroleum refining industry.				
K049			K049	#
Slop oil emulsion solids from the petroleum refining industry.				
K050			K050	10
Heat exchanger bundle cleaning sludge from the petroleum refining industry.				
K051			K051	#
API separator sludge from the petroleum refining industry.				
K052			K052	10
Tank bottoms (leaded) from the petroleum refining industry.				
K060			K060	1
Ammonia still lime sludge from coking operations.				
K061			K061	#
Emission control dust/sludge from the primary production of steel in electric furnaces.				
K062			K062	#
Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (Standard Industrial Classification Codes 331 and 332).				
K064			K064	##
Acid plant blowdown slurry/sludge resulting from thickening of blowdown slurry from primary copper production.				
K065			K065	##
Surface impoundment solids contained in and dredged from surface impoundments at primary lead smelting facilities.				
K066			K066	##
Sludge from treatment of process wastewater and/or acid plant blowdown from primary zinc production.				
K069			K069	#
Emission control dust/sludge from secondary lead smelting.				
K071			K071	1

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used.				
K073			K073	10
Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production.				
K083			K083	100
Distillation bottoms from aniline extraction.				
K084			K084	1
Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.				
K085			K085	10
Distillation or fractionation column bottoms from the production of chlorobenzenes.				
K086			K086	#
Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.				
K087			K087	100
Decanter tank tar sludge from coking operations.				
K088			K088	
Spent potliners from primary aluminum reduction.				
K090			K090	
Emission control dust or sludge from ferrochromiumsilicon production.				
K091			K091	
Emission control dust or sludge from ferrochromium production.				
K093			K093	5000
Distillation light ends from the production of phthalic anhydride from ortho-xylene.				
K094			K094	5000
Distillation bottoms from the production of phthalic anhydride from ortho-xylene.				
K095			K095	100
Distillation bottoms from the production of 1,1,1-trichloroethane.				
K096			K096	100
Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.				
K097			K097	1
Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.				
K098			K098	1
Untreated process wastewater from the production of toxaphene.				
K099			K099	10
Untreated wastewater from the production of 2,4-D.				
K100			K100	#
Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.				

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
K101			K101	1
Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.				
K102			K102	1
Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.				
K103			K103	100
Process residues from aniline extraction from the production of aniline.				
K104			K104	10
Combined wastewater streams generated from nitrobenzene/aniline production.				
K105			K105	10
Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.				
K106			K106	1
Wastewater treatment sludge from the mercury cell process in chlorine production.				
K107			K107	10
Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazines.				
K108			K108	10
Condensed column overhead from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.				
K109			K109	10
Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.				
K110			K110	10
Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.				
K111			K111	10
Product washwaters from the production of dinitrotoluene via nitration of toluene.				
K112			K112	10
Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.				
K113			K113	10
Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.				
K114			K114	10
Vicinais from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.				
K115			K115	10
Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.				

(continued)

Table 4-1 (continued)

Hazardous Waste/Substances	CAS No.[1]	Threshold Planning[2] Quantity (pounds)	USEPA Waste Number	RQ (pounds)[3]
K116			K116	10
Organic condensate from the solvent recovery column in the production of toluene disocyanate via phosgenation of toluenediamine.				
K117			K117	1
Wastewater from the reaction vent gas scrubber in the production of ethylene bromide via bromination of ethene.				
K118			K118	1
Spent absorbent solids from purification of ethylene dibromide in the production of ethylene dibromide.				
K123			K123	10
Process wastewater (including supermates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salts.				
K124			K124	10
Reactor vent scrubber water from the production of ethylene-bisdithiocarbamic acid and its salts.				
K125			K125	10
Filtration, evaporation, and centrifugation solids from the production of ethylene-bisdithiocarbamic acid and its salts.				
K126			K126	10
Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylene-bisdithiocarbamic acid and its salts.				
K131			K131	100
Wastewater from the reactor and spent sulfuric acid from the acid dryer in the production of methyl bromide.				
K132			K132	1000
Spent absorbent and wastewater solids from the production of methyl bromide.				
K136			K136	1
Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.				

1. Chemical Abstract Service (CAS) Registry Number.

2. Quantity in storage above which the Executive Agent must be notified (see Section 2, *Hazardous Materials Management*).

3. Reportable Quantity (RQ) release that requires notification (see Section 7, *Petroleum, Oil, and Lubricant (POL) Management*).

++No reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 µm (0.004 in.).

+++The RQ for asbestos is limited to friable forms only.

1*Indicates that the 1-lb [0.37 kg] RQ is a statutory RQ.

(continued)

Table 4-1 (continued)

**Indicates that no RQ is being assigned to the generic or broad class.

# Indicates that the RQ is subject to change when the assessment of potential carcinogenicity is completed.

##The statutory RQ for this hazardous substance may be adjusted in a future rulemaking; until then, the statutory RQ applies.

(continued)

Table 4-1, Part 2

Substances Considered Water-endangering in Germany

(Source: FGS-FRG, Appendix C - Part 2)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Acephat	Acetate	677	2
Acetaldehyd	Acetaldehyde	1	1
Acetamid	Acetamide	2	1
Acetanhydrid	Acetic acid (anhydride)	3	1
Acetessigsäureethylester	Ethylacetoacetate	4	1
Acetessigsäuremethylester	Methylacetoacetate	5	1
Aceton	Acetone	6	0
Acetoncyanhydrin	Acetone cyanohydrin	7	3
Acetonitril	Acetonitrile	8	2
Acrolein	Acrolein	9	2
Acrylnitril	Acrylonitrile	10	3
Acrylsäure	Acrylic acid	11	1
Acrylsäure-2-ethyl-hexylester	2-Ethyl hexylacrylate	13	1
Acrylsäure-n-butylester	Butyl acrylate	12	1
Acrylsäureethylester	Ethyl acrylate	208	2
Acrylsäuremethylester	Methyl acrylate	147	2
Adipinsäure	Adipic acid (solid)	474	0
Adipinsäuredinitril	Adlpic dinitrile	209	1
Aldrin	Aldrin	464	3
sek. Alkan (C13-C17) sulfonate		663	2
Alkoholethersulfate C12-C18. 2-3 mol EO, Na-Salze		665	2
Alkoholethoxylate		670	2
Alkylbenzolsulfonate (C10-C14), linear		449	2
Alkylbenzyl (C8-C18) dimethylammoniumchlorid		599	3
Alkylolamide		673	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Allylalkohol		444	2
Allylamin	Allyl amine	14	2
Allylammoniumchlorid	Allylammonium chloride	525	2
Allylchlorid	Allyl chloride	15	2
N-Allylthioharnstoff	N-Allylthiourea	16	1
Altöle	Used oil	438	3
Aluminiumchlorid	Aluminum chloride	507	1
Aluminiumhydroxychlorid	Aluminum hydroxychloride	508	1
Aluminiumnitrat	Aluminum nitrate	509	1
Aluminiumphosphid	Aluminum phosphide	551	2
Aluminiumsulfat	Aluminum sulfate	486	1
Ameisensäure	Formic acid	210	1
Ammoniak	Ammonia	211	2
Ammoniumarsenat	Ammonium arsenate	289	3
Ammoniumchlorid	Ammonium chloride	213	1
Ammoniumdichromat	Ammonium dichromate	290	3
Ammoniumeisen (II)-sulfat		513	1
Ammoniumfluorid	Ammonium fluoride	291	1
Ammoniumhexafluorsilikat	Ammonium hexafluorsilicate	544	2
Ammoniumhydrogenfluorid	Ammonium bifluoride	292	1
Ammoniumhydrogensulfat	Ammonium bisulfate	293	1
Ammoniummolybdat		637	1
Ammoniumnitrat	Ammonium nitrate	212	1
Ammoniumperchlorat	Ammonium perchlorate	294	1
Ammoniumpikrat	Ammonium picrate	295	2
Ammoniumsulfat	Ammonium sulfate	296	1
Ammoniumsulfid	Ammonium sulfide	297	2
Ammoniumthiosulfat	Ammonium thiosulfate	193	1
n-Amylalkohol	n-Amyl alcohol	18	1
tert-Amylalkohol	tert-Amylalkohol	19	1
Anilin	Aniline	20	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Anilinhydrochlorid	Aniline hydrochloride	298	2
Anisol	Anisole	21	2
Arsen(III)-oxid	Arsennons oxide or Arsenic (III) oxide	299	3
Arsen(V)-oxid	Arsenic pentoxide or Arsenic (V) oxide	300	3
Arsensäure	Arsenic acid	301	3
Arsenwasserstoff	Arsenous hydride (Arsine)	214	3
Atrazin	Atrazine	24	2
Azinphos-ethyl	Ethylazinphos	627	3
Azinphos-methyl	Methylazinphos	628	3
Azocyclotin	Azocyclotin	534	3
Bariumchlorat	Barium chlorate	302	2
Bariumchlorid	Barium chloride	25	1
Bariumcyanid	Barium cyanide	303	3
Bariumnitrat	Barium nitrate	304	1
Bariumoxid	Barium oxide	305	1
Bariumperchlorat	Barium perchlorate	306	1
Bariumperoxid	Barium peroxide	307	1
Bariumsulfat	Barium sulfate	308	0
Bentazon	Bentazon	711	2
Benzaldehyd	Benzaldehyde	26	1
Benzoesäure	Benzoic acid	30	1
Benzol	Benzene	29	3
Benzolsulfonylchlorid	Benzene sulfonylchloride	215	1
Benzolitril	Benzonitrile	31	2
Benzotrichlorid	Benzylchloride	32	1
Benzylalkohol	Benzyl alcohol	216	1
Benzylchlorid	Benzyl chloride	33	2
Bernsteinsäure		476	
Berylliumnitrat	Beryllium nitrate	34	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Bis-(tributylzinn)-tetrachlorphthalat	Bis-(tributyltin)-tetrachlorophthalate	565	3
Bitumen	Asphalt	326	0
Blausäure	Hydrocyanic acid	309	3
Blei (II)-acetat	Lead (II) acetate	36	2
Blei (II)-arsenat	Lead (II) arsenate	310	3
Blei (II)-arsenit	Lead (II) arsenite	311	3
Blei (II)-cyanid	Lead (II) cyanide	312	3
Blei (II)-nitrat	Lead (II) nitrate	313	2
Blei (II)-perchlorat	Lead (II) perchlorate	314	2
Bleitetraethyl	Tetraethyl lead	35	3
Bleitetramethyl	Tetramethyl lead	538	3
Borsäure	Boric acid	315	1
Braunkohlenteer	Brown coaltar	496	3
Brenzcatechin	Pyrocatechol	536	2
Bromophos	Bromophos	617	3
Bromophos-ethyl	Ethylbromophos	618	3
Bromwasserstoff	Hydrogen bromide (hydrobromide acid)	217	1
1, 3-Butadien		218	2
n-Butan	n-Butane	561	
n-Butanol	n-Butanol	39	1
sek. Butanol	sec-Butanol	40	1
tert. Butanol	tert-Butanol	219	1
(2-Butoxiethyl) acetat		592	1
Butoxypolyethylen-propylenglycol		563	1
n-Buttersäure	n-Butyric acid	41	1
n-Buttersäureethylester	Ethyl-n-butyrate	100	1
n-Butylaldehyd	n-Butylaldehyde	48	1
n-Butylamin	n-Butyl amine	44	1
n-Butylammoniumchlorid	n-Butylammonium chloride	527	1
tert.-Butylbenzol	tert-butylbenzene	45	1

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Butylstannonsäure	Butyl stannous oxide	577	1
Butylthiostannonsäure	Butyl thiostannoic acid	49	3
Cadmiumsulfat	Cadmium sulfate	564	3
Calciumarsenat	Calcium arsenate	360	3
Calciumarsenit	Calcium arsenite	316	3
Calciumcarbonat	Calcium carbonate	317	0
Calciumchlorat	Calcium chlorate	318	2
Calciumchlorid	Calcium chloride	220	0
Calciumcyanid	Calcium cyanide	319	3
Calciumhydroxid	Calcium hydroxide	320	1
Calciumnitrat	Calcium nitrate	321	1
Calciumoxid	Calcium oxide	322	1
Calciumperchlorat	Calcium perchlorate	323	1
Calciumperoxid	Calcium oxide	324	1
Calciumsulfat	Calcium sulfate	325	0
∈-Caprolactam	∈-Caprolactame	221	1
Carbaryl	Carbaryl	50	2
Cetylpyridiniumchlorid		601	3
Cetyltrimethylammoniumbromid		600	3
Chlor	Chlorine	223	2
4-Chlor-2-nitroanilin	4-Chloro-2-nitroaniline	706	2
4-Chlor-3-methylphenol	4-Chloro-3-methyl phenol	231	2
2-Chlor-6-trichlormethylpyridin	2-Chloro-6-trichloromethy pyrdine	539	2
Chloralhydrat	Chloral hydrate	51	2
Chloralkane (C10-C13)	Chloroalkane	649	3
Chloramin T	Chloramine-T	640	2
2-Chloranilin	2-Chloroaniline	694	2
3-Chloranilin	3-Chloroaniline	695	2
4-Chloranilin	4-Chloroaniline	224	2
2-Chlorbenzoesäure	2-Chlorobenzoic acid	225	2
4-Chlorbenzoesäure	4-Chlorobenzoic acid	226	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Chlorbenzol	Chlorobenzene	53	2
Chloressigsäure	Chloroacetic acid	227	2
Chloressigsäuremethylester	Methyl chloroacetate	228	2
2-Chlorethanol	2-Chloroethanol	229	3
Chlorfenvinphos	Chlorfenvinphos	631	3
Chlorhexidin	Chlorhexidin	602	3
1-Chlornaphthalin	1-Chloronepthalene	232	2
2-Chlornitrobenzol	2-Chloronitrobenzene	710	2
3-Chlornitrobenzol	3-Chloronitrobenzene	709	2
4-Chlornitrobenzol	4-Chloronitrobenzene	233	2
Chloroform	Chloroform	54	3
2-Chlorphenol	2-Chlorophenol	234	2
3-Chlorpropionsäure	3-Chloropropionic acid	235	1
Chlorpyrifos	Chlorphyrifos	622	3
Chlorsilane	Chlorosilane	557	1
Chlorsulfonsäure	Chlorosulfonic acid	236	2
Chlorthiophos	Chlorthiophos	619	3
2-Chlortoluol	2-Chlorotoluene	55	2
4-Chlortoluol	4-Chlorotoluene	237	2
Chlorwasserstoff	Hydrogen chloride	238	1
Chromschwefelsäure		327	3
Chromtrioxid (Chromsaure)	Chromium trioxide (Chromic acid)	328	3
Chromylchlorid	Chromolchloride	329	3
Citronensäure	Citric acid	57	0
Crotonaldehyd	Croton aldehyde	239	3
Cumol	Cumene	58	1
Cumolhydroperoxid	Cumene hydroperoxide	59	2
Cycloheptan	Cycloheptane	61	1
Cyclohepten	Cycloheptene	62	1
Cyclohexan	Cyclohexane	63	1
Cyclohexanol	Cyclohexanol	240	1

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Cyclohexanon	Cyclohexanone	64	1
Cyclohexen	Cyclohexene	65	1
Cyclohexylamin	Cyclohexylamine	67	1
Cyclohexylammoniumchlorid	Cyclohexylammonium chloride	529	1
Cyclopentan	Cyclopentane	478	1
Cyclopentanol	Cyclopentanol	68	1
Cyclopentanon	Cyclopentanone	69	1
Cyfluthrin	Cyfluthrin	678	3
Cyhexatin	Cyhexatin	451	3
Cypermethrin	Cypermethrin	679	3
p, p'-DDD	p, p'-DDD	465	3
p, p'-DDE	p, p'-DDE	466	3
p, p'-DDT	p, p'-DDT	70	3
n-Decanol	n-Decanol	71	1
Deltamethrin	Deltamethrin	680	3
Demeton-S-methyl	Methyl demeton-S	655	3
Demeton-S-methylsulphon	Demeton-S-methylsulphone	607	2
Di-n-butylamin	Di-n-butylamine	593	1
Di-n-butylammoniumchlorid	Di-n-butyl ammoniumchloride	610	1
Di-n-butylether	Di-n-butylether	73	2
Diacetonalkohol	Diacetone alcohol	72	1
Dialifos	Dialifos	629	3
Dialkyl (C16-C18) dimethylammoniumchlorid	Dialkyl (C16-C18) dimethyl ammoniumchloride	674	2
Diazinon	Diazinon	609	3
1, 2-Dibromethan	1, 2-Dibromethane	241	3
2, 3-Dibrompropanol-1	2, 3-Dibrompropanol-1	242	2
Dibutylzinnbis-(thioglycolsäure-isooctylester)	Dibutyltin-his-(isooctyl thioglyculate)	530	2
Dibutylzinndichlorid	Dibutyl tin chloride	499	2
Dibutylzinndifluorid	Dibutyl tin fluoride	528	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Dibutylzinndilaurat	Dibutyl tin dilaurate	526	2
Dibutylzinnmaleinat	Dibutyltin maleate	472	2
Dibutylzinnoxid	Dibutyl tin oxide	445	2
2, 3-Dichloranilin	2, 3-Dichloraniline	696	3
2, 4-Dichloranilin	2, 4-Dichloraniline	697	3
2, 5-Dichloranilin	2, 5-Dichloraniline	698	3
2, 6-Dichloranilin	2, 6-Dichloraniline	699	3
3, 4-Dichloranilin	3, 4-Dichloraniline	700	3
1, 2-Dichlorbenzol	1, 2-Dichlorbenzene	74	2
1, 3-Dichlorbenzol	1, 3-Dichlorbenzene	641	2
1, 4-Dichlorbenzol	1, 4-Dichlorbenzene	642	2
Dichloressigsäure	Dichloroacetic acid	243	1
1, 2-Dichlorethan	1, 2-Dichlorethane	102	3
Dichlormethan	Dichlormethane	149	2
2, 3-Dichlorphenol	2, 3-Dichlorphenol	75	3
2, 4-Dichlorphenol	2, 4-Dichlorphenol	244	3
1, 2-Dichlorpropan	1, 2-Dichlorpropane	446	3
2, 3-Dichlorpropen	2, 3-Dichlorpropene	246	3
1, 3-Dichlorpropen (cis u. trans)	1, 3-Dichlorporpene (cis u. trans)	245	3
Dichlorvos	Dichlorvos	632	3
Dicyandiamid	Dicyandiamide	247	1
Didodecylzinnbis-(thioglycolsäure-isooctylester)	Didodecyltin-bis-(isooctyl thioglycolate)	574	1
Didodecylzinndichlorid	Dodecyltin oxide	572	1
Didodecylzinnoxid	Dodecyltin oxide	573	1
Dieldrin	Dieldrin	467	3
Dieselkraftstoff	Diesel fuel	76	2
Diethanolaminn	Diethanolamine	77	1
Diethanolammoniumchlorid	Diethanolammonium chloride	531	1
Diethylamin	Diethylamine	248	1
Diethylammoniumchlorid	Diethylammonium chloride	447	1

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
1, 2-Diethylbenzol	1, 2-Diethylbenzene	78	2
Diethylenglycol	Diethyleneglycol	79	0
Diethylenglycolmono-n-butylether	Diethyleneglycolmono-n-butyl ether	46	1
Diethylenglycolmonoethylether	Diethyleneglycol monoethyl ether	101	1
Diethylether	Diethylether	80	1
Diisobutylketon	Diisobutylketone	591	1
Diisopropylamin	Diisopropylamine	614	2
Diisopropylammoniumchlorid	Diisopropyl ammonium chloride	605	2
Diisopropylether	Diisopropylether	598	1
Dimethoat	Dimethoate	49	3
Dimethylamin	Dimethylamine	250	2
Dimethylammoniumchlorid	Dimethyl ammoniumchloride	457	1
2, 3-Dimethylanilin	2, 3-Dimethylaniline	596	2
2, 4-Dimethylanilin	2, 4-Dimethylaniline	82	2
3, 4-Dimethylanilin	3, 4-Dimethylaniline	595	2
Dimethylether	Dimethylether	714	1
Dimethylformamid	Dimethylformamide	83	1
2, 2-Dimethylpropan	2, 2-Dimethylpropane	463	0
Dimethylzinnbis-(thioglycolsäure-isooctylester)	Dimethyltin-bis-(isoctyl thioglycolate)	575	2
Dinatriumhydrogenphosphat	Dibasic sodium-phosphate	330	1
2, 4-Dinitroanilin	2, 4-Dinitroaniline	704	2
1, 2-Dinitrobenzol	1, 2-Dinitrobenzene	708	3
1, 3-Dinitrobenzol	1, 3-Dinitrobenzene	84	3
1, 4-Dinitrobenzol	1, 4-Dinitrobenzene	707	3
2, 4-Dinitrotoluol	2, 4-Dinitrotoluene	251	3
2, 5-Dinitrotoluol	2, 5-Dinitrotoluene	645	3
2, 6-Dinitrotoluol	2, 6-Dinitrotoluene	646	3
Dinoseb	Dinoseb	85	2
Dioctylzinnbis-(thioglycolsäure-isooctylester)	Dioctyltin-bis-(isoctyl thioglycolate)	571	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Dioctylzinndichlorid	Dioctyltindichloride	569	2
Dioctylzinnoxid	Dioctyltinoxide	570	2
1, 4-Dioxan	1, 4-Dioxane	86	2
Dipenten	Dipentene	87	1
Diphenylether	Diphenylether	88	2
Diphenylmethan	Diphylmethane	89	2
Diphenylmethandiisocyanat	Diphenyl methane diisocyanate	635	1
Dischwefelsäure (Oleum)	Pyrosulfuric acid (oleum)	331	2
Disulfoton	Disulfoton	620	3
n-Dodecylbenzol	n-Dodecylbenzene	90	1
n-Dodecylhydrogen-sulfat, Natriumsalz	Sodium dodecylhydrogen sulfate	91	1
Dodecylstannonsäure		584	1
Eisen(II)-chlorid	Iron (II) chloride	524	1
Eisen(II)-sulfat	Iron (II) sulfate	514	1
Eisen(III)-chlorid	Iron (II) chloride	515	1
Eisen(III)-nitrat	Iron (II) nitrate	516	1
α, β-Endosulfan		468	3
Endrin	Endrin	469	3
Epichlorhydrin	Epichlorhydrin	92	3
Essigsäure (>25%)	Acetic acid (less than 25%)	93	1
Essigsäure-2-ethoxyethylester	2-ethoxyethylacetate	106	1
Essigsäure-n-amylester	n-Amylacetate	17	1
Essigsäure-n-butylester	n-Butylacetate	42	1
Essigsäure-n-propylester	n-Propylacetate	178	1
Essigsäure-tert.-butylester	tert-Butyl acetate	43	1
Essigsäurecyclohexylester	Cyclohexylacetate	66	1
Essigsäureethylester	Ethylacetate	95	1
Essigsäureisobutylester	Isobutyl acetate	133	1
Essigsäureisopropylester	Isopropyl acetate	136	1
Essigsäuremethylester	Methyl acetate	146	1

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Essigsäurephenylester	Phenyl acetate	171	2
Essigsäurevinylester	Vinyl acetate	203	2
Esterzinn	Tin ester	587	2
Ethanol	Ethanol	96	0
Ethanolamin	Ethanolamine	94	1
Ethanolammoniumchlorid	Ethanolammonium chloride	533	1
Ethephon	Ethephon	689	2
Ethoprophos	Ethoprophos	650	3
Ethyl-n-amylketon	Ethyl-n-amylketone	98	1
Ethylamin	Ethylamine	97	1
Ethylammoniumchlorid	Ethylammonium chloride	558	1
N-Ethylanilin	N-Ethylaniline	252	2
Ethylbenzol	Ethylbenzene	99	1
Ethylendiamin	Ethylendiamine	103	2
Ethylendiamin-Hydrochlorid	Ethylendiamin-Hydrochloride	535	2
Ethylendiamintetraessigsaure u. Na-Salze	Sodium ethylene diaminetetra acetate	104	2
Ethylenglycol	Ethyleneglycol	105	0
Ethylenglycolmono-n-butylether	Ethyleneglycolmono-n-butylether	47	1
Ethylenglycolmonomethyl ether	Ethyleneglycol-monomethylether	107	1
Ethylenimin	Ethylenimine	108	3
Ethylenoxid	Ethylenoxide	253	2
2-Ethylhexanol-1	2-Ethylhexanol-1	134	2
2-Ethylhexylamin-1	2-Ethylhexylamine-1	109	2
2-Ethylhexylammoniumchlorid	2-Ethylhexyl ammoniumchloride	537	2
Ethylpolysilikat	Ethylpolysilicate	488	1
Etrimphos	Etrimphos	623	3
Fenbutatinoxid		532	3
Fenpropathrin	Fenpropathrin	681	3
Fenthion	Fenthion	616	3
Fenvalerat	Fenvalerat	682	3

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Fettalkohol-/Fettsaureester, gesättigt und ungesättigt mitgeradzahliger, unverzweigter C-Kette und-C-Zahl des Alkohol- und Fettsäurerestes jeweils ≥12 und-endständiger Carboxyl-bzw. OH-Gruppe von Fettsäure- und Alkoholrest	Fat alcohol-Fatty acid ester saturated and unsaturated with even numbered, unbranched caron-chain and carbon-number of alcohol and fatty acid residues equal to or less than 12 as the case may be	660	0
Fettalkohol-EO/PO-Addukte	Fatty alcohol-EO/PO adducts	672	2
Fettalkohole, gesättigt mit -geradzahliger C-Kette und -C-Zahl ≥12 und -einer endständigen OH-Gruppe	Fatty alcohol, saturated with even numbered carbon-chain and carbon-number equal and less than 12 and an end OH group	656	0
Fettalkohole, ungesattigt mit -geradzahliger, unverzweigter C-Kette und -C-Zahl von 16-18 und -einer endständigen OH-Gruppe	Fatty alcohol, unsaturated with even numbered, unbranched carbon-chain and carbon-number of 16-18 and an end OH group	658	0
Fettsäuren, gesättigt, unverzweigt mit -geradzahliger C-Kette und -C-Zahl ≥14 und -einer endständigen Carboxylgruppe	Fatty acid, saturated, unbleached with an even numbered carbon-chain and a carbon-number equal or less than 14 and an end carboxyl group	661	0
Fettsäuren, gesättigt, unverzweigt mit -C-Zahl 8 -≤12 und einer -endständigen Carboxylgruppe	Fatty acid, saturated, unbranched with carbon-number between 8-12 and an end carboxyl group.	657	1
Fettsäuren, ungesättigt, unverzweigt mit -geradzahliger C-Kette -C-Zahl von 16-18 und -einer endständigen Carboxylgruppe	Fatty acid, unsaturated, unbranched with an even numbered carbon-chain, carbon-number between 16-18 and an end carboxyl group	659	1
Fluoressigsäure	Fluoroacetic acid	156	2
Fluorwassigstoff	Hydrogen fluoride (Hydroflluric acid)	254	1
Formaldehyd	Farmaldehyde	112	2
Furfural	Fufurai	113	2
Furfurylalkohol	Furfuyl alcohol	114	1
Glutardialdehyd		712	2
Glycerin	Clycorine	116	0
Glycerindiester	Glycerine diester	691	0
Glycerinmonoester	Glycerine monoester	690	0

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Glycolsäure-n-butylester	n-Butylglycolate	117	1
Harnstoff	Urea	118	1
Heizöl EL	Heating Oil EL	119	2
Heizöl, schwer	Heating oil, heavy	443	1
n-Heptan	n-Heptane	120	1
n-Heptanol-1	n-Heptanol-1	121	1
n-Hepten-1	n-Heptene-1	122	1
Heptenophos	Heptenophos	651	3
Hexachlorbenzol	Hexachlorobenzene	470	3
Hexachorbutadien	Hexachlorbutadiene	123	3
Hexafluorkieselsöure	Hexafluorosilicic acid	491	2
n-Hexan	n-Hexane	124	1
n-Hexanol-1	n-Hexanol-1	125	1
n-Hexanol-2	n-Hexanol-2	126	1
n-Hexanol-3	n-Hexanol-3	127	1
Hydrazin	Hydrazine	130	3
Hydrochinon	Hydriquione	128	2
Hydrochinonmonomethylether	Hydroquione monomethylether	129	1
Imidazoliniumzalz	Imidazoline salt	675	2
Isoamylalkohol	Isoamyl alcohol	597	1
Isobutan	Isobutane	562	0
Isobutanol	Isobutanol	131	1
Isobuttersaurenitril	Isobutyrenitrile	132	2
Isofenphos	Isofenphos	684	3
Isopentan	Isopentane	648	1
Isopropanol	Isopropanol	135	1
Jod	Iodine	492	1
Jodwasserstoff	Hydrogen iodide (Hydroiodic acid)	332	1
Kaliumalaun	Potassium alum	510	1
Kaliumantimonat	Potassium antimonate	22	1
Kaliumantimonyltartrat	Potassium antimonyl tartrate	334	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Kaliumarsenat	Potassium arsenate	335	3
Kaliumarsenit	Potassium arsenite	336	3
Kaliumcarbonat	Potassium carbonate	337	1
Kaliumchlorat	Potassium chlorate	52	2
Kaliumchlorid	Potassium chloride	230	0
Kaliumcyanid	Potassium cyanide	338	3
Kaliumdichromat	Potassium chromate	339	3
Kaliumfluoracetat	Potassium fluoractetate	340	2
Kaliumfluorid	Potassium fluoride	341	1
Kaliumhexacyanoferrat (II)	Potassium ferro cyanide	489	1
Kaliumhexacyanoferrat (III)	Potassium ferri cyanide	490	1
Kaliumhexafluorsilikat	Potassium hexafluorosilicate	517	2
Kaliumhydrogenfluorid	Potassium hydrogen fluoride	342	1
Kaliumhydrogensulfat	Potassium hydrogen sulfate	343	1
Kaliumhydrogensulfid	Potassium hydrogen sulfide	344	2
Kaliumhydroxid	Potassium hydroxide	345	1
Kaliumnitrat	Potassium nitrate	346	1
Kaliumnitrit	Potassium nitrite	347	2
Kaliumoxid	Potassium oxide	348	1
Kaliumperchlorat	Potassium perchlorate	169	1
Kaliumperoxid	Potassium peroxide	349	1
Kaliumsulfat	Potassium sulfate	255	0
Kaliumsulfid	Potassium sulfide	350	2
Kaliumtetracyanomercurat (II)	Potassium mercury (II) tetracyanide	351	1
Kaliumtetrajodomercurat (II)	Potassium mercury (II) tetraiodide	352	1
Kobalt (II)-chlorid	Cobalt (II) chloride	493	2
Kobalt (II)-nitrat	Cobalt (II) nitrate	520	2
Kobalt (II)-sulfat	Cobalt (II) sulfate	521	2
Königswasser	aqua regia	353	2
Kohlensäure	Carbonic acid	354	0
Kohlenstoffdioxid	Carbon dioxide	256	0

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Kohlenstoffmonoxid	Carbon monoxide	257	0
m-Kresol	m-Cresol	140	2
Kupfer(I)-chlorid	Copper (I) chloride	358	2
Kupfer(II)-arsenit	Copper (II) arsenite	355	3
Kupfer(II)-arsenitacetat	Copper (II) arsenite acetate	356	3
Kupfer(II)-chlorat	Copper (II) chlorate	357	2
Kupfer(II)-chlorid	Copper (II) chloride	359	2
Kupfer(II)-sulfat	Copper (II) sulfate	141	2
Lindan	Lindane	144	3
Linuron		258	2
Magnesiumarsenat	Magnesiumarsenate	361	3
Magnesiumchlorat	Magnesiumchlorate	362	2
Magnesiumchlorid	Magnesiumchloride	259	0
Magnesiumhexafluorsilikat	Magnesiumhexa fluorsilicate	518	2
Magnesiumnitrat	Magnesiumnitrate	363	1
Magnesiumperchlorat	Magnesiumper chlorate	364	1
Magnesiumperoxid	Magnesiumperoxide	365	0
Magnesiumphosphid	Magnesiumphosphide	552	2
Magnesiumsulfat	Magnesiumsulfate	366	0
Malathion	Malathion	615	3
Maleinsäure	Maleic acid	260	1
Maleinsäureanhydrid	Manganese anhydride	261	1
Mangan(II)-chlorid	Manganese (II) chloridee	494	1
Mangan(II)-sulfat	Manganese (II) sulfate	522	1
Mercaptane	Mercaptan	144	3
Mesityloxid	Mesityloxide	262	1
Methacrylsäuremethylester	Methy methacrylate	154	1
Methamidophos	Methamidophos	688	3
Methanol	Methanol	145	1
Methidathion	Methidathion	653	3
2-Methyl-4-nitroanilin	2-Methyl-4-nitroaniline	705	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Methylamin	Methylamine	263	2
Methylammoniumchlorid	Methylammoniumchloride	459	1
2-Methylanilin	2-Methylaniline	195	2
3-Methylanilin	3-Methylaniline	453	2
4-Methylanilin	4-Methylaniline	693	2
Methylbromid	Methylbromide	264	3
Methylchlorid	Methylchloride	265	2
2-Methylcyclohexanon	2-Methylcyclohexanone	148	1
α-Methylestersulfonate C12-C18, Na-Salz		668	2
Methylethylketon	Methyl ethyl ketone	150	1
2-Methylfuran	2-Methylfurane	151	1
Methylisoamylketon	Methylisoamylketone	152	1
Methylisobutylketon	Methylisobutylketone	137	1
Methylisothiocyanat	Methylisothiocyanate	266	3
Methylmercaptan	Methylmercaptane	267	3
Methylpropylketon	Methylpropylketone	590	1
Mevinphos	Mevinphos	633	3
Monobutylzinntrichlorid	Monobutyl tin trichloride	579	1
Monobutylzinntris-(thioglycolsäure-isooctylester)	Monobutyl tin-tris-(isoctyl thioglycolate)	580	1
Monododecylzinntrichlorid	Monododecyltin trichloride	585	1
Monododecylzinntris-(thioglycolsäureisooctylester)	Monodocecyltin-tris-(isoctyltioglycolate)	586	1
Monolinuron		157	2
Monomethylzinntris-(thioglycolsäureisooctylester)	Monomethyltin-tris-(isoctylester glycolate)	576	2
Monooctylzinntrichlorid	Monooctyltin trichloride	582	1
Monooctylzinntris-(thioglycolsäure-isooctylester)	Monooctyl tin-tris-(isooctylthioglycolate)	583	1
Morpholin	Morpholine	158	2
Naphtha auf Mineral-ölbasis (180/210)	Naptha, mineral oil base	441	1

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Naphthalin	Naphtalene	269	2
Natriumacetat	Sodium acetate	367	1
Natriumadipat	Sodium adipate	475	0
Natriumalkyl (C8-C20)-sulfate	Sodium alkyl (C8-C20) sulfate	664	2
Natriumarsenat	Sodium arsenate	23	3
Natriumarsenit	Sodium arsenite	368	3
Natriumazid	Sodium azide	636	2
Natriumbromid	Sodium bromide	38	1
Natriumcarbonat	Sodium carbonate	222	1
Natriumchloracetat	Sodium chloroacetate	369	2
Natriumchlorat	Sodium chlorate	370	2
Natriumchlorid	Sodium chloride	270	0
Natriumchlorit	Sodium chlorite	487	2
Natriumcyanid	Sodium cyanide	60	3
Natriumdichromat	Sodium dichromate	56	3
Natriumdihydrogenphosphat	Sodium phosphate, monobasic	371	1
Natriumfluoracetat	Sodium fluoroacetate	372	2
Natriumfluorid	Sodium fluoride	111	1
Natriumformiat	Sodium formate	373	1
Natriumhexafluorsilikat	Sodium hexafluorosilicate	519	2
Natriumhydrogencarbonat	Sodium bicarbonate	374	0
Natriumhydrogenfluorid	Sodium bifluoride	375	1
Natriumhydrogensulfat	Sodium bisulfate	376	1
Natriumhydrogensulfid	Sodium hydrosulfide	377	2
Natriumhydroxid	Sodium hydroxide	142	1
Natriumjodid	Sodium iodide	138	1
Natriummolybdat	Sodium molybdat	638	1
Natriumnitrat	Sodium nitrate	378	1
Natriumnitrit	Sodium nitrite	161	2
Natriumoxalat	Sodium oxalate	379	1
Natriumoxid	Sodium oxide	380	1

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Natriumpentachlorphenolat	Sodium pentachlorphenolate	381	3
Natriumperchlorat	Sodium perchlorate	382	1
Natriumperoxid	Sodium peroxide	383	1
Natriumphenolat	Sodium phenolate	384	2
Natriumphthalat	Sodium phthalate	482	0
Natriumpropionat	Sodium propionate	484	1
Natriumselenat	Sodium selenate	385	2
Natriumselenit	Sodium selenite	184	2
Natriumsuccinat	Sodium succinate	477	0
Natriumsulfat	Sodium sulfate	286	0
Natriumsulfid	Sodium sulfide	188	2
Natriumsulfit	Sodium sulfite	282	1
Natriumtetraborat	Sodium tetraborate	37	1
Natriumthiosulfat	Sodium thiosulfate	386	0
Nickel (II)-chlorid	Nickel (II) chloride	159	2
Nickel (II)-nitrat	Nickel (II) nitrate	387	2
Nickel (II)-nitrit	Nickel (II) nitrite	2388	2
Nitriersäure	Nitric and sulfuric acid	389	2
Nitrilotriessigsäure und Natriumsalze	Nitrilotriacetic acid and sodium salt	160	1
2-Nitroanilin	2-Nitroaniline	702	2
3-Nitroanilin	3-Nitroaniline	703	2
4-Nitroanilin	4-Nitroaniline	162	2
2-Nitroanisol	2-Nitroanisole	647	2
Nitrobenzol	Nitrobenzene	163	2
Nitroethan	Nitroethane	588	2
Nitromethan	Nitromethane	589	2
Nitrosylchlorid	Nitrocylchloride	271	2
2-Nitrotoluol	2-Nitrotolyene	164	2
3-Nitrotoluol	3-Nitrotoluene	643	2
4-Nitrotoluol	4-Nitrotoluene	644	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
4-Nonylphenol (Gemisch verzweigter Isomerer)	4-Nonylphenol (Mixture of branched isomers)	272	2
Nonylphenolethoxylate	Nonylphenolethoxylate	671	2
n-Octan	n-Octane	479	1
n-Octanol-1	n-Octanol-1	165	1
n-Octen-1	n-Octene-1	480	1
Octylstannonsäure		581	1
α-Olefinsulfonate C14-C18	α-Olefin sulfonate C14-C18	666	2
Omethoat	Omethoate	273	3
Ottokraftstoffe	Automobile fuel	204	2
Oxalsäure	Oxalic acid	166	1
Oxalsäurediethylester	Diethyl oxalate	81	1
Oxidemeton-methyl	Methyl oxicemeton	608	3
Paraffine (Wachse)	Paraggin	268	0
Parathionethyl	Ethyl parathion	167	3
Parathionmethyl	Methyl parathion	274	3
Pentachlorphenol	Pentachlorphenol	275	3
Pentaerythrit		276	1
n-Pentan	n-Pentane	452	1
2, 4-Pentandion	2, 4-Pentandione	168	1
Perchlorsäure	Perchloric acid	390	1
Permethrin	Permethrin	683	3
Petrolether	Petroleum ether	27	1
Petroleum (130/290)	Petroleum (130/290)	442	1
Petrolkoks	Petroleum coke	443	0
Phenol	Phenol	170	2
Phosalon	Phosalon	630	3
Phosphamidon	Phosphamidon	652	3
Phosphorpentoxid	Phosphorous pentaoxide	391	1
Phosphorsäure	Phosphoric acid	392	1
Phosphorsäuretri-n-butylester	n-Butyl phosphate	196	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Phosphorsäuretriethylester	Triethylphosphate	456	1
Phosphorwasserstoff	Phosphine (or phosphorous hydride)	277	2
Phoxim	Phoxim	686	3
Phthalsäure	Phthalic acid	481	0
Phthalsäurebenzyl-n-butylester	Benzyl (n-butyl) phthalate	278	2
Phthalsäurediallylester	Diallyl phthalate	173	2
Phthalsäurediethylester	Diethylphthalate	174	2
Pikrinsäure	Picric acid	175	2
Pirimiphos-methyl	Methyl prirmiphos	676	3
Polyaldehydrocarbonsäuren und Natriumsalze		639	1
Polychlorierte Biphenyle und Terphenyle	Polychlorinated byphenyls and terphenyls	471	3
Polychlorierte Naphthaline	Polychlorinated napthalene	523	3
Polyethylenglycole	Polyethyleneglycol	279	0
Polymerdispersionen	Polymeric dispersion agent	662	1
Prometon	Prometon	613	2
Propan	Propan	560	0
n-Propanol	n-Propanol	176	1
Propargylalkohol	Propargyl alcohol	177	2
Propionsäure	Propionic acid	483	1
Propionsäureethylester	ethyl propionate	110	1
Propionsäuremethylester	Methyl propionate	153	1
1, 2-Propylenglycol	Propylene slycol	280	0
Pyrazophos	Pyrazophos	624	3
Pyridin	Pyridine	179	2
Quecksilber	Mercury	393	3
Quecksilber (I)-bromid	Mercury (I) bromide	397	3
Quecksilber (I)-chlorid	Mercury (I) chloride	399	3
Quecksilber (I)-nitrat	Mercury (I) nitrate	405	3
Quecksilber (I)-sulfat	Mercury (I) sulfate	411	3

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Quecksilber (II)-acetat	Mercury (II) acetate	394	3
Quecksilber (II)-arsenat	Mercury (II) arsenate	395	3
Quecksilber (II)-benzoat	Mercury (II) benzoate	396	3
Quecksilber (II)-bromid	Mercury (II) bromide	398	3
Quecksilber (II)-chlorid	Mercury (II) chloride	180	3
Quecksilber (II)-cyanid	Mercury (II) cyanide	400	3
Quecksilber (II)-diamminchlorid	Mercury (II) diamine chloride	401	3
Quecksilber (II)-disulfat	Mercury (II) disulfate	402	3
Quecksilber (II)-gluconat	Mercury (II) gluconate	403	3
Quecksilber (II)-jodid	Mercury (II) iodide	404	3
Quecksilber (II)-nitrat	Mercury (II) nitrate	406	3
Quecksilber (II)-oleat	Mercury (II) oleate	407	3
Quecksilber (II)-oxid	Mercury (II) oxide	408	3
Quecksilber (II)-oxidcyanid	Mercury (II) oxycyanide	409	3
Quecksilber (II)-salicylat	Mercury (II) salicylate	410	3
Quecksilber (II)-sulfat	Mercury (II) sulfate	412	3
Quecksilber (II)-thiocyanat	Mercury (II) thiocyanate	413	3
Rohöle (leichtflüssige)	Crude oil (light liquid)	440	2
Rohöle (zähflüssige und feste)	Crude oil (thick and solid)	439	1
Säureteer	Acid tar	333	3
Salicylaldehyd	Salicylaldehyde	181	2
Salicylsäure	Salicylic acid	281	1
Salpetersäure (außer rauchende)	Nitric acid (except fuming)	414	1
Salpetersäure (rauchende)	Nitric acid (fuming)	415	2
Schmieröle (Grundöle, unlegierte)	Lubricating oil (crude oil unmixed or unrefined)	435	1
Schmieröle (legierte, emulgierbare)	Lubricating oil (refined or mixed, emulsified)	437	3
Schmieröle (legierte, nicht emulgierbare)	Lubricating oil (refined or mixed, not emulsified)	436	2
Schwefeldioxid	Sulfur dioxide	416	1
Schwefelkohlenstoff	Carbon disulfide	183	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Schwefelsäure	Sulfuric acid	182	1
Schwefeltrioxid	Sulfur trioxide	417	2
Schwefelwasserstoff	Hydrogen sulfide	283	2
Schweflige Säure	Sulfurons acid	418	1
Seife	Soap	669	2
Selendioxid	Selenium dioxide	419	2
Selensäure	Selenix acid	420	2
Selenwasserstoff	Hydrogen selenide	284	3
Silane (feste und flüssige)	Silane (solid and liquid)	566	1
Silane (gasförmige)	Solid (gaseous)	567	0
Silanole	Silanol	568	1
Silberarsenit	Silver arsenite	421	3
Silbernitrat	Silver nitrate	185	3
Silicone A	Silicone A	542	1
Silicone B	Silicone B	543	1
Simazin	Simazin	603	2
Stickoxide (Stickstoffmonoxid u. -dioxid)	Nitrogen oxides (nitrogen oxide and dioxide)	285	1
Styrol	Styrene	187	2
Sulfobernsteinsäureester, Na-Salz	Sodium salt of thiosuccinic acid	667	2
Sulfotepp	Sulfotepp	687	3
Tallöl	Tall oil	497	2
Tallölfettsäuren	tall oil fatty acids	692	2
Terbufos	Terbufos	621	3
Terbutryn	Terbutryn	612	2
Terbutylazin	Terbutylazine	604	2
Tetrabutylzinn	Tetrobutyltin	498	3
Tetrachlorethen	Tetrachlorethene	287	3
Tetrachlorkohlenstoff	Carbon tetrachloride	189	3
Tetraethylsilikat	Tetraethyl silicate	450	1
Tetrahydrofuran	Tetrahydrofuran	190	1

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
1, 2, 4, 5-Tetramethylbenzol	1, 2, 4, 5-tetra methylbenzene	191	1
Tetraoctylzinn	Tetraoctyltin	554	2
Tetraphenylzinn	Tetraphenyl tin	553	2
Thallium (I)-chlorat	Thallium (I) chlorate	422	2
Thallium (I)-nitrat	Thallium (I) nitrate	192	2
Thallium (I)-sulfat	Thallium (I) sulfate	555	2
Thallium (III)-nitrat	Thallium (II) nitrate	423	2
Thiabendazol	Thiabendazol	713	2
Thioglycolsäure	Thioglycolic acid	485	1
Tolclofos-methyl	Methyl toclofos	685	3
Toluol	Toluene	194	2
2, 4-Toluylendiisocyanat	2, 4-Diisocyanato toluene	511	2
2, 6-Toluylendiisocyanat	2, 6-Diisocyanato toluene	512	2
Tri-n-butylamin	Tri-n-butylamine	594	2
Tri-n-butylammoniumchlorid	Tri-n-butylammonium chloride	611	2
Triazophos	Triazophos	625	3
Tributylzinnacetat	Tributyltin acetate	500	3
Tributylzinnaphthenat	Tributyltin naphthenate	548	3
Tributylzinnbenzoat	Tributyl tin benzoate	546	3
Tributylzinnchlorid	Tributyltin chloride	501	3
Tributylzinnfluorid	Tributyltin fluroide	545	3
Tributylzinnlinoleat	Tributyltin linoleate	549	3
Tributylzinnoleat	Tributyltin oleate	550	3
Tributylzinnoxid	Tributyltin oxide	502	3
Tributylzinnphosphat	Tributyltin phosphate	547	3
2, 4, 6-Trichloranilin	2, 4, 6-Trichloraniline	701	3
1, 2, 4-Trichlorbenzol	1, 2, 4-Trichlorbenzene	454	3
Trichloressigsäure	Trichloroacetic acid	197	1
1, 1, 1-Trichlorethan	1, 1, 1-Trichlorethane	198	3
Trichlorethen	Trichlorethene	199	3
Trichlorfluormethan	Trichlorfluormethane	448	2

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Trichlorfon	Trichlorfon	634	3
2, 4, 5-Trichlorphenol	2, 4, 5-Trichlorphenol	455	3
2, 4, 5-Trichlorphenoxyessigsäure	2, 4, 5-Trichlorphenoxyacetic acid	200	3
1, 1, 2-Trichlortrifluorethan	1, 1, 2-Trichlortrifluorethane	458	2
Triethanolamin	Triethanolamine	201	1
Triethanolammoniumchlorid	Triethanolammoniumchloride	473	1
Triethylamin	Triethylamine	556	1
Triethylammoniumchlorid	Triethylammonium chloride	559	1
Triethylenglycol	Triethylene glycol	202	0
2, 4, 6-Trimercaptotriazin	2, 4, 6-Trimercaptotriazine	540	2
2, 4, 6-Trimercaptotriazin, Trinatriumsalz	2, 4, 6-Trimercaptotriazine, trisodium salt	541	2
Trimethylamin	Trimethylamine	460	2
Trimethylammoniumchlorid	Trimethylammonium chloride	461	1
Trinatriumphosphat	Sodium phosphate, tribasic	172	1
Triphenylzinnacetat	Triphenyltin acetate	503	3
Triphenylzinnchlorid	Triphenyltin chloride	504	3
Triphenylzinnfluorid	Triphenyltin fluoride	505	3
Triphenylzinnhydroxid	Triphenyltin hydroxide	506	3
Turbinenkraftstoffe	Turbine fuel	139	2
Vanadiumpentoxid	Vanndium pertaoxide	654	2
Vinylchlorid	Vinylchloride	462	2
Wasserstoffperoxid	Wasserstoffperoxide	288	0
Weißole (nach DAB)	White oil (according to DAB)	434	0
Xylol (alle Isomere)	Xylene (all isomers)	206	2
Zinkammoniumnitrat	Zinc ammonium nitrate	424	1
Zinkarsenat	Zinc arsenate	425	3
Zinkarsenit	Zinc arsenite	426	3
Zinkchlorat	Zinc chlorate	427	2
Zinkchlorid	Zinc chloride	207	1
Zinkcyanid	Zinc cyanide	428	3

(continued)

Table 4-1 (continued)

GERMAN NAME	ENGLISH NAME	NUMBER	WGK
Zinknitrat	Zinc nitrate	429	1
Zinkperoxid	Zinc peroxide	430	1
Zinkphosphid	Zinc phosphide	431	2
Zinksulfat	Zinc sulfate	432	1
Zink (II)-chlorid	Zinc (II) chloride	495	1

(continued)

Table 4-1, Part 3

Additional Substances Considered to be Hazardous to Water in Bavaria, Hessen, and Rheinland-Pfalz

(Source: FGS-FRG, Appendix C - Part 3)

NUMBER	GERMAN NAME	ENGLISH NAME	GROUP
1	Abfallsäure	Residual acid	L
2	Ablaugen	Waste lye (waste liquors)	L
3	Acetaldehyd	Acetaldehyde	M
4	Acetessigsäure-Äthylester	Ethyl acetoacetate	M
5	Acetessigsäure-Methylester	Methyl acetoacetate	M
6	Aceton	Aceton	M
7	Acetoncyanhydrin	Aceton cyanohydrin	S
8	Acetonitril	Acetonitrile	S
9	Acrylnitril	Acrylonitrile	S
10	Äthanol (13)	Ethanol	L
11	Äthylacetat (45)	Ethyl acetate	M
12	Äthylather	Ethyl ether	L
13	Äthylalkohol (10)	Ethyl alcohol	L
14	Äthyldiglycol	Ethyl diglycol	L
15	Äthylenchlorid (41)	Ethylene chloride	S
16	Äthylendiglycol	Ethylene diglycol	L
17	Äthylenglycol	Ethylene glycol	L
18	Äthylentrichlorid (87)	Ethylene trichloride	S
19	Äthylglycol	Ethyl glycol	L
20	Äthylglycolacetat	Ethylglycol acetate	M
21	2-Äthylhexanol	2-Ethyl hexanol	L
22	Ammoniakwasser	Ammonia water	L
23	Ammoniumthiosulfat	Ammonium thiosulfate	L
24	Amylacetat	Amylacetate	M
25	Beizlaugen	Mordant liquors (lyes)	L
26	Benzin	Gasoline	S

(continued)

Table 4-1 (continued)

NUMBER	GERMAN NAME	ENGLISH NAME	GROUP
27	Benzol	Benzene	S
28	Bläusaure 20%	Hydrocyanic acid (20%)	S
29	Bleichlauge (69, 53)	Bleach liquors	L
30	Bleitetraäthyl	Tetraethyl lead	S
31	n-Butanol (33)	n-Butanol (or Butyl alcohol)	M
32	Butylacetat	Butyl acetate	M
33	n-Butylalkohol (31)	n-Butanol (or n-Butyl alcohol)	M
34	sec. Butylalkohol	sec-Butyl alcohol	M
35	Butyldiglycol	Butyldiglycol	M
36	Butylglycol	Butylglycol	M
37	n-Butyraldehyd	n-Butyraldehyde	M
38	Chloroform	Chloroform	S
39	Cyclohexan	Cyclohexane	S
40	Diacetonalkohol	Diacetone alcohol	M
41	1, 2-Dichloräthan (15)	1, 2-Dichloroethane	S
42	Dieselöl	Diesel oil	S
43	Dimethylformamid	Dimethyl formamide	L
44	Eisessig	Acetic acid (Glacial)	L
45	Essigsäure-Äthylester (11)	Ethylacetate	M
46	Essigsäure-Methylester (62)	Methylacetate	M
47	Flußsäure	Hydrofluoric acid	L
48	Formalin	Formalin (Formaldehyde in methanol)	M
49	Glycerin	Glycerine	L
50	Glycolsäure-Butylester	Butyl glycolate	M
51	Heizöle (Sorten EL bis M)	Fuel oil (EL through M quality)	S
52	Hexanol	Hexanol	M
53	Hypochloritlauge (29, 69)	Hypochlorite liquor	L
54	Isobutanol (56)	Isobutanol (Isobutyl alcohol)	M
55	Isobutylacetat	Isobutyl acetate	M
56	Isobutylalkohol (54)	Isobutanol (Isobutyl alcohol)	M

(continued)

Table 4-1 (continued)

NUMBER	GERMAN NAME	ENGLISH NAME	GROUP
57	Isopropylalkohol	Isopropanol	M
58	Kalilauge	Potash lye	L
59	Leichtbenzin	Light petrol (light gasoline)	S
60	Mercaptane	Mercaptan	S
61	Methanol (63)	Methanol (Methyl alcohol)	M
62	Methylacetat (46)	Methyl acetate	M
63	Methylalkohol (61)	Methanol (Methyl alcohol)	M
64	Methylenchlorid	Methylene Chloride	S
65	Methylglycol	Methyl glycol	M
66	Methylisobutylketon	Methlisobutyl ketone	M
67	Mineralöl	Mineral oil	S
68	Monohydrat (81)	Monohydrate	L
69	Natronbleichlauge (29, 53)	Caustic soda bleach liquor	L
70	Natronlauge	Caustic soda solution (soda lye, or sodium hydroxide)	L
71	n-Oktanol	n-Octtanol	L
72	Phenole/Kresole	Phenols/cresol	S
73	Petroleum	Petroleum, mineral oil, or kerosene	S
74	Phosphorsäure	Phosphoric acid	L
75	Propanol (76)	Propanol	M
76	n-Propylalkohol (75)	n-Propanol	M
77	Roherdöl	Crude oil	S
78	Salpetersäure	Nitric acid	L
79	Salzsäure	Hydrochloric acid	L
80	Schwefelkohlenstoff	Carbon disulfide	S
81	Schwefelsäure (68)	Sulfuric acid	L
82	Sodalösung	Soda solution	L
83	Terpentilöl	Turpentine oil	S
84	Teeröl	Tar oil or pine oil, coaltar oil	S
85	Tetrachlorkohlenstoff	Carbon tetrachloride	M
86	Toluol	Toluene	S

(continued)

Table 4-1 (continued)

NUMBER	GERMAN NAME	ENGLISH NAME	GROUP
87	Trichloräthylen (18)	Trichloroethylene	S
88	Xylol	Xylene	S

1. Group S represents liquids that are hazardous to water in small amounts (similar to the WGK rating of 3). Group M represents liquids that are hazardous to water in larger amounts (similar to the WGK rating of 2). Group L represents liquids that are hazardous to water only in very large amounts (similar to the WGK rating of 1).

Table 4-2

Hazardous Materials/Hazardous Waste Storage Incompatibility Chart

Substances in bold have detailed example lists on the next page.

If the material contains:	It may not be stored with any of the following:
Acid (pH below 2.0)	**Caustics** (pH above 12.5) **Reactive Metals** Alcohol Water Aldehydes Halogenated, Nitrated, or Unsaturated Hydrocarbons **Reactive Organic Compounds and Solvents** Spent Cyanide and Sulfide Solutions **Oxidizers**
Caustic (pH above 12.5)	**Acid** (pH below 2.0) **Reactive Metals** Alcohol Water Aldehydes Halogenated, Nitrated, or Unsaturated Hydrocarbons **Reactive Organic Compounds and Solvents**
Reactive Metals	**Caustics** **Acids** Alcohol Aldehydes Halogenated, Nitrated, or Unsaturated Hydrocarbons **Reactive Organic Compounds and Solvents** **Oxidizers**
Reactive Organic Compounds and Solvents	**Caustics** **Acids** **Reactive Metals**
Spent Cyanide and Sulfide Solutions	**Acids**
Oxidizers	Acetic or Other Organic Acids Concentrated Mineral Acids **Reactive Metals** **Reactive Organic Compounds and Solvents** **Ignitable [Flammable/Combustible] Wastes***

* "Ignitable" in this context refers to substances with a flashpoint below 140 °F, and includes:
Combustible substances, with a flashpoint below 140 °F
Flammable substances, with a flashpoint below 100 °F.

Some Deadly Combinations

Acids + Oil or Grease = Fire
Acids + Caustics = Heat/Spattering
Caustics + Epoxies = Extreme Heat
Chlorine Gas + Acetylene = Explosion
Flammable Liquids + Hydrogen Peroxide = Fire/Explosion
Aluminum Powder + Ammonium Nitrate = Explosion
Sodium Cyanide + Sulfuric Acid = Lethal Hydrogen Cyanide
Ammonia + Bleach = Noxious Fumes

(continued)

Table 4-2 (continued)

In general: **Reactives** must be segregated from **Ignitables**
Acids must be segregated from **Caustics**
Corrosives should be segregated from **Flammables**
Oxidizers should be segregated from **EVERYTHING**
Many **Corrosives** are "Water Reactive"
Most **Organic Reactives** must be segregated from **Inorganic Reactives** (metals)

Ignitables (Flammables/Combustibles)	**Corrosives**	
	Acids	**Caustics**
Carburetor Cleaners Engine Cleaners Epoxy, Resins, Adhesives, and Rubber Cements Finishes Fuels Lacquers Paints Paint Thinners Paint Wastes Pesticides that contain Solvents (such as Methyl Alcohol, Ethyl Alcohol, Isopropyl Alcohol, Toluene, Xylene). Petroleum Solvents (Drycleaning Fluid) Solvents: Acetone Benzene Carbon Tetrachloride (Carbon Tet) Ethanol (Ethyl Alcohol) Ethyl Benzene Isopropanol (Isopropyl Alcohol) Kerosene (Fuel Oil #1) Methanol (Wood Alcohol) Methyl Ethyl Ketone (MEK) Petroleum Distillates Tetrahydrofuran (THF) Toluene (Methacide, Methylbenzene, Methylbenzol, Phenylmethane, Toluol, Antisal 1A) White Spirits (White Spirits, Mineral Spirits, Naptha) Xylene (Xylol) Stains Stripping Agents Varsol Waste Fuels Waste Ink Wax Removers Wood Cleaners	Battery Acids Degreasers and Engine Cleaners Etching Fluids Hydrobromic Acid Hydrochloric Acid (Muriatic Acid) Nitric Acid (<40%) (Aquafortis) Phosphoric Acid Rust Removers Sulfuric Acid (Oil of Vitriol)	Acetylene Sludge Alkaline Battery Acids Alkaline Cleaners Alkaline Degreasers Alkaline Etching Fluids Lime and Water Lime Wastewater Potassium Hydroxide (Caustic Potash) Rust Removers Sodium Hydroxide (Caustic Soda, Soda Lye)
	Reactive Metals	**Reactive Organic Compounds and Solutions**
	Lithium (Batteries) Aluminum Beryllium Calcium Magnesium Sodium Zinc Powder	Alcohols Aldehydes Chromic Acids (from chrome plating, copper stripping and aluminum anodizing) Cyanides (from electroplating operations) Hypochlorides (from water treatment plants, swimming pools, sanitizing operations) Organic Peroxides (including Hydrogen Peroxide) Perchlorates Permanganates Sulfides
	Oxidizers	
	Chlorine Gas Nitric Acid (>40%), aka Red Fuming Nitric Nitrates (Sodium Nitrate, Ammonium Nitrate) Perchlorates Perchloric Acid Peroxides Calcium Hypochlorite (>60%)	

Table 4-3

Maximum Allowable Capacity of Containers and Portable Tanks for Hazardous Materials

(AFOSH STD 127-43, Table 1)

Container Type	Flammable Liquids			Combustible Liquids	
	IA	*IB*	*IC*	*II*	*II*
Glass or approved plastic[1]	1 pt[2]	1 qt[2]	1[3]	1	1
Metal (other than Department of Transportation (DOT drums)	1	5	5	5	5
Safety cans	2	5	5	5	5
Metal drums (DOT specifications)	60	60	60	60	60
Approved portable tanks	660	660	660	660	660

[1] Nearest metric size is also acceptable for the glass and plastic containers listed.

[2] One gallon or nearest metric equivalent size may be used if metal containers must be avoided because of chemical reaction with their contents.

[3] Quantities are in gallons for the rest of this table.

Table 4-4

Storage of Hazardous Materials in Inside Rooms

(AFOSH STD 127-43, Table 2)

Fire Protection Provided[1]	Fire Resistance	Maximum Size	Total Allowable Quantities[2] (gal/ft^2 floor area)
Yes	2 h	500 ft^2	10
No	2 h	500 ft^2	4
Yes	1 h	150 ft^2	5
No	1 h	150 ft^2	2

[1] Fire protection system will be sprinkler, water spray, or other approved method.

[2] If metric containers are being stored, use the nearest metric equivalent.

Table 4-5

Indoor/Outdoor Storage for Flammable/Combustible Materials

(DOD 4145.19-R-1, Tables 5-1 through 5-4)

Indoor Container Storage			
Class Liquid	*Storage Level*	**Protected Storage Maximum per Pile In Gallons*	*Unprotected Storage Maximum per Pile In Gallons*
IA	Ground and upper floors Basement	2750 (50) Not permitted	600 (12) Not permitted
IB	Ground and upper floors Basement	5500 (100) Not permitted	1375 (25) Not permitted
IC	Ground and upper floors Basement	16,500 (300) Not permitted	4125 (25) Not permitted
II	Ground and upper floors Basement	16,500 (300) 5500 (100)	4125 (75) Not permitted
III	Ground and upper floors Basement	55,000 (1000) 8250 (450)	13,750 (250) Not permitted

*A sprinkler or equivalent fire protection system installed in accordance with NFPA Standard 30.

NOTES:

1. When two or more classes of materials are stored in a single pile, the maximum gallonage permitted in that pile must be the smallest of the two or more separate maximum gallonages.

2. Aisles must be provided so that no container is more than 4 m (12 ft) from an aisle. Main aisles must be at least 2-m (8-ft) wide and side aisles at least 1-m (4-ft) wide. (Numbers in parentheses indicate the number of 55-gal drums.)

3. Each pile must be separated from each other by at least 1 m (4 ft).

(continued)

Table 4-5 (continued)

Outdoor Container Storage				
Class Liquid	*Maximum per pile* [1] *(gal)*	*Distance between piles* [2] *(ft)*	*Distance to property line that can be built upon* [1,3] *(ft)*	*Distance to street, alley, public way* [4] *(ft)*
IA	1100	5	20	10
IB	2200	5	20	10
IC	4400	5	20	10
II	8800	5	10	5
III	22,000	5	10	5

[1] When two or more classes of materials are stored in a single pile, the maximum gallonage permitted in that pile must be the smallest of the two or more separate maximum gallonages.

[2] Within 200 ft [60.96 m] of each container, there must be a 12-ft [3.66-m] wide accessway to permit access to fire control apparatus.

[3] The distances listed apply to properties that have protection for exposures as defined. If there are exposures, and such protection for exposures does not exist, the distances in column 4 must be doubled.

[4] When total quantity stored does not exceed 50 percent of maximum per pile, the distance in columns 4 and 5 may be reduced 50 percent, but not to less than 3 ft [0.91 m].

(continued)

Table 4-5 (continued)

Indoor Portable Tank Storage			
Class Liquid	*Storage Level*	**Protected Storage Maximum per Pile In Gallons*	*Unprotected Storage Maximum per Pile In Gallons*
IA	Ground and upper floors Basement	Not permitted Not permitted	Not permitted Not permitted
IB	Ground and upper floors Basement	20,000 Not permitted	2000 Not permitted
IC	Ground and upper floors Basement	40,000 Not permitted	5500 Not permitted
II	Ground and upper floors Basement	40,000 20,000	5500 Not permitted
III	Ground and upper floors Basement	60,000 20,000	22,000 Not permitted

*A sprinkler or equivalent fire protection system installed in accordance with NFPA Standard 30.

NOTES:

1. When two or more classes of materials are stored in a single pile, the maximum gallonage permitted in that pile must be the smallest of the two or more separate maximum gallonages.

2. Aisles must be provided so that no container is more than 4 m (12 ft) from an aisle. Main aisles must be at least 2-m (8-ft) wide and side aisles at least 1-m (4-ft) wide.

3. Each pile must be separated from each other by at least 1 m (4 ft).

(continued)

Table 4-5 (continued)

Outdoor Portable Tank Storage				
Class Liquid	*Maximum per pile* [1] *(gal)*	*Distance between piles* [2] *(ft)*	*Distance to property line that can be built upon* [1,3] *(ft)*	*Distance to street, alley, public way* [4] *(ft)*
IA	2200	5	20	10
IB	4400	5	20	10
IC	8800	5	20	10
II	17,600	5	10	5
III	44,000	5	10	5

[1] When two or more classes of materials are stored in a single pile, the maximum gallonage permitted in that pile must be the smallest of the two or more separate maximum gallonages.

[2] Within 200 ft of each container, there must be a 12-ft [4-m] wide accessway to permit access to fire control apparatus.

[3] The distances listed apply to properties that have protection for exposures as defined. If there are exposures, and such protection for exposures does not exist, the distances in column 4 must be doubled.

[4] When total quantity stored does not exceed 50 percent of maximum per pile, the distance in columns 4 and 5 may be reduced 50 percent, but not to less than 3 ft [0.91 m].

Table 4-6

Reactive substances that must be separated from flammable materials

(Source: FRG-FGS, Appendix D)

UN Number	German Name	English Name
	Highly Reactive Substances	
1442	Ammoniumperchlorat	Ammonium perchlorate
1445	Bariumchlorat	Barium chlorate
1447	Bariumperchlorat	Barium perchlorate
1449	Bariumperoxid	Barium peroxide
1450	Bromate, Anorganisch, N.A.G.	Inorganic Bromate (all forms)
1452	Calciumchlorat	Calcium chlorate
1453	Calciumchlorit	Calcium chlorite
1455	Calciumperchlorat	Calcium perchlorate
1461	Chlorate; Anorganisch, N.A.G.	Inorganic chlorate (all forms)
1462	Chlorite; Anorganisch, N.A.G.	Inorganic chlorite (all forms)
1470	Bleiperchlorat	Lead perchlorate
1471	Lithiumhypochlorit, trocken oder Lithiumhypochlorit-mischungen mit mehr als 39% avtivem Chlor (8.8% aktivem Sauerstoff)	Lithium hypochlorite, dry or lithium hypochlorite mixture with more than 39% active Chlorate (8.8 active oxygen)
1472	Lithiumperoxid	Lithium peroxide
1475	Magnesiumperchlorat	Magnesium perchlorate
1479	Entzündend (oxydierend) Wirkende Stoffe, fest, N.A.G.	Flammable (oxidizing) acting materials, solid
1481	Perchlorate; Anorganisch, N.A.G.	Inorganic perchlorate (all forms)
1483	Peroxide, Anorganisch, N.A.G.	Inorganic peroxide (all forms)
1484	Kaliumbromat	Potassium bromate
1485	Kaliumchlorat	Potassium chlorate
1489	Kaliumperchlorat	Potassium perchlorate
1491	Kaliumperoxid	Potassium peroxide
1494	Natriumbromat	Sodium bromate
1495	Natriumchlorat	Sodium chlorate

Table 4-6 (continued)

UN Number	German Name	English Name
1496	Natriumchlorit	Sodium chlorite
1502	Natriumperchlorat	Sodium perchlorate
1504	Natriumperoxid	Sodium peroxide
1506	Strontiumchlorat	Strontium chlorate
1508	Strontiumperchlorat	Strontium perchlorate
1510	Tetranitromethan	Tetra nitromethane
1513	Zinkchlorat	Zinc chlorate
1745	Brompentafluorid	Bromine pentafluoride
1746	Bromtrifluorid	Bromine trifluoride
1748	Calciumhypochlorit, trocken oder Calciumhypochloritmischungen mit mehr als 39% aktivem Chlor (8.8% aktivem Sauerstoff)	Calcium hypochlorite, dry or Calcium hypochlorite mixture with more than 39% active chlorine (8.8% active oxygen)
1873	Perchlorsäure, mit mehr als 50%, aber hochstens 72% Säure	Perchloric acid with more than 50%, but less than 72% acid
2015	Wasserstoffperoxid, Stabilisiert oder Wasserstoff peroxid, Wässerige Lösungen, stabilisiert, mit mehr als 60% Wasserstoffperoxid	Hydrogen peroxide stabilized or a water solution of hydrogen peroxide stabilized, with more than 60% hydrogen peroxide
2466	Kaliumsuperoxid	Potassium peroxide
2495	Jopentafluorid	Iodine pentafluoride
2547	Natriumsuperoxid	Sodium peroxide
2723	Magnesiumchlorat	Magnesium chlorate
2741	Bariumhypochlorit	Barium hypochlorite
2880	Calciumhypochlorit wasserhaltig oder Calciumhypochlorit wasserhaltige michungen, mit nicht weniger als 5.5%, jedoch nicht mehr als 10% Wasser	Calcium hypochlorite water solution or calcium hypochlorite water solution mixture, with no less than 5.5% but no more than 10% water
3085	Entzündend (oxydierend) wirkende stoffe, fest, ätzend, N.A.G.	Flammable (oxidizing) acting materials, solid, waste (or spent) (all forms)
3087	Entzündend (oxydierend) wirkende stoffe, fest, giftig, N.A.G.	Flammable (oxidizing) acting materials, solid, poisonous (all forms)
3098	Entzündend (oxydierend) wirkende stoffe, flüssig, ätzend, N.A.G.	Flammable (oxidizing) acting materials, liquid, waste (or spent) (all forms)

(continued)

Table 4-6 (continued)

UN Number	German Name	English Name
3099	Entzündend (oxydierend) wirkende stoffe, flüssig, giftig, N.A.G.	Flammable (oxidizing) acting materials, liquid, poisonous (all forms)
3139	Entzündend (oxydierend) wirkende stoffe, flüssig, N.A.G.	Flammable (oxidizing) acting materials, liquid, (all forms)
3212	Hypochlorite, anorganisch, N.A.G.	Inorganic Hypochlorite (all forms)
-	Kaliummetaperjodat	Potassium periodate
-	Natriummetaperjodat	Sodium periodate
-	Perjodsäure	Periodic acid

Mildly Reactive Substances

1438	Aluminumnitrat	Aluminum nitrate
1439	Ammoniumdichromat	Ammonium dichromate
1444	Ammoniumpersulfat	Ammonium persulfate
1446	Bariumnitrat	Barium nitrate
1448	Bariumpermanganat	Barium permanganate
1454	Calciumnitrat	Calcium nitrate
1456	Calciumpermanganat	Calcium permanganate
1457	Calciumperoxid	Calcium peroxide
1458	Chlorat und Borat, mischungen	Chlorate and borate mixtures
1459	Chlorat und Magnesiumchlorid, mischung ein spezifiziertes hygroskopisches Chlorid oder und Calciumchlorid oder und Natriumchlorid, mischung	Chlorate and magnesium chloride mixtures, a specified water-absorbing chloride or calcium chloride or sodium chloride mixture
1463	Chromtrioxid	Chromium trioxide
1469	Bleinitrat	Lead nitrate
1473	Magnesiumbromat	Magnesium bromate
1476	Magnesiumperoxid	Magnesium peroxide
1477	Nitrate; anorganisch, N.A.G.	Inorganic nitrates (all forms)
1482	Permanganate, anorganisch, N.A.G.	Inorganic permanganate (all forms)
1486	Kaliumnitrat	Potassium nitrate
1487	Kaliumnitrat und natriumnitrit, mischungen	Potassium and sodium mixtures

(continued)

Table 4-6 (continued)

UN Number	German Name	English Name
1488	Kaliumnitrit	Potassium nitrite
1490	Kaliumpermanganat	Potassium permanganate
1498	Natriumnitrat	Sodium nitrate
1199	Natriumnitrat und kaliumnitrat	Sodium nitrate and potassium nitrate
1500	Natriumnitrit	Sodium nitrite
1503	Natriumpermanganat	Sodium permanganate
1509	Strontiumperoxid	Strontium peroxide
1515	Zinkpermanganat	Zinc permanganate
1516	Zinkperoxid	Zinc peroxide
1796	Nitriersäure, mischungen	Mixtures of nitric acid and sulfur acid
1802	Persclorsäure, hochstens 50 Gew.-% säure	Perschloric acid with less than 50% acid by weight
1826	Abfallnitriersäure, mischungen	Waste nitric and sulfuric acid mixtures
2014	Wasserstoffperoxid, wasserige lösungen, mit mindestens 20%, jedoch nicht mehr als 60% wasserstoffperoxid (stabilisiert, wenn erforderlich)	Hydrogen peroxide water solution with more than 20%, but less than 60% of hydrogen peroxide (stabilized when necessary)
2032	Salpetersäure mit mehr als 70% säure	Nitrous acid with more than 70% acid
2427	Kaliumchlorat, wässerige lösung	Potassium chlorate water solutions
2428	Natriumchlorat, wässerige lösung	Sodium chlorate water solutions
2429	Calciumchlorat, lösung, wässerig	Calcium chlorate water solutions
2469	Zinkbromat	Zinc bromate
2573	Thalliumchlorat	Thallium chlorate
2626	Chlorsaure; wasserige lösung mit nicht mehr als 10% chlorsäure	Chloric acid water solutions with no more than 10% chloric acid
2627	Nitrite, anorganisch, N.A.G.	Inorganic nitrite (all forms)
2719	Bariumbromat	Barium bromate
2721	Kupferchlorat	Copper chlorate
2722	Lithiumnitrat	Lithium nitrate
2726	Nickelnitrit	Nickel nitrite
2976	Thoriumnitrat, fest	Thorium nitrate, solid

(continued)

Table 4-6 (continued)

UN Number	German Name	English Name
2981	Uranylnitrat, fest	Uranyl nitrates, solid
3084	Ätzende stoffe, fest, entzündend (oxydierend wirkend)	Etching substances, solid, flammable (oxidation effect)
3086	Giftige stoffe, fest, entzündend (oxydierend wirkend)	Hazardous substances, solid, flammable (oxidation effect)
3093	Atzende stoffe, flussig, entzundend (oxydierend wirken)	Etching substances, liquid, flammable (oxidation effect)
3122	Giftige stoffe, flussig, entzündend (oxydierend wirkend)	Hazardous substances, liquid, flammable (oxidation effect)
3210	Chlorate, anorganisch, wässerige lösungen	Inorganic chlorate water solutions
3211	Perchlorate, anorganisch, wässerige lösungen	Inorganic perchlorate water solutions
3213	Bromate, anorganisch, wässerige lösungen	Inorganic Bromate water solutions
3214	Permanganate, anorganisch, wässerige lösungen	Inorganic permanganate water solutions
3218	Nitrate, anorganisch, wässerige lösungen	Inorganic nitrate water solutions
3219	Nitrite, anorganisch, wässerige lösungen	Inorganic nitrite water solutions
3247	Natriumperborat, wasserfrei	Sodium perborate, anhydrous
337	Chromylchlorid	Chromyl chloride
-	Kaliumjodat	Potassium iodate
-	Natriumjodat	Sodium iodate

Weak Reactive Substances

1451	Cäsiumnitrat	Cessium nitrate
1456	Didymiumnitrat	Didymiumnitrate
1466	Eisennitrat	Iron nitrate
1474	Magnesiumnitrat	Magnesium nitrate
1492	Kaliumpersulfat	Potassium persulfate
1493	Silbernitrat	Silver nitrate
1505	Natriumpersulfat	Natrium persulfate
1507	Strontiumnitrat	Strontium nitrate

(continued)

Table 4-6 (continued)

UN Number	German Name	English Name
1514	Zinknitrat	Zinc nitrate
1872	Bleidioxid	Lead oxide
2014	Wasserstoffperoxid, wässerige lösungen mit mindestens 20%, jedoch nicht mehr als 60% wasserstoffperoxid (Stabilisiert, wenn erforderlich)	hydrogen peroxide water solution with more than 20%, but less than 39% active chlorine
2208	calciumhypochloritmischungen, trocken, mit mehr als 10%, jedoch nicht mehr als 39% aktivem chlor	Calcium hypochlorite dry mixtures with more than 10%, but less than 39% active chloride
2464	Berylliumnitrat	Beryllium nitrate
2465	Dichlorisocyanursäure, trocken oder dichlor-isochyanursäure salze	Dichlorisocyanuric acid dry dichlor-isocyanuric acid
2467	Natriumpercarbonat	Sodium carbonate peroxyhydrate (or sodium percarbonate)
2468	Trichlorisocyanursäure, trocken	Trichlorisocyanuric acid, dry
2720	Chromnitrat	Chromium
2724	Mangannitrat	Manganese nitrate
2725	Nickelnitrat	Nickel nitrate
2727	Thalliumnitrat	Thallium nitrate
2728	Zirkoniumnitrat	Zirconium nitrate
3215	Persulfate, anorganisch, N.A.G.	Inorganic persulfate (all forms)
3217	Percarbonate, anorganisch, N.A.G.	Inorganic percarbonate (or carbonate peroxyhydrate) (all forms)
3247	Natriumperborat-monohydrat	Sodium perborate, monohydrate
-	Jodsäure	Iodic acid
-	Calciumjodat	Calcium iodate
-	Jodpentoxid	Iodine pentaoxide

INSTALLATION:	COMPLIANCE CATEGORY: HAZARDOUS WASTE MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		

SECTION 5

NATURAL RESOURCES MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 5

NATURAL RESOURCES MANAGEMENT

A. Applicability of this Section

This chapter applies to any Air Force (AF) installation with improved, semi-improved, and unimproved grounds. Included are required plans and programs needed to ensure proper protection and management of natural resources such as soil, water, plants, and wildlife.

The regulatory requirements in this section are based on DOD regulations that apply at overseas installations. Management Practices (MPs) are derived from DOD regulations and other documents that are not mandatory overseas but are important to follow to preserve the health and safety of AF employees and protect the environment.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 13 addresses plans and programs required for the protection, enhancement, and management of natural resources and endangered or threatened species.

C. U.S. Air Force Documents

- None.

D. Responsibility for Compliance

- Base Civil Engineering (BCE) is responsible for funding, supervising, controlling, and managing installation natural resources.

- The Natural Resources Manager is responsible for preparing management plans, cooperative agreements, budgets, and the annual natural resources report. The natural resources manager also implements and controls all activities that promote natural resources management. On installations without a full-time Natural Resources Manager, these duties would normally be assigned to the environmental coordinator or community planner.

E. Definitions

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Action* - all activities or programs of any kind authorized, funded, or carried out, in whole or in part, on DOD-controlled installations (FGS-FRG, Appendix A).

- *Adverse Effect* - changes that reduce the quality of the natural environment or diminish the quality or value of archaeological resources or cultural resources or properties (FGS-FRG, Appendix A).

- *Commander* - the person responsible for controlling the actions under discussion. This may be a person other than an accommodation or installation commander. Such would be the case, for example, if the action dealt with a non-base operations function (FGS-FRG, Appendix A).

- *Conservation* - wise management and use of natural resources to provide the best public benefits for present and future generations (FGS-FRG, Appendix A).

- *Endangered Species* - any species of flora or fauna listed in Table 5-1, in a German state's *Rote Liste*, or designated in some other fashion by the governments of the U.S. and Germany whose continued existence is, or is likely to be, threatened and is therefore subject to special protection from destruction or adverse modification of associated habitat (FGS-FRG, Appendix A).

- *Environment* - the natural and physical environment, excluding social, economic, and other environments (FGS-FRG, Appendix A).

- *Fauna* - animals collectively (FGS-FRG, Appendix A).

- *Flora* - plant life collectively (FGS-FRG, Appendix A).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Management Plan* - a document describing natural resources, and their quantity and condition, and actions to ensure conservation and good stewardship (FGS-FRG, Appendix A).

- *Management Practices (MPs)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *Natural Resource* - all living and inanimate materials supplied by nature that are of aesthetic, ecological, educational, historical, recreational, scientific, or other value (FGS-FRG, Appendix A).

- *Natural Resources Management* - action taken to protect, manipulate, alter, or manage environmental, human, and biological resources in harmony with each other to meet present and future human needs (FGS-FRG, Appendix A).

- *Preservation* - the act or process of applying measures to sustain the existing form, integrity, and material of a building or structure and the existing form and vegetative cover of a site. It may include initial stabilization work where necessary, as well as ongoing maintenance of the historic building materials (FGS-FRG, Appendix A).

- *State* - the political subdivision referred to as a *Land* in Germany (FGS-FRG, Appendix A).

- *Use (of water)* - removal or diversion of waters from surface water; damming or lowering of surface waters; removal of solids from surface waters so that the condition of the water or its drainage is affected; introduction or discharge of substances into surface waters; introduction or discharge of substances into coastal waters; discharge of substances into the groundwater; removal, unearthing, drawing, or diverting of groundwater; damming, lowering, or conducting groundwater through facilities intended for these purposes; any measure that is likely to cause lasting or significant deleterious changes in the physical, chemical, or biological quality of the water. Measures that promote the development of the surface water are not considered uses, nor are measures taken to maintain surface water that do not involve chemicals (FGS-FRG 13-7a(1) and 13-7(a)(2)).

- *Water Protection Area* - (German: *Wasserschutzgebiet*) an area established by a German state to protect public water supplies, supplement groundwater, or prevent harmful runoff of precipitation and flooding, as well as to prevent entry into the water of soil constituents or substances used to treat manure and plants. The state will publish a set of restrictions for each area designated applicable to all, including DOD components (FGS-FRG, Appendix A).

- *Waters of the Host Nation* - surface waters including the territorial seas recognized under customary international law, including (FGS-FRG, Appendix A):
    1. all waters that are currently used, were used in the past, or may be susceptible to use in commerce
    2. waters that are or could be used for recreation or other purposes
    3. waters from which fish or shellfish are or could be taken and sold
    4. waters that are used or could be used for industrial purposes by industry
    5. waters, including lakes, rivers, streams (including intermittent streams), sloughs, prairie potholes, or natural ponds
    6. tributaries of waters identified in 1 through 5 above.

  (NOTE: Waste treatment systems, including treatment ponds or lagoons, are not waters of the host nation. This exclusion applies only to man-made bodies of water which neither were originally waters of the host nation nor resulted from impoundment of waters of the host nation.)

NATURAL RESOURCES MANAGEMENT

GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
All Installations	5-1 through 5-4	(1)(2)
Natural Resources		
General	5-5 through 5-11	(1)
Protecting the Land and Countryside	5-12 through 5-19	(1)
Protecting Water	5-20 and 5-21	(1)
Use and Protection of Surface Water	5-22 through 5-25	(1)
Use and Protection of Groundwater	5-26 through 5-28	(1)
Water Protection Areas	5-29 through 5-33	(1)
Protecting Flora in General	5-34 through 5-37	(1)
Protecting Fauna in General	5-38 through 5-41	(1)
Endangered or Threatened Species	5-42 through 5-46	(1)

(a) **CONTACT/LOCATION CODE:**

(1) Natural Resources Manager (or Environmental Coordinator)
(2) Base Staff Judge Advocate

NATURAL RESOURCES MANAGEMENT

Records To Review

- Documentation of finding of no adverse effect (for construction activities)
- Environmental Impact Statements (EIS)
- Land Use Plan
- Fish and Wildlife Plan
- Outdoor Recreation Plan
- Cropland and Grazing Plan
- Forest Management Plan

Physical Features To Inspect

- Construction sites
- Site or landmark of historic or archaeological interest
- Facilities constructed in the past 2 yr
- Wildlife containment areas
- Wildlife habitat and land and water resources
- Equipment that could damage wildlife, its habitat, or land and water resources

People To Interview

- Natural Resources Manager (or Environmental Coordinator)
- Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
ALL INSTALLATIONS	
5-1. Copies of all relevant DOD directives/ instructions, U.S. Air Force (USAF) directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF directives. (2)
5-2. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning natural resources have been issued since the finalization of the manual. (1) Verify that the installation is in compliance with newly issued regulations.
5-3. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to natural resources management. (1)(2) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
5-4. The Installation Natural Resource Manager should be included in the coordination process for all actions that may affect the installation's natural resources (MP).	Verify that the Natural Resources Manager is included in the coordination process for all actions that may affect the installation's natural resources. (1)

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
NATURAL RESOURCES **General**	
5-5. ICs must maintain a current list of all designated natural cultural or historic monuments on the installation (FGS-FRG 13-4b).	Verify that the installation maintains a current list of all designated natural cultural or historic monuments on the installation. (1)
5-6. Installations must develop programs for conserving, managing, and protecting natural resources (FGS-FRG 13-3a).	Verify that the installation has programs for conserving, managing, and protecting natural resources. (1) Verify that the program respects German conservation practices. Verify that the program is coordinated with the German officials responsible for the protection of the natural resources on the accommodation.
5-7. Installations must have management plans for certain resources where these resources exist (FGS-FRG 13-3b).	Determine whether the installation has any of the following resources: (1) - land (soil and water) - grazing and cropland - forest - fish and wildlife - outdoor recreation. Verify that the installation has management plans for such resources, where they exist. Verify that the plans are coordinated with the appropriate German authorities.

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
5-8. The installation's land management plan should address certain topics (MP).	Verify that the land management plan reflects a comprehensive effort to educate installation personnel. (1) Verify that the plan includes programs and policies and reduces non-point sources of water pollution, including: - fertilizer application - pesticide use - stormwater runoff - waste oil recovery - grounds maintenance - car washing - erosion/sedimentation control.
5-9. Technical instruction should be provided for personnel engaged in the care of the installation (MP).	Verify that the installation provides periodic and comprehensive technical instruction concerning land preparation, soil management, fertilization, pruning, spraying, and other horticulture skills to personnel engaged in the care of the installation. (1)
5-10. Personnel who manage natural resources must be properly trained (FGS-FRG 13-5).	Verify that personnel who manage natural resources are properly trained. (1)
5-11. All persons who work in or around environmentally sensitive areas must be trained to respect and protect the environment (FGS-FRG 13-5).	Verify that all persons who work in or around environmentally sensitive areas are trained to respect and protect the environment. (1)
Protecting the Land and Countryside	
5-12. Land management activities must be consistent with modern conservation and land use principles (FGS-FRG 13-6a).	Verify that the installation's land management activities are consistent with modern conservation and land use principles. (1)

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
5-13. Installation grounds must be maintained in ways that meet designated mission use and assure harmony with the natural landscape (FGS-FRG 13-6c).	Verify that installation grounds are maintained in ways that meet designated mission use and assure harmony with the natural landscape. (1)
5-14. A protective vegetative cover or other standard soil erosion/ sediment control practices must be used to control dust and/or stabilize sites (FGS-FRG 13-6b).	Verify that the installation uses a protective vegetative cover (or other standard soil erosion/sediment control measures) to control dust and/or stabilize sites. (1)
5-15. The installation should have a mitigation and monitoring plan (MP).	Verify that there is a mitigation and monitoring plan for environmental compliance. (1) Verify that the installation has developed plans to preserve, protect, and acquire the water supplies necessary to support all natural resources projects and programs.
5-16. Installations must have the permission of the German government to alter the landscape or use natural resources for commercial purposes (FGS-FRG 13-6d).	Verify that the installation obtains the permission of the German government to alter the landscape or use natural resources for commercial purposes. (1) (NOTE: The prohibition against altering the landscape applies to actions that reconfigure the ground, such as putting in roads, rechanneling watercourses, leveling areas, etc. Actions of this type would normally be a major construction process, and the approval would be obtained as part of the *Auftragsbauengrundsätze-1975* (*Principles for Contracting Construction Projects-1975*) (ABG-75) process.) (NOTE: Commercial use would include borrow pit operations, mining, timber harvesting, and similar activities, even if the product is to be used by the DOD component on the accommodation.)
5-17. Actions that would destroy, affect, or change certain designated areas are prohibited (FGS-FRG 13-6e).	Verify that the installation does not engage in activities that would destroy, affect, or change any of the following types of designated areas: (1) - national parks - landscape protection areas - nature parks - natural landmarks - protected portions of landscapes.

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
5-17. (continued)	(NOTE: States may direct that specific actions to protect nature be taken by the users/owners of forests, wetlands, and meadows.)
5-18. Installations must not take actions that would adversely affect wetlands or shore vegetation without prior coordination with the appropriate German authorities (FGS-FRG 13-6f).	Verify that the installation does not take actions that would adversely affect wetlands or shore vegetation without prior coordination with the appropriate German authorities. (1) (NOTE: These restrictions apply to moors, swamps, ponds, natural barriers, natural pastures, or reed stands; wild fowl landing areas in still waters (lakes, ponds, etc.); and the shore vegetation or reed stands in public waters.)
5-19. Specific types of activities are prohibited in Hessen (FGS-FRG 13-6h).	Determine whether the installation is located in Hessen. (1) Verify that the installation does not fill, drain, or otherwise make lasting changes to moist areas, especially the following: - swamps or moors - wild fowl landing areas - old river beds - ponds - pools. Verify that the installation does not straighten Class II or Class III waterways or impair their natural function by technical means. (NOTE: FGS-FRG refers here to "waterways designated by the state as being of the second and third order," which terms it does not define. The infelicitous translation from the German is corrected here.) Verify that the installation does not diminish, plow, or fertilize moors without the approval of the appropriate German authorities.
Protecting Water	
5-20. Installations must manage waters in accordance with certain general criteria (FGS-FRG 13-7a and 13-7d).	Verify that the installation manages coastal waters, surface waters, and groundwater in such a way that the general welfare is promoted, pollution and degradation are prevented, and the resources are used economically. (1) Verify that no water is used or diverted to the detriment of another party. Verify that the installation operates in such a fashion that water quality is not endangered.

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
5-20. (continued)	(NOTE: In connection with maneuvers or tests for the purpose of defense, no authorization need be obtained from German authorities to draw water temporarily or to reintroduce it into a body of water by means of a moveable facility, or to discharge substances into a water temporarily, if there is no reason to believe that others will be affected in more than a limited way, or that there will be any interference with the management of a water resource.) Verify that interested German authorities are notified in advance of the intent to use water in the above fashions in connection with maneuvers or tests for the purpose of defense.
5-21. ICs must designate the person(s) or organization(s) responsible for water protection in writing and describe their duties in detail (FGS-FRG 13-7b).	Verify that the IC designates the person(s) or organization(s) responsible for water protection in writing and describes their duties in detail. (1) (NOTE: FGS-FRG 4-4a also creates an obligation to designate a person(s) or organization(s) responsible for water protection (see checklist item 12-6). Both the appointment under paragraph 4-4 and that under paragraph 13-7 should make specific reference to the relevant portions of FGS-FRG when describing the appointee's duties. Even though the obligations to appoint such a person or organization are independent of one another, the same person or organization may be appointed for both purposes.) Verify that only qualified individuals are designated responsible for water protection. (NOTE: If more than one responsible party is so designated, the IC is responsible for coordination. It is the responsibility of the designated party to ensure compliance with FGS-FRG or any applicable agreements or permits.) Verify that the IC supports the designated party, including making resources and personnel available. Verify that the designated party informs the IC of deficiencies and recommends measures for correcting them.

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
Use and Protection of Surface Waters	(NOTE: The public may use surface waters if the use is allowed under state law, unless such use must be restricted for good and sufficient reason.) (NOTE: Coordination with German authorities is not required for the use of surface water by a DOD component on an accommodation for personal needs if no injury to others, no degradation of water quality, no material decrease in water flow, and no other injury to water resources is foreseen.)
5-22. Installations may not introduce solids into surface water as a means of disposal (FGS-FRG 13-7e(3)).	Verify that solids are not introduced into surface water as a means of disposal. (1)
5-23. Installations may store or unload solids near water only if certain conditions are met (FGS-FRG 13-7e(3)).	Verify that solids are stored or unloaded near water only if there are no grounds for concern that water pollution or other degradation of the properties of the water or of drainage will occur. (1)
5-24. DOD components must allow water maintenance measures to be conducted on their accommodation (FGS-FRG 13-7e(4) and 13-7e(5)).	Verify that the installation allows water maintenance measures to be conducted. (1) (NOTE: Such measures may include planting on banks and shores, insofar as it is necessary for water maintenance, and directing how riparian lands are to be used. German authorities are required to coordinate such activities in advance.) (NOTE: Maintenance costs for surface waters on an accommodation are to be borne by the DOD component assigned the accommodation, insofar as such costs are not the responsibility of territorial entities, water or land development associations, or special administrative unions of local authorities. In some cases this cost may be shared by others who benefit from the water or who make maintaining it more difficult.)
5-25. Installations must identify areas subject to flooding and must make provisions to ensure that little or no damage will result from the drainage of floodwater (FGS-FRG 13-7e(6)).	Verify that areas on the installation that are subject to flooding have been identified. (1) Verify that provisions have been made to ensure that little or no damage will result from the drainage of floodwater.

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
Use and Protection of Groundwater	
5-26. The use of groundwater must be coordinated with the responsible German officials (FGS-FRG 13-7f(1)).	Determine whether the installation uses groundwater. (1) Verify that the installation's use of groundwater has been coordinated with the responsible German officials.
5-27. Installations may store or unload substances only if certain conditions are met (FGS-FRG 13-7f(2)).	Verify that substances are stored or unloaded only if there are no grounds for concern that water pollution or other degradation of the groundwater will occur. (1) (NOTE: This requirement applies both in general and in particular to the transport of fluids and gases through pipelines.)
5-28. Installations must meet specific requirements with regard to excavations (FGS-FRG 13-7f(3)).	Verify that the installation coordinates in advance with the responsible German authorities if an excavation will tap groundwater. (1) (NOTE: This may be accomplished through the ABG-75 procedures.) Verify that, if groundwater is tapped accidentally or without coordination, the fact is reported to the appropriate German authorities. (NOTE: The excavation may have to be filled in if prudent management of water resources requires it.)
Water Protection Areas	
5-29. Installations must act in strict conformity with the restrictions contained in ordinances establishing water protection areas (FGS-FRG 13-7g).	Determine whether the installation is located in a water protection area. (1) Verify that the installation acts in strict conformity with the restrictions contained in the ordinances establishing the water protection area. (NOTE: This requirement does not apply if such restrictions would frustrate the use of the area for the purposes granted to the U.S. forces in the document granting exclusive use to the U.S. forces under Article 48 of the NATO Status of Force Agreement. If this situation occurs, the problem should be resolved through discussions with the appropriate water authority at the lowest level. If resolution cannot be reach at the lower or intermediate levels, the problem should be elevated through component channels to the Executive Agent.)

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
5-30. Installations must not store, transfer, or otherwise handle water endangering hazardous substances in Zone I of a water protection area (FGS-FRG 13-7g(1)(a)).	Determine whether any installation facilities are located within Zone I of a water protection area. (1) Verify that no water-endangering hazardous substance (including POL products) is stored, transferred, or otherwise handled in that zone. (NOTE: Restrictions on the use of certain chemicals in water protection areas can be found in Section 7, *Pesticide Management* and Table 7-2.) (NOTE: Other restrictions for storing or handling various substances in Zones II, III, and IV will probably appear in the ordinance establishing the water protection area.)
5-31. Installations should, when possible, avoid the storage, transfer, handling, or use of any substance that could be considered water endangering in a water protection area (MP).	Verify that the installation avoids the storage, transfer, handling, or use of any substance that could be considered water endangering in a water protection area. (1) (NOTE: This MP is suggested by FGS-FRG 13-7g(1)(a), and it applies even if such activity is not restricted in Section 7, *Pesticide Management*, or in Table 7-2, or in the ordinance establishing the water protection area.)
5-32. When storage of a water endangering hazardous substance is permitted in a water protection area, installations must comply with limits on the amount of substance in storage facilities (FGS-FRG 13-7g(1)(b)).	Determine whether the storage of a water endangering hazardous substance is permitted in the water protection area. (1) Verify that the capacity of the storage facility does not exceed 100,000 L. (NOTE: See Section 3, *Hazardous Materials Management* and Section 8, *POL Management*, for other standards related to the storage of water endangering hazardous substances.)
5-33. The application of nitrogen to land within water protection areas in the state of Hessen is restricted (FGS-FRG 13-7g(3)).	Determine whether the installation is in a water protection area in the state of Hessen. (1) Verify that the installation applies no more than 45 kg/ha/yr of nitrogen to such land.

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
Protecting Flora in General	
5-34. Vegetative management activities must be consistent with modern conservation and land use principles (FGS-FRG 13-8a).	Verify that the installation's vegetative management activities are consistent with modern conservation and land use principles. (1)
5-35. Installations must comply with specific restrictions on the cutting of flora and similar activities (FGS-FRG 13-8b through 13-8e).	Verify that no wild plants are harvested, used, knocked down, or otherwise harmed without good and sufficient reason. (1) Verify that no trees are cut down for any purpose without coordinating with and obtaining the concurrence of the appropriate German authorities. Verify that no signs are attached to trees or other living things. Verify that the vegetation on the following lands is not burned: - pastures - unused land - slopes - embankments. Verify that the following are not burned: - hedges - living fences - trees - bushes - reed stocks [= stands of reeds or stalks of reeds?].
5-36. Certain additional restrictions apply to activities involving flora in Hessen (FGS-FRG 13-8g and 13-8h).	Determine whether the installation is located in Hessen. (1) Verify that no one cuts back reeds, reed stands, woods on flowing waters, or hedges and bushes between 1 March and 31 August. Verify that no scenic hedges, bushes, field or shore woods, single trees, reeds, or reed stands are removed. Verify that no foreign plant species are sown or planted. (NOTE: The latter prohibition does not apply to the cultivation of crops or to ornamental plants in gardens or parks.)

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
5-37. Installations must meet specific standards with regard to the management of forests (FGS-FRG 13-8i).	Verify that no forest is cleared or converted from one use to another without the approval of the appropriate German authorities. (1) (NOTE: This includes even temporary conversions with the goal of later reforestation.) Verify that the installation has the approval of the appropriate German authorities before establishing new forest or reforesting forest meadows. Verify that, to the best of its ability, the installation takes action to protect the forest against animal and plant pests, pollution, harmful natural events, fire, and malicious damage. Verify that, to the extent possible without undue hardship, managers of forests take into account the management of neighboring tracts. (NOTE: Secondary use of the forest is allowed only when it does not endanger the orderly management of the forest. Unless there is good and sufficient reason to prevent it, any person may have access to a forest for recreational purposes at his/her own risk. Installations are not required to prepare the forest in any way for this purpose.) Verify that visitors to the forest behave in such a way that: - the forest flora and fauna are not disturbed - the management of the forest is not hindered - the forest is not endangered, damaged, or polluted - they do not infringe upon the recreation of others. Verify that the following activities occur only on tracks and roads: - bicycle riding - driving of coaches (*sic*) and wheelchairs - horseback riding. (NOTE: Other uses, such as the driving of motor vehicles and wagons, require the permission of the IC. Special uses may be authorized after appropriate study and coordination with German officials.) (NOTE: The general public is allowed to take nuts, fruits, etc. from forests in limited amounts (i.e., handfuls).)

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
Protecting Fauna in General	
5-38. ICs must emphasize the maintenance and protection of habitat favorable to the local fish and wildlife (FGS-FRG 13-9a).	Verify that habitats that are favorable to the reproduction and survival of indigenous fish and wildlife are maintained and protected. (1)
5-39. Wild animals must not be deliberately disturbed, captured, or killed (FGS-FRG 13-9b).	Verify that no wild animals are deliberately disturbed, captured, or killed. (1) (NOTE: This prohibition does not apply when persons are engaged in authorized hunting.)
5-40. Installation activities must be conducted in such a way that wild animals are not disturbed (FGS-FRG 13-9c).	Verify that installation activities are conducted in such a way that wild animals are not disturbed. (1)
5-41. Nonnative animals must not be set free or introduced into the wild (FGS-FRG 13-9d).	Verify that no nonnative animals are set free or introduced into the wild. (1)
ENDANGERED OR THREATENED SPECIES	
5-42. ICs must maintain a current list of threatened or endangered species for their locality (FGS-FRG 13-4a).	Verify that the installation maintains a current list of threatened or endangered species (both flora and fauna) for its locality. (1) (NOTE: Table 5-1 provides a listing of threatened or endangered species found in Europe. In addition, each state publishes a *Rote Liste* (Red List) that identifies threatened or endangered species in that state. Table 5-1 and the Red List should provide the information necessary to meet this requirement. FGS-FRG 13-4a includes a list of addresses for state offices where a Red List may be obtained.)

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
5-43. ICs must initiate surveys to identify threatened or endangered species or support German initiated surveys, if financially and otherwise practical (FGS-FRG 13-4c).	Verify that, if it is financially and otherwise practical, a survey of endangered species is conducted. (1) Verify that German-initiated surveys, if any, are supported. (NOTE: Interested German state agencies will often conduct such surveys without charge if requested to do so.)
5-44. German officials must be notified of the discovery of any threatened or endangered species not previously known to be present on the installation (FGS-FRG 13-4d).	Verify that German officials are notified of the discovery of any threatened or endangered species not previously known to be present on the installation. (1)
5-45. ICs must take reasonable steps to protect and enhance known endangered species and their habitat (FGS-FRG 13-10a).	Verify that the IC takes reasonable steps to protect and enhance known endangered species and their habitat. (1) Verify that actions that have a negative effect on a protected biotope are eliminated to the greatest extent possible.
5-46. Certain activities involving threatened or endangered species are prohibited (FGS-FRG 13-10b through 13-10e).	Verify that no threatened or endangered species of plants or their parts are: (1) - cut down - picked - pulled down - removed - otherwise harmed. Verify that no threatened or endangered species of animal is disturbed, captured, hurt, or killed. Verify that no one destroys or disturbs the nests, eggs, larvae, chrysalis, broods, or other developing forms of threatened or endangered species of animals. Verify that no one takes possession of, acquires, works, processes, gives away, offers for sale, sells, or otherwise brings into trade products of or from threatened or endangered species of plants or animals or their nests. (NOTE: Exceptions for good and sufficient reasons (such as scientific study) may be made if coordinated with and agreed to by the appropriate German authorities.)

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
5-46. (continued)	Verify that no one disturbs the living and breeding areas of endangered species for the purposes of photographing or filming without authorization from the IC and the appropriate German authorities.

(1) Natural Resources Manager (or Environmental Coordinator) (2) Base Staff Judge Advocate

Table 5-1

Threatened or Endangered Species
(Source: FGS-FRG, Table 13-1)

MAMMALS

SCIENTIFIC NAME	COMMON GERMAN NAME
Mammalia	**Saugetiere**
Alopex lagopus	Eisfuchs
Bradypus torquatus	Kragenfaultier
Bradypus tridactylus	Dreifingerfaultier
Canis lupus	Wolf
Capra aegagrus	Bezoarziege
Capra pyrenaica	Iberiensteinbock
Castier fiber	Biber
Chiroptera spp.	Fledermause -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Choloepus didactylus	Unau
Citellus citellus	Ziesel
Cricetus cricetus	Europaischer Feldhamster
Cystophora cristata	Klappmutze
Dasypodidae spp.	Gurteltiere
Dryomys nitedula	Baumschlafer
Felidae	Katzen
Erignathus barbatus	Bartrobbe
Galemys pyrenaicus	Pyrenaen-Desman
Gliridae spp.	Schlafer -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Gulo gulo	Vielfrass
Hystrix cristata	Stachelschwein
Halichoerus grypus	Kegelrobbe
Loxodonta africana	Afrikanischer Elefant

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Mustela lutreola	Europaischer
(Lutreola lutreola)	Wildnerz
Microtus bavaricus	Bayerische Kleinwuhlmaus
Microtus oeconomus	Sumpfmaus
Odobenus rosmarus	Walross
Ovibos moschatus	Moschusochse
Phoca groenlandica (Pagophilus groenlandicus)	Sattelrobbe
Pusa hispida	Ringelrobbe
Sciurus vulgaris	Eichhornchen
Sicista belulina	Birkenmaus
Sorex alpinus	Alpenspitzmaus
Soricidae spp.	Spitzmause -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Talpa europaea	Europaischer Maulwurf
Ursus arctos	Braunbar
Genetta genetta	Ginsterkatze -alle heimischen Arten, soweit nicht im einzelnen aufgefuhrt
with the exception of *Arvicola terrestris*	mit Ausnahme von Schermaus
Clethrionomys *glareolus*	Rotelmaus
Microtus agrestis	Erdmaus
Microtus arvalis	Feldmaus
Mus musculus	Hausmaus
Myocastor coypus	Nutria
Nyctereutes procyonoides	Marderhund
Ondatra zibethica	Bisam
Procyon lotor	Waschbar
Rattus norvegicus	Wanderratte
Tamandua tetradactyla	Mittlerer Ameisenbar
Ursus arctos	Braimbar

(continued)

Table 5-1 (continued)

BIRDS

SCIENTIFIC NAME	COMMON GERMAN NAME
Acrocephalus arundinaceus	Drosselrohrsanger
Acrocephalus paludicola	Seggenrohrsanger
Actitis hypoleucos	Flussuferlaufer
Aegolius funereus	Rauhfusskauz
Aegypius monachus	Monchsgeier
Afropavo congensis	Kongopfau
Alca torda	Tordalk
Alcedo atthis	Eisvogel
Alectoris barbara	Felsenhuhn
Alectoris graeca saxatilis	Alpen-Steinhuhn
Alectoris rufa	Rothuhn
Amazona agilis	Rotspiegel-Amazone
Amazona collaria	Jamaika-Amazone
Amazona ventralis	Blaukronen-Amazone
Amazona xanthops	Gelbbauch-Amazone
Anas clypeata	Loffelente
Anas querquedula	Knakente
Anodorhynchus hyacinthinus	Hyazinthara
Anser erythropus	Zwerggans
Anthropoides virgo	Jungfemkranich
Anthus bertheloti	Kanarenpieper
Anthus campestris	Brachpieper
Aplonis pelzelni	Pelzelnstar
Aplonis santovestris	Rotburzelstar
Andea purpurea	Purpurreiher
Aquila chrysaetos	Steinadler
Aquila pomarina	Schreiadler
Aratinga auricapilla auricapilla	Goldscheitelsittich
Aratinga auricapilla aurifrons	Goldkappensittich

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Aratinga cactorum	Kaktussittich
Ardeola ralloides	Rallenreiher
Arenaria interpres	Steinwalzer
Asio flammeus	Sumpfohreule
Arthene noctua	Steinkauz
Aythya nyroca	Moorente
Balaeniceps rex	Schuhschnabel
Botaurus stellaris	Rohrdommel
Brotogeris tirica	Tirika-Sittich
Bubo bubo	Uhu
Bucerotidae spp.	Nashornvogel -alle Arten
Burhinus oedicnemus	Triel
Buteo rufinus	Adlerbussard
Calandrella brachydactyla	Kurzzehenlerche
Calidris alpina	Alpenstrandlaufer
Calonectris diomedea	Gelbschnabelsturmtaucher
Caprimulgus europaeus	Ziegenmelker
Carduelis flammea	Birkenzeisig
Carpodacus erythrinus	Karmingimpel
Cathartes aura	Truthahngeier
Cathartes burrovianus	Kleiner Gelbkopfgeier
Cathartes melambrotus	Grosser Gelbkopfgeier
Cettia cetti	Seidensanger
Chlidonias hybrida	Weissbartseeschwalbe
Chlidonias leucoptera	Weissflugelseeschwalbe
Chlidonias niger	Trauerseeschwalbe
Ciconia ciconia	Weissstorch
Ciconia nigra	Schwarzstorch
Circaetus gallicus	Schlangenadler
Circus syaneus	Komweihe

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Circus macrourus	Steppenweihe
Circus pygargus	Wiesenweihe
Claravis godefrida	Purpurbindentaubchen
Coenocorypha aucklandica	Aucklandschnepfe
Columba junoniae	Lorbeertaube
Columba trocaz	Silberhalstaube
Copsychus sechellarum	Seychellendajal (Seychellendrossel)
Coracias garrulus	Blauracke
Coragyps atratus	Rabenjeier
Corvus kubaryi	Guam-Krahe
Corvus tropicus	Hawaii-Krahe
Crax alberti	Blaulappenhokko
Crax fasciolata pinima	Nattererhokko
Crex crex	Wachtelkonig
Cyanolimnas cerverai	Kuba-Ralle
Cygnus columbianus	Zwergschwan
Cygnus cygnus	Singschwan
Cygnus melanocoryphus	Schwarzhalsschwan
Dendrocopos leucotos	Weissruckenspecht
Dendrocopos medius	Mittelspecht
Dendrocopos syriacus	Blutspecht
Didunculus strigirostris	Zahntaube
Drepanoptila holosericea	Spaltschwingentaube
Dryocopus martius	Schwarzspecht
Ducula aurorae	Aurorafruchttaube
Ducula galeata	Marquesafruchttaube
Ducula goliath	Riesenfruchttaube
Egretta alba	Silberreiher
Egretta eulophotes	Schneereiher (China-Seidenreiher)
Egretta garzetta	Seidenreiher

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Elanus caeruleus	Gleitaar
Emberiza caesia	Grauer Ortolan
Emberiza cia	Zippammer
Emberiza cirlus	Zaunammer
Emberiza hotulana	Ortolan
Eudromias morinellus	Mornellregenpfeifer
Ficedula albicollis	Halsbandschnapper
Ficedula parva	Zwergschnapper
Falco biamicus	Lanner
Falco cherrug	Saker-Falke
Falco eleonorae	Eleonorenfalke
Falco peregrinus peregrinus	Eurasian peregrine Falcon
Falconiformes spp.	Greifvogel -alle Arten, soweit nicht im einzelnen aufgefuhrt
with the exception of *Coragyps atratus* *Cathartes aura* *Cathartes burrovianus* *Cathartes melambrotus*	mit Ausnahme von Rabengeier Truthahngeier Kleiner Gelbkopfgeier Grosser Gelbkopfgeier
Ficedula semitorquata	Halbringschnapper
Foudia flavicans	Rodriquezweber
Foudia rubra	Mauritius-Weber
Foudia sechellarum	Seychellen-Weber
Fratercula arctica	Papegeitaucher
Fringilla teydea	Teydefink
Fulica cornuta	Russelblasshuhn
Fulica cristata	Kammblasshuhn
Fulmarus glacialis	Eissturmvogel
Galerida theklae	Theklalerche
Gallicolumba erythroptera	Tahiti-Taube
Callicolumba rubescens	Marquesataube
Gallinago media	Doppelschnepfe

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Gavia immer	Eistaucher
Gelochelidon nilotica	Lachseeschwalbe
Geronticus calvus	Glattnackenibis
Glareola nordmanni	Schwarzflugel-Brachschwalbe
Glaucidium passerinum	Sperlingskauz
Gruidae spp.	Kraniche -alle Arten, soweit nicht im einzelnen aufgefuhrt
Grus grus	Kranich
Gypaetus barbatus	Bartgeier
Gypopsitta vulturina	Kahlkopfpapagei
Gyps fulvus	Gansegeier
Haematopus chathamensis	Chatham-Austern-fischer
Haematopus moquini	Russ-Austernfischer
Hieraaetus fasciatus	Habichtsadler
Hieraaetus pennatus	Zwergadler
Himantopus himantopus	Stelzenlaufer
Himantopus novaezelandiae	Neuseeland-Stelzen-laufer
Hoplopterus spinosus	Spornkiebitz
Hydrobates pelagicus	Sturmschwalbe
Hydroprogne caspia	Raubseeschwalbe
Ixobrychus minutus	Zwergdommel
Lanius collurio	Neuntoter
Lanius excubitor	Raubwurger
Lanius minor	Schwarzstirnwurger
Lanius senator	Rotkopfwurger
Larus audouinii	Korallenmowe
Larus genei	Dunnschnabelmowe
Larus sabini	Schwalbenmowe
Leptotila conoveri	Tolimataube
Leptotila wellsi	Lorbeertaube (Grenadataube)
Locustella luscinioides	Rohrschwirl

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Lophotibis cristata	Schopfibis (Madagaskar-Schopfibis)
Lophura bulweri	Weissschwanzfasan
Lullula arborea	Heidelerche
Luscinia svecica (Cyanosylvia svecica)	Blaukehlchen
Lymnocryptes minimus	Zwergschnepfe
Marmaronetta angustirostris	Marmelente
Megapodius laperouse	Laperousehuhn (Marianen-Dschun-gelhuhn)
Merops apiaster	Bienenfresser
Mesoenas unicolor	Einfarbstelzenralle
Mesoenas variegata	Kurzfussstelzenralle
Milvus milvus	Rotmilan
Monias benschi	Moniasralle
Monticola saxatilis	Steinrotel
Nannopterum lharrisi	Galapagosscharbe
Nectariniidae spp.	Nektarvogelartige -alle Arten
Nemosia rourei	Rubinkehltangare
Neophron peronopterus	Schmutzgeier
Nesoenas mayeri	Mauritius-Taube
Notornis mantelli	Takahe
Numenius arquata	Grosser Brachvogel
Nyctea scandiaca	Schnee-Eule
Nycticorax nycticorax	Nachtreiher
Oceanodroma leucorhoad	Wellenlaufer
Odontophorus strophium	Kragenwachtel
Otis tarda	Grosstrappe
Oxyura leucocephala	Weisskopfruderente
Pandion haliaetus	Fischadler

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Pelecanus onocrotalus	Rosaeplikan
Penelope perspicax	Caucaguan
Petronia petronia	Steinsperling
Phalacrocorax carunculatus	Warzenscharbe
Phalacrocorax pygmaeus	Zwergscharbe
Phalaropus lobatus	Odinshuhnchen
Philomachus pugnax	Kampflaufer
Phoenicopterus roseus	Flamingo
Picoides tridactylus	Dreizehenspecht
Picus canus	Grauspecht
Platalea leucorodia	Europaischer Loffler
Plegadis falcinellus	Braunsichler
Ploceus golandi	Golandweber
Pluvialis apricaria	Goldregenpfeifer
Podiceps andinus	Andentaucher
Podiceps auritus	Ohrentaucher
Podiceps gallardoi	Kapuzentaucher
Podiceps grisegena	Rothalstaucher
Podiceps nigricollis	Schwarzhalstaucher
Porphyrio porphyrio	Purpurhuhn
Porzana parva	Kleines Sumpfhuhn
Porzana porzana	Tupfelsumpfhuhn
Porzana pusilla	Zwergsumpfhuhn
Probosciger aterrimus	Palmkakadu
Prosobonia cancellatus	Sudseelaufer
Pseudibis davisoni	Borneo-Warzenibis
Pterocles alchata	Spiessflughuhn
Pterocles orientalis	Sandflughuhn
Pterocles paradoxus	Steppenhuhn

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Ptilinopus huttoni	Rapafruchttaube
Ptyonoprogne rupestris	Felsenschwalbe
Phrrhula pyrrhula murina	Azoren-Gimpel
Phrrhura hypoxantha salvadori	Gelbesitensittich
Pyrrhura pertata	Blausteisssittich
Pyrrhura rhodogaster	Rotbauchsittich
Rallus owstoni	Guam-Ralle
Rallus poecilopterus	Fidji-Ralle
Rallus semiplumbeus	Bogota-Rallef
Ramphastidae spp.	Tukane
Recurvirostra avosetta	Sabelschnabler
Rheinatia ocellata	Rheinartsfasan
Rukia longirostria	Langschnabelbrillenvoge
Rukia ruki	Trukbrillenvogel
Sarcoramphus papa	Konigsgeler
Saxicola dacotiae	Kanaren-Schmalzer
Semnornis ramphastinus	Tukanbartvogel
Serinus canaria	Kanarea-Girlitz
Serinus citrinella	Zitronengirlitz
Sitta ledanti	Kabylen-Kleiber
Sitta whiteheadi	Korsenkleiber
Spheniscus demersus	Brillenpinguin
Sterna albifrons	Zwergseeschwalbe
Sterna dougallii	Rosenseeschwalbe
Sterna hirundo	Flussseeschwalbe
Sterna paradisaea	Kustenseeschwalbe
Sterna sandvicensi	Brandseeschwalbe
Streptopelia turtur	Turteitaube
Strigiformes spp.	Eulen -allen Arten, soweit nicht in einzelnen aufgefuhrt
Strix uralensis	Habichtskauz

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Sylvia nisoria	Sperbergrasmucke
Sylvia undata	Provencegrasmucke
Tachybaptus rufolavatus	Madagaskar-Zwerg-taucher
Tadorna ferruginea	Rostgans
Tangara fastuosa	Vielfarbentangare
Terpsiphone corvina	Seychellen-Paradies-schnapper
Tetrax tetrax	Zwergtrappe
Thaumatibis gigantea	Riesenibis
Thinornis novaeseelandiae	Kapregenpfeifer (Neuseeland-Regen-pfeifer)
Tigrisoma fasciatum	Brasil-Tigerrohr-dommel
Touit melanonota	Schwarzruckenpapagei
Touit surda	Goldschwanzpapagei
Triciaria malachitaces	Blaubauchpapagei
Tringa glareola	Bruchwasserlaufer
Tringa ochropus	Waldwasserlaufer
Tringa stagnatalis	Teichwasserlaufer
Tringa totanus	Rotschenkel
Trochilidae spp.	Colibris
Turdus iliacus	Rotdrossel
Upupa epops	Wiedehopf
Uratelornis chimaera	Langschwanzerdracke
Aves spp.	Vogel -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Vini peruviana	Saphir-Lori
Vini ultramarina	Smaragd-Lori

REPTILES

Reptilia	**Kriechtiere**
Ablepharus kitaibelii	Johannisechse
Algyroides marchi	Spanische Kieleidechse

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Amphibolurus spp.	Bartagaaamen -alle Arten
Aprasia parapulchella	Schmuckflossenfuss
Bradypodion spp.	Zwergchamaleons -alle Arten
Calman spp.	Krokodilkaimane, Brillenkaimane
Chamaeleo chmaeleon	Gewohnliches Chamaleon
Chamaeleo spp.	Chamaleons -alle Arten, soweit nicht im einzelnen aufgefuhrt
Chlamydosaurus kingii	Kragenechse
Ctenotus lancelini	Lancelin-Streifen-skink
Coluber hippocrepis	Hufeisennatter
Crocodilurus lacertinus	Krokodilschwanzechse
Crocodylus intermedius	Orinoko-Krokodil
Cyrtodactylus kotschyi	Agaischer Nacktfingergecko
Diplodactylus spp.	Australische Geckos -alle Arten
Dracaena guianensis	Krokodilteju
Egernia spp.	Stachelskinke -alle Arten
Elaphe longissima	Askulapnatter
Elaphe quatuorlineata	Vierstreifennatter
Elaphe situla	Leopardnatter
Emys orbiculuris	Europaische Sumpfschildkrote
Enhydris spp.	Choury-Schlangen -alle Arten
Eunectes spp.	Anakondas
Gallotia atlanticad	Atlantische Kanareneidechse
Gallotia gallotia	Kanareneidechse
Gallotia stehlini	Riesen-Kanareaeidechse
Gehyra australis	Australischer Hausgecko
Geochelone yniphora	Madagassische Schnabelbrustschilkikrote

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Cerberus rhynchops	Hundskopf-Wassertrugnatter
Homalopsis buccata	Boa-Wassertrugnatter
Iguana spp.	Grune Leguane
Lacerta lepida	Perleidechse
Lacerta parva	Zwerg-Zauneidechse
Lacerta princeps	Zagros-Eidechse
Lacerta viridis	Smaragdeidechse
Lerista lineata	Australischer Skink
Mauremys caspica	Spanische Sumpfschildkrote
Moloch horridus	Dornteufel
Naja naja	Brillenschiange
Natrix tessellata	Wurfelnatter
Nephrurus spp.	Knopfschwanz-Geckos -alle Arten
Oedura spp.	Samtgecko -alle Arten
Ophidiocephalus taeniatus	Australischer Flossenfuss
Phrynosoma coronatum blainvillei	Texaskrotenechse
Phrynosoma spp.	Krotenechsen -alle Arten
Phyllurus spp.	Blattschwanzgeckos -alle Arten
Physignathus lesueurii	Gewohnlicher Wasserdrachen
Podarcis filfolensis	Malta-Eidechse
Podarcis lilfordi	Baleareneidechse
Podarcis muralis	Mauereidechse
Podarcis pityusensis	Pityuseneidechse
Podarcis sicula	Ruinen-Eidechsed
Pseudemoia palfreymani	Australischer Skink
Ptyas mucosus	Rattennatter
Terrapene spp.	Dosenschildkroten -alle Arten

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Testude graeca	Maurische Landschildkrote
Testudo hermanni	Griechische Landschildkrote
Testudo horsfieldii	Vierzehen-Landschildkrote
Testudo marginata	Breitrandschildkrote
Tiliqua spp.	Blauzungenskinke -alle Arten
Trachydosaurus rugosus	Tannenzapfenechse
Tupinambis spp.	Grosstejus
Underwoodisaurus spp.	Rubenschwanzgeckos -alle Arten
Vermicella annulata	Australische Giftnatter
Vipera ammodytes	Sandotter
Vipera aspis	Aspisviper
Vipera berus	Kreuzotter
Vipera kaznakovi	Kaukasus-Otter
Vipera latasti	Stulpnasenotter
Vipera lebetina	Levante-Otter
Vipera russellii	Kettenviper
Vipera usinii	Wiesenotter
Vipera xanthina	Bergotter
Xenochrophis piscator *Natrix piscator*	Fischnatter
Reptilia spp.	Kriechtiere -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt

AMPHIBIANS

Amphibia	**Lurche**
Alytes cisternasii	Iberische Geburtshelferkrote
Alytes muletensis (Baleaphryne muletensis)	Balearenkroted
Alytes obstetricans	Geburtshelferkrote
Bombina bombina *Bombina fortinuptialis*	Rotbauchunke

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Bombina maxima *Bombina microdeladigitora*	Riesenunke
Bombina orientalis	Chinesische Rotbauchunke
Bombina variegata	Gelbbauchunke
Bufo calamita	Kreuzkrote
Bufo viridis	Wechselkrote
Chioglossa lusitanica	Goldstreifen-Salamander
Dendrobates spp.	Baumsteigerfrosche
Hyla arborea	Laubfrosch
Pelobates cultripes	Messerfuss
Pelobates fuscus	Knoblauchkrote
Phyllobates spp.	Blattsteigerfrosche
Proteus anguinus	Grottenolm
Rana arvalis	Moorfrosch
Rana dalmatina	Springfrosch
Rana hexadactyla	Sechszehenfrosch
Rana latastei	Italienischer Springfrosch
Rana tigerina	Asiatischer Ochsenfrosch
Rana spp.	Eigentliche Frosche -alle nichteuropai-schen Arten
with the exception of *Rana catesbeiana*	mit Ausnahme von Amerikanischer Ochsenfrosch
Salamandra luschani	Lyzischer Salamander
Salamandrina terdigitata	Brillensalamander
Triturus cristatus	Kammolch
Amphibia spp.	Lurche -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt

FISH and CYCLOSTOMES

Pisces	**Fische**
Acipenser sturio	Baltischer Stor
Chaetondontidae spp.	Borstenzahner -alle Arten

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Petromyzontidae spp.	Rundmauler -alle heimischen Arten
Pomacanthidae spp.	Engelfische -alle Arten
Zanclidae spp.	Halfterfische -alle Arten

ECHINODERMS

Echinodermata	**Stachelhauter**
Echinus esculentus	Essbarer Seeigel
Solaster papposus	Sonnenstern

INSECTS

Insecta	**Insekten**
Odonata	Libellen
Pamassius apollo	Apollofalter
Aeshna coerulea	Alpen-Mosaikjungfer
Aeshna viridis	Grune Mosaikjungfer
Ceriagrion tenellum	Spate Adonislibelle
Coenagrion armatum	Hauben-Azurjungfer
Coenagrion hylas	Sibirische Azurjungfer
Coenagrion mercuriale	Helm-Azurjungfer
Coenagrion ornatum	Vogel-Azurjungfer
Coenagrion hylas	Sibirische Azurjungfer
Coenagrion mercuriale	Helm-Azurjungfer
Coenagrion ornatum	Vogel-Azurjungfer
Cordulegaster bidentata	Gestreifte Quelljungfer
Epitheca bimaculata	Zweifleck
Gomphus flavipes	Asiatische Keiljungfer
Gomphus simillimus	Gelbe Keiljungfer
Gomphus vulgatissimus	Gemeine Keiljungfer
Leucorrhinia albifrons	Ostliche Moosjungfer

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Leucorrhinia caudalis	Zierliche Moosjungfer
Onychogomphus uncatus	Grosse Zangenlibelle
Ophiogomphus serpentinus	Grune Keiljungfer
Orthetrum brunneum	Sudlicher Blaupfeil
Odonata spp.	Libellen -alle heimischen Arten, soweit nicht im einzelnen aufgefuhrt
Mantodea	Fangheuschrecken
Mantis religiosa	Gottesanbeterin
Saltatoria	Springheuschrecken
Aiolopus thalassinus	Grune Strandschrecke
Arcyptera fusca	Pallas' Hockerschrecke
Arcyptera microptera	Kleine Hockerschrecke
Bryodema tuberculata	Gefleckte Schnarrschrecke
Calliptamus italicus	Italienische Schonschrecke
Ephippiger ephippiger	Steppen-Sattelschreck
Gampsocleis glabra	Heideschrecke
Metrioptera suassureina	Gebirgsbeissschrecke
Oecanthus pellucens	Weinhahnchen
Oedipoda caevulescens	Blauflugelige Odlandschrecke
Oedipoda germanica	Rotflugelige Odlandschrecke
Platycleis tesselata	Braunfleckige Beissschrecke
Psophus stridulus	Rotflugelige Schnarrschrecke
Ruspolia nitidula	Gemeine Schiefkopfschrecke
Sphingonotus caerulans	Blauflugelige Sandschrecke
Rhynchota	Schnabelkerfen
Cicadetta montana	Bergzikade
Tibicina haematodes *Planipennia*	Blutrote Singzikade Echte Netzflugler
Ascalaphidae spp.	Schmetterlingshafte -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Dendroleon pantherinus	Panther-Ameisenjungfer

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Distoleon tetragrammicus	Langfuhlerige Ameisenjungfer
Libelloides coccajus *(Ascalaphus libelluloides)*	Libellen-Schmetterlingshaft
Libelloides longicornis *(Ascalaphus longicornis)*	Langfuhleriger Schmetterlingshaft
Mantispa styriaca	Steirischer Fanghaft
Myrmeleon bore	Dunen-Ameisenjungfer
Myrmeleonidae spp.	Ameisenjungfern -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Coleoptera	Kafer
Acmaeodera degener	Achtzehnfleckiger Ohnschild-Pracht-kafer
Aesalus scarabaeoides	Kurzschroter
Aromia moschata	Moschusbock
Buprestidae spp.	Prachtkafer -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
with the exception of . *Agrilus ater (sexguttatus)*	mit Ausnahmen von Pappelprachtkafer
Agrilus biguttatus	Zweipunktiger Eichenprachtkafer
Agrilus viridis	Buchenprachtkafer (Laubholzprachtkafer)
Anthaxia quadripunctata	Vierpunkt-Kiefernprachtkafer
Chrysobothris affinis	Goldgruben-Eichenprachtkafer
Buprestis novemmaculata	Gefleckter Nadelholzprachtkafer
Buprestis splendens	Goldstreifiger Prachtkafer
Calosoma auropunctatus	Goldpunkt-Puppenrauber
Calosoma reticulatum	Smaragdgruner Puppenrauber
Calosoma spp.	Puppenrauber -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Carabus clathratus	Ufer-Laufkafer
Carabus menetriesi	Waldmoor-Laufkafer
Carabus variolosus	Schwarzer Grubenkafer

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Carabus spp.	Grosslaufkafer -alle heimischen Arten, soweit nicht im einzelnen aufgefuhrt
Cerambyx cerdo	Heldbock (Grosser Eichenbock)
Cerambyx scopolii	Kleiner Eichenbock
Cetonia aurata	Rosenkafer
Cicindela arenaria	Wiener Sandlaufkafer
Cicindela spp.	Sandlaufkafer -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Clerus mutillarius	Eichen-Buntkafer
Copris lunaris	Mondhornkafer
Dicerca furcata (acuminata)	Scharfzahniger Zahnflugelprachtkafer
Dicerca moesta	Linienhalsiger Zahnflugelprachtkafer
Dorcadion fuliginator	Erdbock
Dytiscus latissimus	Breitrand
Ergates faber	Mulmbock
Eurythyrea austriaca	Grunglanzender Glanz-Prachtkafer
Eurythyrea quercus	Eckschild-Glanz-Prachtkafer
Gaurotes excellens	Geissblattbock
Gnorimus nobilis	Gruner Edelscharrkafer
Gnorimus octopunctatus	Veranderlicher Edelscharrkafer
Hydrous spp.	Kolbenwasserkafer -alle heimischen Arten
Lamis textor	Schwarzer Weberbock
Liocola lugubris	Marmorierter Goldkafer
Lucanidae spp.	Hirschkafer -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Megopis scabrincornis	Kornerbock
Melanophila picta	Gefleckter Zahnrand-Prachtkafer
Meloe autumnalis	Blauschimmernder Maiwurmkafer
Meloe cicatricosus	Narbiger Maiwurmkafer

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Meloe coriarius	Glanzendschwarzer Maiwurmkafer
Meloe decorus	Violetthalsiger Maiwurmkafer
Meloe hungarus	Gelbrandiger Maiwurmkafer
Meloe rugosus	Mattschwarzer Maiwurmkafer
Meloe variegatus *Meloe* spp.	Bunter Olkafer Olkafer -alle heimischen Arten, soweit nicht im einzelnen aufgefuhrt
Necydalis major	Grosser Wespenbock
Oryctes nasicornis	Nashornkafer
Osmoderma eremita	Eremit
Phytoecia nigripes	Schwarzfussiger Walzenhalsbock
Phytoecia rubropunctata	Rotpunktierter Walzenhalsbock
Phytoecia uncinata	Wachsblumenbockchen
Phytoecia spp.	Walzenhalsbocke -alle eurpaischen Arten, soweit nicht im einzelnen aufgefuhrt
Purpuricenus kaehleri	Purpurbock
Rosalia alpina	Alpenbock
Sitaris muralis	Schmalflugliger Pelzbienenolkafer
Tragosoma depsarium	Zottelbock
Trichodes alvearius	Zottiger Bienenkafer
Trichodes apiarius	Gemeiner Bienenkafer
Trichodes ircutensis	Sibirischer Bienenkafer
Typhoeus typhoeus	Stierkafer
Hymenoptera	Hautflugler
Apoidea spp.	Bienen und Hummeln -alle heimischen Arten
Bembix integra	Kurzflugelige Kreiselwespe
Bembix spp.	Kreiselwespen -alle heimischen Arten, soweit nicht im einzelnen aufgefuhrt
Cimbex spp.	Knopfhornwespen -alle heimischen Arten, soweit nicht im einzelnen aufgefuhrt
Formica aquilonia	Alpenwaldameise

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Formica exsecta *Formica foreli*	Grosse Kerbameise
Formica lugubris *Formica nigricans*	Gebirgs-Waldameise
Formica polyctena	Kahlruckige Waldameise
Formica pratensis	
Formica pressilabris	Furchenlippige Kerbameise
Formica rufa	Rote Waldameised
Formica sanguinea	Blutrote Raubameise
Formica truncorum	Strunkameise
Formica uralensis	Uralameise
Scolia quadripunctata	Viewfleck-Dolchwespe
Vespa crabro	Hornisse
Lepidoptera	Schmetterlinge
Abraxas sylvata	Ulmen-Flecken-spanner
Acanthobrahmaea europaea	Europaischer Brahmaeaspinner
Acosmetia caliginosa	Scharteneule
Aedia funesta	Windeneule
Aglia tau	Nagelfleck
Agrochola laevis	Graue Wollschenkeleule
Agrotis ripae	Strand-Erdeule
Agrotis trux	Steppenheiden-Erdeule
Allancastria cerisyi	Ostlicher Osterluzeifalter
Ammobiota festiva	Englischer Bar
Ammoconia senex	Mittelrheintal-Graseule
Amphipyra livida	Schwarze Hochglanzeule
Amphipyra perflua	Gesaumte Glanzeule
Anarta cordigera	Moorbunteule
Anarta myrtilli	Heidekrauteulchen
Anthocharis cardamines	Aurorafalter
Anthocharis damone	Goldfleck-Aurorafalter

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Apatura spp.	Schillerfalter -alle europaischen Arten
Apamea aquila	Pfeifengras-Trauereule
Apamea oblonga	Auen-Graswurzeleule
Apamea pabulatricula	Weissgraue Graseule
Apamea platinea	Platineule
Apamea rubrirena	Hartgraseule
Aperira syringaris	Geissblatt-Buntspanner
Apharitis acamas	Goldflugel-Feuerfalter
Apharitis maxima	
Aporophyla lueneburgensis	Hellgraue Heideblumeneule
Aporophyla lutulenta	Graue Glattruckeneule
Aporophyla nigra	Schwarze Glattruckeneule
Archiearis notha	Mittleres Jungfernkind
Archiearis parthenias	Grosses Jungfernkind
Archon apollinus	Insel-Apollo
Arctia villica	Schwarzer Bar
Arctia spp.	Baren -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Arethusana arethusa	Rotbindiger Samtfalter
Argynnis paphia	Kaisermantel, Silberstrich
Argyronome laodice	Grunlicher Perlmutterfalter
Arichanna melanaria	Rauschbeeren-Flekkenspanner
Aricia crassiopuncta *Aricia taberdiana*	
Artiora evonymaria	Pfaffenhutchen-Wellrandspanner
Artogeia ergane	Berg-Weissling
Artogeia krueperi	Krupers Weissling
Artogeia manni	Mannis Weissling
Aspilates formosaria	Wiesenmoor-Buntspannerf
Baptria tibiale	Trauerspanner

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Boloria aquilonaris	Moosbeeren-Schekkenfalter
Boloria spp.	Perlmutterfalter -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Brenthis daphne	Brombeer-Perlmutterfalter
Brenthis hecate	Saumfleck-Perlmutterfalter
Brenthis ino	Feuchtwiesen Perlmutterfalter
Brintesia circe	Weisser Waldpurtier
Calamia tridens	Gruneule
Callimorpha spp.	Schonbar und Spanische Flagge -alle europaischen Arten
Callophrys mystaphia *Callophrys suaveola*	
Callopistria juventina	Adlerfarneule
Carcharodus alceae	Kleiner Malvendickkopffalter
Carcharodus boeticus	Andorn-Dickkopffalter
Carcharodus flocciferus	Eibischfalter
Carcharodus lavatherae	Ziest-Dickkopffalter
Carsia sororiata	Moosbeeren-Grauspanner
Carterocephalus silvicolus	Schwarzfleckiger Golddickkopf
Catephia alchymista	Weisses Ordensband
Catocala pacta	Bruchweidenkarmin
Catocala spp.	Ordensbander -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Celaena haworthii	Haworths Wieseneule
Cerura spp.	Hermelinspinner und Grosser Gabelschwanz -alle europaischen Arten
Charaxes jasius	Erdbeerbaumfalter
Chazara bischoffi	Bischoffs-Augenfalter
Chazara briseis *Chazara persephone*	Blaugras-Augenfalter
Chelis maculosad	Fleckenbar
Chondrosomafiduciaria	

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Clossiana spp.	Perlmutterfalter -alle europaischen Arten
Coenonymphaoedippus	Moor-Wiesenvogelchen
Coenonympha spp.	Wiesenvogelchen -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Colias palaeno	Hochmoorgelbling
Colias spp.	Heufalter und Moorgelbling -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Conistra fragariae	Erdbeereule
Conistra veronicae	Rotbraune Wintereule
Coscinia cribraria	Weisser Grasbar
Cosmia diffinis	Weissflecken-Ulmeneule
Crocallis tusciaria	Waldreben-Schmuckspanner
Cucullia argentea	Silbermonch
Cucullia thapsiphaga	Konigskerzen-Braunmonch
Cucullia spp.	Moncheulenfalter -alle europaischen Arten, soweit nicht in einzelnen aufgefuhrt
Cymbalophora pudica	
Dasychira abietis	Tannenstreckfuss
Dasypolia templi	Graugelbe Rauhaareule
Deltote candidula	Ampfer-Grasmotteneulchen
Diachrysia chryson	Goldfleck-Wasserdosteule
Diacrisia metelkana	Metelkanabar
Diarsia dahlii	Dahls Moorheideneule
Dicycla oo	Eichen-Nulleneule
Dolbina elegans	
Drymonia spp.	Eichenbuschspinner -alle europaischen Arten
Dysauxes ancilla	Braunes Fleckwidderchen
Dyscia fagaria	Heidekraut-Fleckenspanner

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Dyscia spp.	-alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Dyspessa ulula	Lauchzwiebelbohrer
Elphinstonia charlonia	Gelber Aurorafalter
Endromis versicolora	Scheckflugel, Fruhlings-Birkenspinner
Ephesia fulminea	Gelbes Ordensband
Epilecta linogrisea	Silbergraue Bandeule
Epirranthis diversata	Bunter Espne-Fruhlingsspanner
Episema glaucina	Graslilien-Zwiebeleule
Erebia phegea	
Erebia spp.	Mohrenfalter -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Eremobia ochroleuca	Ockerfarbene Queckeneule
Eriogaster catax	Heckenwollafter
Eriogaster rimicola	Eichenwollafter
Eriopygodes imbecilla	Braune Berggraseule
Euapatura mirza	
Eucarta amethystina	Amethysteule
Euchalcia modesta	Lungenkraut-Silbereule
Euchalcia variabilis	Olivengrune Eisenhut-Hockereule
Eucharia casta (deserta)	Labkrautbar
Euchloe charlonia	
Eudia pavonia	Kleines Nachtpfauenauge
Eumera regina	
Eugraphe subrosea	Rotbraune Torfmooreule
Eupithecia breviculata	Haarstrang-Blutenspanner
Eupithecia impurata	Gebanderter Glockenblumen-Blutenspanner
Eurodryas aurinia	Skabiosen-Scheckenfalter
Eurodryas desfontainii	Knautien-Scheckenfalter
Euxoa lidia	Schwarzliche Erdeule
Euxoa vitta	Sandrasen-Erdeule

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Exaereta ulmi	Ulmenspinner
Fabriciana spp.	Perlmutterfalterarten -alle eurpaischen Arten
Fagivorina arenariaf	Rotbuchen-Rindenflechtenspanner
Fixsenia lederi	
Furcula spp.	Gebelschwanzarten -alle europaischen Arten
Gastropacha spp.	Kupferglucke und Pappelglucke
Gonepteryx cleopatra cleobule	Kanarischer Zitronenfalter
Gonepteryx cleopatra palmae	Las Palmas-Zitronenfalter
Gonepteryx farinosa	Balkan-Zitronenfalter
Gortyna borelli	Haarstrangwurzeleule
Graellsia isabellae	Isabellaspinner
Grammia cervini	Materhornbar
Grammia quenselii	Quenselis Alpenbar
Griposia aeruginea	Dunkelgraue Eicheneule
Griposia aprilina	Aprileule (Grune Eicheneule)
Gynaephora selenitica	Mondfleck-Burstenspinner
Hadena irregularis	Gipskraut-Kapseleule
Hamearis lucina	Perlbinde (Brauner Wurfelfalter)
Heliophobus texturata	Tragant-Steppenheideneule
Heliothis maritima	Schuppenmieren-Bluteneule
Hemaris spp.	Schwarmer -alle europaischen Arten
Heyeropterus morpheus	Spiegelfleck-Dickkopffalter
Hipparchia alcyone	Kleines Waldportier
Hipparchia statilinus	Eisenfarbener Samtfalter
Hipparchia spp.	Samtfalter, Waldportier -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Hyboma strigosa	Laubgebusch-Striemeneule
Hyles spp.	Schwarmer -alle europaischen Arten

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Hyphoraia aulica	Hofdame, Barenspinner
Hypodryas maturna	Kleiner Maivogel
Hypogymna morio	Trauerspinner
Hyponephele kocaki	Kocaks Ochsenauge
Hyponephele lycaon	Kleines Ochsenauge
Iphiclides podalirius	Segelfalter
Issoria lathonia	Kleiner Perlmutterfalter
Jodia croceago	Eichen-Safraneule
Jordanita chloros	Kupferglanz-Grunwidderchen
Kirinia climena	
Kirinia roxelana	
Kretania eurypilus	
Kretania psylorita	Kretischer Blauling
Laelia coenosa	Gelbbein
Lamprosticta culta	Osthaineule
Lamprotes c-aureum	Goldenes C, Wiesenrauten-C-Eule
Lasiommata spp.	Braunauge, Maauerfuchs -alle europaischen Arten
Lemonia taraxaci	Lowenzahnspinner
Lemonia spp.	-alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Leptidea morsie	Fentons Weissling
Leptidea sinapis	Senfweissling
Libythea celtis	Zurgelbaum-Schnauzenfalter
Limenitis spp.	Eisvogel -alle europaischen Arten
Lithophane lamda	Sumpfporst-Rindeneule
Lithophane spp.	Rindeneulen -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Lopinga achine	Gelbringfalter
Luperina nickerlii	Nickerlis Graswurzeleule
Luperina pozzi	Pozzis Graswurzeleule

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Lycaena dispar	Flussampfer-Dukatenfalter
Lycaena helle	Blauschillernder Feuerfalter
Lycaenidae spp.	Blaulinge -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Lycia isabellae	Isabellaspanner
Lycia zonaria	Trockenrasen-Spinnerspanner
Lycophotia molothina	Graue Besenheideeuled
Lysandra caucasica	Kaukasus-Blauling
Lythria purpuraria	Vogelknoterich-Purpurbindenspanner
Macroglossum croaticum	Kroatischer Taubenschwanz
Maculinea alcon	Kleiner Moorblauling
Maculinea arion	Schwarzfleckiger Blauling
Maculinea nausithous	Schwarzblauer Moorblauling
Maculinea rebeli	Rebels Enzianblauling
Malacosoma franconica	Frankfurter Ringelspinner
Mamestra splendens	Rote Mooreule
Maniola nurag	Sardisches Ochsenauge
Meganephria bimaculosa	Zweifleckige Plumpeule
Melanargia spp.	Schachbrettfalter -alle europaischen Arten
Melitaea spp.	Scheckenfalter -alle europaischen Arten
Menophra abruptaria	Lederbrauner Fliederspanner
Mesoacidalia aglaja	Grosser Perlmutterfalter
Mesogona acetosellae	Eichenbuschwald-Winkeleule
Mesogona oxalina	Auenwald-Winkeleule
Minois dryas	Blauaugiger Waldportier
Minucia lunaris	Mondeule, Braunes Ordensband
Mormo maura	Schwarzes Ordensband
Muschampia cribrellum	Steppen-Dickkopffalter
Muschampia tessellum	Schachbrett-Dickkopffalter

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Mythimna favicolor	Salzwiesen-Graseule
Narraga fasciolaria	Beifuss-Banderspanner
Neolysandra coelestina	Coelestin-Blauling
Neptis sappho	Schwarzbrauner Trauerfalter
Nordmannia armena	Armenischer Zipfelfalter
Nordmannia marcidus	
Nordmannia sassanides	
Nymphalis spp.	-alle europaischen Arten
Ochropleura praecox	Grune Beifuss-Erdeule
Ocneria detrita	Russspinner
Ocneria rubea	Rostspinner
Ocnogyna spp.	-alle europaischen Arten
Odonestis pruni	Pflaumenglucke, Feuerglucke
Odontognophos dumetata	Kreuzdorn-Grossspanner
Oeneis glacialis	Alpensamtfalter
Orgyia ericae	Heideburstenspinner
Orgyia gonostigma	Eckfleck
Orthosia opima	Moorheiden-Fruhlingseule
Pachypasa otus	Ohreulen-Glucke
Papilio alexanor	Alexanor-Schwalbenschwanz
Papilio machaon	Schwalbenschwanz
Paradiarsia punicea	Rotbraune Moorheiden-Erdeule
Pararge xiphia	Madeira-Brettspiel
Pararge xiphioides	Kanaren-Brettspiel
Parasemia plantaginis	Wegerichbar
Parnassius mnemosyne	Schwarzer Apollofalter
Parnassius phoebus	Alpen-Apollofalter
Pechipogo plumigeralis	Steppenheiden-Spannereule
Pericallia matronula	Augsburger Bar
Periphanes delphinii	Rittersporneule

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Perisomena caecigena	Ockerfarbener Pfauenspinner
Perizoma sagittata	Wiesenrauten-Blattspanner
Pharetra cinerea	Sandheiden-Randeneule
Phlogophora scita	Waldfarn-Smarugdeule
Photedes captiuncula	Grashalden-Haineulchen
Phragmatobia caesarea	Kaiserbar
Phragmitiphila nexa	Wasserschwaden-Rohrichteule
Phyllodesma ilicifolia	Weidenglucke
Phyllodesma tremulifolia	Eichenglucke
Pieris cheiranthi	Kanarischer Kohlweissling
Plebejus loewii	Loews-Blauling
Plusia spp.	Goldeulen -alle europaischen Arten
Polychrysia moneta	Goldige Eisenhut-Hockereule
Polygonia c-album	C-Falter
Polymixis flavicincta	Gelbliche Steineule
Polymixis polymita	Olivbraune Steineule
Polyphaenis sericata	Bunte Ligustereule
Pontia callidice	Alpenweissling
Pontia chloridice	
Porphyrinia noctualis	Zwergeulchend
Problepsis ocellata	
Proclossiana eunomia	Randring-Perlmutterfalter
Proserpinus proserpina	Nachtkerzenschwarmer
Pseudochazara spp.	-alle europaischen Arten
Pseudophilotes bavius	Bavius Blauling
Pseudotergumia wyssii	
Pyrgus accretus	Veritys Wurfelfalter
Pyrgus armoricanus	Oberthurs Wurfelfalter
Pyrgus cirsii	Ramburs Wurfelfalter
Pyrgus trebevicensis	Warrens Wurfelfalter

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Pyrgus spp.	Wurfelfalter -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Pyrois cinnamomea	Glanz-Zimteule
Pyronia tithonus	Rotbraunes Ochsenauge
Rethera komarova	
Rhodostrophis spp.	Rotbandspanner -alle europaischen Arten
Rhyacia lucipeta	Glanzende Erdeule
Rhyparia purpurata	Purpurbar
Saturnia pyri	Wiener Nachtpfauenauge
Scopula decorata	Thymian-Steppenrasenspanner
Scotopteryx coarctaria	Ginsterheiden-Wellenstriemenspanner
Sedina buettneri	Buttners Schragflugeleule
Selidosema brunnearia	Purpurgrauer Hornklee-Tagspanner
Senta flammea	Striemen-Schilfeule
Simyra albovenos	Goezes Rohrichteule
Simyra nervosa	Weissgraue Schragflugeleule
Smerinthus ocellata	Abendpfauenauge
Spatalia argentina	Silberfleckenspinner
Sphinx ligustri	Ligusterschwarmer
Spialis sertorius	Roter Wurfelfalter
Spiris striata	Gestreifter Grasbar
Standfussiana lucernea	Standfuss Zackenbindeneule
Staurophora celsia	Malachiteule
Sublysandra myrrha	
Sublysandra myrrhina	
Syngrapha interrogationis	Rauschbeeren-Silbereule
Syntomis phegea	Weissfleck-Widderchen
Synvaleria jaspidea	Schlehen-Jaspiseule
Synvaleria oleagina	Olivgrune Schmuckeule
Thetidia smaragdaria	Smaragdgruner Schafgarbenspanner

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Thyria jacobaeae	Blutbar
Tomares callimachus	
Tomares romanovi	
Trichosea ludifica	Gelber Hermelin
Vacciniina optilete	Moosbeerenblauling
Vanessa indica vulcanica	Indischer Admiral
Xestia agathina	Heidekraut-Bodeneule
Xestia castanea	Ginsterheiden-Bodeneule
Xestia collina	Hugel-Erdeule
Xestia sincera	Hochmoor-Fichteneule
Xylena exsoleta	Fahlgraue Moderholzeule
Xylena vetusta	Braune Moderholzeule
Zegris eupheme	Rotfleck-Aurorafalter
Zerynthis polyxena	Osterluzeifalter
Zerynthis rumina	Spanischer Osterluzeifalter
Zygaena cynarae	Haarstrang-Widderchen
Zygaenidae spp.	Widderchen -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt

ANNELIDA

Annelida	**Ringelwurmer**
Hirudo medicinalis	Blutegel

CRUSTACEA

Crustacea	**Krebse**
Phyllopoda	Blattfuss-Krebse
Branchipus schaefferi	
Branchipus stagnalis	
Chirocephalus diaphanus	
Lepidurus apus	
Leptestheria dahalacensis	

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Limnadia lenticularis	
Lynceus brachyurus	
Siphonophanes grubei	
Tanymastix stagnalis	
Triops cancriformis	
Decapoda	Zehnfuss-Krebse
Astacus astacus	Edelkrebs
Austropotamobius torrentium	Steinkrebs
Homarus gammarus (vulgaris)	Hummer
Arachnida	Spinnentiere
Arctosa cinera	
Argyroneta aquatica	
Dolomedes fimbriatus	
Dolomedes plantarius	
Eresus cinnaberinus	
Philaeus chrysops	
Mollusca	Weichtiere
Polyplacophora	Kaferschnecken
Lepidochiton cinereus	Kaferschnecke
Gastropoda	Schnecken
Calliostoma zizphinus	Bunte Kreiselschnecke
Charonia tritonis	Tritonshorn
Helix aspersa	Gefleckte Weinbergschnecke
Helix pomatia	Gewohnliche Weinbergschnecke
Patina pellucida	
Thais lapillus	Nordische Purpurschnecke
Lamellibranchiata	Muscheln
Anodonta anatina	Flache Teichmuschel
Anodonta cygnea	Gemeine Teichmuschel
Margaritifera margaritifera	Flusspermuschel
Pinna nobilis	Steckmuschel

(continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Pseudanodonta complanata	Abgeplattete Teichmuschel
Pseudanodonta elongata	Schlanke Teichmuschel
Pseudanodonta middendorffi	Donau Teichmuschel
Unio crassus	Kleine Flussmuschel
Unio pictorum	Malermuschel
Unio tumidus	Grosse Flussmuschel

ANTHOZOA

Anthozoa	**Blumentiere**
Corallium rubrum	Edelkoralle

PLANTS

Pteridophyta et Spermatophyta	**Farn- und Blutenpflanzen**
Abies nebrodensis (Lojac.) Mattei	Nebroden-Tanne
Achillea atrata L.	Schwarze Schafgarbe
Achillea clavennae L.	Bittere Schafgarbe
Achillea clusiana Tausch	Ostalpen-Schafgarbe
Achillea erba-rotta All.	Westalpen-Schafgarbe
Achillea moschata Wulfen	Moschus-Schafgarbe, Iva
Achillea nana L.	Zwerg-Schafgarbe
Achillea oxyloba (DC.) Schultz Bip	Dolomiten-Schafgarbe
Aconitum spp.	Eisenhut -alle europaischen Arten
Adenophora liliifolia (L.) Ledeb. ex A. DC.	Schellenblume
Adonis vernalis L.	Fruhlings-Adonisroschen
Aeonium saundersii Bolle	Kanarendachwurz
Aeonium spp.	Kanarendachwurz -alle Arten, soweit nicht im einzelnen aufgefuhrt
Aichryson spp.	Aichryson -alle Arten
Allium crameri Aschers. & Boiss.	Cramers Lauch
Allium strictum Schrader	Steifer Lauch

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Allium victorialis L. Althaea officinalis L.	Allermannsharnisch Echter Eibisch
Ales albiflora A. Guill.	
Aloe compressa Perr. (incl. *A. Compressa var. schisto-phila Perr.*)	
Aloe descoingsii Reyn.	
Aloe dinteri Berger	
Aloe haemanthifolia Mart. et Berger	
Aloe parvula Berger	
Aloe rauhii Reyn.	
Alyssum akamasicum B.L. Burtt	Akamas-Steinkraut
Alyssum fastigiatum Heywood	Buschel-Steinkraut
Alyssum montanum L.	Berg-Steinkraut
Alyssum saxatile L.	Felsen-Steinkraut
Amaracus cordifolius Aucher-Eloy & Montbret ex Benth.	Herzblatt-Bost
Anacyclus alboranensis Esteve Chueca & Varo	Alboran-Kreisblume
Anagallis tenella (L) L.	Zarter Gauchheil
Anagyris latifolia	Breitblattriger
Brouss. ex Willd.	Stinkstrauch
Anchusa crispa Viv.	Krause Ochsenzunge
Androcymbium rechingeri Greuter	Rechingers Androcymbium
Androsace spp. with the exception of	Mannsschild -alle heimischen Arten mit Ausnahme von
Androsace elongata L.	Verlangerter Mannsschild
Androsace maxima L.	Riesen-Mannsschild
Androsace septentrionalis L.	Nordischer Mannsschild
Anemone narcissiflora L.	Narzissen-Windroschen, Berghahnlein
Anemone sylvestris L.	Grosses Windroschen
Antennaria dioica (L.) Gaertner	Katzenpfotchen
Anthyllis lemanniana Lowe	Lemanns Wundklee
Antirrhinum charidemi Lange	Cabo-do-Gata-Lowenmaul
Apium inundatum (L.) Rchb. f.	Flutender Sellerie
Apium repens (Jacq.) Lag.	Kriechender Sellerie

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Aquilegia cazorlensis Heywood	Cazorla-Akelei
Aquilegia spp.	Akelei -alle Arten, soweit nicht im einzelnen aufgefuhrt
Arabis kennedyae Meikle	Kennedys Gansekresse
Arctostaphylos uvaursi (L.) Spreng.	Echte Barentraube
Arenaria lithops Heywood ex McNeill	Stein-Sandkraut
Argyranthemum lidii Humphries	Lids Kanarenmargerite
Argyranthemum pinnatifidum (L.f.) Lowe subsp. succulentum (Lowe) Humphries	Fleischige Kanarenmargerite
Argyranthemum thalassophilum (Svent.) Humphries	Salvagen-Kanarenmargerite
Argyranthemum winteri (Svent.) Humphries	Winters Kanarenmargerite
Ariocarpus spp.	Wollfruchtkaktus -alle Arten
Armeria purpurea Koch	Ried-Grasnelke
Armeria rouyana Daveau	Rouys Grasnelke
Armeria soleirolii (Duby) Godron	Soleirols Grasnelke
Armeria spp.	Grasnelke -alle leuropaischen Arten, soweit nicht im einzelnen aufgefuhrt
Arnica montana L.	Arnika, Wohlverleih
Artemisia genipi Weber	Schwarze Edelraute
Artemisia glacialis L.	Gletscher-Edelraute
Artemisia granatensis Boiss.	Granada-Beifuss
Artemisia laciniata Willd.	Schlitzblatt-Beifuss
Artemisia umbelliformis Lam.	Echte Edelraute
Asparagus fallax Svent.	Tauschender Spargel
Asplenium adulterinum Milde	Braugruner Streifenfarn
Asplenium billotii F.W. Schultz	Billots Streifenfarn
Asplenium cuneifolium Viv.	Serpentin-Streifenfarn
Asplenium fissum Kit. ex Willd.	Zerschlitzter Streifenfarn
Asplenium fontanum (L.) Bernh.	Jura-Streifenfarn
Aster alpinus L.	Alpen-Aster

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Aster amellus L.	Berg-Aster
Aster pyrenaeus Desf. ex DC.	Pyrenaen-Aster
Aster sibiricus L.	Sibirsche Aster
Asteriscus schultzii (Bolle) Pitard & Proust	Schultz' Sternauge
Astragalus algarbiensis Coss. ex Bunge	Algarve-Tragant
Astragalus aquilllanus Anzalone	Abruzzen-Tragant
Astragalus maritimus Moris	Strand-Tragant
Astragalus verrucosus Moris	Warziger Tragant
Atractylis arbuscula Svent. & Michaelis	Baumchen-Atractylis
Atractylis preauxiana Schultz Bip.	Preaux-Atractylis
Atropa baetica Willk.	Andalusische Tollkirsche
Bellevalia salah-eidii Tackh. & Boulos	Agyptische Bellevalie
Bellevalia spp.	Bellevalie -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Bencomia brachystachya Svent.	Kurzahrige Bencomia
Bencomia exstipulata Svent.	Nebenblattlose Bencomia
Betula humilis Schrank	Niedrige Birke
Betula nana L.	Zwerg-Birke
Biscutella laevigata L.	Gewohnliche Brillenschote
Biscutella neustriaca Bonnet	Pariser Brillenschote
Blossfeldia liliputana Werderm.	
Botrychium matricariifolium (Retz.) A. Braun ex Koch	Astiger Rautenfarn
Botrychium multifidum (S. G. Gmelin) Rupr.	Vielteiliger Rautenfarn
Botrychium simplex E. Hitchc.	Einfacher Rautenfarn
Botrychium virginianum (L.) Swartz	Virginischer Rautenfarn
Botrychium spp.	Rautenfarn, Mondraute -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Brassica bourgeaui (Webb ex Christ) Kuntze	Bourgeaus Kohl
Brassica hilarionis Post	Zypern-Kohl
Brassica macrocarpa Guss.	Grossfruchtiger Kohl

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Braya purpurascens (R. Br.) Bunge	Purpur-Knotenschotchen
Brimeura spp.	Brimeura -alle Arten
Bupleurum kakiskalae Greuter	Kakiskala-Hasenohr
Buxus sempervirens L.	Buchsbaum
Caldesia parnassifolia (Bassi ex L.) Parl.	Herzloffel
Calla palustris L.	Calla, Schlangenwurz
Calystegia soldanella (L.) R. Br.	Strand-Winde
Campanula baborensis Quezel	Algerische Glockenblume
Campanuala latifolia L.	Breitblattrige Glockenblume
Campanula sabatia De Not.	Savona-Glockenblume
Campanula thyrsoides L.	Strauss-Glockenblume
Caralluma burchardii N. E. Brown	Burchards Fliegenblume
Caralluma europaea (Guss.) N. E. Brown	Europaische Fliegenblume
Caralluma munbyana (Decaisne) N. E. Brown	Munbys Fliegenblume
Carduncellus ilicifolius Pomel	Stachelblattrige Zwergdistel
Carex baldensis L.	Monte-Baldo-Segge
Carline acaulis L.	Silberdistel
Centaurea balearica J.D. Rodriquez	Balearen-Flockenblume
Centaurea heldreichii Halacsy	Heldreichs Flockenblume
Centaurea horrida Badaro	Stachelige Flockenblume
Centaurea kalambakensis Freyn & Sint.	Kalambaka-Flockenblume
Centaurea lactiflora Halacsy	Milchweisse Flockenblume
Centaurea linaresii Lazaro	Linares' Flockenblume
Centaurea megarensis Halacsy & Hayek	Megara-Flockenblume
Centaurea niederi Heldr.	Nieders Flockenblume
Centaurea peucedanifolia Boiss. & Orph.	Haarstrang-Flockenblume
Centaurea princeps Boiss. & Heldr.	Furstliche Flockenblume
Centaurium spp.	Tausendguldenkraut -alle heimischen Arten
Ceropegia spp.	Leuchterblume
Ceterach officinarum DC.	Milzfarn

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Copiapoa spp.	-alle Arten
Chamaemeles coriacea Lindl.	Lederige Zierquitte
Cheirolophus arboreus (Webb) Holub	Baumartige Flockenblume
Cheirolophus duranii (Burchard) Holub	Durans Flockenblume
Cheirolophus junonianus (Svent.) Holub	La-Palma-Flockenblume
Cheirolophus massonianus (Lowe) Hansen & Sunding	Massons Flockenblume
Cheirolophus tagananensis (Svent.) Holub	Taganana-Flockenblume
Chimaphila umbellata (L.) Barton	Doldiges Winterlieb
Chionodoxa lochiae Meikle	Schneestolz
Cistus osbeckiaefolius Webb ex Christ	Osbeckiablatt-Zistrose
Clematis alpina L.	Alpen-Waldrebe
Cochlearia spp.	Loffelkraut -alle heimischen Arten
Consolida samia P.H. Davis	Samos-Rittersporn
Convolvulus argyrothamnos Greuter	Silber-Winde
Convolvulus lopezsocasi Svent.	Lanzarote-Winde
Convolvulus massonii A. Dietr.	Massons Winde
Coronopus navasii Pau	Navas; Krahenfuss
Cortusa matthioli L.	Alpen-Heilglockel
Crambe arborea Webb ex Christ	Baumartiger Meerkohl
Crambe maritima L.	Gewohnlicher Meerkohl
Crambe sventenii	Sventenius-Meerkohl
B. Petters. ex Bramw. & Sunding	
Crocus cyprius Boiss. & Kotschy	Zyprischer Krokus
Crocus hartmannianus Holmboe	Hartmannis Krokus
Crocus spp.	Krokus -alle Arten, soweit nicht im einzelnen aufgefuhrt
Cryptogramma crispa (L.) R. Br. ex Hooker	Krauser Rollfarn
Cupressus dupreziana A. Camus	Sahara-Zypresse
Cyatheaceae spp.	Baumfarne -alle Arten

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Cyclamen balearicum Willk.	Balearen-Alpenveilchen
Cylamen cilicium Boiss. et Heldr.	Zilizisches Alpenveilchen
Cyclamen creticum (Dorfl.) Hildebr.	Kretisches Alpenveilchen
Cyclamen graecum Link	Griechisches Alpenveilchen
Cyclamen mirabile Hildebr.	Wunderbares Alpenveilchen
Cyclamen parvifforum Pobed.	Kleinblutiges Alpenveilchen
Cyclamen purpurascens Mill.	Europaisches Alpenveilchen
Cyclamen pseudibericum Hildebr.	Amanus-Alpenveilchen
Cyclamen trochopteranthum O. Schwarz	Flugelrad-Alpenveilchen
Cyclamen spp.	Alpenveilchen -alle Arten, soweit nicht im einzelnen aufgefuhrt
Cyperus papyrus L. subsp. hadidii Chrtek & Slavikova	Hadidis Papyrus
Cypripedium spp.	Frauenschuhorchideen -alle nichteuropaischen Arten
Cystopteris montana (Lam.) Desv.	Berg-Blasenfarn
Cystopteris sudetica A. Br. & Milde	Sudeten-Blasenfarn
Cytisus aeolicus Guss. ex Lindl.	Aolischer Geissklee
Daphne rodriquezii Texidor	Rodriquez' Seidelbast
Daphne spp.	Seidelbast -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Delphinium caseyi B. L. Burtt	Caseys Rittersporn
Delphinium elatum L.	Hoher Rittersporn
Dianthus spp.	Nelke -alle Arten
Dicksoniaceae spp.	Baumfarne -alle Arten, ausgenommen bepflanztes durchwurzeltes Substrat von Orchideenpflanzen aus Brasilien
Dictamnus albus L.	Diptam
Digitalis atlantica Pomel	Atlantischer Fingerhut
Digitalis grandiflora Mill.	Grossblutiger Fingerhut
Digitalis lutea L.	Gelber Fingerhut
Diplazium caudatum (Cav.) Jermy	Schwanz-Doppelschleierfarn
Diplotaxis siettiana Maire	Siettis Doppelsame

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Discocactus spp.	Scheibenkakteen -alle Arten
Draba spp.	Felsenblumchen -alle europaischen Arten
with the exception of *Draba muralis L.*	mit Ausnahme von Mauer-Felsenblumchen
Draba nemorosa L.	Hain-Felsenblumchen
Drosera spp.	Sonnentau -alle heimischen Arten
Dryopteris cristata (L.) A. Gray	Kammfarn
Echinocereus delaetii Gurke	
Echium auberianum Webb. & Berthel.	Aubers Natternkopf
Echium gentianoides	Enzianahnlicher
Webb ex Coincy	Natternhopf
Echium handiense Svent.	Jandia-Natternkopf
Echium wildpretii H. H. W. Pears. ex Hook. fil.	Wildprets Natternkopf
Enarthrocarpus pterocarpus (Pers.) DC	Geflugelte Gliederschote
Encephalocarpus strobiliformis (Werd.) Berg.	
Epilobium fleischeri Hochst.	Fleischers Weidenroschen
Epithelantha spp.	Epithelantha -alle Arten
Eritrichum nanum (L.) Schrader ex Gaudin	Himmelsherold
Eryngium alpinum L.	Alpen-Mannstreu
Eryngium maritimum L.	Strand-Mannstreu, Stranddistel
Euphorbia anachoreta Svent.	Einsiedler-Wolfsmilch
Euphorbia ankarensis P. Boit.	
Euphorbia balsamifera Aiton	
Euphorbia bupleurifolia Jacq.	
Euphorbia crispa (Haw.) Sweet	
Euphorbia cylindrifolia J. Mam.-Lap. & Rauh	
Euphorbia decaryi A. Guill.	
Euphorbia francoisii Leandri	
Euphorbia guillauminiana P. Boit.	

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Euphorbia gymnocalycioides M. Gilbert et S. Carter	
Euphorbia haniensis Burchard	Jandia-Wolfsmilch
Euphorbia lucida Waldstein & Kitaibel	Glanz-Wolfsmilch
Euphorbia millotii Ursch & Leandri	
Euphorbia moratii Rauh	
Euphorbia multiceps Berger	
Euphorbia namaquensis N. E. Br.	
Euphorbia Neohumbertii P. Boit.	
Euphorbia pachypodioides P. Boit.	
Euphorbia palustris L.	Sumpf-Wolfsmilch
Euphorbia pedilanthoides M. Denis	
Euphorbia piscidermis G. Gilbert	
Euphorbia ruscinonensis Boiss.	Roussillon-Wolfsmilch
Euphorbia squarrosa Haw.	
Euphorbia trichadenia Pax	
Euphorbia viguieri M. Denis	
Ferula cypria Post	Zyprischer Riesenfenchel
Fritillaria meleagris L.	Echte Schachblume
Fritillaria spp.	Schachblume -alle Arten, soweit nicht im einzelnen aufgefuhrt
Galanthus spp.	Schneeglockchen -alle Arten
Galium litorale Guss.	Strand-Labkraut
Genista spinulosa Pomel	Kleidorniger Ginster
Gentiana lutea L.	Gelber Enzian
Gentiana spp.	Enzian -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Gentianella bohemica Skalicky	Bohmischer Enzian
Gentianella uliginosa (Willd.) Borner	Sumpf-Enzian
Gentianella spp.	Enzian -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Geranium maderense Yeo	Madeira-Storchschnabel
Gladiolus palustris Gaudin	Sumpf-Siegwurz
Gladiolus spp.	Siegwurz -alle Arten, soweit nicht im einzelnen aufgefuhrt
Globularia ascanii D. Bramwell & Kunkel	Weisse Kugelblume
Globularia sarcophylla Svent.	Fleischige Kugelblume
Globularia stygia Orph. ex Boiss.	Dunkle Kugelblume
Globularia spp.	Kugelblume -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Gratiola officinalis L.	Gottes-Gnadenkraut
Greenovia spp.	Greenovie -alle Arten
Gymnospermium altaicum (Pallas) Spach	Altai-Trapp
Gypsophila fastigiata L.	Ebenstraussiges Gipskraut
Gypsophila papillosa P. Porta	Warziges Gipskraut
Helianthemum apenninum (L.) Mill.	Apenninen-Sonnenroschen
Helianthemum bystropogophyllum Svent.	Bystropogonblattriges Sonnonroschen
Helichrysum arenarium (L.) Moench	Sand-Strohblume
Helichrysum monogynum B. L. Burtt & Sunding	Eingrifflige Strohblume
Helleborus niger L.	Christrose, Schwarze Nieswurz
Helleborus spp.	Nieswurz -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Hepatica nobilis Schreber	Leberblumchen
Horminum pyrenaicum L.	Pyrenaen-Drachenmaul
Hottonia palustris L.	Wasserfeder, Wasserprimel
Hutera rupestris P. Porta	Felsen-Hutera
Hyacinthella sp.	Zwerghyazinthe -alle Arten
Hymenophyllum tunbrigense (L.) Smith	Hautfarn
Hypericum aciferum (Greuter) N. K. B. Robson	Nadel-Johanniskraut
Hypericum elegans Stephan ex Willd.	Zierliches Johanniskraut
Hypericum elodes L.	Sumpf-Johanniskraut

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Iberis runemarkii Greuter & Burdet	Runemarks Schleifenblume
Ilex aquifolium L.	Stechpalme
Ipomoea sinaica Tackh. & Boulos	Sinai-Prunkwinde
Iris lortetii Barbey	Lortets Schwertlilie
Iris spuria L.	Wiesen-Schwertlilie
Iris variegata L.	Bunte Schwertlilie
Iris spp.	Schwertlilie -alle Arten, soweit nicht im einzelnen aufgefuhrt
Isoetes echinospora	Stachelsporiges
Dur.	Brachsenkraut
Isoetes lacustris L.	See-Brachsenkraut
Isoplexis canariensis (L.) Loud.	Gewohnlicher Kanarenfingerhut
Isoplexis chalcantha Svent. & O'Shanahan	Behaarter Kanarenfingerhut
Isoplexis isabelliana (Webb & Berthel.) Masf.	Kahler Kanarenfingerhut
Juncus stygius L.	Moor-Binse
Juniperus cedrus Webb & Berthel.	Zedern-Wacholder
Jurinea cyanoides (L.) Rchb.	Sand-Silberscharte
Kochia saxicola Guss.	Felsen-Radmelde
Kunkeliella canariensis Stearn	Gran-Canaria-Kunkeliella
Kunkeliella psilotoclada (Svent.) Stearn	Teneriffa-Kunkeliella
Lamyropsis microcephala (Moris) Dittrich & Greuter	Sardische Lamyropsis
Laser Trilobum (L.) Borkh.	Rosskummel
Laserpitium longiradium Boiss.	Langstrahliges Laserkraut
Lathyrus bauhinii Genty	Schwert-Platterbse
Lanthyrus maritimus Bigelow	Strand-Platterbse
Lathyrus pannonicus (Jacq.) Garcke	Ungarische Platterbse
Lavatera phoenicea Vent.	Purpurrote Strauchmalve
Ledum palustre L.	Sumpf-Porst
Leontodon siculus (Guss.) Finch & Sell	Sizilianischer Lowenzahn
Leontopodium alpinum Cass.	Edelweiss
Leucojum aestivum L.	Sommer-Knotenblume

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Leucojum vernum L.	Fruhlings-Knotenblume, Marzenbecher
Leuzea cynaroides	Artischockenartige
(Link) Font Quer	Bergscharte
Leuzea rhapontica (L.) Holub	Alpen-Bergscharte
Lilium spp.	Lilie -alle Arten
Limonium larborescens (Brouss.) Kuntze	Baumahnlicher Strandflieder
Limonium dendroides Svent.	Baumartiger Strandflieder
Limonium fruticans (Webb) Kuntze	Strauchiger Strandflieder
Limonium imbricatum (Webb & Berthel.) Hubbard	Dachziegeliger Strandflieder
Limonium macrophyllum (Brouss.) Kuntze	Grossblattriger Strandflieder
Limonium paradoxum Pugsley	Seltsamer Strandflieder
Limonium preauxii (Webb & Berthel.) Kuntze	Preaux' Strandflieder
Limonium recurvum C. E. Salmon	Zuruckgekrummter Strandfliederf
Limonium *spectabile* (Svent.) Kunkel & Sunding	Prachtiger Strandflieder
Limonium spp.	Strandflieder -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Linaria burceziana Maire	Burcez-Leinkraut
Linnaea borealis L.	Moosglockchen
Linum flavum L.	Gelber Lein
Linum perenne L.	Ausdauernder Lein
Linum spp.	Lein -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
with the exception of *Linum catharticum L.*	mit Ausnahme von Purgier-Lein
Lloydia serotina (L.) Rchdb.	Spatbluhende Faltenlilie
Lobelia dortmanna L.	Wasser-Lobelie
Loeflingia tavaresiana G. Samp.	Portugiesische Loeflingie
Logfia neglecta (Soy.-Will.) Holub	Verkanntes Filzkraut
Lomatogonium carinthiacum (Wulf.) Rchb.	Karntner Tauernblumchen
Lophophora spp.	-alle Arten

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Lotus berthelotii Masferrerf	Berthelots Hornklee
Lotus callis-viridis D. Bramwell & D. H. Davis	Gran-Canaria-Hornklee
Lotus kunkelii (Esteve) D. Bramwell & D. H. Davis	Kungels Hornklee
Lotus maculatus Breitfeld	Gefleckter Hornklee
Lugoa revoluta DC.	Teneriffa-Lugoa
Lycopodiales spp.	Barlappgewachse -alle heimischen Arten
Mammillaria goldii Glass & Foster	
Mammillaria haudeana Lau & Wagner	
Mammillaria hernandezii Glass & Foster	
Mammillaria humboldtii Ehrenb.	
Mammillaria saboae Glass	
Mammillaria theresae Cutak	
Marcetella maderensis (Bornm.) Svent.	Madeira-Marcetella
Matteuccia struthiopteris (L.) Todaro	Straussenfarn
Medemia argun (Martius) Wurtt. ex. Mart.	Nordafridanische Medemia
Melocactus spp.	Melonenkakteen -alle Arten
Menyanthes trifoliata L.	Fieberklee
Mesembryanthemum gaussenii Leredde	Gaussens Mittagsblume
Micromeria taygetea P. H. Davis	Taygetos-Micromerie
Monanthes adenoscepes Svent.	Drusige Zwegfetthenne
Monanthes spp.	Zwergfetthenne -alle Arten, soweit nicht im einzelnen aufgefuhrt
Muscari gussonei (Parl.) Tod.	Gussones Traubenhyazinthe
Muscari spp.	Traubenhyazinthe -alle Arten, soweit nicht im einzelnen aufgefuhrt
Musschia wollastonii Lowe	Musschia
Myosotis rehsteineri Wartm.	Bodensee-Vergissmeinnicht
Narcissus exsertus Haw.	Stern-Narzisse
Narcissus spp.	Narzisse -alle Arten, soweit nicht im einzelnen aufgefuhrt
Narthecium ossifragum (L.) Huds.	Beinbrech, Ahrenlilie

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Nepenthes spp.	Kannenpflanze -alle Arten
Nepeta sphaciotica P. H. Davis	Westkretische Katzenminze
Nuphar lutea (L.) Sm.	Gelbe Teichrose
Nuphar pumila (Timm) DC.	Kleine Teichrose
Nymphaea alba L.	Weisse Seerose
Nymphaea candida K. Presl	Kleine Seerose
Nymphoides peltata (S. G. Gmel.) O. Kuntze	Seekanne
Omphalodes littoralis Lehm.	Strand-Gedenkemein
Ononis maweana Ball	Mawes Hauhechel
Ononis megalostachys Munby	Grossahrige Hauhechel
Onopordum algeriense (Munby) Pomel	Algerische Eselsdistel
Onopordum cyrenaicum Marie & M. Weiller	Lybische Eselsdistel
Onosma arenaria Waldstein & Kitaibel	Sand-Lotwurz
Onosma elegantissima Rech. fil. & Goulimy	Zierliche Lotwurz
Onosma pseudarenaria Schur	Rumanische Lotwurz
Onosma spp.	Lotwurz -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Orchidaceae spp.	Orchideen -alle europaischen Arten
Orchidaceae spp.	Orchideen -alle nichteuropaischen Arten, soweit nicht im einzelnen aufgefuhrt, der Unterfamilien und Triben Calypsoeae Cypripedioideae Malaxideae Neottioideae Orchidoideae Spiranthoideae
Osmunda regalis L.	Konigsfarn
Oxytropis deflexa (Pallas) DC.	Gekrummte Fahnenwicke
Oxytropis pilosa (L.) DC.	Zottige Fahnenwicke
Pachypodium spp.	-alle Arten
Paeonia spp.	Pfingstrose -alle europaischen Arten
Pancratium maritimum L.	Strand-Pankrazlilie
Papaver sendtneri Kern. ex Hayek	Sendtners Alpen-Mohn

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Paphiopedilum spp.	Venusschuhorchideen -alle Arten
Paradisea liliastrum (L.) Bertol.	Trichterlilie
Parnassia palustris L.	Sumpf-Herzblatt
Pedicularis numidica Pomel	Algerisches Lausekraut
Pedicularis sceptrumcarolinum L.	Karlszepter
Pedicularis spp.	Lausekraut -alle heimischen Arten, soweit nicht im einzelnen aufgefuhrt
Petrocallis pyrenaica (L.) R. Br.	Pyrenaen-Steinschmuckel
Phlomis brevibracteata Turrill	Kurzdeckblatt-Brandkraut
Phlomis cypria Post	Zyprisches Brandkraut
Phyllitis scolopendrium (L.) Newm.	Hirschzunge
Pinguicula alpina L.	Alpen-Fettkraut
Pinguicula crystallina Sibth. & Smith	Kristall-Fettkraut
Pinguicula vulgaris L.	Gewohnliches Fettkraut
Polemonium caeruleum L.	Blaue Himmelsleiter
Polystichum spp.	Schildfarn -alle heimischen Arten
Primula apennina Widner	Apenninen-Primel
Primula egaliksensis Wormsk.	Island-Primel
Primula spp.	Primel, Schlusselblume -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
with the exception of *Primula elatior (L.) Hill*	mit Ausnahme von Hohe Schlusselblume
Prmula veris L.	Wiesen-Schlusselblume
Pteris serrulata Forskal	Feingesagter Saumfarn
Pterocephalus virens Berthel.	Grunender Flugelkopf
Ptilotrichum pyrenaicum (Lapeyr.) Boiss.	Pyrenaen-Haarfeder
Pulicaria burchardii Hutch.	Burchards Flohkraut
Pulicaria canariensis Bolle	Kanarisches Flohkraut
Pulmonaria angustifolia L.	Schmalblattriges Lungenkraut
Pulmonaria mollis Wulflen ex Hornem.	Weiches Lungenkraut

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Pulmonaria montana Lejeune	Berg-Lungenkraut
Pulsatilla patens (L.) Miller	Finger-Kuchenschelle
Pulsatilla pratensis (L.) Miller	Wiesen-Kuchenschelle
Pulsatilla vernalis (L.) Miller	Fruhlings-Kuchenschelle
Pulsatilla spp.	Kuchenschelle -alle Arten, soweit nicht im einzelnen aufgefuhrt
Ranunculus kykkoensis Meikle	Kykko-Hahnenfuss
Ranunculus lingua L.	Zungen-Hahnenfuss
Ranunculus radinotrichus Greuter& Strid	Zartbehaarter Hahnenfuss
Ranunculus weyleri Mares	Weylers Hahnenfuss
Rheum rhaponticum L.	Pontischer Rhabarber
Rhododendron ferrugineum L.	Rostblattrige Alpenrose
Rhodoooodendron hirsutum L.	Rauhblattrige Alpenrose
Rhodothamnus chamaecistus (L.) Rchb.	Zwergalpenrose
Rhynchosinapis johnstonii (G. Samp.) Heywood	Johnstons Schnabelsenf
Ribes sardoum Martelli	Sardinische Stachelbeere
Rubus chamaemorus L.	Moltebeere
Rupicapnos africana (Lam.) Pomel	Afrikanischer Felsenerdrauch
Salicornia veneta Pitnatti & Lausi	Venezianischer Queller
Salvia veneris Hedge	Dickblattriger Salbei
Salvinia natans (L.) All.	Schwimmfarn
Sarracenia spp.	-alle Arten
Saxifraga hirculus L.	Moor-Steinbrech
Saxifraga spp.	Steinbrech -alle Arten, soweit nicht im einzelnen aufgefuhrt
with the exception of *Saxifraga tridactylites L.*	mit Ausnahme von Finger-Steinbrech
Scheuchzeria palustris L.	Blasenbinse
Scilla morrisii Meikle	Morris' Blaustern
Scilla spp. (incl. Endymion)	Blaustern (eunchl. Hasenglockchen) -alle Arten, soweit nicht im einzelnen aufgefuhrt
Scorzonera austriaca Willd.	Osterreichische Schwarzwurzel
Scorzonera drarii Tackh.	Drars Schwarzwurzel

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Scorzonera hispanica L.	Spanische Schwarzwurzel
Scorzonera humilis L.	Niedrige Schwarzwurzel
Scorzonera purpurea L.	Violette Schwarzwurzel
Sempervivum spp. (incl. *Jovibarba* spp.)	Hauswurz (einschl. Fransenhauswurz) -alle Arten
Senecio carniolicus Willd.	Krainer Greiskraut
Senecio hadrosomus Svent.	Gran-Canaria-Greiskraut
Senecio hermosae Pitard	Hermosatal-Greiskraut
Sideritis cypria Post	Zyprisches Gliedkraut
Sideritis cystosiphon Svent. *Sideritis discolor (Webb ex De Noe)*	Versteckblutiges Gliedkraut
Bolle Sideritis infernalis	Zweifarbiges Gliedkraut
Bolle Sideritis nervosa	Hollenschlucht Gliedkraut
(Christ) Lit Silene orphanidis	Starknerviges Gliedkraut
Boiss. Silene rothmaleri	Leere Lichtnelke
Pinto da Silva	Rothmalers Lichtnelke
Silene velutina Pourret ex Loisel.	Samt Lichtnelke
Solanum lidii Sundling *Solanum trisectum*	Lids Nachtschatten
Dunal	Dreischnittiger Nachtschatten
Soldanella spp.	Troddelblume -alle heimischen Arten
Solenanthus albanicus (Degen & Baldacci)	Albanischer Riesenboretsch
Sonchus bornmuelleri Pitard	Bornmullers Gansedistel
Stipa bavaric Martinovsky & H. Scholz	Bayerisches Federgras
Stipa spp.	Federgras, Pfriemengras -alle europaischen Arten, soweit nicht im einzelnen aufgefuhrt
Stipagrostis drarii (Tackh.) De Winter	Drars Grannen Straussgras
Stratiotes aloides L.	Krebsschere
Swertia perennis L.	Blauer Sumpfstern
Symphytum cycladense Pawl.	Kykladen-Beinwll
Tanacetum ptarmiciflorum (Webb) Schultz Bip.	Silbergrauer Rainfarn

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Taxus baccata L.	Eibe
Teline benehoavensis (Bolle ex Svent.)	La-Palma-Teline
Teline linifolia (L.) Webb & Berthel. subsp. teneriffae P. E. Gibbs & Dingwall	Teneriffa-Teline
Thymus camphoratus Hoffmans. & Link	Kampfer-Thymian
Thymus carnosus Boiss.	Fleischiger Thymian
Thymus cephalotos L.	Grosskopfiger Thymian
Trapa natans L.	Wassernuss
Trollius europaeus L.	Trollblume
Tuberaria major (Willk.) Pinto da Silva & Rozeira	Grosses Sandroschen
Tulipa spp.	Tulpe -alle Arten
Turbinicarpus spp.	-alle Arten
Uebelmannia spp.	Uebelmanns Kakteen -alle Arten
Utricularia bremii Heer	Bremis Wasserschlauch
Utricularia ochroleuca Hartm.	Ockergelber Wasserschlauch
Valeriana longiflora Willk.	Langblutiger Baldrian
Veronica longifolia L.	Langblattriger Ehrenpreis
Veronica spicata L.	Ahriger Ehrenpreis
Viola calaminaria (Ging. in DC.) Lejeune	Gelbes Galmei-Veilchen
Viola calcarata L.	Gesporntes Veilchen
Viola guestphalica Nauenburg	Violettes Galmei-Veilchen
Viola hispida Lam.	Steifhaariges Veilchen
Viola jaubertiana Mares & Vigineix	Jauberts Veilchen
Viola palmensis Webb. & Berthel.	La-Palma-Veilchen
Vitis sylvestris C.C. Gmelin	Wilde Weinrebe
Wahlenbergia hederacea (L.) Rchb.	Efeu-Moorglockchen
Withania aristata (Aiton) Pers.	Grannen-Withania
Withania obtusifolia	Stumpfblattrige
Tackh.	Withania
Woodsia spp.	Wimperfarn -alle heimischen Arten

(continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Wulfenia carinthiaca Jacq.	Karnter Kuhtritt

MOSS

Bryophyta	**Moose**
Dicranum spp.	Gabelzahnmoos
Hylocomium spp.	Hainmoos
Polytrichum commune Hedwig	Frauenhaarmoos
Polytrichum formosum Hedwig	Schone Haarmutzenmoos
Rhytidiadelphus spp.	Kranzmoos
Sphagnum spp.	Torfmoos

LICHENS (Algae)

Lichenes	**Flechten**
Anaptychia spp.	Wimperflechte -alle heimischen Arten
Cetraria islandica (L.) Ach. *Cetraria* spp.	Islandisch Moos Islandflechte Moosflechte -alle heimischen Arten, soweit nicht im einzelnen aufgefuhrt
Cladina spp. *(Cladonia Sect. Cladina)*	Rentierflechte -alle Arten
Lobaria pulmonaria (L.) Hoffm.	Echte Lungenflechte
Lobaria spp.	Lungenflechte -alle heimischen Arten, soweit nicht im einzelnen aufgefuhrt
Parmelia spp.	Schlusselflechte -alle heimischen Arten
Usneaceae spp. (incl. *Ramalinaceae* spp.)	Bartflechte -alle heimischen Arten

FUNGI

Fungi	**Pilze**
Albatrellus spp.	Schaf-Porling, Semmel-Porling -alle heimischen Arten
Amanita caesarea (Scop. ex Fr.) Pers. ex Schw.	Kaiserling

(continued)

Table 5-1 (continued)

SCIENTIFIC NAME	COMMON GERMAN NAME
Boletus aereus Bull. ex Fr.	Weisser Bronze-Rohrling
Boletus appendiculatus Schff. ex Fr.	Gelber Bronze-Rohrling
Boletus edulis Bull. ex Fr.	Steinpilz
Boletus fechtneri Vel.	Sommer-Rohrling
Boletus regius Krbh.	Echter Konigs-Rohrling
Boletus speciosus Frost	Blauender Konigs-Rohrling
Cantharellus spp.	Pfifferling -alle heimischen Arten
Gomphus clavatus (Pers. ex Fr.) S. F. Gray	Schweinsohr
Gyrodon lividus (Buss. ex. Fr.) Sacc.	Erlen-Grubling
Hygrocybe spp.	Saftling -alle heimischen Arten
Hygrophorus marzuolus (Fr.) Bres.	Marz-Schneckling
Lacdtarius volemus Fr.	Bratling
Leccinum spp.	Birkenpilz und Rotkappe -alle heimischen Arten
Morchella spp.	Morchel -alle heimischen Arten
Tricholoma flavovirens (Pers. ex. Fr.) Lund & Nannf.	Grunling
Tuber spp.	Truffel -alle heimischen Arten

INSTALLATION:	COMPLIANCE CATEGORY: NATURAL RESOURCES MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		

SECTION 6

OTHER ENVIRONMENTAL ISSUES

Federal Republic of Germany ECAMP

SECTION 6

OTHER ENVIRONMENTAL ISSUES

A. Applicability of this Section

This section applies to all U.S. Air Force (USAF) installations overseas. Currently, this section contains major subsections that address environmental impacts, environmental noise, the Installation Restoration Program (IRP), the Pollution Prevention Program, and environmental program management in general.

The regulatory requirements in this section are based on the *Environmental Final Governing Standards--Germany* (FGS-FRG), Department of Defense (DOD) regulations, and Air Force Instructions (AFIs) that apply at overseas installations. Management practices (MPs) are derived from U.S. Environmental Protection Agency (USEPA) regulations that are not mandatory overseas but are important to follow to preserve the health and safety of AF employees and protect the environment.

Environmental Impacts

The topic of this subsection is the AF's Environmental Impact Analysis Process (EIAP). The subsection addresses FGS-FRG and AF standards the goal of which is to ensure that decision makers are presented with sufficient relevant analysis to understand and evaluate the impact on the environment of the actions they approve and that they receive this information at appropriate times in the decision-making process.

Environmental Noise

This subsection contains standards to control environmental noise within installations. It is limited to measures allowing reasonable internal DOD planning efforts, but it does not address procedures for operating aircraft or ships, which are outside the scope of DOD Directive 6050.16.

Installation Restoration Program

This subsection contains standards to ensure that cleanup projects at sites contaminated by AF operations are executed to the appropriate point.

Pollution Prevention

The U.S. Environmental Protection Agency (USEPA) has developed a hierarchy of options regarding environmental management. The highest priority in this hierarchy of management methods is source reduction as a means of preventing pollution. Source reduction includes reuse or closed-loop recycling. The hierarchy then proceeds to recycling, treatment, and disposal as management methods of decreasing priority.

The concept of pollution prevention, as defined by the USEPA, is the maximum feasible reduction at the source of all wastes generated. This reduction is accomplished by the judicious use of resources through source reduction, materials substitution, energy efficiency, reuse of input materials during production, and reduced water consumption.

Some of the benefits of pollution prevention are:

1. reducing operating costs (materials, waste management and disposal, production, energy, and facility cleanup)
2. reducing risk of liability
3. enhancing public image
4. protecting the environment and public health.

In Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, 30 November 1993, the AF explicitly makes Pollution Prevention one of the four pillars of its Environmental Quality Program. The AF will eliminate pollution from its activities wherever possible. It will reduce the generation of waste and the procurement of environmentally damaging materials to as near zero as feasible through material substitution, process change, and other techniques. It will prevent at the source, to the greatest extent possible, environmentally harmful discharges to the air, land, surface water, and groundwater. If the generation of waste cannot be prevented at the source, spent material and waste will be reused or recycled whenever possible. What cannot be reused or recycled will be disposed of in an environmentally sound manner. Both waste disposal and releases to the environment are permitted only after all other pollution prevention alternatives have been exhausted.

The regulatory requirements in this subsection are based on the AFIs that address pollution prevention. Management Practices (MPs) are derived from USEPA regulations that are not mandatory overseas but are important to the protection of the environment.

Program Management

This subsection contains standards relevant to weapons ranges, the A-106 Pollution Abatement Plan, certain reporting requirements, the installation's Environmental Protection Committee (EPC), standards addressing the management of environment-related data in the Work Information Management System-Environmental Subsystem (WIMS-ES), and deployments of forces to AF installations overseas.

B. DOD Directives/Instructions

Environmental Impacts

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 10, contains criteria to control environmental noise generated by a DOD component on a DOD-controlled accommodation. The control of noise generated on an accommodation is addressed under two distinct headings: firstly, noise that affects the area within the accommodation's boundaries, and, secondly, the off-site effects of noise generated within the accommodation's boundaries. A list of German *Deutsches Institut für Normung* (DIN) standards that are basic to the understanding and management of an environmental noise program is presented as reference tool at Table 6-1 in this manual.

- DOD Directive (DODD) 6050.7, *Environmental Effects Abroad of Major Defense Department Actions*, 31 March 1979, also contains EIAP requirements for overseas installations.

Environmental Noise

Environmental Final Governing Standards--Germany (FGS-FRG), November 1994, Chapter 10, contains criteria for controlling environmental noise on installations.

Installation Restoration Program

- None.

Pollution Prevention

- DOD Instruction (DODI) 4715.4, *Pollution Prevention*, 18 June 1996, implements policy, assigns responsibility, and prescribes procedures for implementation of pollution prevention programs throughout the DOD. Only those portions of the Instruction that are applicable outside the United States are included here.

Program Management

- None.

C. U.S. Air Force Documents

Environmental Impacts

- AFI 32-7061, *Environmental Impact Analysis Process,* 24 January 1995, contains requirements that apply to EIAP overseas.

- HQ USAF/CEV Policy Letter, *MAJCOM EPC Coordination of EIAP Documents*, 26 August 1994, requires documentation indicating prior MAJCOM EPC coordination or approval to accompany EIAP documents sent to them for senior staff approval or signature.

Environmental Noise

- AFI 13-212, Volume 1, *Weapons Ranges*, 28 July 1994, requires that installations with air-to-surface weapons ranges address those ranges in plans required by environmental regulations.

Installation Restoration Program

- AFI 32-7006, *Environmental Program in Foreign Countries*, 29 April 1994, contains requirements relevant to the cleanup of overseas sites that have been contaminated in the course of AF actions.

Pollution Prevention

- AFI 32-7080, *Pollution Prevention Program*, 12 May 1994, outlines the requirements for the AF's Pollution Prevention Program. It provides instruction in the areas of planning, use of ozone depleting chemicals (ODCs), hazardous substance management and minimization, solid waste management, nonpoint source pollution, and air pollutant emissions.

- AF Policy Letter, *Air Force Ban on Purchases of ODCs*, 7 January 1993, governs the purchase, use, and management of controlled ODCs. It outlines the ODCs and equipment that use them that cannot be purchased and it outlines the steps that should be taken to replace ODCs currently in use.

- AF Pollution Prevention Strategy, 24 July 1995, details the goals and strategies promoted by the AF for pollution prevention.

Program Management

- AFI 13-212, Volume I, *Weapons Ranges*, 28 July 1994, environmental requirements for bases that operate air-to-surface weapons ranges.

- AFI 32-7001, *Environmental Budgeting*, 9 May 1994, provides guidance on identifying, developing, and processing requirements to meet environmental standards at AF installations.

- AFI 32-7002, *Environmental Information Management System*, 31 May 1994, provides guidance and procedures to standardize the use of WIMS-ES.

- AFI 32-7005, *Environmental Protection Committees*, 25 February 1994, provides guidance on the make-up and responsibilities of the installation's Environmental Protection Committee (EPC).

- AFI 32-7006, *Environmental Program in Foreign Countries*, 29 April 1994, requires installations to cooperate with host nation regulatory authorities. Further, it requires that copies of host nation regulatory authority inspection reports be forwarded to HQ USAF/CE and that receipt or notification of the imminent receipt of findings involving media attention or off-base impacts be reported to specific authorities. It also imposes on installations requirements for planning prior to receiving deployments.

D. Responsibility for Compliance

Environmental Impacts

- The BCE provides support to the Environmental Planning Function (EPF), including managing and getting the technical analyses necessary to support the EIAP.

- The BES provides technical assistance to the EPF concerning environmental quality standards, effects, and monitoring capabilities relating to the action(s) being assessed.

- The Environmental Protection Committee (EPC) reviews and approves or disapproves environmental documents prepared by the EPF during the EIAP.

- The SJA advises the EPF and EPC of legal issues regarding environmental documents.

- The PAO reviews environmental documents for public affairs sufficiency and advises the EPF on issues to be addressed in environmental impact statements (EISs).

- The Proponent Activity is responsible for providing a complete description of the proposed action and alternatives (DOPAA) and for identifying key decision points and assisting in making sure that

the EIAP is properly phased so that the relevant environmental documents are available to the decision maker.

Environmental Noise

- The Airspace Manager, under the Deputy Commander for Operations, is responsible for managing special use airspace (SUA) and military training routes (MTRs).

- The Public Affairs Officer (PAO) is responsible for making all public releases of information about AF activities.

- The Range Management Agency is responsible for activities at an air-to-ground range, including planning for the range.

Installation Restoration Program

- The BCE is normally responsible for IRP execution. However, this responsibility may be assigned to the installation's Environmental Management Office if one has been established.

- The BES is responsible for providing technical support in risk analysis, Quality Assurance or Quality Control (QA/QC), worker health and safety, and other areas.

- The Staff Judge Advocate (SJA) is responsible for providing legal and negotiation support.

Pollution Prevention

- The Installation Commander (IC) must establish and maintain an active program to survey the use, generation, and disposal of hazardous and radioactive waste. The commander must identify requirements and execute the programs to comply with AF policy.

- The Deputy Commander for Maintenance (DCM) ensures that nonhazardous/nontoxic materials are used where possible, maintains a list of hazardous materials used in the work area by shop and maintenance related task, ensures that personnel are properly trained in ordering, using, handling, controlling, and storing hazardous materials and wastes. DCM is also responsible for ensuring that hazardous waste is properly labeled and for notifying the appropriate headquarters when a nonhazardous substitute can be used. In addition, he/she works with the civil and bioenvironmental engineers to develop the installation's waste management plan.

- The Base Civil Engineer (BCE) is responsible for the maintenance and operation of incinerators, fuel burners (boilers), and all installed petroleum storage and dispensing systems. The BCE is also responsible for the storage and handling of all hazardous materials and fuels used by civil engineering shops. The BCE or designated Environmental Management Office (EMO) develops installation-specific policy for all aspects of hazardous waste and pollution prevention management for all activities on the installation (including AF and non-AF tenants). The BCE/EMO also manages the pollution prevention program and serves as the Office of Primary Responsibility (OPR) for developing and implementing the pollution prevention plan.

- The Bioenvironmental Engineering Services (BES) provides technical expertise on hazardous waste identification and, along with the Environmental Manager and the Environmental Protection Committee, establishes the baseline inventory of the Industrial Toxic Project (ITP) targeted chemicals

(see Table 6-2). The BES identifies pollution prevention opportunities based on workplace surveys and recommends substitute processes. The BES reviews all substitutions to ensure that substituted materials do not introduce new hazards.

- The Supply Officer has primary responsibility to receive, store, and issue all items ordered. He/she serves as the equipment approval authority, administers the supply improvement program, provides technical guidance and assistance on supply matters to agencies across the installation, and serves as the primary stock fund manager.

- The Environmental Protection Committee (EPC) is comprised of representatives from all activities involved in pollution prevention management. It reviews and coordinates the installation commander's pollution prevention management program. The committee reviews summary data on waste generation and personnel exposure. The EPC helps with establishing the baseline inventory of ITP targeted chemicals. It should also adopt a policy recommending against the procurement of hazardous materials containing any USEPA ITP chemicals.

- The Environmental Manager (EM) is responsible for managing the installation hazardous waste (HW) management program. The EM, along with the BES and the EPC, establishes the baseline inventory of ITP chemical quantities. The EM then tracks the issue of these chemicals and sends the information to the MAJCOM.

- Hazardous Waste Generators manage hazardous waste in their custody. Management includes proper storage, inspection, recordkeeping, labeling of containers, and transfer for disposal.

- The Water and Waste Shop within Base Civil Engineering has responsibility for operations and maintenance of treatment plants, pretreatment facilities, pump stations, oil/water separators, and other associated facilities around the installation.

Program Management

A-106 Pollution Abatement Plan

- The BEC is responsible for managing the A-106 program, including updating the current plan, inputting new projects, and coordinating with the Civil Engineering Programmer to ensure projects are included in the Civil Engineering Contract Reporting System (CECORS) or the Programming Design and Construction (PDC) System.

- The Civil Engineering Programmer (CEP) is responsible for getting projects into the CECORS or the PDC system.

- The EPC is responsible for coordinating and approving the A-106 Plan.

WIMS-ES

- The BCE or the Environmental Manager (EM) will coordinate the input of data into WIMS-ES.

Reporting Requirements and Deployments

- AFI 32-7006 does not designate the parties responsible for actions required by these sections.

E. Definitions

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Action* - all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by a DOD component (FGS-FRG, Appendix A).

- *Affirmative Procurement* - Federal agencies must establish programs to encourage purchase of products containing recycled materials, in particular, USEPA Guideline Items. Affirmative procurement programs must establish preference for products containing recycled material, must include a promotion plan to place emphasis on buying recycled, and must have procedures for obtaining and verifying estimates and certifications of recycled content (AFI 32-7080, Attachment 1, Section C).

- *Alternatives* - ways of reducing adverse effects of hazardous materials (HM). Alternatives, as applied to HM decision making, include, but are not limited to, such possibilities as substituting less hazardous or nonhazardous material; redesigning a component such that HM is not needed in its manufacture, use, or maintenance; modifying processes or procedures; restricting users; consumptive use; on-demand supply; direct ordering; extending shelf life; regenerating spent material; downgrading and reuse of spent material; use of waste as raw material in other manufacturing and combinations of those factors. Alternatives are to be analyzed in a could cost approach, considering what the lowest amount the decision could cost by overcoming barriers to getting the job done, while ensuring protection of human health and the environment (AFI 32-7080, Attachment 1, Section C).

- *A-Weighted Sound Level* - calculation of noise exposure that emphasizes sound in the frequency range where most speech information occurs, and thus closely resembles the frequency response of the human ear. Sound measures that are measured on the A-scale are abbreviated dB(A) (FGS-FRG, Appendix A).

- *Baseline* - quantified starting points from which progress is measured. For the purposes of this instruction, baselines are quantities of material purchased or generated over a specified period of time (AFI 32-7080, Attachment 1, Section C).

- *Booby Pistol* - devices that make a noise like a cannon or gun shot to scare away birds. They are normally used around airfields or facilities with similar bird problems (FGS-FRG, Appendix A).

- *Categorical Exclusion* - a class of actions, defined and approved in accordance with Executive Order 12114, DOD Directive 6050.7 and service regulations, that normally do not, individually or cumulatively, significantly harm the environment and that require no further environmental review beyond appropriate documentation of the decision to apply the exclusion (FGS-FRG, Appendix A).

  (NOTE: Attachment 2 to AFI 32-7061 contains an extensive list of actions that are categorically excluded in the absence of unique circumstances.)

- *Characteristic Waste* - a waste that exhibits any of the characteristics listed in 40 Code of Federal Regulations (CFR) 261, Subpart C (i.e., toxicity, corrosiveness, ignitability, reactivity) (AFI 32-7080, Attachment 1, Section C).

- *Competent* - an agency, authority, individual, official, person, etc., who meets any of the following criteria: (FGS-FRG, Appendix A)
  1. specifically designated as competent by FGS-FRG
  2. specifically designated as competent by the authority of a German government [agency]
  3. specifically designated as competent by or meets the qualifications of competency of a recognized German trade organization or association
  4. based on experience, training, and/or authority granted per DOD/component policy or regulations, judged by the responsible commander to be a capable and appropriated organization/ individual to accomplish the task in question.

- *Cost Factors* - the expense and cost avoidance associated with hazardous materials that may be reduced to monetary terms, which includes future liability. Cost factors refer to direct and indirect costs attributable to hazardous materials that are encountered in operations such as acquisition, manufacture, supply use, supply, use, storage inventory control, treatment, recycling, emission control, training, work place safety, labeling, hazard assessments, engineering controls, personal protective equipment, medical monitoring, regulatory overhead, spill contingency, disposal, remedial action and liability (AFI 32-7080, Attachment 1, Section C).

- *Day-Night Average Sound Level* (L_{dn}) - a measure of installation noise exposure expressed in a single number ("xx L_{dn}" as in 55 L_{dn}) that is obtained by adding a 10 dB penalty to nighttime sound levels (2200-0700) to account for increased annoyance caused by noise during these hours (FGS-FRG, Appendix A).

- *Daytime* - 0600 to 2200 hours. However, local authorities may define nighttime starting as early as 2000 hours and ending as late as 0700 hours. On Sundays and German holidays daytime is from 0700 to 2200 hours (FGS-FRG 10-14c(5)).

- *Decibel* (dB) - the unit of sound pressure is the decibel and is symbolically represented as dB. Sound pressure is the amplitude or measure of the difference between atmospheric pressure (with no sound present) and total pressure (with sound present). The decibel scale is a logarithmic scale (FGS-FRG, Appendix A).

- *Description of Proposed Action and Alternatives (DOPAA)* - an AF document that is the framework for assessing the environmental impact of a proposal. It describes the purpose and need for the action, the alternatives to be considered, and the rationale used to arrive at the proposed action (AFI 32-7061, Attachment 1).

- *Economic Analysis* - an evaluation of the costs associated with the use of hazardous materials and potential alternatives. An economic analysis is not a specific, step-by-step procedure that can be applied by rote to all cases of analyzing whether to use a hazardous material. Rather, organizations shall be guided by basic principles of economics and informed judgment (AFI 32-7080, Attachment 1, Section C).

- *Environment* - the natural and physical environment, excluding social, economic, and other environments (FGS-FRG, Appendix A).

- *Environmental Assessment* - a concise analysis to assist DOD components in determining whether there is potential for significant environmental impacts associated with the proposed action and whether an environmental impact statement is required (FGS-FRG, Appendix A).

- *Environmental Impact Statement (EIS)* - an analysis of the likely environmental consequences of a proposal for a major Federal action that is considered by DOD components in deciding whether to approve the proposal. It includes a review of the affected environment, a description of any adverse environmental effects that cannot be avoided if the proposal is adopted, alternatives to the proposed action (including a no-action alternative), actions taken to avoid environmental harm or otherwise to better the environment, and environmental considerations and actions by the other participating nations, bodies, or organizations (FGS-FRG, Appendix A).

- *Environmental Manager* - the Base environmental management function supervisor or designated representative. Synonymous with the term Environmental Coordinator (AFI 32-7080, Attachment 1, Section C).

- *Environmental Review* - an analysis of the likely environmental consequences of the action that is to be considered by DOD components in the decision-making process. It includes a review of the affected environment, actions taken to avoid environmental harm or otherwise to better the environment, and environmental considerations and actions by the other participating nations, bodies, or organizations. Environmental reviews are prepared either unilaterally by DOD or in conjunction with another U.S. Agency but do not include foreign government participation (FGS-FRG, Appendix A).

- *Environmental Study* - an analysis of the likely environmental consequences of the action that is to be considered by DOD components in the decision-making process. It includes a review of the affected environment, actions taken to avoid environmental harm or otherwise to better the environment, and environmental considerations and actions by the other participating nations, bodies, or organizations. Environmental studies are prepared by the United States in conjunction with one or more foreign nations or by an international body or organization in which the United States is a member (FGS-FRG, Appendix A).

- *Environmentally Preferable* - products or services that are less harmful to human health and the environment to use, reuse, operate and maintain, and dispose of in comparison with competing products or services of equal value (AFI 32-7080, Attachment 1, Section C).

- *Equivalent Level* (L_{eq}) - the equivalent steady-state sound that, in a stated period of time, would contain the same acoustic energy as the time-varying sound during the same period (FGS-FRG, Appendix A).

- *Excluded Materials* - excluded items may not be sold through a qualified recycling program (QRP), and the proceeds from their sale shall not be returned to a QRP. Excluded items include but are not limited to: (DODI 4715.4, Enclosure 3):
  a. government-furnished material
  b. precious metal bearing scrap
  c. hazardous waste (including household hazardous waste)
  d. ozone-depleting substances (ODS)
  e. electrical components
  f. unopened containers of solvents, paints, or oil
  g. fuel

h. material that can be sold (as is) as a usable item
i. repairable items that may be used again for their original purposes or functions, e.g., used vehicles, vehicle or machine parts, etc.
j. ships, aircraft, weapons, and other material required to be demilitarized or mutilated, and scrap resulting from demilitarization
k. all Munitions List Items and Strategic List Items as defined in DOD 4160.21-M-1, except firing range expended brass and mixed metals gleaned from firing range cleanup
l. types of surplus personal property whose sales proceeds must be deposited to accounts other than a QRP per 32 CFR 172, Appendix B
   1. scrap generated from Defense Business Operations Fund (DBOF) activities
   2. usable personal property purchased by DBOF activities
   3. property purchased with commissary surcharge funds
   4. automatic data processing equipment owned by the General Services Administration
   5. property purchased for the Military Assistance Program or purchased with Foreign Military Sales Administrative funds
   6. Coast Guard property
   7. property owned by nonappropriated fund activities
   8. lost, abandoned, or unclaimed privately owned personal property
   9. property owned by a country or international organization
   10. bones, fats, and meat trimmings generated by a commissary.

- *Federal Action* - an action that is implemented or funded directly by the United States Government. It does not include actions in which the United States participates in an advisory, information gathering, representational, or diplomatic capacity, nor does it include actions taken by a foreign government in a foreign country in which the United States is a beneficiary of the action or actions in which foreign governments use funds derived indirectly from the United States (FGS-FRG, Appendix A).

- *Foreign Nation* - any geographic area (land, water, or airspace) that is under the jurisdiction of one or more foreign governments; any area under military occupation by the U.S. alone or jointly with any other foreign government; and any area that is the responsibility of an international organization of governments. For the purposes of FGS-FRG, foreign nation includes contiguous zones and exclusive economic zones established consistent with customary international law (FGS-FRG, Appendix A).

- *Global Commons* - geographic areas that are outside the jurisdiction of any nation, and include the oceans outside territorial limits and Antarctica. Global commons do not include contiguous zones and fisheries zones of foreign nations (DODD 6050.7, para C(4)).

- *Hazardous Material Pharmacy* - single point control of hazardous material (AFI 32-7080, Attachment 1, Section C).

- *Hazardous Materials* - any substances or materials that pose a threat to human health or the environment typically due to their toxic, corrosive, ignitable, explosive, or chemically reactive nature. More specific definitions may be found in various Federal regulations that implement statutes (i.e., *Hazardous Material Transportation Act, Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA)) (AFI 32-7080, Attachment 1, Section C).

- *Hazardous Waste* - any waste by-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed; possess at least one of five charac-

teristics (toxic, corrosive, ignitable, explosive, or chemically reactive) or are listed in 40 CFR 261.3 or applicable state or local waste management regulations (AFI 32-7080, Attachment 1, Section C).

- *Hazardous Waste Characterization* - the identification, description, and quantification of a hazardous waste stream (AFI 32-7080, Attachment 1, Section C).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Level 1 Projects and Services* - in the context of the A-106 Pollution Abatement Plan (AFI 32-7001, para 3.4.2.1.1):
  1. correct conditions out of compliance with the FGS or the *Overseas Environmental Baseline Guidance Document* (OEBGD) if there are no FGS (see AFI 32-7006)
  2. restore contaminated sites posing imminent and substantial endangerment to human health and safety
  3. restore contaminated sites as needed to sustain current operations.

- *Level 2 Projects and Services* - in the context of the A-106 Pollution Abatement Plan, these address (AFI 32-7001, para 3.4.2.2.1):
  1. conditions that will be out of compliance with future requirements of international agreements such as treaties, Status of Forces Agreements (SOFAs), or bilateral agreements
  2. conditions that will be out of compliance with future FGS requirements.

- *Level 3 Projects and Services* - in the context of the A-106 Pollution Abatement Plan, these projects and services enhance the environment beyond current and future FGS requirements. (AFI 32-7001, para 3.4.2.2)

  (NOTE: Do not use U.S. funds to restore contaminated sites beyond that needed to eliminate imminent and substantial endangerment to human health and safety or sustain current operations (unless required by international agreement).)

- *Life Cycle Economic Analysis* - an evaluation of the costs associated with the use of hazardous materials and potential alternatives over the life of the investment or hazardous material. The analysis is not a specific, step-by-step procedure that can be applied by rote to all cases. Analysis shall be guided by basic principles of economics and informed judgement (AFI 32-7080, Attachment 1, Section C).

- *Life Cycle of Hazardous Material* - the period starting when the use or potential use of hazardous material is first encountered and extending as long as the actual material or its after effects, such as a discarded residual in a landfill, have a bearing on cost. In the case of weapon system acquisition, the life cycle starts when the system is first envisioned. Effects of the use of hazardous material on later operations and maintenance are to be considered. This also holds true for a new use of a hazardous material. Where the hazardous material is already in general use, the life cycle starts when the material is first encountered by any organization that must deal with it (AFI 32-7080, Attachment 1, Section C).

- *Major Action* - an action involving substantial expenditures of time, money, or resources, that affects the environment on a large geographic scale or has substantial environmental effects on a more limited geographic area, and that is substantially different or a significant departure from other actions previously analyzed with respect to environmental considerations and approved, with which the action under consideration may be associated. A deployment of units, ships, aircraft, or mobile military equipment that does not involve significant changes to the physical environment and that does not require additional support facilities that would significantly change the physical environment is not a major action for the purposes of the Special Programs Management section (FGS-FRG, Appendix A).

- *Management Practice (MP)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *Media* - the term referring to air, land, water, and groundwater (AFI 32-7080, Attachment 1, Section C).

- *Mitigation* - specific steps taken to lessen the adverse effects of a DOD action on the environment (FGS-FRG, Appendix A).

- *Municipal Solid Waste* (MSW) - trash wastes generated by administrative and domestic activities. MSW does not include hazardous wastes (AFI 32-7080, Attachment 1, Section C).

- *Negative Decision* - a record of decision not to prepare an environmental analysis (FGS-FRG, Appendix A).

- *Nighttime* - 2200 to 0600 hours on weekdays. However, local authorities may define nighttime starting as early as 2000 hours and ending as late as 0700 hours. On Sundays and German holidays nighttime is from 2200 to 0700 hours (FGS-FRG 10-14c(5)).

- *Nonpoint or Nonstationary Source (NPS) Pollution* - a diffuse source of pollution that does not discharge through a single point, such as (AFI 32-7080, Attachment 1, Section C):
  1. for water - runoff from construction activities and agricultural, silvicultural, urban areas, and industrial areas including airfield operating areas
  2. for air - aircraft test stands, vehicles, aerospace ground equipment (AGE), and aircraft operations.

- *Opportunity Assessment* - a systematic procedure to identify and assess ways to prevent pollution by reducing or eliminating wastes (AFI 32-7080, Attachment 1, Section C).

- *Other Qualified Recyclable Program Materials* - materials that fit neither the definition of recyclable materials nor the definition of excluded materials (DODI 4715.4, Enclosure 3).

- *Ozone Depleting Chemicals (ODCs)* - chlorofluorocarbons, halons, and other substances that deplete the stratospheric ozone layer as classified by the *Clean Air Act* (CAA) Amendment of 1990 (AFI 32-7080, Attachment 1, Section C).

- *Pollution Prevention* - all the actions necessary, to include use of processes, practices, products or management actions that eliminate or reduce undesirable impacts on human health and the environment. These actions are a hierarchy of source reduction, recycling, treatment, and disposal or means

source reduction and other practices that reduce or eliminate the creation of pollutants through increased efficiency in the use of raw materials, energy, water, or other natural resources, and the protection of natural resources (AFI 32-7080, Attachment 1, Section C).

- *Proponent* - any office, unit, or activity that proposes to initiate an action (AFI 32-7061, Attachment 1).

- *Qualified Recycling Program* - organized operations that require concerted efforts to divert or recover scrap or waste, as well as efforts to identify, segregate, and maintain the integrity of the recyclable materials in order to maintain or enhance their marketability. If the program is administered by a DOD component, a QRP includes adherence to a control process providing accountability for all materials processed through program operations (DODI 4715.4, Enclosure 3).

- *Recyclable Materials* - recyclable materials can include, but are not limited to: high-quality paper and paper products, mixed paper, newspaper, cardboard, plastic, metal cans, glass, used oil (except when hazardous waste), batteries, and tires. In addition, scrap (including ferrous and nonferrous scrap) and firing range expended brass and mixed metals gleaned from firing range cleanup that do not require demilitarization may be included in a QRP (DODI 4715.4, Enclosure 3).

- *Recycling* - the series of activities, including collection, separation, and processing, by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion (DODI 4715.4, Enclosure 3).

- *Recycling* - the use, reclamation and reuse of a material. Use/reuse includes return of the recovered waste to the original process or when the waste is substituted for a raw material in another process. Waste reclamation includes processing of residual waste to recover a useful product and generation of waste material (AFI 32-7080, Attachment 1, Section C).

- *Source Reduction* - any practice that reduces or eliminates any hazardous material, pollutant, or contaminant entering any waste stream or otherwise residual waste generation at the source, usually within the generation process. The term includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, feedstock substitutions, improvements in feedstock purity, shipping and packaging modifications, improvements in housekeeping, maintenance, training, and management practices, increases in machinery efficiency, and recycling within a process (AFI 32-7080, Attachment 1, Section C).

- *State* - the political subdivision referred to as *Land* in Germany (FGS-FRG, Appendix A).

- *Times of Rest* - on workdays, from 0600 to 0800 hours and from 2000 to 2200 hours. On Sundays and German holidays, from 0700 to 0900 hours and from 2000 to 2200 hours (FGS-FRG, Appendix A).

- *Toxic Chemicals* - those chemicals listed in Section 313 of the *Emergency Planning and Community Right-to-Know Act* (EPCRA) as of 1 December 1993 (AFI 32-7080, Attachment 1, Section C).

- *Volatile Organic Compound (VOC)* - organic substances that react rapidly with NO_x in the air and in the presence of sunlight to form oxidants or smog (AFI 32-7080, Attachment 1, Section C).

OTHER ENVIRONMENTAL ISSUES

GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
Environmental Impacts		
All Installations	6-1 through 6-6	(1)(2)(3)(4)(14)
Environmental Analyses	6-7 through 6-22	(1)
Environmental Noise	6-23 through 6-41	(1)(3)(4)(5)(6)
IRP	6-42 through 6-44	(1)(3)
Pollution Prevention (P2)		
All Installations	6-46 and 6-47	(1)(3)(7)
Opportunity Assessments	6-48	(8)(11)
P2 Management Plan	6-49 and 6-50	(8)(10)(11)
ODCs	6-51 through 6-60	(1)(2)(7)(8)(9)(11)(12)
Hazardous Substances	6-61 through 6-65	(1)(7)(8)(9)(11)
Solid Waste	6-66 through 6-70	(1)(7)(8)(9)(11)(12)
Program Management		
All Installations	6-71 and 6-72	(1)(3)
Weapons Ranges	6-73 and 6-74	(1)(3)(13)
A-106	6-75 and 6-76	(1)(3)
Reporting Requirements	6-77 through 6-79	(1)
EPC	6-80 through 6-82	(1)(11)
WIMS-ES	6-83 and 6-84	(1)(3)
Deployments	6-85 and 6-86	(1)

(a) CONTACT/LOCATION CODE:

(1) BCE (Environmental Planning)
(2) BES (Bioenvironmental Engineering Services)
(3) Base Staff Judge Advocate
(4) PAO (Public Affairs Officer)
(5) Deputy for Operations (Airspace Manager)
(6) Range Operating Agency
(7) Supply Officer
(8) Environmental Manager
(9) Generating Activities (Including Accumulation Point Managers/Operators)
(10) Water and Waste Shop
(11) EPC (Environmental Protection Committee)
(12) Contracting
(13) Natural and Cultural Resources Managers (or Environmental Coordinator)
(14) Base Safety Officer

OTHER ENVIRONMENTAL ISSUES

Records To Review

Environmental Impacts
- Documentation related to EIAP
- Documentation of finding of no adverse effect (for construction activities)
- Environmental Impact Statements (EISs)
- Environmental Analyses (EAs)

Environmental Noise
- Installation Master Plan Document
- Log of complaints from the local community

Installation Restoration Program
- Documentation related to IRP

Pollution Prevention
- Inventory records
- Supply/distribution procedures
- Opportunity assessments
- Baseline records
- Pollution Prevention Management Plan
- Records of any waste reduction/pollution prevention programs
- Records of resource recovery practices including the sale of materials for the purpose of recycling
- Equipment maintenance and inspection records
- Records of waste recovery equipment (i.e., solvent distillation equipment)
- Plans and procedures applicable to air pollution control
- Air emission inventories

Program Management
- A-106 Pollution Abatement Plan
- Exercise- or contingency-specific environment plans, if any

Physical Features To Inspect

Environmental Impacts
- None

Environmental Noise
- Power generators or other noise sources
- Emergency generators
- Test tracks

Installation Restoration Program
- None

Pollution Prevention
- Shop activities
- Hazardous materials and wastes storage areas
- Fire fighting equipment
- Vehicle maintenance areas/motor pool
- Supply area
- Waste recovery areas
- Reuse facility
- VOC sources
- Recycling area

Program Management
- None

People To Interview

Environmental Impacts
- BCE (Environmental Planning)
- BES (Bioenvironmental Engineering Services)
- Base Staff Judge Advocate
- PAO (Public Affairs Officer)
- Base Safety Officer

Environmental Noise
- BCE (Environmental Planning)
- Deputy for Operations (Airspace Manager)
- PAO (Public Affairs Officer)
- Range Operating Agency

Installation Restoration Program
- BCE (Environmental Planning)
- BES (Bioenvironmental Engineering Services)

Pollution Prevention
- BCE (Base Civil Engineer)
- Supply Officer
- BES (Bioenvironmental Engineering Services)
- Environmental Manager
- Generation Activities (Including Accumulation Point Managers/Operators)
- Water and Waste Shop
- EPC (Environmental Protection Committee)
- Contracting

Program Management
- BCE (Environmental Planning)
- Natural and Cultural Resources Managers (or Environmental Coordinator)

COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
ENVIRONMENTAL IMPACTS **All Installations**	
6-1. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation Final Governing Standards and relevant USAF documents. (3) (NOTE: Among the relevant documents are the following: - AFI 32-7061, *The Environmental Impact Analysis Process*, 24 January 1995 - DODD 6050.7, *Environmental Effects Abroad of Major Department of Defense Actions*, 31 March 1979 - HQ USAF/CEV Policy Letter, *MAJCOM EPC Coordination of EIAP Documents*, 26 August 1994 - USAFE/CE Message, *Policy Change, EIAP, MILCON Projects*, 100900Z November 1994.)
6-2. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether new regulations concerning EIAP have been issued since the finalization of the manual. (1) Verify that the installation is in compliance with newly issued regulations.
6-3. Installations must have an Environmental Planning Function (EPF) (AFI 32-7061, para 1.3.4).	Verify that the installation has an EPF. (1)(3) (NOTE: The EPF is the interdisciplinary staff responsible for the EIAP.)

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) SJA (Staff Judge Advocate) (4) PAO (Public Affairs Officer) (5) Deputy for Operations (Airspace Manager) (6) Range Operating Agency (7) Supply Officer (8) Environmental Manager (9) Generating Activities (Including Accumulation Point Managers/Operators) (10) Water and Waste Shop (11) EPC (Environmental Protection Committee) (12) Contracting (13) Natural & Cultural Resources Managers (or Environmental Coordinator) (14) Base Safety Officer

COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
6-3. (continued)	Verify that the EPF: - assists the proponent in preparing a DOPAA - evaluates proposed actions and completes Sections II and III of AF Form 813, *Request for Environmental Impact Analysis* subsequent to submissions by the proponent and makes categorical exclusion (CATEX) determinations - identifies and documents, with technical advice from the bioenvironmental engineer and other staff members, environmental quality standards that relate to the action under evaluation - prepares environmental documents, or obtains technical assistance through the AF channels or contract support, and adopts the documents as official AF papers when completed and approved - ensures the EIAP is conducted on base-level plans, including contingency plans for the training, movement, and operation of AF personnel and equipment - prepares Notices of Intent (NOI) to prepare an EIS with assistance from the proponent and the PAO - prepares AF Form 813 and applicable portions of Certificates of Compliance for each military construction (MILCON) project according to AFI 32-1021, and the U.S. Air Force - Europe (USAFE) 10 November 94 message - determines if an action significantly affects the environment (has potential to do significant harm) in accordance with USAFE 5 May 92 letter. (NOTE: Determining whether an action significantly affects the environment entails procedures set up to review AF Form 332 and project documentation such as DD Form 1391/C.) Verify that the EPF responsible official signs the AF Form 813 certification.
6-4. Any office, unit, or activity at any level that initiates AF actions (the proponent) must perform specific functions in the EIAP process (AFI 32-7061, para 1.3.5).	Verify that the proponent of an action does the following: (1)(3) - notifies the EPF of pending actions and completes Section I of AF Form 813, including a DOPAA for submittal to the EPF - identifies key decision points and coordinates with the EPF on EIAP phasing to ensure that environmental documents are available to the decision maker before the final decision is made and activities associated with the proposal are not implemented until the EIAP is complete - integrates the EIAP into the planning stage of a proposed program or action and, with the EPF, determines as early as possible whether to prepare an EIS - presents the DOPAA to the EPC for review and comment - coordinates with the EPF prior to organizing public or interagency meetings that deal with EIAP elements of a proposed action and involve persons or agencies outside the Air Force - assists the EPF and PAO in preparing a draft NOI when a decision is made to prepare an EIS.

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
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6-5. The SJA, PAO, BES, and Safety Office must perform specific functions in the EIAP process (AFI 32-7061, para 1.3.7 through 1.3.10).	Verify that the SJA does the following: (3) - advises the command level proponent EPF and EPC on CATEX determination and the legal sufficiency of environmental documents - advises the EPF during the scoping process of issues that should be addressed in EISs and on procedures for the conduct of public hearings - coordinates with AFLSA/JAJT on the appointment of an independent hearing officer - refers matters causing, or likely to cause substantial public controversy or litigation through channels to AFLSA/JACE. Verify that the PAO: (4) - advises the EPF, the EPC, and proponents on public affairs implications of proposed actions and review environmental documents for public affairs issues - advises the EPF during the scoping process of issues that should be addressed in the EIS - prepares, coordinates, and distributes news releases related to the proposal and associated EIAP documents - notifies the media and purchases advertisements when newspapers will not run the notices free of charge. Verify that, as a representative of Medical Services, the bioenvironmental engineer provides technical assistance to the EPF in the areas of environmental health standards, effects, and monitoring capabilities. (2) Verify that the Safety Office provides technical assistance to the EPF to ensure consideration of safety standards and requirements. (14)
6-6. The EPC must help the commander assess, review, and approve EIAP documents (AFI 32-7061, para 1.3.6).	Verify that the EPC helps the commander assess, review, and approve EIAP documents. (1) (NOTE: The HQ USAF/CEV policy letter of 26 August 1994 requires documentation indicating prior MAJCOM EPC coordination or approval to accompany EIAP documents sent to them for senior staff approval or signature. The policy is directed at, but not limited to, Draft and Final EISs, EAs, Records of Decision, Findings of No Practicable Alternative, and FONSIs.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
ENVIRONMENTAL ANALYSES (EAs)	(NOTE: The term 'environmental analysis' is understood to include environmental impact statements (EISs), environmental reviews, and environmental studies.)
6-7. A service component that is responsible for a proposal must complete the appropriate EAs (FGS-FRG 17-2).	Determine whether the installation has sponsored proposals that require EAs. (1) Verify that the installation has completed the EA appropriate to each such proposal. (NOTE: See Table 6-3 for a summary of which types of actions require which kinds of analysis.)
6-8. If it is determined that no EA is required, the proponent must document that decision (FGS-FRG 17-4).	Verify that, if a proponent determines that no environmental analysis is required, a negative decision is completed. (1) (NOTE: The negative decision should be recorded on AF Form 813 or 332, or on the Certificate of Compliance (DD Form 1391/C).)
Environmental Impact Statements	(NOTE: EISs are required for the following types of actions only: - major DOD actions that do significant harm to the environment of the global commons - major DOD actions that significantly affect natural or ecological resources of global importance designated for protection by the President or in the case of such a resource protected by an international agreement that is binding on the United States.)
6-9. Installations must take certain actions with regard to decisions not to prepare an EIS (FGS-FRG 17-5 and AFI 32-7061, para 5.2.1).	Determine whether the installation has made any decisions not to prepare EISs for the types of actions listed in the above note. (1) Verify that the EPF documents its decisions not to do EISs. Verify that the installation forwards decisions not to prepare EISs to the appropriate headquarters and to the Executive Agent.
6-10. Installations in the process of completing an EIS must meet certain requirements while engaged in that process (DODD 6050.7, Encl. 1, para C(2) through C(6)).	Verify that no action is taken that does significant harm or limits the choice of a reasonable alternative until the completion of the documentation process. (1) (NOTE: In the case of an emergency where the actions are taken that do significant harm to the environment, the DOD component concerned must consult with the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics.) (NOTE: Environmental documents may be combined with other documents to reduce duplication. Both the use of collective statements and tiering are acceptable.)

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6-10. (continued)	(NOTE: If a current and acceptable environmental document already exists for a particular action, regardless of which Federal agency prepared it, DODD 6050.7 does not require the preparation of a new document.)
6-11. EISs must be prepared in two stages (DODD 6050.7, Encl. 1, para D(2)).	Verify that the installation prepares both a draft and a final version of its EISs. (1)
6-12. Draft EISs must be sufficiently complete to permit meaningful analysis and comment (DODD 6050.7, Encl. 1, para D(2)).	Verify that the installation's draft EISs are sufficiently complete to permit meaningful analysis and comment. (1)
6-13. Installations must take into account substantive comments received on draft EISs (DODD 6050.7, Encl. 1, para D(3)).	Verify that final EISs consider, either individually or collectively, substantive comments received on draft EISs. (1)
6-14. Installations must use supplements to draft or final EISs under certain circumstances (DODD 6050.7, Encl. 1, para D(4)).	Verify that supplements to draft or final EISs are prepared when either: (1) - substantial changes to the proposed action are made relative to the environment of the global commons - significant new information or circumstances (relevant to environmental concerns) bears on the proposed action or its environmental effects on the global commons.
6-15. Draft and final EISs must include certain information (DODD 6050.7, Encl. 1, para D(5) and D(6)).	Verify that EISs contain the following: (1) - a section on consideration of the purpose and need for the proposed action - a section on the environmental effects of the proposed action and reasonable alternatives - a section that provides a succinct description of the environment of the global commons affected by the proposed action and reasonable alternatives - a section that analyzes, in comparative form, the environmental effects on the global commons of the proposed action and reasonable alternatives.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
6-15. (continued)	Verify that the EIS contains clear statements as to why relevant information is missing, whether that information is unavailable or scientifically uncertain.
Environmental Studies and Environmental Reviews	(NOTE: The decision whether a proposed action is one that would significantly affect the environments (potential for significant harm) covered by this section is taken by the EPF.)

6-16. Specific analyses and documentation procedures must be carried out when an installation performs certain types of major DOD actions that do significant harm to the environment of a foreign nation or to a protected global resource (FGS-FRG 17-2, FGS-FRG 17-3, and DODD 6050.7, Encl. 2, para B(1) and C(3)(a)).	Verify that the installation performs appropriate analyses and creates documentation for the following types of major Federal actions: (1)
	- those that significantly affect the environment of a foreign nation that is not involved in the action
	- those that are determined to cause significant harm to the environment because they provide to that nation:
	  - a product or involve a physical project that produces a principal product, emission, or effluent that is prohibited or strictly regulated by Federal law in the United States because its toxic effects on the environment create a serious public health risk
	  - a physical project that is prohibited or strictly regulated in the United States by Federal law to protect the environment against radioactive substances
	- those that significantly harm natural or ecological resources of global importance designated for protection by the President or, in case of such a resource protected by international agreement binding on the United States, designated for protection by the Secretary of State.
	
	(NOTE: Included in the category of "prohibited or strictly regulated" are the following: asbestos, vinyl chloride, acrylonitrile, isocyanates, polychlorinated biphenyls, mercury, beryllium, arsenic, cadmium, and benzene.)
	
	Determine whether any of the actions occurring at the installation have been granted a categorical exclusion by the DOD.
	
	Verify that either an environmental study or an environmental review was prepared, as appropriate.

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6-16. (continued)	(NOTE: The following are exempt from these requirements: - actions that the EPF determines do not significantly affect the environment of a foreign nation that is not participating in the action, or that do not cause significant harm to a designated resource of global importance - actions taken by the President - actions taken by or pursuant to the direction of the President or a cabinet officer in the course of armed conflict - actions taken by or pursuant to the direction of the President or a cabinet officer when the national security or national interest is involved - intelligence activities and arms transfers - votes and other actions in international conferences and organizations - actions involving export licenses, export permits, or export approvals, other than those relating to nuclear activities - actions relating to nuclear activities and nuclear material, except actions providing a nuclear production or utilization facility as defined in the *Atomic Energy Act* of 1954, as amended, or a nuclear waste management facility to a foreign nation - disaster and emergency relief action.) (NOTE: Additional exemptions may be granted on a case-by-case basis.) (NOTE: If a current and acceptable environmental document already exists for a particular action, regardless of which Federal agency prepared it, DODD 6050.7 does not require the preparation of a new document.)
6-17. Certain information must be recorded in the event that a decision is made not to prepare an ES (DODD 6050.7, Encl. 2, para D(3)).	Verify that, if a negative decision is made, the file is documented with a a record of that decision and the names of the decision makers who participated. (1) (NOTE: The negative decision should be recorded on AF Form 813 or 332, or on the Certificate of Compliance (DD Form 1391/C).)
6-18. Installations in the process of completing an environmental study (ES) must meet certain requirements while engaged in that process (DODD 6050.7, Encl. 2, para D(3)).	Verify that no action concerning the proposal is taken that would do significant harm to the environment until the study has been completed and the results considered. (1)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
6-19. The content of an ES is subject to certain requirements (DODD 6050.7, Encl. 2, para D(4)).	Verify that the environmental study includes the following: (1) - a general review of the affected environment - the predicted effects of the action on the environment - significant know actions taken by governmental entities with respect to the proposed action to protect or improve the environment - if no actions are being taken to protect or enhance the environment, a statement as to whether the decision not to do so was made by the affected foreign government or international organization.
6-20. Certain information must be recorded in the event that a decision is made not to prepare an environmental review (ER) (DODD 6050.7, Encl. 2, para E(3)).	Verify that, if a decision is made not to prepare an ER, a record is made of that decision and its basis. (1) (NOTE: The negative decision should be recorded on AF Form 813 or 332, or on the Certificate of Compliance (DD Form 1391/C).)
6-21. Installations in the process of completing an ER must meet certain requirements while engaged in that process (DODD 6050.7, Encl. 2, para E(3)).	Verify that no action concerning the proposal is taken that would do significant environmental harm until the review has been completed. (1)
6-22. The content of an ER is subject to certain requirements (DODD 6050.7, Encl. 2, para E(4)).	Verify that the environmental review includes the following, to the extent reasonably practical: (1) - a statement of the proposed action including its timetable, physical features, general operating plan, and other similar broad-gauge descriptive factors - identification of the important issues involved - the aspects of the actions taken or to be taken by the AF that ameliorate or minimize the impact on the environment - the actions known to have been taken or to be planned by the government of any participating and affected foreign nations that will affect environmental considerations.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
ENVIRONMENTAL NOISE **All Installations**	
6-23. Copies of all relevant DOD directives/ instructions, U.S. Air Force (USAF) directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (1)(3) (NOTE: Among the relevant documents is AFI 13-201, *Air Force Airspace Management*, 1 August 1994.)
6-24. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning noise emissions have been issued since the finalization of the manual. (1)(5) Verify that the installation is in compliance with newly issued regulations.
6-25. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to environmental noise management. (1) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
6-26. Installations must have procedures to register and resolve noise complaints (FGS-FRG 10-9 and 10-18).	Verify that a noise complaint procedure has been instituted. (1)(4)(5)(6)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
Noise within an Accommodation	(NOTE: The standards of this section apply to noise that affects the area within a DOD-controlled accommodation. Nothing in this section should be applied to any location outside the boundaries of an accommodation.)
6-27. Installations with significant noise sources must develop and maintain a noise contour map (FGS-FRG 10-4).	Determine whether the installation has significant noise sources. (1)(5) Verify that the installation has developed and maintains a noise contour map limited to the installation. Verify that noise contours for significant noise sources are developed using a computerized program from operational data using the Day-Night Average Sound Level (L_{dn}) noise descriptor system. Verify that noise analysis for airfields is developed using the A-weighted L_{dn}. Verify that operational data is maintained to facilitate development of noise level contour installation compatible use zone studies. (NOTE: The noise simulation program used to assess heavy weapons noise is MicroBNOISE. This software was developed and is maintained by the U.S. Army Construction Engineering Research Laboratories (USACERL).) (NOTE: Noise level contours are generated using the NOISEMAP 6.1 computer program. This program is maintained by the USAF Armstrong Aerospace Medical Research Laboratory.)
6-28. Installations must maintain records of incompatible buildings and land uses (FGS-FRG 10-5).	Verify that the installation maintains records of incompatible buildings and land uses on the installation. (1)(5) (NOTE: Table 6-4 establishes compatible uses and the Noise Level Reduction (NLR) to achieve acceptable indoor noise levels for facilities.)
6-29. Installations must review installation master plans to ensure that existing and future facility siting are consistent with an acceptable noise environment (FGS-FRG 10-6).	Verify that the installation master plan has been reviewed to ensure that existing and future facility siting are consistent with an acceptable noise environment. (1)(5) Verify that all noise sources are considered in this review.

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6-30. The siting and conduct of ground runup must be evaluated for low frequency vibration as well as general audible noise (FGS-FRG 10-7).	Verify that the siting and conduct of ground runup are evaluated for both low frequency vibration and general audible noise. (1)(5)
6-31. Installations must take specific actions with regard to noise mitigation within their boundaries (FGS-FRG 10-8).	Verify that the installation identifies noise sources that create noise impacts. (1)(5)(6) Verify that the installation investigates possible mitigation measures. Verify that, if practical, the installation programs resources to reduce noise impacts.
Noise Outside An Accommodation	(NOTE: This section applies to noise that affects a location outside a DOD-controlled accommodation when the noise is generated on a DOD accommodation. The source of the noise is immaterial (i.e., whether from equipment, training, activities, etc.); regardless of the source, the noise is considered to be generated by the accommodation. No standard in this section should be applied to any location within the boundaries of an accommodation.)
6-32. Installations must take specific actions with regard to noise mitigation outside their boundaries (FGS-FRG 10-12).	Verify that the installation identifies noise sources that create noise impacts. (1)(2)(4) Verify that the installation investigates possible mitigation measures. Verify that, if practical, the installation programs resources to reduce noise impacts. (NOTE: The key question for the installation is, "*Could* the sound produced be disturbing?" It need not be shown to be actually disturbing.)
6-33. New facilities must use state-of-the-art noise abatement measures if necessary to ensure a proper environment for their neighbors (FGS-FRG 10-13).	Verify that new facilities use state-of-the-art noise abatement measures if necessary to ensure a proper environment for their neighbors. (1)
6-34. Installations must meet specific standards for acceptable noise levels (FGS-FRG 10-14).	Verify that noise levels off the installation that emanate from the installation do not exceed the limits specified in Table 6-5. (1) (NOTE: The levels in Table 6-5 do not apply to noise that emanates from sports facilities or roadways.)

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6-34. (continued)	Verify that noise levels off the installation that emanate from open air sports facilities on the installation do not exceed the limits in Table 6-6. Verify that noise levels off the installation that emanate from indoor sports facilities on the installation do not exceed the following limits: - 70 dB(A) in the day time but outside the times of rest - 65 dB(A) in the day time during the times of rest - 55 dB(A) at night. (NOTE: Noise levels for short-term noise peaks from infrequent events may increase the levels listed above by 20 dB(A) in the daytime and 10 dB(A) at night.) Verify that noise levels off the installation generated by traffic on internal roadways do not exceed the limits in Table 6-7.
6-35. DOD components must comply with the provisions of all officially promulgated permits and administrative agreements (FGS-FRG 10-15).	Determine whether there are any officially promulgated permits and/or administrative agreements that are relevant to installation activities. (1) Verify that the installation is in compliance with the provisions of such officially promulgated permits and/or administrative agreements. (NOTE: Two such agreements with respect to noise are: - "Administrative Agreement between the Federal Minister of Defense and the Commander in Chief, United States Army, Europe and Seventh Army concerning the Use of Major Training Areas made available to the U.S. Forces for their exclusive use under the 'Supplementary Agreement to the NATO Status of Forces Agreement'" dated 18 March 1993, and any amendments - "Administrative Agreement between the Federal Minister of Defense and the Commander in Chief, United States Army, Europe and Seventh Army concerning the Use of Local Training Areas and Local Firing Ranges made available to the U.S. Forces for their exclusive use under the 'Supplementary Agreement to the NATO Status of Forces Agreement'" dated 18 March 1993, and any amendments. Article 4 of the former agreement establishes the periods in which live fire and demolition training may take place, and Sections 2 through 5 of the latter agreement address noise control.)

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Noise Outside An Accommodation in Rheinland-Pfalz	
6-36. Installations must meet specific criteria with regard to the use of booby pistols (FGS-FRG 10-17a).	Determine whether booby pistols are used on the installation to scare off birds. (1) Verify that they are not used any closer than 700 m to an area occupied exclusively by residential buildings and that the noise level does not exceed 50 dB(A). Verify that they are not used any closer than 500 m to an areas that has residential and farming or retail establishments and that the noise level does not exceed 60 dB(A). Verify that they are not used any closer than 300 m from areas consisting of residential and commercial/industrial activities and that the noise level does not exceed 60 dB(A).
6-37. Installations must not operate industrial areas between certain hours if the noise can be heard off the installation and is disturbing (FGS-FRG 10-17b).	Verify that no industrial area is operated between 2200 and 0700 hours if the noise can be heard off the installation and is disturbing. (1)
6-38. Only low-noise lawn mowers and machines may be used within 50 m of certain types of buildings (FGS-FRG 10-17c).	Verify that only low-noise lawn mowers and machines (i.e., less than 60 dB(A)) are used within a radius of 50 m from the following types of buildings: (1) - churches - hospitals - old peoples' homes - children's homes - similar institutions that need noise protection.
6-39. The use of sound reproduction equipment and musical instruments is subject to restrictions (FGS-FRG 10-17d).	Verify that no one uses sound reproduction equipment or musical instruments in such a way as to disturb an unconcerned party. (1) (NOTE: This prohibition applies particularly between 1300 and 1500 hours and 2000 to 0700 hours.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
Equipment Restrictions	(NOTE: The standards in this section apply without regard to the state in which the installation is located.)
6-40. Installations must ensure that German rules and regulations that limit noise from passenger and utility vehicles are observed (FGS-FRG 10-19).	Verify that the installation has a program to ensure that German rules and regulations that limit noise from passenger and utility vehicles are observed to the extent that they are not excessively burdensome. (1) (NOTE: Compliance with German rules and regulations is particularly important with respect to new passenger and utility vehicles.) Verify that consultation with German authorities is part of this program.
6-41. Installations must comply with standards on the use of lawn mowers under certain circumstances (FGS-FRG 10-20).	Determine whether both the following are the case: (1) - lawn mower noise can be heard off the installation in recreation and/or residential areas - the noise exceeds the limits established in Table 6-5. Verify that engine-operated, self-propelled lawn mowers are not used between 1900 and 0700 hours on regular workdays. Verify that such lawn mowers are not used at all on Sundays and German holidays. (NOTE: Such lawn mowers may be used from 1900 to 2200 hours on workdays if either of the following is the case: - the manufacturer's label lists the acoustic power level at less than 88 dB(A) related to 1 picowatt - the lawn mower was procured before 1 August 1987 and is identified as having an emission value of 60 dB(A) or less.)

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
INSTALLATION RESTORATION PROGRAM (IRP)	
6-42. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (1)(3) (NOTE: Among the relevant documents is AFI 32-7006, *Environmental Program in Foreign Countries,* 29 April 1994.)
6-43. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether new regulations or policies concerning the cleanup of contaminated sites have been issued since the finalization of the manual. (1) Verify that the installation is in compliance with newly issued regulations.
6-44. Cleanup projects at sites contaminated by AF operations must be executed to a point established by AF policy (AFI 32-7006, para 2.2 and 2.3).	Determine whether the installation has planned or conducted any cleanup projects. (1) Verify that cleanup projects are executed to the point that contamination no longer poses an imminent and substantial danger to human health and safety. Verify that cleanup projects are executed as needed to sustain current operations. (NOTE: These requirements do not apply if the AF is bound by international agreement to do more.)
6-45. Installations or facilities identified for return to the host nation must meet specific requirements with regard to documentation (AFI 32-7006, para 2.3.2).	Determine whether the installation or facility has been identified for return to the host nation. (1) Verify that the installation or facility documents all known environmental contamination and provides the documentation to the host nation. (NOTE: This requirement applies only after appropriate U.S.-host public announcement of the return, and only after Major Command (MAJCOM) has granted clearance to release the documentation.)

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
POLLUTION PREVENTION **All Installations**	
6-46. Copies of all relevant DOD directives/ instructions, U.S. Air Force (USAF) directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation Final Governing Standards and relevant USAF documents. (1)(3) (NOTE: Among the relevant documents are the following: - AFI 32-7080, *Pollution Prevention Program,* 12 May 1994 - AF Policy Letter, *Air Force Ban on Purchases of ODCs*, 7 January 1993 - DODI 4715.4, *Pollution Prevention*, 18 June 1996.)
6-47. Installations must meet regulatory and AF requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning pollution prevention have been issued since the finalization of the manual. (1)(7) Verify that the installation is in compliance with newly issued regulations.
Opportunity Assessments	
6-48. Installations must conduct Opportunity Assessments to review waste generating activities and installation waste streams (AFI 32-7080, para 2.2.1).	Verify that an Opportunity Assessment of each waste generating activity is conducted on a recurring basis. (8)(11) Verify that the Opportunity Assessment provides a systematic review of the waste generating activities and installation waste streams. Verify that the assessment examines the total waste generation by type and volume of content and determines the most economical and practical waste minimization option. Verify that consideration is given to cost/benefit analysis when evaluating options.

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REGULATORY REQUIREMENTS:	REVIEWER CHECKS: February 1997
6-48. (continued)	(NOTE: An example of the composition of an assessment team includes the following persons: - raw material supplier - Quality Assurance/Quality Control (QA/QC) Officer - consultant - process engineer - safety engineer - purchasing specialist - line laborer - plant manager.)
Pollution Prevention Management Plan	
6-49. Installations must develop and execute a Pollution Prevention Management Plan (AFI 32-7080, para 2.2 and DODI 4715.4, para F2(c)(2)).	Verify that the installation has a Pollution Prevention Management Plan. (8)(11) Verify that the plan addresses all of the following issues: - the process required to run a pollution prevention program - the program required to fund pollution prevention projects - the road map to achieve AF pollution prevention goals - the actions required to execute the program. Verify that the plan contains management strategies for the following areas: - ODCs - USEPA 17 industrial toxics - hazardous wastes - municipal solid waste - affirmative procurement of recycled materials - energy conservation - air pollution reduction. Verify that the plan identifies and programs projects needed to achieve stated objectives. Verify that the installation maintains and executes pollution prevention plans that identify goals and cost-effective management processes or technologies to eliminate or reduce the use and disposal of hazardous materials.

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
6-50. Installations should include additional strategies for improving the pollution prevention program in the Pollution Prevention Management Plan (MP).	Verify that the plan includes the following information: (8)(11) - plans to crossfeed information to the rest of the AF - plans to brief the base EPC - plans to implement Opportunity Assessments - oil/water separator management strategies - usable measures of success - programming and budgeting strategies.
ODCs	(NOTE: See also Section 1, *Air Emissions Management.*) (NOTE: The only Halon 1211 extinguishers classified as mission critical are the 150 lb flight line extinguishers listed in TO 00-25-172 to support parked aircraft and those hand-held extinguishers on board large frame aircraft.) (NOTE: As of March 1996 no acceptable replacement for Halon 1211 had been identified.)
6-51. Installations must eliminate dependence on ODCs (AF Policy Letter, 7 January 1993).	Determine whether the installation uses any of the substances listed in Table 6-8. (8)(11)(12) Verify that the installation's dependence on chlorofluorocarbons (CFCs), halons, and other substances that deplete the stratospheric ozone layer is being reduced. Verify that any new system or modification to an existing system does not include the use of ODCs as a solvent. (NOTE: This requirement does not apply if the system or modification is approved by the proper waiver approval authority.)
6-52. Installations should have a refrigerant management plan (MP).	Verify that the installation has a plan for managing the use and disposal of refrigerant. (8)

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
6-53. Installations must follow specific requirements during the period of transition away from ODC dependence (AF Policy Letter, 7 January 1993 and AFI 32-7080, para 3.1.2).	Verify that, when non-ODC substitutes need long research and development lead times, existing uses are converted to ODCs with lower ozone depletion potential as interim substitutes, (i.e., hydrochlorofluorocarbons (HCFCs)). (1)(2)(7)(8) Verify that inventory reserves are used only to aid a transition from ODCs. (NOTE: This requirement applies after production has been outlawed.) (NOTE: Inventory reserves may not be used as a substitute for changing to non-ozone-depleting practices.) Verify that, if reserves are used to extend the service life of ODC-dependent equipment, the installation practices conservation, recovery, and reuse.
6-54. Installations must initiate certain ODC replacement programs (AF Policy Letter, 7 January 1993).	Verify that halon systems on crash/rescue vehicles are disabled and a phased program is in place to replace them with nonhalon fire fighting agents. (1)(8) Verify that a phased replacement program has been initiated to replace halon in the 150 lb [≈68 kg] flightline extinguishers. (NOTE: Halon removed from crash/rescue vehicles, or from existing installation stock, may be used to service flightline extinguishers until the phased replacement program is complete.) Verify that existing halon fire extinguishers for facilities are replaced through attrition. Verify that refrigerators and other domestic equipment are replaced at the end of their economic life with non-ODC equipment. (NOTE: Existing airborne cooling systems and subsystems that require ODC refrigerants are considered mission critical.)
6-55. Installations must follow specific requirements regarding contract writing for the use of ODCs (AF Policy Letter, 7 January 1993).	Verify that contracts awarded after 1 June 1993 do not include a requirement to use ODCs or any requirement that can be met only through the use of ODCs. (8)(11) (NOTE: This requirement does not apply if waived by the waiver approval authority (Air Force Logistics (AF/LG), Air Force Civil Engineering (AF/CE), or Deputy Assistant Secretary of the Air Force (SAF/AQ)).)

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**

6-56. Installations must reduce the atmospheric discharge of ODCs (AF Policy Letter, 7 January 1993).	Verify that the discharge of ODCs is reduced to zero as soon as possible. (8)(11)
	
	Verify that one of the following is being used to reduce discharges:
	
	- modification of operating, training, and testing practices
	- implementation of conservation measures such as:
	  - recovery
	  - recycling
	  - reuse
	  - material substitution.
	
	Verify that existing halon systems that discharge to the atmosphere for other than actual fire situations, such as fuel tank inerting systems, are used only in actual combat or in in-flight emergencies.
	
	Verify that fire warning systems and operational procedures operate so that there are no false alarms or false discharges.
	
	Verify that automatic discharge extinguisher systems in facilities are disabled and placed on manual activation.
	
	Verify that all servicing of aircraft halon systems captures the halon for recycling with no atmospheric discharge, other than *de minimis* amounts.
	
	Verify that leaking systems are repaired quickly.

6-57. Installations must eliminate purchases of ODCs (AF Policy Letter, 7 January 1993 and AFI 32-7080, paras 3.1.1 and 3.1.3).	Verify that the substances listed in Table 6-9 are no longer being purchased. (8)(11)(12) Verify that the following are no longer purchased: - new or recycled ODCs, unless a waiver has been granted - halon extinguishers for facilities - total flooding systems - facility air conditioning systems, AGE, and other refrigeration and support equipment that use ODCs - commercial vehicles with ODC air conditioning equipment - ODC solvents and the equipment/systems/products that require these solvents for maintenance or operation. (NOTE: ODC needed to meet the mission critical applications will be obtained by using stocks, or from the Defense Logistic Agency (DLA) Defense Reserve, or purchased from commercial sources if the reserve is not able to fill a request.) Verify that ODC-containing products are not purchased or obtained from the Defense Reserve without an approved waiver.

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
6-57. (continued)	(NOTE: Organizations may apply for waivers prior to the award of any contract which requires the use of Class I ODCs to purchase new or recycled ODCs, or obtain ODCs from the DLA Ozone Depleting Chemical Bank for mission critical applications. Waivers are not required for government use of ODCs currently in stock on Air Force facilities.)
6-58. Installations should follow specific procedures for the processing of reclaimed ODCs (MP).	Verify that processes are in place to ensure that reclaimed and excess ODC halons, refrigerants, and solvents are routed to the DLA Defense Reserve. (2)(7)(9)
6-59. Installations must manage halons in existing systems in a specific manner (AF Policy Letter, 7 January 1993).	Verify that halons are removed from aircraft that are being retired from service. (9) Verify that such halons are redeployed or added to the AF account at the DLA Defense Reserve.
6-60. Installations must maintain equipment and inventories at a certain level (AF Policy Letter, 7 January 1993).	Verify that chillers are well maintained and repaired promptly. (1)(9)
Hazardous Substances (Waste and Material)	
6-61. Installations must develop centralized control procedures for the purchase and use of hazardous materials (AFI 32-7080, para 2.4.1).	Verify that the purchase of hazardous materials is under centralized control. (7)(8) (NOTE: This requirement also applies to ODCs.) Verify that the issuance and distribution of hazardous materials is centrally controlled. Verify that hazardous materials are issued in the smallest quantity necessary to meet the customer's need.

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
6-62. Installations must reduce the use of USEPA ITP chemicals (AFI 32-7080, para 3.2).	Verify that the installation is working to reduce the use of the chemicals listed in Table 6-2. (1)(7)(8) (NOTE: Due to the high levels of certain USEPA 17 Toxics in jet fuel, and the direct link between fuels and flying hours, the AF's USEPA 17 reduction goals exempt jet fuels.)
6-63. Installations must work to minimize hazardous waste generation (AFI 32-7080, para 3.3 and para 2.4.3).	Verify that hazardous waste from industrial, maintenance, and cleanup operations is minimized to the greatest extent practical and economical. (8)(9)(11) Verify that the installation strives to reduce hazardous waste generation at the source. Verify that alternatives to hazardous materials and processes are used whenever possible. Verify that, when technical orders require the use of many hazardous substances or out-of-date technology, the installation submits an Air Force Technical Order (AFTO) Form 22. (NOTE: This requirement applies only if alternative substances/technology are known to exist.)
6-64. Installations must maintain inventory management and control processes that minimize the use of hazardous materials (DODI 4715.4, para F2(c)(1)).	Verify that the installation maintains inventory management and control processes that minimize the use of hazardous materials, as appropriate, in the most economical manner. (1)(7)(8)(9)
6-65. Installations should encourage complete use of hazardous materials (MP).	Verify that a reuse facility of some type is established. (7)(8)(11)

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
Solid Waste **6-66.** Installations must institute pollution prevention procedures as part of their solid waste management (AFI 32-7080, para 3.4.1 and para 3.4.1.1).	Verify that cost-effective waste reduction and recycling programs have been integrated into the Municipal Solid Waste Management program. (1)(9) Verify that the installation either operates a composting program for yard wastes or participates in a regional composting program. (NOTE: This requirement does not apply if the program can be shown to be cost prohibitive.) Verify that the installation establishes a single qualified recycling program (QRP) that serves all AF and tenant organizations occupying space on the installation, including leased space. Verify that the installation has a QRP manager. Verify that the Services Squadron, AAFES, and the Commissary coordinate their recycling activities with the QRP manager. Verify that recycling includes the following materials: (8) - high quality copier paper - plastic - metals - glass - used oil - lead acid batteries - cardboard - newspaper - tires. Verify that contracts awarded after 20 October 1993 for government owned, contractor operated (GOCO) facilities include provisions that obligate the contractor to participate with a DOD installation or establish their own qualified recycling program. Verify that where economically feasible and to the extent required by law, existing contracts covering GOCO facilities are modified to incorporate these recycling provisions. Verify that the installation conducts an annual opportunity assessment of the solid waste stream to identify source reduction potential and additional recyclable materials.

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COMPLIANCE CATEGORY:
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REGULATORY REQUIREMENTS:	REVIEWER CHECKS: February 1997
6-67. Installations must establish recycling programs and procedures, if cost-effective (DODI 4715.4, para F2(c)(3)).	Verify that, if cost-effective, the installation has a recycling program and procedures in place that: (1) - ensure the installation has or participates in a QRP - ensure installation recycling programs are available to serve all host and tenant organizations that occupy space on the installation, including leased space - ensure QRP procedures address recyclable materials, excluded materials, and other qualified recycling program materials - divert recyclable materials from the non-hazardous solid waste stream if economically feasible - establish controls to ensure excluded materials are not sold through a QRP - authorize ICs, as appropriate, to sell directly recyclable and other QRP materials or to consign them to DRMS for sale - ensure that distribution of recycling proceeds is consistent with 10 USC 2577. (NOTE: Installations should require participation by contractors operating government-owned or leased facilities overseas where recycling programs are available.)
6-68. Installations must issue a municipal solid waste and recycling report quarterly (AFI 32-7080, para 3.4.2).	Verify that the municipal solid waste and recycling report (RCS, HAF-CEV(Q)9424 is released quarterly to the Air Staff within 45 days after the end of each quarter. (8) (NOTE: This report can be discontinued during emergency conditions.)
6-69. Installations must implement affirmative procurement programs for materials with recycled content (AFI 32-7080, para 3.5).	Verify that each activity reviews and revises specifications for the following designated items to allow procurement of products containing recycled materials: (1)(7)(8)(11)(12) - paper - retread tires - building insulation - cement/concrete containing fly ash - re-refined oils. Verify that all of the following elements are included in the installation's affirmative procurement program: - a preference program - a promotion plan - procedures requiring vendors and contractors to estimate and certify the content of recovered materials in the above designated items that they sell to the installation or use in construction projects on the installation - annual review of the effectiveness of the program.

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
6-70. Installations must issue an affirmative procurement purchases report quarterly (AFI 32-7080, para 3.5.4).	Verify that the affirmative procurement report (RCS, HAF-CEV(Q)9424 is released quarterly to the Air Staff within 45 days after the end of each quarter. (8) (NOTE: This report can be discontinued during emergency conditions.)

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
PROGRAM MANAGEMENT **All Installations**	
6-71. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (3) (NOTE: Among the relevant documents are the following: - AFI 13-212, Volume 1, *Weapons Ranges*, 28 July 1994 - AFI 32-7001, *Environmental Budgeting*, 9 May 1994 - AFI 32-7002, *Environmental Management System*, 31 May 1994 - AFI 32-7005, *Environmental Protection Committees*, 25 February 1994 - AFI 32-7006, *Environmental Program in Foreign Countries*, 29 April 1994.)
6-72. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether new regulations concerning the following program management topics have been issued since the finalization of the manual: (1)(3) - weapons ranges - A-106 - reporting requirements - the EPC - WIMS-ES - deployments. Verify that the installation is in compliance with newly issued regulations.
Weapons Ranges	(NOTE: These requirements apply to air-to-surface weapons ranges only.)
6-73. Weapons ranges must be addressed in plans required by environmental regulations (AFI 13-212, Volume 1, para 1.10.2.2).	Determine whether the installation has air-to-surface weapons ranges. (13) Verify that each weapons range is addressed in the plans required by environmental regulations. (NOTE: Examples of such plans are: - the hazardous materials management plan - the hazardous waste management plan - the spill plan.)

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**

6-74. Installations must develop a comprehensive weapons range plan that meets specific requirements (AFI 13-212, Volume 1, para 1.10.1.1).	Verify that the installation has a comprehensive weapons range plan. (13)
	
	Verify that the plan addresses:
	
	- land space
	- airspace
	- range facilities
	- targets
	- instrumentation (including scoring devices)
	- environmental items
	- local community and government use of adjacent land (regional development agreements)
	- legal liability
	- base facilities
	- range budget
	- any proposed expansion, construction, rehabilitation, or other action that may have an impact on the range.
	
	(NOTE: For overseas ranges, Major Commands (MAJCOMs) may alter the requirements of this plan as necessary to comply with host nation requirements.)
	
	Verify that a brief narrative is included in the plan for only those items that are impacted.
	
	Verify that the plan contains a statement that all of the following areas have been considered:
	
	- Range:
	  - equipment
	  - targets
	  - structures
	  - land requirements (waivers and exemptions)
	  - airspace requirements
	  - maintenance and decontamination
	- Environmental:
	  - fauna and flora
	  - endangered species
	  - emissions
	  - ambient air quality
	  - noise
	  - water resources
	  - wetlands
	  - coastal zones
	  - mineral resources
	  - soil conservation
	  - timber resources
	  - grazing and croplands

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**

6-74. (continued)	- Environmental (continued):
	  - hunting and fishing
	  - outdoor recreation
	  - hazardous wastes
	  - historical sites
	  - archaeological sites
	  - range land use
	  - wilderness
	  - flood plains
	- Community and Government:
	  - off-range land use
	  - regional development
	  - zoning
	  - intergovernmental agreement(s)
	  - encroachment(s)
	- Legal:
	  - liabilities
	  - environmental laws
	  - ingrants and outgrants
	  - other agreements
	- Base Facilities
	- Range Budget:
	  - past
	  - present
	  - future.
	
	Verify that, for new weapons ranges, a plan is developed no later than 1 yr after the range has become operational.
	
	Verify that the plan is updated at least every 2 yr.

A-106 Pollution Abatement	(NOTE: See Table 6-10 for additional guidance on determining A-106 compliance.)
6-75. Installations must submit a 5 yr pollution abatement plan (the A-106 report) that details the actions they plan to take to get into or maintain compliance (AFI 32-7001, para 3.8).	Verify that the installation submits a 5-yr pollution abatement plan (the A-106 report) that details the actions they plan to take to get into or maintain compliance. (1)

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COMPLIANCE CATEGORY:
OTHER ENVIRONMENTAL ISSUES
Federal Republic of Germany ECAMP

REGULATORY REQUIREMENTS:	REVIEWER CHECKS: February 1997
6-76. The installation's A-106 Plan should meet specific requirements with regard to content (MP).	Verify that the installation A-106 Pollution Abatement Plan reflects environmental requirements and properly prioritizes each as Operation and Services, Level 1, Level 2, or Level 3. (1) Verify that the A-106 Plan includes all projects involving costs that are necessary to comply with environmental standards. Verify that projects resulting from previous Environmental Compliance Assessment and Management Program (ECAMP) evaluations or regulatory inspections are included in the A-106 Plan. (NOTE: Management action plans from ECAMP will give projects required to get installation back in compliance.) Verify that the A-106 Plan includes funds required for studies, management, and monitoring associated with the definition and development of corrective measures and necessary equipment to assure compliance with standards. Verify that the installation budgets for the environmental requirements are recorded in the installation A-106 Plan. (NOTE: Assessors compare listings in the A-106 with the Project by Contract Management System (PCMS) and PDC listings in Civil Engineering and compare official financial records with obligation/expenditure data reflected in the A-106 system.) Verify that funds have been requested for Level 1 projects in the current fiscal year. Verify that design funds have been requested for those projects that will be Level 1 projects in the subsequent fiscal year.
Reporting Requirements	
6-77. Installations must cooperate with host nation regulatory authorities to achieve and maintain environmental quality (AFI 32-7006, para 6.3.5).	Verify that the installation cooperates with host nation regulatory authorities to achieve and maintain environmental quality. (1)

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
6-78. Installations must promptly forward copies of host nation regulatory authority inspection reports to HQ USAF/CE (AFI 32-7006, para 6.3.5).	Verify that the installation promptly forwards copies of host nation regulatory authority inspection reports to HQ USAF/CE. (1)
6-79. Installations must immediately report receipt or notification of the imminent receipt of findings involving media attention or off-base impacts to certain authorities (AFI 32-7006, para 6.3.5).	Verify that the installation immediately reports receipt or notification of the imminent receipt of findings involving media attention or off-base impacts to the following: (1) - HQ USAF/CE - MAJCOM Surgeon - AFLSA/JACE - HQ USAF/JAI.
Environmental Protection Committee (EPC)	
6-80. Installations must have an EPC that fulfills specific functions (AFI 32-7005, para 4.3).	Verify that the installation has an EPC. (1) Verify that it meets at least quarterly or at the direction of the chairperson. Verify that the EPC reviews and approves environmental impact analysis on proposed actions and forwards to the decision maker. Verify that the EPC reviews environmental policy, resources, and performance and makes recommendations on required changes. Verify that the EPC ensures that appropriate training and manpower exist to meet environmental responsibilities.

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES
Federal Republic of Germany ECAMP

REGULATORY REQUIREMENTS:	REVIEWER CHECKS: February 1997
6-81. The EPC must consist of certain members (AFI 32-7005, para 3.3).	Verify that the membership of the EPC mirrors the membership of the USAF EPC. (1)(11) (NOTE: The membership of the USAF EPC includes: - the Assistant Secretary of the Air Force for Manpower, Reserve Affairs, Installations, and Environment (SAF/MII) and the Assistant Vice Chief of Staff (HQ USAF/CVA) cochair the EPC - Assistant Secretary for Acquisition (SAF/AQ) - Assistant Secretary for Budget (SAF/FM) - The General Counsel (SAF/IG) - The Inspector General (SAF/IG) - Office of Legislative Liaison (SAF/LL) - Office of Public Affairs (SAF/PA) - the Civil Engineer (HQ USAF/CE) is the EPC Executive Secretary - Deputy Chief of Staff (DCS) Logistics (HQ USAF/LG) - Director, Programs and Evaluations (HQ USAF/PE) - DCS Plans and Operations (HQ USAF/XO) - Chief of Safety (HQ USAF/SE) - The Judge Advocate General (HQ USAF/JA) - DCS Personnel (HQ USAF/DP) - Services (HW USAF/MW) - DCS Command, Control, Communications and Computers (HQ USAF/SC) - Surgeon General (HQ USAF/SG) - Chief of Air Force Reserves (HQ USAF/RE) - Director, Air National Guard (NGB/CF) - Director, Air Force Base Conversion Agency (AFBC/DR).) Verify that the membership of the EPC also includes representatives from tenant organizations, including DRMO and the Army/Air Force Exchange Services (AAFES).
6-82. The EPC has particular responsibilities with regard to record-keeping (AFI 32-7005, para 5).	Verify that a record of the EPC meetings is prepared within 30 days of the meeting. (1)(11) Verify that the minutes of EPC meetings and related documents are kept for at least 10 yr.

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
WIMS-ES Management	
6-83. Installations must meet specific requirements with regard to the tracking and reporting of certain data (AFI 32-7006, para 6.1).	Verify that the installation tracks and reports data from the following areas using WIMS-ES: (1) - cleanup - compliance with FGS - ECAMP - EIAP - comprehensive planning - pollution prevention - data on host nation regulatory findings.

6-84. Program management reporting should be done in WIMS-ES (AFI 32-7002, paras 3.1, 4.1, 5.1, 6.1, 7.1, 8.1, 9.1, 10.1, 11.1, 12.1, 13.1, 14.1, and 15.1).	Verify that quarterly reports are being added and released. (1)
	Verify that programming records are being added for projects and Operations and Services expenses.
	Verify that the following modules are in use:
	- A-106 Module, for reporting planned environmental expenditures and budgeting for the following programs:
	  - restoration
	  - compliance
	  - conservation
	  - pollution prevention
	- Release Reporting Module, for tracking and reporting releases
	- ECAMP Module, for tracking and reporting ECAMP findings and action plans
	- Underground storage tanks (UST) Module, for tracking and monitoring USTs
	- PCB Module, for inventorying all PCB-containing equipment (excluding sealed PCB items and capacitors containing less than 3 lb [≈1 kg] of dielectric fluid)
	- Inspection and Enforcement Module, for tracking host nation regulatory findings
	- Hazardous Waste Module, for tracking and monitoring hazardous waste data
	- Air Management Module, for tracking and monitoring air pollution sources and permits
	- Water and Wastewater Module, for tracking water- and wastewater-related data
	- Cleanup Module, for tracking and reporting information concerning cleanup of contaminated sites

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COMPLIANCE CATEGORY: OTHER ENVIRONMENTAL ISSUES Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**

6-84. (continued)	- Pollution Prevention Module, for reporting data related to the pollution prevention program, including the following:
	  - solid waste disposal
	  - hazardous material purchases
	  - affirmative procurement of recycled products
	  - justification information for funding requirements
	- Conservation Module, for tracking and reporting of the following:
	  - Base Comprehensive Plan status
	  - Installation compatible use zone (ICUZ) status
	  - EIAP actions
	  - Natural and Cultural Resource data.
	
	(NOTE: The Training Tracking Module may be used to track environmental training received by personnel at all levels.)

Deployments	
6-85. Installations must comply with specific instructions for deployments (AFI 32-7006, para 7.1).	Verify that the installation complies with the provisions of AFI 32-7061 (EIAP) for deployments. (1) (NOTE: See checklist items 6-4, 6-5, and 6-9).
6-86. Installations must develop and comply with an exercise- or contingency-specific environmental plan (AFI 32-7006, para 7.1 and 7.3.2).	Verify that the installation develops and complies with an exercise- or contingency-specific environmental plan. (1) Verify that the plan meets the requirements of Joint Chiefs of Staff (JCS) Publication 4-04. Verify the plan specifies environmental responsibilities and policies. Verify that the plan addresses at least the following concerns: - certification of local water sources by medical field units - solid and liquid waste management - hazardous materials management - protection of flora and fauna - archaeological and historical preservation - spill response.

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Table 6-1

Basic References for Understanding German Environmental Noise Issues

(Source: FGS-FRG, Table 10-5)

DIN 1318	Loudness level (terms and measuring methods)
DIN 1320	Acoustics (fundmentals)
DIN 1332	Acoustics (formula signs)
DIN 13 320	Acoustics (spectrums and monitoring curves, terms, and representation)
DIN 18 005	Sound Protection in Town Buildings (hints for the planning, calculation and evaluation bases, and technical stock-taking)
DIN 45 401	Standard Frequency for Acoustic Measurements
DIN 45 402	Effective Value Measurement in Electro Acoustics
DIN 45 403	Measurements in Nonlinear Electro Acoustics (Parts 1 - 4)
DIN 45 611	Measurements of the Sound Insulation of Hearing Protectors (audibility threshold method)
DIN 45 630	Principles of Sound Measurement Part 1: Physical and Subjective Magnitude of Sound Part 2: Normal Curves of the Same Loudness Level
DIN 45 631	Calculation of the Loudness Level Because of the Sound Spectrum (by Zwicker's method)
DIN 45 633	Precision Sound Level Meter Part 1: General Requirements Part 2: Special Requirements for Impulse Sound Level Meters
DIN 45 634	Sound Level Meter and Impulse Sound Level Meter (requirements and examination)
DIN 45 636	External Noise Measurements on Motor Vehicles
DIN 45 637	External Noise Measurements on Rail Vehicles
DIN 45 641	Average Level and Judgement Level of Temporal Waving Sound Processes
DIN 45 642	Measurement of Traffic Noise
DIN 45 643	Aircraft Noise Monitoring in the Environs of Airports
DIN 45 644	Sound Dosing Meter for People
DIN 45 645	Uniform Determination of the Judgement Level for Noise Emissions Part 1: General Part 2: Noise Emissions at the Work Place
DIN 45 651	Octave Filter for Electro Acoustic Measurements
DIN 45 652	One-third Octave Filter for Electro Acoustic Measurements

(continued)

Table 6-1 (continued)

DIN 45 654	Changeable High and Low Passes for Electro Acoustic Measurements
DIN 45 655	Sound Level Meter with Averaging Device
VDI 2058	Judgement of Work Noise Part 1: In the Neighborhood
VDI 2562	Sound Measurements on Railroads
VDI 2574	Guidelines for Noise Measurement on Motor Vehicles

Table 6-2

USEPA 17 Industrial Toxic Chemicals

(AFI 32-7080, A2.2)

1. Benzene
2. Cadmium and its compounds
3. Carbon Tetrachloride
4. Chloroform
5. Chromium and its compounds
6. Cyanide and its compounds
7. Lead and compounds
8. Mercury and compounds
9. Methylene Chloride
10. Methyl Ethyl Ketone
11. Methyl Isobutyl Ketone
12. Nickel and its compounds
13. Tetrachloroethylene
14. Toluene
15. 1,1,1 - Trichloroethane
16. Trichloroethylene
17. Xylenes

Table 6-3

Environmental Effects Abroad

(FGS-FRG Table 17-1)

Analyses Of Overseas Actions	
Action	**Analyses Required**
a. Major DOD actions significantly affecting the environment of the geographic areas outside the jurisdiction of any nation (i.e., outside any economic zone, fishery zone, territorial sea, or other claim established consistent with customary international law). Antarctica is considered outside the jurisdiction of any nation.	Environmental Impact Statement
b. Major DOD actions significantly affecting the environment of a foreign nation that is not participating with the United States and not otherwise involved in the action.	Environmental Review or Environmental Study
c. Major DOD actions significantly affecting the environment of a foreign nation in which the actions provide, to that nation, a product or physical project producing a principal product or an emission or effluent that is prohibited or strictly regulated by Federal law in the United States because its toxic effects on the environment create a serious public health risk.	Environmental Review or Environmental Study
d. Major DOD actions significantly affecting the environment of a foreign nation in which the actions provide, to that nation, a physical project that is prohibited or strictly regulated by Federal law in the United States to protect against radioactive substances.	Environmental Review or Environmental Study
e. Major DOD actions that significantly affect natural or ecological resources of global importance designated for protection by the President or, in the case of such a resource protected by international agreement binding on the United States, by the Secretary of State. Recommendations to the President in such cases will be accompanied by the views of the Council on Environmental Quality and the Secretary of State.	Environmental Impact Statement, Environmental Review, or Environmental Study
f. Major DOD actions affecting only the environment of a participating or otherwise involved foreign nation and that do not involve emissions, effluents that are prohibited or strictly regulated by Federal law in the United States, or resources of global importance that have been designated for protection.	No formal document required.

Table 6-4

Minimum Building Sound Level Requirements and Acceptable Land Uses

(FGS-FRG Table 10-1)

Facility	Outdoor Noise Environment (L_{dn}/L_{eq} in dB(A))				
	85-89	**80-84**	**75-79**	**70-74**	**65-69**
Family housing	No	No	No	NLR30(4)	NLR25(4)
Bachelor housing	No	No	NLR35(4)	NLR30(4)	NLR25(4)
Transient Lodging - Hotel, Motel, etc.	No	No	NLR35(4)	NLR30(4)	NLR25(4)
*Classrooms, Libraries, Churches	No	No	No	NLR30	NLR25
*Offices and Administration Buildings - Military	NLR40	NLR35	NLR30	NLR25	Yes
*Offices - Business and Professional	No	No	NLR30	NLR25	Yes
Hospitals, Medical Facilities, Nursing Homes (24-h occupancy)	No	No	No	NLR30	NLR25
*Dental Clinic, Medical Dispensaries	No	No	NLR30	NLR25	Yes
*Outdoor Music Shells	No	No	No	No	No
*Commercial and Retail Stores, Exchanges, Movie Theaters, Restaurants and Cafeterias, Banks, Credit Unions, Enlisted Member (EM)/ Officer Clubs	No	No	NLR30	NLR25	Yes
*Flight Line Operations, Maintenance and Training	NLR35(5)	NLR30(5)	Yes	Yes	Yes
*Industrial, Manufacturing and Laboratories	No	NLR35(5)	NLR30(5)	NLR25(5)	Yes
*Outdoor Sports Arenas, Outdoor Spectator Sports	No	No	No	Yes(1)	Yes(1)
*Playgrounds, Active Sport Recreational Areas	No	No	No	Yes	Yes
*Neighborhood Parks	No	No	No	Yes	Yes
*Gymnasiums, Indoor Pools	No	NLR30	NLR25	Yes	Yes
*Outdoor - Frequent Speech Communication	No(2,3)	No(2,3)	No(2)	No(2)	No(2)
*Outdoor - Infrequent Speech Communication	No(2,3)	No(2,3)	Yes	Yes	Yes
Livestock Farming, Animal Breeding	No	No	No	Yes	Yes
*Agricultural (except livestock)	Yes(3)	Yes(3)	Yes	Yes	Yes

*For detailed design, the L_{eq} for the appropriate period of usage is the preferred measure of the noise environment.

Yes- Land use compatible with noise environment. No special noise control restriction. Normal construction appropriate.

(continued)

Table 6-4 (continued)

NLR- Appropriate noise level reduction where indoor activities predominate.

No- Land use not compatible with noise environment, even if special building noise insulation provided.

KEY:

(1) Land use is acceptable, provided special sound reinforcement systems are installed.

(2) Land use may be acceptable, provided special speech communication systems are used.

(3) Land use may be acceptable provided hearing protection devices are worn by personnel. Check applicable hearing damage regulations.

(4) Although it is recognized that local conditions may require residential uses in these areas, this use is strongly discouraged in L_{dn} 70-74 and L_{dn} 75-79 and discouraged in L_{dn} 65-69. The absence of viable development options should be determined. NLR criteria will not eliminate outdoor environment noise problems, and, as a result, site planning and design should include measures to minimize this impact, particularly where the noise is from ground level sources.

(5) The NLR must only be incorporated into the design and construction of portions of these buildings where the public is received, where office areas and noise sensitive work areas exist, or where the normal noise level is low.

Table 6-5

Maximum Acceptable Noise Levels Outside an Accommodation for Noise Generated on a DOD Accommodation

(Source: FGS-FRG, Table 10-2)

APPLICABLE AREA	DAYTIME IN dB(A)	NIGHTTIME IN dB(A)
Contains only commercial or industrial facilities and housing for owners, managers, supervisory or standby personnel	70	70
Contains predominantly commercial facilities	65	50
Contains commercial facilities and housing, but not predominantly either	60	45
Contains predominantly housing	55	40
Contains exclusively housing	50	35
Contains spas, hospitals, or nursing homes	45	35
Contains housing structurally connected to the accommodation	40	30

NOTES:

1. The above is not applicable to noise generated by a sports facility or a roadway. See Tables 6-6 and 6-7.

2. Daytime is defined as 0600 to 2200 hours and nighttime from 2200 to 0600 hours. Local authorities, however, may define nighttime as starting as early as 2000 hours and ending as late as 0700 hours.

3. The noise generated by an accommodation must not exceed the maximum allowable level, even if other sources will cause the area to have a higher level, without considering the accommodation's noise.

4. The hours from 1300 to 1500 hours are considered quiet hours for residential area. Actions should be avoided which would cause an increase in noise during this period even if the maximum allowable level is not exceeded. However, it is not necessary to curtail normal operations.

Table 6-6

Maximum Acceptable Noise Levels Outside an Accommodation for Noise Generated on a DOD Accommodation by an Open-air Sports Facility

(Source: FGS-FRG, Table 10-3)

AREA AFFECTED	DAYTIME MINUS REST TIME	DAYTIME REST TIME	NIGHTTIME
Industrial areas	65 dB (A)	60 dB (A)	50 dB (A)
Central areas, villages, and mixed areas	60 dB (A)	55 dB (A)	45 dB (A)
General housing areas and small settlements	55 dB (A)	50 dB (A)	40 dB (A)
Pure housing area	50 dB (A)	45 dB (A)	35 dB (A)
Spas, hospitals, and nursing homes	45 dB (A)	45 dB (A)	35 dB (A)

NOTES:

1. Daytime on workdays is from 0600 to 2200 hours. On Sundays and German holidays it is from 0700 to 2200 hours.

2. Time of rest on workdays is from 0600 to 0800 hours and from 2000 to 2200 hours. On Sundays and German holidays, it is from 0700 to 0900 hours and from 2000 to 2200 hours.

3. Nighttime on workdays is from 2200 to 0600 hours. On Sundays and German holidays, it is from 2200 to 0700 hours.

4. The quiet time from 1300 to 1500 hours need be considered only if the event is conducted between 0900 and 2000 hours and lasts four (4) hours or more.

Table 6-7

Maximum Acceptable Noise Levels Outside an Accommodation for Noise Generated on a DOD Accommodation by a Roadway

(Source: FGS-FRG, Table 10-4)

IN ALL STATES EXCEPT BADEN-WUERTTEMBERG

AREA AFFECTED	DAYTIME IN dB (A)	NIGHTTIME IN dB (A)
Industrial areas	69	59
Central areas, villages, and mixed areas	64	54
Pure and general housing areas and small settlements	59	49
Hospitals, schools, spas, and nursing homes	57	47

IN BADEN-WUERTTEMBERG

AREA AFFECTED	DAYTIME IN dB (A)	NIGHTTIME IN dB (A)
Industrial areas	75	65
Central areas, villages, and mixed areas	72	62
Pure and general housing areas and small settlements	70	60
Hospitals, schools, spas, and nursing homes	70	60

NOTE:

Daytime is defined as 0600 to 2200 hours and nighttime from 2200 to 0600 hours. Local authorities, however, may define nighttime as starting as early as 2000 hours and ending as late as 0700 hours.

Table 6-8

ODCs Subject to AF Policy Letter, 7 January 1993

(AF Policy Letter, 7 January 1993)

HALONS
Halon 1211, Halon 1301, Halon 1202, and Halon 1011 are used primarily as firefighting agents.
CFCs
CFCs -11, -12, -13, -111, -112, -113, -114, -115, -211, -213, -214, -215, -216, and -217 are used primarily as refrigerants and cleaning solvents.
OTHER CONTROLLED SUBSTANCES
Carbon tetrachloride and methyl chloroform are used primarily as cleaning solvents. Methyl bromide is used as pesticide and fumigant.

Table 6-9

Ozone Depleting Chemicals to which AFI 32-7080 Applies

(AFI 32-7080, A2.1)

Halocarbon Number	Molecular Formula	Name
Section A: Class I Ozone Depleting Chemicals		
CFC-11	CCl_3F	Trichlorofluoromethane
CFC-12	CCl_2F_2	Dichlorodifluoromethane
CFC-113	$C_2Cl_3F_3$	Trichlorotrifluoroethane
CFC-114	$C_2Cl_2F_4$	Dichlorotetrafluoroethane
CFC-115	C_2ClF_5	Chloropentafluoroethane
Halon 1211	CF_2ClBr	Bromochlorodifluoromethane
Halon 1301	CF_3Br	Bromotrifluoromethane
Halon 2402	$C_2F_4Br_2$	Dibromotetrafluoroethane
CFC-13	$CClF_3$	Chlorotrifluoromethane
CFC-111	C_2Cl_5F	Pentachlorofluoroethane
CFC-112	$C_2Cl_4F_2$	Tetrachlorodifluoroethane
CFC-211	$C_3Cl_7F_3$	Heptachlorofluoropropane
CFC-212	$C_3Cl_6F_2$	Hexachlorodifluoropropane
CFC-213	$C_3Cl_5F_3$	Pentachlorotrifluoropropane
CFC-214	$C_3Cl_4F_4$	Tetrachlorotetrafluoropropane
CFC-215	$C_3Cl_3F_5$	Trichloropentafluoropane
CFC-216	$C_3Cl_2F_6$	Dichlorohexafluoropropane
CFC-217	C_3ClF_7	Chloroheptafluoropropane
Carbon Tetrachloride	CCl_4	Tetrachloroethane
Methyl Chloroform	$CHCl_3$	Trichloroethane (all isomers)
Methyl Bromide		
Section B: Class II Ozone Depleting Chemicals		
HCFC-12	$CHCl_2F$	Dichloromethane
HCFC-22	$CHClF_2$	Chlorodifluoromethane
CHFC-121	C_2HCl_4F	Tetrachlorofluoroethane
CHFC-122	$C_2HCl_3F_2$	Trichlorodifluoroethane
CHFC-123	$C_2HCl_2F_3$	Dichlorotrifluoroethane
HCFC-124	C_2HClF_4	Chlorotetrafluoroethane
HCFC-131	$C_2H_2Cl_3F$	Trichlorofluoroethane
HCFC-132	$C_2H_2Cl_2F_2$	Dichlorodifluoroethane

(continued)

Table 6-9 (continued)

Halocarbon Number	Molecular Formula	Name
HCFC-133	$C_2H_2ClF_3$	Chlorotrifluoroethane
HCFC-141	$C_2H_3Cl_2F$	Dichlorofluoroethane
HCFC-142	$C_2H_3ClF_2$	Chlorodifluoroethane

Table 6-10

Guidance for A-106 Compliance

Use the following list of questions to aid in determining whether the A-106 package has been completed correctly.

1. Is **MAJCOM** field correct?
2. Is the **BASE** field filled in?
3. Is the **PROJECT** number correct in accordance with CEV A-106 guidance letter?
4. Does the **MODULE IND** read PREV?
5. Is the **TITLE** one of the standard titles included in the call letter?
6. Is the **Nature of the PROJECT** I, E, or O? If it is E. is it fully justified? If it is O is it an O&S project?
7. Is a **BASE POC** and a **PHONE** listed?
8. Is there an N on screen two?
9. Is the **Pgm FY** correct?
10. Does the PA amount match the PPPN?
11. Is the **CWE** entered in? For an initial entry is it the same as the PA amount?
12. Is the **fund type** entered?
13. Is there an N in **Multiple INST**?
14. **PGM Element** for 3400, 3010, or 3020 money should be 78054. For 3600 money it should be 65854.
15. Is **Assessment** left blank?
16. Is the **progress code** only one of the following: (for an initial entry it should be either 1 or 9)
    1 = project validated and funded
    2 = funds have been obligated
    6 = project canceled
    9 = all O&S
17. Is **ownership type** and **statutory auth** filled in?
18. Does **design/plan** have a year and month that the project will be RTA? Does it make sense (i.e., too late in the FY or already past)?

(continued)

Table 6-10 (continued)

19. Is **pollutant category** entered only for O&S projects?

20. **COMPL level** is left blank for O&S. For all other purposes ensure the validated level is entered as follows:
    Level 1 - ESDP
    Level 2 = ESDF
    Level 3 = ESDL

21. **Narrative Screen,** does the narrative match the PPPN and is it complete?

SECTION 7

PESTICIDE MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 7

PESTICIDE MANAGEMENT

A. Applicability of this Section

This section applies to any U.S. Air Force (USAF) installation that uses, stores, or handles pesticides. This section integrates the requirements of Department of Defense Directives (DODDs), DOD Regulations (DODRs), and Air Force Instructions (AFIs) into a single document that normally will apply to any installation that handles pesticides.

Much of the guidance for pest management involves operations and maintenance (O&M) procedures. This section combines O&M guidance and compliance matters. It is used to determine the compliance status of operations, facilities, and equipment used to store and apply pest control chemicals. The section addresses the adequacy of facilities, operating procedures, and personnel qualifications.

The regulatory requirements in this section are based on DODIs, DODDs, and AFIs that apply at overseas installations. Management Practices (MPs) are derived from U.S. Environmental Protection Agency (USEPA) regulations that are not mandatory overseas but are important to follow to preserve the health and safety of AF employees and protect the environment.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 11, contains criteria regulating the use, storage, and handling of pesticides, herbicides, and defoliants at DOD installations. It does not address the use of these items by individuals acting in an unofficial capacity in a residence or garden.

- DODI 4150.7, *Department of Defense Pest Management Program*, 22 April 1996, sets forth the policy, responsibilities, and procedures for pest management programs. This instruction establishes the DOD policy of maintaining safe, efficient, and environmentally sound integrated pest management programs to prevent or control pests that may adversely affect health, readiness, or military operations, or damage structures, materiel, or property. The *DOD Plan for the Certification of Pesticide Applicators of Restricted-Use Pesticides* establishes the requirement that USAF military and civilian pest managers be certified. DODI 4150.7 requires that a component pest management consultant do an onsite consultant review of each installation's pest management program at least every 36 months. An Environmental Compliance Assessment and Management Program (ECAMP) assessment does not preclude such a visit. DODI 4150.7 applies outside the continental United States consistent with applicable international agreements, Status of Forces Agreements, and the FGS issued for the host nation.

- Technical Information Memoranda (TIM) supplement DODD 4150.7. They provide specific criteria and procedures for the operation of a pest management program, but they contain guidance only and are not regulatory in nature. The following TIM are appropriate to have on hand:
  TIM 13 - *Ultra Low Volume Dispersal of Insecticides by Ground Equipment* (March 1985)
  TIM 14 - *Personal Protective Equipment for Pest Management Personnel* (March 1992)
  TIM 15 - *Pesticide Spill Prevention and Management* (June 1992)
  TIM 16 - *Pesticide Fires: Prevention, Control, and Cleanup* (June 1981)

TIM 18 - *Installation Pest Management Program Guide* (February 1987)
TIM 20 - *Pest Management Operations in Medical Treatment Facilities* (October 1989)
TIM 21 - *Pesticide Disposal Guide for Pest Control Shops* (October 1986)
TIM 24 - *Contingency Pest Management Pocket Guide* (September 1991)
TIM 25 - *Devices for Electrocution of Flying Insects* (August 1988)
TIM 26 - *Lyme Disease - Vector Surveillance and Control* (March 1990)
TIM 27 - *Stored Products Pest Monitoring Techniques* (June 1992)
TIM 29 - *Integrated Pest Management In and Around Buildings* (July 1994).

- Military Handbook 1028-8A, *Design of Pest Management Facilities*, 1 November 1991, includes basic criteria for planning and designing military pest control facilities.

- DOD 4145.19-R-1, *Storage and Materials Handling*, September 1979. Chapter 5, Section 4 of this regulation provides overall guidance for storage and handling of various hazardous commodities at AF installations.

C. U.S. Air Force Documents

- AFI 32-1053, *Pest Management Program*, 18 May 1994, provides guidance for pest management at AF installations. It updates, clarifies, and streamlines previous guidance on the subject and more fully emphasizes environmental impact.

D. Responsibility For Compliance

- Base Civil Engineering (BCE): assures that pest management facilities comply with all applicable USAF and DOD regulations and standards; submits annual reports; and assumes responsibility for the completion of daily records, inspections, requests for additional support, biennial physical examinations, notifications to Public Health (PH), protection of the health and safety of pest management personnel, and required training and certification/recertification of pesticide applicators. The Installation Pest Control Supervisor within BCE is the principal individual charged with proper pesticide management at AF installations.

- Public Health (PH): determines the type, source, and prevalence of vectors and medical nuisance pests that affect the health and efficiency of personnel; recommends preventive and control measures and monitors the effectiveness of BCE pest management efforts; schedules occupational physical examinations for all BCE and golf course personnel who apply pesticides; provides Hazard Communication training to pest management personnel.

- Bioenvironmental Engineering Services (BES): sets local standards for obtaining and using personal protective equipment (PPE) for pest management personnel and trains all pest management personnel in testing the fit of respiratory protection equipment.

E. Definitions

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a *Kaserne*, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Certified Pesticide Applicator* - personnel who apply pesticides or supervise the use of pesticides, and who have been authorized to do so by successfully completing a training program approved by the USEPA, followed by formal certification, or have been certified through the procedures established by a German state government (FGS-FRG, Appendix A).

- *Competent* - an agency, authority, individual, official, person, etc., who meets any of the following criteria: (FGS-FRG, Appendix A)
  1. specifically designated as competent by FGS-FRG
  2. specifically designated as competent by the authority of a German government [agency]
  3. specifically designated as competent by or meets the qualifications of competency of a recognized German trade organization or association
  4. based on experience, training, and/or authority granted per DOD/component policy or regulations, judged by the responsible commander to be a capable and appropriated organization/ individual to accomplish the task in question.

- *Direct Supervision* - supervision that includes being at the specific location where pest management work is conducted; providing instruction and control; and maintaining a line-of-sight view of the work performed. Certain circumstances may temporarily remove the line-of-sight view of the application of pesticide from the supervisor such as topographic constraints, vegetation constraints, or building structural constraints. Under these temporary circumstances, the supervisor shall be responsible for the actions of the pesticide applicators (DODI 4150.7, Enclosure 2).

- *Disease Vector* - any animal capable of transmitting the causative agent of a human disease; serving as an intermediate or reservoir host of a pathogenic organism; or producing human discomfort or injury, including (but not limited to) mosquitoes, flies, other insects, ticks, mites, snails, and rodents. It is recognized that certain disease vectors are predominately economic pests that as conditions change may require management or control as a disease vector (DODI 4150.7, Enclosure 2).

- *DOD-Certified Pesticide Applicator* - DOD military or civilian personnel certified in accordance with the *DOD Plan for the Certification of Pesticide Applicators of Restricted-Use Pesticides* (DODI 4150.7, Enclosure 2).

- *Environment* - the natural and physical environment, excluding social, economic, and other environments (FGS-FRG, Appendix A).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Installation Pesticide Applicator* - DOD employees or contract personnel whose job responsibilities involve the application of pesticides on DOD installations and property (DODI 4150.7, Enclosure 2).

- *Integrated Pest Management* - the use of all appropriate technology and management techniques to bring about pest prevention and suppression in a cost-effective and environmentally sound manner (FGS-FRG, Appendix A).

  For the purposes of DODI 4150.7, a planned program, incorporating continuous monitoring, education, recordkeeping, and communication to prevent pests and disease vectors from causing unacceptable damage to operations, people, property, materiel, or the environment. IPM uses targeted, sustainable (effective, economical, environmentally sound methods, including education, habitat modification, biological control, genetic control, cultural control, mechanical control, physical control, regulatory control, and where necessary, the judicious use of least-hazardous pesticides (DODI 4150.7, Enclosure 2).

- *Management Practice (MP)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *Material Safety Data Sheet (MSDS)* - a form used by manufacturers of chemical products to communicate the chemical, physical, and hazardous properties of their products to users (FGS-FRG, Appendix A).

- *Monument* - a cultural property or resource, natural or man-made, that appears on a state list of cultural or historic properties or sites (FGS-FRG, Appendix A).

- *Natural Cultural or Historic Monument* - a natural (as opposed to a man-made) item or place designated as a cultural or historic monument by either the German federal government or a state government (FGS-FRG, Appendix A).

- *On-Site Supervision* - supervision that includes being physically located on the installation, but not necessarily at the specific worksite, during the work performance and being able to be contacted and at the worksite within 30 min (DODI 4150.7, Enclosure 2).

- *Personal Relief* - pest management control efforts made by DOD personnel or their family members at their own expense for control of pests consistent with DOD and component pest management policy (DODI 4150.7, Enclosure 2).

- *Pest* - arthropods; birds; rodents; nematodes; fungi; bacteria; viruses; algae; snails; marine borers; snakes; weeds; undesirable vegetations; and other organisms (except for microorganisms that cause human or animal disease) that adversely affect the well-being of humans or animals, attack real property, supplies, equipment, or vegetation, or are otherwise undesirable (FGS-FRG, Appendix A).

  (NOTE: This term is defined by AFI 32-1053, para 1.2.2, as a plant or animal out of place.)

- *Pest Management* - the effective, economical, and environmentally sound prevention or control of animal pests and vectors, undesirable terrestrial and aquatic plants, and plant diseases. It includes such methods as education; inspection (surveys); sanitation and proper waste management (such as use of pressure washing and self-closing compactors); proper storage of food and other pest-susceptible items; exclusion, trapping, and other mechanical or physical means of containing pests (such as using portable vacuum cleaners); pest-preventive building construction and maintenance (caulking); biological control; minimal use of pesticidal chemicals in a manner (such as containerized baits and crack and crevice application) that causes the least harm to the environment (AFI 32-1053, para 1.2.1).

For DODI 4150.7, the prevention and control of disease vectors and pests that may adversely affect the DOD mission or military operations; the health and well-being of people; or structures, materiel, or property (DODI 4150.7, Enclosure 2).

- *Pest Management Consultant* - professional DOD pest management personnel located at component Headquarters, field operating agencies, major commands, facilities engineering filed divisions or activities, or area support activities who provide technical and management guidance for the conduct of installation pest management operations. Some pest management consultants may be designated by their component as certifying officials (DODI 4150.7, Enclosure 2).

- *Pest Management Coordinator* - the individual officially designated by the Installation Commander (IC) to coordinate and oversee the installation pest management program and installation pest management plan. Pest management coordinators shall be certified as pesticide applicators if their job responsibilities require them to apply or supervise the use of pesticides (DODI 4150.7, Enclosure 2).

  (NOTE: This term is understood to be synonymous with 'installation pest control supervisor,' a term which is used in AFI 32-1053 but not defined there.)

- *Pest Management Personnel* - personnel involved with activities that monitor or mitigate pest problems, including personnel that manage a pest management program, carry out pest control work (which includes selecting, mixing, or applying pesticides), monitor pest populations, coordinate various activities that prevent or mitigate pest problems. This includes active duty, civilian (U.S. and local nationals) and contract workers directly involved with the program; it does not include persons whose contact with pesticides is limited to transporting, loading, and unloading closed containers (FGS-FRG, Appendix A).

- *Pest Management Plan* - a long-range, comprehensive installation planning and operational document that establishes the strategy and methods for conducting a safe, effective and environmentally sound IPM program. Written pest management plans are required as a means of establishing and implementing an installation pest management program (DODI 4150.7, Enclosure 2).

- *Pesticide* - any substance or mixture of substances used to destroy pests, control their activity, or prevent them from causing damage. The term is used generically to refer to pesticides, herbicides, and defoliants (FGS-FRG, Appendix A).

- *Pesticide Applicator* - any individual who applies pesticides or supervises the use of pesticides by others (DODI 4150.7, Enclosure 2). See also *Certified Pesticide Applicator, DOD-Certified Pesticide Applicator, Installation Pesticide Applicator,* and *Uncertified Installation Pesticide Applicator.*

- *Pesticide Handling* - operations involving contact or potential contact with pesticides, including loading, unloading, transferring, mixing, and applying pesticides, filling or cleaning pest management equipment, preparing pesticide waste for disposal, and pesticide spill response (FGS-FRG, Appendix A).

- *Pesticide Waste* - materials that are subject to pesticide disposal restrictions and should be treated as excess pesticides for purposes of disposal (FGS-FRG, Appendix A):
  1. any pesticide that has been suspended, does not meet specifications, is contaminated, improperly mixed, or otherwise unusable, whether concentrated or diluted
  2. used spill cleanup material

3. any containers, equipment, or material that are contaminated with pesticides; empty pesticide containers that have been triple-rinsed are not considered hazardous waste but are normal solid waste.

- *Professional Pest Management Personnel* - DOD military officers commissioned in the Medical Service or Biomedical Sciences Corps or DOD civilian personnel with college degrees in biological or agricultural sciences who are in a current assignment that includes pest management responsibilities exercised regularly. DOD civilian employees also shall meet Office of Personnel Management qualification standards. Based on assignment, some professional pest management personnel are pest management consultants (DODI 4150.7, Enclosure 2).

- *Qualified* - see *Competent.*

- *Restricted-Use Pesticide* - (also restricted pesticide) a pesticide that has been determined to merit additional restrictions by either the U.S. or the host nation because it would cause unreasonable adverse effects on health or the environment (FGS-FRG, Appendix A).

- *State* - the political subdivision referred to as *Land* in Germany (FGS-FRG, Appendix A).

- *Uncertified Pesticide Applicator* - DOD employees who are not certified under the DOD plan during an apprenticeship period not exceeding two years and who must apply pesticides under the supervision of a DOD-certified applicator (DODI 4150.7, Enclosure 2).

- *Vector* - a carrier, usually an arthropod, that is capable of transmitting a pathogen from one organism to another (FGS-FRG, Appendix A and AFI 32-1053, para 1.2.3)

PESTICIDE MANAGEMENT

GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
All Installations	7-1 through 7-17	(1)(2)(3)(4)(5)(7)(8)
Pesticide Application		
Choice of Pesticide	7-18 through 7-27	(1)(4)(5)
Procurement	7-28 and 7-29	(4)(5)
Equipment	7-30 through 7-32	(4)(5)
Application Restrictions	7-33 through 7-39	(1)(2)(4)(5)
Pesticide Applicators	7-40 through 7-47	(1)(2)(4)(5)
Documentation and Notification	7-48 through 7-51	(1)(3)(4)(5)
Pest Management Facilities	7-52 through 7-68	(1)(4)(5)
Storing, Mixing, and Preparation of Pesticides	7-69 through 7-80	(1)(2)(4)(5)
Highly and Moderately Toxic Pesticides	7-81 through 7-86	(1)(3)(4)(5)(6)
Disposal	7-87 through 7-90	(1)(2)(4)(5)

(a) **CONTACT/LOCATION CODE:**

(1) BCE (Base Civil Engineering)
(2) BES (Bioenvironmental Engineering Services)
(3) BMS (Base Medical Service)/EHO (Environmental Health Office)
(4) Pest Management Shop
(5) Golf Course Maintenance
(6) Base Fire Department
(7) Base Contracting Officer
(8) Base Staff Judge Advocate

PESTICIDE MANAGEMENT

Records To Review

- Records of pesticides purchased by the facility (purchase orders, inventory)
- Pesticide application records
- Description of the facility's pest control program
- Certificates of applicators of restricted-use pesticides
- Facility applicator certification and training program
- Pesticide disposal manifests
- Installation Spill Plan
- Inventory of stored pesticides
- Copy of notification letter to local emergency officials of pesticides stored onsite
- Pest Management Plan

Physical Features To Inspect

- Pesticide application equipment
- Pesticide storage areas, including storage containers
- Golf course maintenance areas

People To Interview

- BCE (Base Civil Engineering)
- BES (Bioenvironmental Engineering Services)
- BMS (Base Medical Service)/EHO (Environmental Health Office)
- Pest Management Shop
- Golf Course Maintenance
- Base Fire Department
- Base Contracting Officer
- Base Staff Judge Advocate

COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
ALL INSTALLATIONS	
7-1. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (1)(8) (NOTE: Among the relevant documents are the following: - DODI 4150.7, *DOD Pest Management Program*, 22 April 1996 - AFI 32-1053, *Pest Management Program*, 18 May 1994.)
7-2. Pest Management personnel should have certain documents readily available (MP).	Verify that the following are readily available to Pest Management personnel: (4)(5) - TIM 13 - *Ultra Low Volume Dispersal of Insecticides by Ground Equipment* (March 1985) - TIM 14 - *Personal Protective Equipment for Pest Management Personnel* (March 1992) - TIM 15 - *Pesticide Spill Prevention and Management* (June 1992) - TIM 16 - *Pesticide Fires: Prevention, Control, and Cleanup* (June 1981) - TIM 18 - *Installation Pest Management Program Guide* (February 1987) - TIM 20 - *Pest Management Operations in Medical Treatment Facilities* (October 1989) - TIM 21 - *Pesticide Disposal Guide for Pest Control Shops* (October 1986) - TIM 24 - *Contingency Pest Management Pocket Guide* (September 1991) - TIM 25 - *Devices for Electrocution of Flying Insects* (August 1988) - TIM 26 - *Lyme Disease - Vector Surveillance and Control* (March 1990) - TIM 27 - *Stored Products Pest Monitoring Techniques* (June 1992) - TIM 29 - *Integrated Pest Management In and Around Buildings* (July 1994) - Military Handbook 1028-8A, *Design of Pest Management Facilities* (1 November 1991).
7-3. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning pesticides have been issued since the finalization of the manual. (1)(2) Verify that the installation is in compliance with newly issued regulations.

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-4. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to pesticide management. (1) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
7-5. Each installation must have a comprehensive pest management plan (FGS-FRG 11-3 and DODI 4150.7, E.3.v(1)).	Verify that the installation implements and maintains a written pest management plan. (1)(2)(4)
7-6. Installation pest management plans must meet specific content requirements (FGS-UK 11-3 and DODI 4150.7, Encl. 4, para 4b).	Verify that the plan is a comprehensive, long-range, narrative document that: (1)(2)(4) - describes all installation and satellite installation pest management requirements and programs, including those for contracts, natural resources, golf courses, and out leases, and identifies minimum pest management staffing requirements - describes all IPM procedures required to monitor and control pests on the installation - describes all IPM procedures for surveillance and control of disease vectors - identifies all resources, such as work years, facilities, and equipment, required to support the installation pest management program - identifies all pesticides (including USEPA registration numbers) approved by the component pest management consultant for use in the installation pest management program - describes all health and safety measures that will be taken to protect both pest management personnel and the general public from pesticide exposure and risk - describes pest management functions that can be done more economically through commercial contracts and provides, or references, cost comparison analysis

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**

7-6. (continued)	- describes any pest management operation with special environmental considerations such as those that:
	  - use a restricted-use pesticide
	  - use any pesticide application that may contaminate surface water or groundwater
	  - include 259 or more contiguous hectares (640 acres) in one pesticide operation
	  - may adversely affect endangered or other protected species and their habitat
	  - involve aerial application of pesticides
	  - involve permits for the use of experimental-use pesticides
	- identifies animal control efforts for feral cats, feral dogs, or wildlife
	- identifies active or potential vector-borne diseases and describe medical department collaboration with host nation agencies for vector surveillance and control matters
	- identifies golf course pest management operations.

7-7. Installations must meet additional requirements with regard to pest management plans (DODI 4150.7, Encl. 4, paras 2, 8d, and 8h, and AFI 32-1053, para 2.4).	Verify that the plan is reviewed and updated annually by qualified personnel. (1)(2)(3)(4) Verify that the pest management coordinator formally coordinates appropriate portions of the plan with the senior medical officer, environmental coordinator, and senior engineering officer and that these individual sign the cover sheet of the plan. Verify that appropriate portions of the plan are reviewed by the Natural Resources Program Manager for consistency with the National Resources Management Plan. Verify that the plan was forwarded to the cognizant component pest management consultant for review, technical approval, and signature on the cover sheet. Verify that the plan has been signed and approved by the IC. Verify that the plan lists all program objectives, arranged in order of priority, according to potential or actual impact on health, morale, structures, materiel, or property. Verify that the plan specifically addresses the surveillance and control of insects and other arthropods in child care and food service facilities. Verify that the plan clearly delineates the responsibilities for surveillance and control of medically important insects and other arthropods. (NOTE: A suggested format for the plan appears in Enclosure 8 of DODI 4150.7.)

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-8. The installation's pest management coordinator must meet specific requirements (DODI 4150.7, Encl. 4, paras 5a and 2a(3)).	Verify that the installation's pest management coordinator has an appropriate position and educational background and has the management skills necessary to implement the installation's pest management plan. (4)(5) Verify that the pest management coordinator is DOD-certified.
7-9. Installations must meet specified measures of merit in the pest management program (DODI 4150.7, Encl. 3).	Verify that the installation meets the following measures of merit: (1)(4)(5)(7) - Measure of Merit 1: by the end of FY97 the installation has a pest management plan that is prepared, reviewed, and updated annually by pest management professionals - Measure of Merit 2: by the end of FY 2000, the amount of pesticides applied annually on DOD installations is reduced by 50% from the FY 93 baseline in pounds of active ingredients (NOTE: The goal for this measure of merit must not be obtained by substituting more toxic pesticides that have lower application rates than the pesticide in use.) - Measure of Merit 3: by the end of FY 98, 100 percent of installation pesticide applicators are properly certified. (NOTE: Direct hire employees have a maximum of 2 yr to become certified after initial employment, contract employees need appropriate certification when the contract is let.)
7-10. Installations must notify component pest management consultants whenever host nation regulators ask to inspect pest management operations (DODI 4150.7, Encl. 4, para 4c(2)).	Verify that the installation notifies the component pest management consultant whenever host nation regulators ask to inspect pest management operations. (1)(4)(5)

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-11. Installations must not construct buildings that have heating, ventilation, or air-conditioning (HVAC) ducts located below the floor (DODI 4150.7, Encl. 4, para 4c(2)).	Verify that buildings are not constructed with HVAC ducts located in and below the floor. (1) (NOTE: This prohibition is intended to prevent accidental contamination of the ducts with termiticides.) (NOTE: Postconstruction treatment of structures with HVAC ducts is prohibited without a waiver from the component pest management consultant.)
7-12. Self-help programs must be managed in accordance with specific standards (DODI 4150.7, para. E.3.v.(3) and Encl. 4, para 8i(3)).	Verify that self-help programs are established for military housing when cost-effective and when IPM monitoring indicates the need for a self-help program. (1)(4) Verify that liquid pesticides are not issued. (NOTE: Self-help pest management materials issued may include cockroach and ant baits and/or traps, mouse traps, glue boards, and general use pesticide aerosols with crack and crevice devices as recommended by the component pest management consultant.) Verify that self-help personnel provide written instructions and appropriate precautions beyond those on pesticide labels to military quarters' and housing occupants. Verify that, if a pesticide is issued to an occupant, records are maintained.
7-13. Pest management and disease vector control during military contingency operations, readiness training exercises, and deployments must meet specific standards (DODI 4150.7, Encl. 4, para 9).	Verify that pesticides are applied consistent with the policies and procedures described in DODI 4150.7 during military contingency operations, readiness training exercises, and deployments. (1)(4) Verify that individuals who apply pesticides in these situations are certified in accordance with the *DOD Plan for the Certification of Pesticide Applicators of Restricted-Use Pesticides* or are under the direct or on-site supervision of a certified individual. (NOTE: Shipboard independent duty technicians and other military personnel who have received special training for limited site application of pre-selected pesticides during military operations or deployments are exempt from the certification requirement, but they must be fully trained.)

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-14. Pest management consultants must provide the guidance needed to protect all closing or closed facilities from pests from the beginning of deactivation until property disposal (DODI 4150.7, Encl. 4, para 8j).	Verify that pest management consultants provide the guidance needed to protect all closing or closed facilities from pests from the beginning of deactivation until property disposal. (1)(4)
7-15. Seedlings or seeds that have been treated with certain pesticides must not be imported (FGS-FRG 11-7).	Verify that the installation does not import seedlings or seeds that have been treated with pesticides that are composed of or contain any of the substances listed in Table 7-1. (1) Verify that the installation does not import seedlings, seeds, or substrate that have been treated with pesticides that are composed of or contain any of the substances listed in Table 7-2.
7-16. Agricultural products from areas that have been treated with aldicarb may not be used during the year in which they were treated (FGS-FRG 11-8).	Verify that the installation does not use agricultural products from areas that have been treated with aldicarb during the year in which they were treated. (1)(2)
7-17. Medical treatment facilities personnel may neither store nor use pesticides (AFI 32-1053, para 2.6.).	Verify that medical treatment facilities personnel neither store nor use pesticides. (2) (NOTE: This prohibition does not apply to disinfectants or germicides.)
PESTICIDE APPLICATION **Choice of Pesticide**	
7-18. Installations must use permissible pesticides only (FGS-FRG 11-6a).	Verify that the installation uses only those pesticides that have been approved for stocking by the Armed Forces Pest Management Board (AFPMB) or those that have been approved in writing by the cognizant DOD pest management authority. (4)(5)

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-19. Installations must not use pesticides that are composed of or contain certain substances (FGS-FRG 11-6b(1)).	Verify that pesticides that are composed of or contain one of the substances listed in Table 7-1 are not in use on the installation. (1)(4)(5)
7-20. Installations must not use pesticides that are composed of or contain certain substances except when specifically allowed to do so (FGS-FRG 11-6b(2) and 11-6b(5)).	Verify that pesticides that are composed of or contain one of the substances listed in Table 7-2 are not in use on the installation, except for uses that are listed as permissible in Column 3 of Table 7-2. (1)(4)(5) (NOTE: Local German authorities may prohibit or restrict the use of pesticides that are composed of or contain substances number 1 and 3 through 8 in Table 7-2.) Verify that, before using agents that are composed of or contain substances number 1 and 3 through 8 in Table 7-2, the installation contacts local authorities to determine their policy. Verify that the installation respects that policy.
7-21. Installations must not use pesticides that are composed of or contain certain substances unless they are used in accordance with specified restrictions (FGS-FRG 11-6b(3)).	Verify that pesticides that are composed of or contain one of the substances listed in Table 7-3, Section A, are not in use on the installation unless they are used in accordance with the restrictions specified in Table 7-3, Section A. (1)(4)(5)
7-22. Installations must not use pesticides that are composed of or contain certain substances in water protection areas or mineral spring protection areas (FGS-FRG 11-6b(4)).	Determine whether the installation is located in a water protection area or a mineral spring protection area. (1)(4)(5) Verify that pesticides that are composed of or contain one of the substances listed in Table 7-3, Section B are not in use on the installation.

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7-23. Installations must not use pesticides that are composed of or contain certain substances even outside of water protection areas or mineral spring protection areas unless certain requirements are met (FGS-FRG 11-6b(4)).	Verify that pesticides that are composed of or contain one of the substances listed in Table 7-3, Section B are not in use even outside of water protection areas and mineral spring protection areas unless the area of intended application falls outside the catchment/drainage areas of: (1)(4)(5) - facilities for the extraction of drinking water - mineral springs - areas for the protection of underground water. Verify that the DOD component checks with German authorities before using these substances to ensure that use in the proposed area of application is not so restricted.
7-24. Installations must not use pesticides that are composed of or contain certain substances in preservation areas, national parks, national monuments, or in areas that are protected by the states (FGS-FRG 11-6b(6)).	Determine whether the installation's boundaries include preservation areas, national parks, national monuments, or areas that are protected by the states. (1)(4)(5) Verify that pesticides that are composed of or contain one of the substances listed in Tables 7-2 and 7-3 are not used in such areas. (NOTE: This restriction does not apply if the preservation authority expressly authorizes the application.)
7-25. Installations in Hessen must not use specific types of substances in the open countryside unless it is in the public interest (FGS-FRG 13-6g).	Determine whether the installation is located in Hessen. (1)(4)(5) Verify that neither chemical substances used to combat pests nor substances that affect the development of plants are used in the open countryside unless it is in the public interest. (NOTE: This restriction does not apply to areas used by the farm and forest industries.)
7-26. Paint containing insecticides is prohibited from use on DOD property (DODI 4150.7, Encl. 4, para 6f).	Verify that neither interior nor exterior paint that contains pesticides is used on the installation. (1)(4)(5) (NOTE: This prohibition also applies to insecticides formulated and labelled for use as paint additives.) (NOTE: Paints containing fungicides as mildew inhibitors may be used when the application directions specify no special restrictions due to the fungicide. Approved marine anti-fouling compounds or coatings may be applied to protect the surfaces of watercraft.)

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7-27. Installations must use the least toxic but effective product in their pest management efforts (FGS-FRG 11-3).	Verify that, where the use of pesticides is warranted, the installation uses the least toxic but effective product. (4)(5)
Procurement	
7-28. Certain information must be included on ordering documents in order to make sure that no one buys or issues nonapproved pesticides (AFI 32-1053, para 3.5.3.).	Verify that advice code 2B is used on ordering documents to tell Supply that it may not substitute another product for the requested item. (4)(5)
7-29. Installations must follow specific restrictions when ordering pesticides and application equipment (AFI 32-1053, para 3.5.2.).	Verify that standard pesticide application equipment is ordered from Federal supply catalogues. (4)(5) Verify that only pesticides from the Federal listings approved by the AFPMB and the preapproved WIMS-Air Force master inventory are used. Verify that the installation has sought and received MAJCOM approval before ordering or using nonstandard, locally purchased pesticides or application equipment.
Equipment	
7-30. Installations must use recyclable and refillable pesticide containers and closed pesticide mixing and transfer systems as much as possible (AFI 32-1053, para 2.4.11.).	Verify that the installation uses recyclable and refillable pesticide containers and closed pesticide mixing and transfer systems as much as possible. (4)(5)
7-31. Installations must meet specific requirements with regard to their pest control vehicles (AFI 32-1053, para 3.6).	Verify that only pest management personnel use pest control vehicles. (4)(5) Verify that pest management vehicles are painted with a chemical-resistant coating (similar to fire department vehicles) and equipped with plastic bed liners. Verify that vehicles are equipped with locking compartments for safe handling, storage, and transport of pesticides.

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7-31. (continued)	(NOTE: A telephone maintenance truck will suit the purpose.) Verify that the truck carries emergency phone numbers and a spill cleanup kit. Verify that placards are attached to trailer-mounted sprayers that identify the pesticide that is being applied. Verify that all pesticide dispersal equipment is kept in the BCE pest management section. (NOTE: Equipment at base golf courses that have certified pesticide applicators is exempt from this requirement.) Verify that vehicles (prime movers) used for fogging, misting, dusting, or ultra-low volume (ULV) application are equipped with air conditioning.
7-32. Equipment used for pesticide applications should be dedicated to the pest management operation (MP).	Verify that such vehicles and dispersal equipment are used solely in support of pest management activities. (4)(5)
Application Restrictions	
7-33. Pest management personnel must use all pesticides according to label directions and use equipment according to the manufacturer's instructions (AFI 32-1053, para 3.5.4.).	Verify that pest management personnel use all pesticides according to label directions and use equipment according to the manufacturer's instructions. (4)(5)
7-34. The use of regularly scheduled, periodic pesticide applications and of preventative pesticide treatments is prohibited, (DODI 4150.7, Encl. 4, para 6g).	Verify that the installation does not perform regularly scheduled, periodic pesticide applications. (4)(5) (NOTE: This prohibition does not apply in situations where the installation pest management plan clearly documents that no other technology or approach is available to protect personnel or property of high value.) Verify that preventative pesticide treatments are not used unless the component pest management consultant has given approval based on current surveillance information or records documenting past disease vectors or pest problems that require this approach.

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7-35. Insecticides and termiticides must not be injected into the soil to control subterranean termites in any military buildings with subslab or in-slab heating, ventilation, or air conditioning ducts (AFI 32-1053, para 2.4.11.).	Determine whether pesticide applications are undertaken to control subterranean termites. (1)(4) Verify that no subterranean termite control is undertaken for the types of buildings listed. (NOTE: This prohibition does not apply if such systems are made inoperable and duct registers are blocked to prevent air flow.)
7-36. Installations must meet specific criteria with regard to pesticides applied outdoors for plant protection purposes (FGS-FRG 11-6d).	Verify that pesticides applied outdoors for plant protection purposes are on the list of pesticides registered with the *Biologische Bundesanstalt* (BBA). (4)(5)
7-37. Pesticides applied for plant protection purposes within 100 m of surface water or in water protection zones must be applied in accordance with specific criteria (FGS-FRG 11-6d).	Verify that pesticides applied for plant protection purposes within 100 m of surface water or in water protection zones are applied in accordance with the special instructions found on the BBA-approved product. (4)(5)
7-38. Installations must ensure the prevention of damage to wildlife from pesticide applications (DOD 4145.19-R-1, para 3-417).	Verify that basic precautions are observed that prevent drift of pesticides to the following: (1)(2)(4)(5) - wooded areas occupied by wildlife - land area not intended for treatment - fish-bearing waters. Verify that the installation guards against runoff or washoff by rain from treated areas to fish-bearing waters.

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7-39. Public safety should be ensured when applying or using pesticides (MP).	Verify that hazardous exposure to the general public has been eliminated by: (4)(5) - posting appropriate signs for treatment area - scheduling low use periods or restricted usage for a number of days - following water use restrictions and reentry times according to the pesticide labels.
PESTICIDE APPLICATORS	
7-40. DOD pesticide applicators must meet certification requirements (FGS-FRG 11-4; DODI 4150.7, para E.3.v(4) and Encl. 4, para 5b; and AFI 32-1053, para 2.4.3).	Verify that DOD pesticide applicators are certified in accordance with DODD 4150.7, *DOD Pest Management Program* and the *DOD Plan for Certification of Pesticide Applicators of Restricted-Use Pesticides.* (4)(5) (NOTE: The certification of an applicator by a German state-approved and validated training course will be acceptable in the case of non-DOD employees. Care must be taken to ensure that state-certified applicators perform only those tasks for which they are certified.) Verify that personnel who are undergoing apprenticeship training, but are not yet certified, apply pesticides only under the direct supervision of a certified pesticide applicator. (NOTE: Uncertified but trained pest management personnel may apply general-use pesticides under the supervision of certified personnel.) (NOTE: After receiving training from pest management personnel, nonpest-management personnel may apply pesticides in the following situations: - adult military housing occupants and facility building managers may apply approved self-help pesticides - military personnel may apply approved arthropod repellents (aerosol, creme, lotion, stick) - military personnel may apply approved aerosol insecticide for quarantine insect extermination on aircraft.) Verify that neither prisoners nor volunteer workers are assigned to apply pesticides. Verify that contractor personnel are certified prior to beginning the job.
7-41. DOD-certified pesticide applicators must be recertified every 3 yr (DODI 4150.7, Encl. 4, para 5b(3).	Verify that DOD-certified pesticide applicators are recertified every 3 yr. (1)(4)(5)

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7-42. Restricted-use pesticides may be applied only by or under the direct supervision of certified pesticide applicators (FGS-FRG 11-6c; DODD 4150.7, para F1; and AFI 32-1053, para 2.4.3).	Verify that restricted-use pesticides are applied only by or under the direct supervision of certified pesticide applicators. (4)(5) (NOTE: For lists of restricted-use pesticides see Tables 7-2, 7-3, and 7-4. Given the definition of 'restricted-use pesticide' in FGS-FRG, both pesticides whose use is restricted by the German government and those whose use is restricted by the U.S. government may be applied only by or under the direct supervision of certified pesticide applicators.)
7-43. All pesticide applicators must participate in a medical surveillance program (FGS-FRG 11-5 and AFI 32-1053, para 2.4.9).	Verify that all pesticide applicators are included in a medical surveillance program. (3)(4)(5) Verify that all BCE personnel who apply pesticides receive a baseline physical examination and an interview with Public Health (PH) within 30 days after they arrive. Verify that health monitoring of pesticide applicators includes: - a baseline physical examination with a cholinesterase test - annual physical - at a minimum, quarterly physical and cholinesterase tests for personnel who work regularly with organophosphate or carbamate pesticides. Verify that the medical surveillance program is explained to the workers. Verify that, for local national employees, the medical surveillance program is coordinated with the local works council. (NOTE: Increased medical surveillance is authorized, if deemed appropriate by the IC.)
6-44. All pest management personnel must be provided with PPE (FGS-FRG 11-10).	Verify that all pest management personnel are provided with PPE that is appropriate for the work they perform and the types of pesticides to which they may be exposed. (4)
7-45. Specific operational practices should be observed in dealing with pesticides (MP).	Verify that health and safety procedures emphasizing good work habits, reduction or elimination of hazards, and use of PPE are followed. (4)(5) Verify that protective clothing and equipment are stored away from chemical areas. Verify that respirator cartridges/canisters are changed at appropriate intervals. Verify that periodic fit testing of respirators is conducted.

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7-46. Pest management personnel who mix and apply pesticides must meet specific requirements with regard to PPE and clothing (AFI 32-1053, para 3.4).	Verify that overalls are kept clean at all times. (4)(5) Verify that shop washing machines and dryers are used or that any clothing sent to base laundry services is clearly identified as being contaminated with pesticides.
7-47. Individuals who handle pesticides must wear an approved respiratory device (DOD 4145.19-R-1, para 3-415a(6) and 3-415a(7)).	Verify that all personnel who handle pesticides wear an approved respiratory device that is appropriate for protection against the pesticides they use. (4)(5) Verify that all respirators, gas masks, cartridges, and canisters are Occupational Safety and Health Administration/Mine Safety and Health Administration (OSHA/MSHA) approved for the specific pesticide being handled. (NOTE: Paint respirators do not provide protection from pesticide vapors.)
DOCUMENTATION AND NOTIFICATION	
7-48. Copies of material safety data sheets (MSDSs) for all pesticides must be available at the storage and holding facility (FGS-FRG 11-9e).	Verify that MSDSs for the pesticides used at the installation are available at the storage and holding facility. (4)(5)
7-49. Records must be maintained and summary reports written for pest management activities (AFI 32-1053, para 2.4.13.).	Verify that Work Information Management System (WIMS) pesticide software is used to track pesticide inventories and pesticide applicator certifications. (4)(5) Verify that daily pesticide use is recorded on the WIMS pesticide software. (NOTE: DD Forms 1532 and 1532-1 may be used if WIMS is not on-line.) Verify that historical data are kept on pesticide application in accordance with Air Force Manual (AFM) 37-139, *Record Disposition--Standards* (formerly Air Force Regulation (AFR) 4-20, volume 2). Verify that Quarterly Reports are sent no later than 15 days after the close of quarter to the MAJCOM.

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7-49. (continued)	Verify that the Quarterly Reports include the following:
	
	- pesticide inventory data
	- pesticide applicator certification data
	- pesticide application data (equivalent of Report Control Symbol (RCS) DD-P&L[A&AR]1080) for all pest management operations on AF real property:
	  - pest management shop
	  - self-help pest control
	  - roads and grounds
	  - golf course
	  - contractors
	  - forestry
	  - lessee and land permit holders.

7-50. Installations must meet additional record-keeping requirements (DODI 4150.7, para E.3.v(7) and Encl. 4, para 10).	Verify that records of all pest management operations performed on the installation are properly maintained and reported to the component pest management consultant. (4)(5) Verify that the records: - account for all shop operations and provide a historical record of pest management operations and pesticide applications for each building, structures, or outdoor site - include information on kinds, amounts, uses, dates, places of application, and applicator's names and certification numbers - include all pesticide application performed on the installation, including work done on golf courses by nonappropriated fund activities, by contract services, and as a part of leases and land management and forestry programs as well as the work performed by the installation pest management shop. Verify that applications performed during military operations, excluding arthropod skin and clothing repellant, are recorded. Verify that DD Form 1532, Pest Management Report, or an equivalent computer product, is produced monthly using the DD Form 1532-1 information. Verify that these records are archived after 2 yr for permanent retention. (NOTE: Pesticides applied by installation personnel for their own relief are excluded from the recordkeeping requirements.)

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7-51. Notification must be made and/or approval received for certain application activities (AFI 32-1053, para 2.4.10 and 2.4.12.).	Verify that PH is notified prior to any pesticide applications in food preparation or consumption facilities, medical facilities, or child development centers. (3)(4) Verify that PH and the fire department are notified prior to any fumigation activities. Verify that the Installation Pest Control Supervisor coordinates all fumigations with installation medical, fire, security police, and safety personnel. Verify that no internal combustion or electrical power-driven spraying machines for aerosol or mist sprays are used inside buildings without approval from BES and the installation Fire Chief.
PEST MANAGEMENT FACILITIES	
7-52. Pesticide management facilities and service vehicles must be provided with spill kits (MIL-HDBK 1028-A, para 3.5.2.2, implementing FGS-FRG 11-9a and 11-9b).	Verify that pesticide management facilities and service vehicles are provided with spill kits. (4)(5)
7-53. Installations must include certain features in pest management facilities (MIL-HDBK 1028-A, paras 3.1.3, 3.1.4.3, and 3.4.8, implementing FGS-FRG 11-9a).	Verify that pest management facilities include at least the following: (1)(4) - clean areas (office, vestibule and airlock (where appropriate, given weather conditions), and mechanical and electrical spaces) - pesticide handling areas (storage and mixing rooms) - transitional areas (dressing area, shower and locker rooms, toilet, laundry and cleaning gear room) - an outdoor hardstand and parking apron for vehicles and equipment.
7-54. Pest management facilities must have security fencing and gates (MIL-HDBK 1028-A, para 3.4.6, implementing FGS-FRG 11-9a).	Verify that a climb-resistant chain link fence prevents unauthorized entry. (1)(4) (NOTE: The fence may be omitted if other security measures, such as bars or heavy-gauge wire mesh over the windows, are taken.) Verify that the fence is at least 7 ft (2.13 m) high, without top rail. Verify that the fence fabric is twisted and barbed at the top and bottom. Verify that security gates to the fence are kept locked.

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7-55. Holding tanks are prohibited in new construction (MIL-HDBK 1028-A, para 3.5.2.3, implementing FGS-FRG 11-9a).	Verify that the facility has no drainage to holding tanks. (4)
7-56. Pest management facilities must be located in accordance with specific criteria (MIL-HDBK 1028-A, para 3.4.1 and 3.4.2, implementing FGS-FRG 11-9a).	Verify that pest management facilities are located away from congested areas. (1)(4) Verify that new construction results in isolated, single-purpose structures. Verify that pest management facilities are located a minimum of 200 ft (61 m) from surface water, existing wells and cisterns, and 100-yr flood plains. Verify that the facility is located downhill from the above sensitive areas. (NOTE: Diking must be provided if space is limited.) Verify that the facility is not located uphill from potable water sources or continuously occupied structures. (NOTE: Facilities should not be located over aquifers (subsurface potable water supplies), unless the aquifer is adequately protected through containment measures.) Verify that the facility is located at least 100 ft (30.4 m) from other structures.
7-57. Pest management facilities must meet specific standards with regard to accessibility, grading, and parking (MIL-HDBK 1028-A, para 3.4.3 through 3.4.5, implementing FGS-FRG 11-9a).	Verify that vehicles carrying supplies or pulling trailer-mounted dispersal equipment have access to the facility. (1)(4) Verify that the facility is accessible to vehicles and pedestrians on at least two sides. Verify that runoff from fire-fighting is prevented from reaching ponds, lakes, streams, or rivers. (NOTE: Diking, if provided, is recommended for large pest management facilities only.) Verify that there is adequate space to park all pesticide dispersal equipment inside the pest management area, under cover. Verify that the part of the compound used for travel and vehicle parking is covered with gravel or paved. Verify that employee parking, if provided, is located outside the security fence or perimeter.

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7-58. The arrangement of spaces in pest management facilities must meet specific requirements (MIL-HDBK 1028-A, para 3.1.3 and 3.1.4.3, implementing FGS-FRG 11-9a).	Verify that arrangement of spaces allows workers to arrive in a clean area, dress for hazardous exposure in the change area, leave through a pesticide area doorway, and retrace that path at the end of the workday. (1)(4) Verify that there is no direct access between the office and the pesticide storage and mixing areas. Verify that doorways are arranged so that no pesticide need be carried through clean areas. Verify that the mixing room is located adjacent to the storage area and the equipment storage area (if indoors). Verify that the mixing room is accessible through the corridor to the shower and locker rooms and the exterior.
7-59. Installations must meet specific requirements with regard to the foundations, floor slabs, and floor finishes in pest management facilities (MIL-HDBK 1028-A, para 3.1.5.1, implementing FGS-FRG 11-9a).	Verify that there are no floor drains in the interior pesticide areas. (1)(4) Verify that, in areas where pesticides are handled or stored, floors slope (3/100) from sills to the center. Verify that, if the floor does not slope, a 4 in. (102 mm) concrete curb is provided in the pesticide areas. Verify that exterior slabs slope to a sump with a closeable drain located not more than 6 ft (1.829 m) from the outer margin of the washstand. Verify that exterior ramps slope downward from exterior flat (flushed) door sills. (NOTE: The intent of these provisions is to provide containment for at least 110 percent of the capacity of the largest bulk liquid pesticide container anticipated for the facility.) Verify that no utility, heating, or ventilation ducting is located in or below slabs. Verify that pesticide concentrates and finished (formulated) materials are prevented from entering the sanitary or storm sewer systems. Verify that concrete floors are finished with a nonabsorbent nonskid finish. (NOTE: Change rooms and office floors may be tiled.) Verify that the floors in both the storage and mixing areas are covered with nonskid epoxy sealant or are otherwise made impermeable.

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7-60. Installations must meet specific requirements with regard to the exterior walls of pesticide management facilities (MIL-HDBK 1028-A, para 3.1.5.2, implementing FGS-FRG 11-9a).	Verify that exterior walls are constructed of metal, concrete, or masonry. (1)(4) Verify that the interior surfaces of exterior walls are constructed of metal, coated concrete, or masonry. Verify that no porous surface finishes are used.
7-61. Installations must meet specific requirements with regard to the doors and windows in pesticide management facilities (MIL-HDBK 1028-A, para 3.1.5.3, implementing FGS-FRG 11-9a).	Verify that exterior doors are self-locking and self-closing with weather stripping. (1)(4) Verify that doors have locks that prevent unauthorized entry. Verify that flat (flush) sills are provided for all doors between the mixing and storage areas. Verify that the facility has a 9 x 9 ft (2.74 x 2.74 m) overhead garage door with weather stripping. (NOTE: Higher doors may be necessary to accommodate high-mast equipment.) Verify that, if the garage is separate from the pesticide mixing and storage areas, a flat (flush) sill is provided for the garage doorway. Verify that, if the garage is not separate from the pesticide mixing and storage areas, a ramp to a 4 in. (104 mm) high sill is provided. Verify that there is a slope away from the exterior of the door to prevent rain water from entering the facility. Verify that the pest management facility has nonporous framed windows that are double glazed, where appropriate, with a thermal barrier feature. Verify that, if the facility is not surrounded by a climb-resistant chain link fence and security gates, it has interior security mesh windows. (NOTE: It is permissible to have no windows as an alternative.) Verify that drop ceilings are not used in pesticide areas.

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7-62. A fire extinguisher must be provided by the door between the storage and mixing areas (MIL-HDBK 1028-A, para 3.7.1, implementing FGS-FRG 11-9a).	Verify that a fire extinguisher is located by the door between the storage and mixing areas. (4)
7-63. Drains from pesticide mixing areas must not be connected to septic systems, sanitary sewers, or stormwater systems (MIL-HDBK 1028-A, para 3.5.2.5, implementing FGS-FRG 11-9a).	Verify that no pesticide mixing area is connected to septic systems, sanitary sewers, or stormwater systems. (1)(4)
7-64. Pesticide management areas must have backflow prevention devices (MIL-HDBK 1028-A, para 3.5.2.10 and 3.5.2.11, implementing FGS-FRG 11-9a).	Verify that reduced pressure backflow prevention devices are installed on plumbing that provides a source of water for filling pesticide dispersal equipment tanks. (1)(4) Verify that permanent hose bibs (overhead filling pipes) have a discharge hose and an approved backflow prevention device. (NOTE: The requirement as to hose bibs applies to outdoor washdown areas of medium and large facilities.)
7-65. Mixing and storage areas must have a ventilation system separate from that in the rest of the facility (MIL-HDBK 1028-A, para 3.5.4.2, implementing FGS-FRG 11-9a).	Verify that mixing and storage areas have a ventilation system separate from that in the rest of the facility. (1)(4) Verify that the system is provided with a roof-mounted, centrifugal fan system selected for a minimum of six air changes per hour. Verify that fans discharge vertically. Verify that replacement air is heated to 55 °F (13 °C). Verify that the ventilation system has a control switch with a light to indicate ON at the entrance to the pesticide handling areas.

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-65. (continued)	Verify that the control switch has a sign that reads as follows: VENTILATION SYSTEM SHOULD OPERATE CONTINUOUSLY DO NOT ENTER UNLESS VENTILATION SYSTEM HAS OPERATED FOR AT LEAST 10 MINUTES.
7-66. Mixing sinks must have slotted hood, local exhaust systems (MIL-HDBK 1028-A, para 3.5.4.2, implementing FGS-FRG 11-9a).	Verify that the mixing sink has a slotted hood, local exhaust system. (4)
7-67. Outdoor hardstands and parking aprons for vehicles must meet specific standards (MIL-HDBK 1028-A, para 3.4.8, implementing FGS-FRG 11-9a).	Verify that the outdoor hardstand and parking apron consists of a concrete pad sufficiently large to park a truck and trailer (at least 15 x 25 ft (4.57 x 7.62 m)). (1)(4) Verify that the hardstand pad slopes (3/100) to a sump fitted with a removable grate cover suitable for the anticipated vehicular traffic load. Verify that the sump is sufficiently large to contain a minimum of 110 percent of the capacity of the largest bulk liquid pesticide container anticipated to be used at the facility. Verify that there is a curb at least 4 in. (102 mm) high at the low edge of the pad to direct liquid into the sump. Verify that, if an industrial sewer is available, a 3 in. (75 mm) sump drain is provided. Verify that, if a connection to an industrial sewer exists, the sump has a ball valve in the sump drain to control discharge. Verify that the valve is located adjacent to the sump in a pit with a grate cover. Verify that the ball valve is normally closed and manually opened. Verify that, if no industrial sewer is available, a small section of removable grate is provided to accommodate a hose for recovering sump contents. Verify that the hardstand area has an elevated hose bib (fill pipe) of 1.5 to 2 in. (38 to 51 mm) diameter. (NOTE: This requirement applies if application equipment with tanks 50 gal (189.9 L) or larger will be used at the facility.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-67. (continued)	Verify that the hardstand area has an emergency eyewash and a deluge shower with manually operated, delayed-closing valves located adjacent to the mixing site. (NOTE: This requirement does not apply if devices inside the facility are accessible within 10 s from the outdoor mixing site.) (NOTE: The hardstand area may be provided with a canopy roof to protect parked vehicles and equipment and to minimize the accumulation of water.)
7-68. Pesticide management facilities must meet specific requirements with regard to signs (MIL-HDBK 1028-A, para 3.8, implementing FGS-FRG 11-9a and 11-9b).	Verify that identification signs are provided in appropriate rooms and buildings and on fences. (1)(4)(5) (NOTE: Signs such as DANGER, POISON, PESTICIDE STORAGE AREA are suggested.) Verify that a NO SMOKING sign is located in pesticide areas. Verify that warning signs are provided on the exterior of the building at each entrance. Verify that building identification information is visible from 100 ft (30.48 m). Verify that a sign is installed over the sink that reads as follows: DO NOT DISCHARGE PESTICIDES INTO THE SINK. Verify that a sign is posted at the entrance(s) to toilets that reads: WASH HANDS BEFORE USING TOILET. Verify that the hardstand has a sign that reads as follows: CLOSE DRAIN WHILE HANDLING PESTICIDES ON HARDSTAND. Verify that a sign is provided near the hardstand's pit valve stating: RECOVER PESTICIDE SPILLS USE VALVE TO DRAIN WASHWATER AND RAIN. Verify that, if a flammable liquid storage cabinet is present, a sign is provided that reads as follows: FLAMMABLE PESTICIDES.

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-68. (continued)	Verify that a list of the types of materials stored is posted on the outside of the storage area. (NOTE: Copies of this list should be given to the installation on-scene hazardous waste coordinator and to the fire department.) Verify that the list includes chemical names and formulations rather than generic brand names. Verify that a sign is posted at the mixing area that requires the use of protective gloves, aprons and boots, protective eyewear or face shields, coveralls, and an approved pesticide respirator.
STORAGE, MIXING, AND PREPARATION OF PESTICIDES	
7-69. Pesticides must be addressed in the control/response portion of the installation's spill plan (FGS-FRG 11-13).	Verify that pesticides are addressed in the control/response portion of the installation's spill plan. (1)(4)(5)
7-70. Labels on pesticides must bear the appropriate use instructions and precautionary messages (FGS-FRG 11-11).	Verify that the pesticides are properly labeled. (4)(5) Verify that labels bear the appropriate use instructions and precautionary message based on the toxicity category of the pesticide. (NOTE: Examples of precautionary messages include DANGER, WARNING, or CAUTION.) Verify that, if foreign nationals will be using the pesticides, the precautionary messages are in English and in the prevalent local languages.
7-71. Pesticide storage areas must be regularly inspected and secured to prevent unauthorized access (FGS-FRG 11-9c and MIL-HDBK 1028-A, para 3.1.4.1.1, implementing FGS-FRG 11-9a and 11-9b).	Verify that storage areas are inspected regularly and secured to prevent unauthorized access. (4)(5)

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-72. Pesticide storage areas must have a readily visible, current inventory of all items in storage (FGS-FRG 11-9c).	Verify that the inventory includes all items in storage and items awaiting disposal. (1)(2)(4)(5)
7-73. Indoor storage areas for pesticides must meet specific requirements (MIL-HDBK 1028-A, para 3.1.4.1.2, implementing FGS-FRG 11-9b).	Verify that pesticides are stored in an area sealed or separated from clean areas, with direct access to the exterior. (1)(4)(5) Verify that pesticides are stored in such a way that: - they are off the floor, with all labels visible - they are stored no more than 8-ft (2.44-m) high. Verify that lanes are present to provide effective access and inspection. Verify that pesticides are stored in a dry building in which a temperature is maintained that is above 50 °F (12 °C) and below 100° F (38° C). Verify that pesticides are stored separated from the following areas: - mixing areas - shower and locker room - offices - any area where personnel work for prolonged periods. Verify that no pesticide concentrates are stored in a room containing a floor drain of any type. Verify that storage and mixing areas have containment provided either by curbing or sloped floors.
7-74. Certain chemicals must be stored outside of occupied buildings (MIL-HDBK 1028-A, para 3.1.4.1.4, implementing FGS-FRG 11-9b).	Verify that all liquid fumigants are stored outside of occupied buildings in hazardous chemical lockers. (4) Verify that toxic or flammable pesticides are stored on the ground floor of unoccupied buildings.

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-75. Outdoor storage areas for pesticides must meet specific requirements (MIL-HDBK 1028-A, para 3.1.4.1.4, implementing FGS-FRG 11-9a and 11-9b).	Verify that outdoor storage areas for pesticides are: (4) - secured and under cover - protected from radiant heating, freezing temperatures, and moisture.
7-76. Motor vehicles may not be stored in the same areas as pesticides (MIL-HDBK 1028-A, para 3.1.4.1.3, implementing FGS-FRG 11-9b).	Verify that no motor vehicles are stored in the same area as pesticides. (4)(5) (NOTE: Wherever possible, vehicles are to be located outside or in a separate building from the pesticide storage or handling area.) Verify that, when motor vehicles are located under the same roof as the pesticide area, they are separated from the pesticide area by a minimum of 2-h fire rated construction.
7-77. Mixing rooms must meet specific requirements (MIL-HDBK 1028-A, para 3.1.4.2, implementing FGS-FRG 11-9a).	Verify that mixing rooms have electricity and hot and cold water. (4) Verify that mixing rooms have metal or plastic shelves to hold pesticides off the floor. (NOTE: Plastic is preferred for the pallets, and steel stands are recommended for keeping drums off the floor.) Verify that no wooden pallets are in use. Verify that the work area contains a pesticide-resistant sink equipped with the following: - a closeable drain - a contiguous self-draining, drip-proof counter top at least 5-ft (1.524-m) long - sideboards - splash panel on back - an adjacent shelf for holding measuring devices and concentrates.
7-78. Installations should store pesticides, pesticide containers, and pesticide residues in accordance with specific restrictions (MP).	Verify that pesticides, pesticide containers, and/or pesticide residues are stored such that: (4)(5) - labeling is consistent - there is no open dumping of pesticides or pesticide containers - there is no open burning, except when allowed by regulation - there is no water dumping or ocean dumping.

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-79. Installations must store contingency pesticides under the same controlled temperature, security, and other conditions as daily use pesticides (AFI 32-1023, para 2.4.6.).	Verify that the installation stores contingency pesticides under the same controlled temperature, security, and other conditions as daily use pesticides. (1)(4)
7-80. Installations must rotate contingency pesticide stocks back to pest management shop inventories and replace them with fresh chemicals annually (AFI 32-1023, para 2.4.6.).	Verify that the installation rotates contingency pesticide stocks back to pest management shop inventories and replaces them with fresh chemicals annually. (1)(4)
HIGHLY AND MODERATELY TOXIC PESTICIDES	
7-81. Installations should consider installing an environmental monitoring system in the vicinity of pesticide storage facilities under certain conditions (MP).	Verify that the installation has considered providing monitoring systems when appropriate. (1)(4)(5) (NOTE: Monitoring systems are particularly appropriate when there is no spill management system and when the facility handles large quantities of pesticides and is located near a sensitive area.)
7-82. Storage facilities for pesticides and excess pesticides that are classed as highly toxic or moderately toxic and that must be labeled DANGER, POISON, WARNING, or with the skull and crossbones should meet specific requirements (MP).	Verify that the site location, where possible, is in an area where flooding is unlikely and where hydrogeologic conditions prevent contamination of any water system by runoff or percolation. (1)(4)(5) (NOTE: The following may be considered: - proximity to surface water and to sanitary wastewater or stormwater systems - location relative to floodplains, depth of groundwater, and general soil types and typical permeabilities.) Verify that storage is in a dry, separate room, building, or covered area where fire protection is provided.

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-82. (continued)	Verify that: - pesticide containers are stored with the labels plainly visible - all containers are in good condition - the lids and bungs on metal or rigid plastic containers are tight - the pesticides are segregated, and if practicable, stored under a sign containing the name of the formulation - rigid containers are stored upright and all containers are stored off of the ground. Verify that containers are regularly inspected for corrosion and leaks and that absorbent material is available for spill cleanup. Verify that excess pesticides and containers are segregated.
7-83. Personnel in storage/usage facilities for pesticides classed as highly toxic or moderately toxic and labeled DANGER, POISON, WARNING, or with the skull and crossbones symbol, should follow specific practices and procedures to ensure safety (MP).	Verify that no food consumption, drinking, smoking, or tobacco use is undertaken in any area where pesticides are present. (4)(5) Verify that the following practices are part of pest management operations: - people handling pesticides keep hands away from mouths and eyes and wear rubber gloves during all pesticide handling - people handling pesticides wash hands immediately upon completion of working with pesticides and always prior to eating, smoking, or using toilet facilities - inspections are made once a month to determine if any pesticide containers are leaking - pesticide containers are inspected for leakage prior to handling.
7-84. Installations must post signs and safety procedures in pesticide storage facilities and equipment that contain or use pesticides classed as highly toxic or moderately toxic and labeled DANGER, POISON, WARNING, or with the skull and crossbones symbol (MP).	Verify that signs reading DANGER, POISON, and PESTICIDE STORAGE are posted on or near entries to storage facilities. (4)(5) Verify that safety precautions and accident prevention measures are posted. Verify that an inventory of pesticides is displayed outside of the storage facility, identifying all chemicals in storage. Verify that mobile equipment used for pesticide applications is labeled: CONTAMINATED WITH PESTICIDES.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-85. Installations must notify the local fire department, hospitals, public health officials, and police department in writing that pesticides are being stored (MP).	Verify that notification has been submitted and includes a statement of the hazards that pesticides may present during a fire. (3)(6) Verify that a floor plan of the storage facility, indicating the location of the different pesticide classifications, has been submitted to the fire department. Verify that the fire chief has the home telephone numbers of the person(s) responsible for the pesticide storage facility. (NOTE: These requirements apply where large quantities of pesticides classed as highly toxic or moderately toxic and labeled DANGER, POISON, WARNING, or with the skull and crossbones symbol are being stored, or where other conditions warrant.)
7-86. Certain precautions should be taken in the event of a fire at a pesticide storage area where pesticides are classed as highly toxic or moderately toxic and labeled DANGER, POISON, WARNING, or with the skull and crossbones symbol (MP).	Verify, by interviewing the fire chief, that the following precautions are taken: (6) - fire fighting personnel wear supplied air suits and rubberized clothing - personnel avoid breathing or otherwise contacting toxic smoke and fumes - personnel wash completely as soon as possible after encountering smoke and fumes - water used in fire fighting is contained within the storage site drainage system - individuals who might be threatened by the fumes/smoke are evacuated - firemen take cholinesterase tests after fighting fires involving organophosphate or N-alkyl carbamate pesticides.
DISPOSAL	
7-87. Installation pest management programs must be conducted so as to ensure that pesticides do not become hazardous wastes (DODI 4150.7, Encl. 4, para 6c and FGS-FRG 11-12).	Verify that the installation's pest management program is conducted so as to ensure that pesticides do not become hazardous wastes. (1)(4)(5) Verify that excess USEPA registered pesticides are either: - returned to the DLA Materials Return Program - transferred to a DOD installation able to use the materials - transferred to the servicing DRMO. (NOTE: The component pest management consultant can, if requested, provide assistance in identifying installations were usable pesticides could be used.) (NOTE: When the USEPA publishes a proposed pesticide regulatory action involving pesticide label suspension or cancellation that affects DOD, installations are required to comply with administrative procedures developed between the DLA and AFPMB.)

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COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
7-88. If waste pesticides are generated, the installation must dispose of them in accordance with specific standards (FGS-FRG 11-12 and AFI 32-1053, para 3.5.5).	Verify that pesticide wastes are tested to determine if they are hazardous wastes. (1)(2)(4)(5) Verify that, if the pesticide waste is not a hazardous waste, it is disposed of in accordance with the label instructions, through Defense Reutilization and Marketing Office (DRMO), or in a specially designated landfill under Section 9, *Solid Waste Management.* Verify that, if the pesticide is a hazardous waste, it is disposed of in accordance with the provisions of Section 4, *Hazardous Waste Management.*
7-89. Installations must properly dispose of any clothing that is heavily contaminated with pesticides (AFI 32-1053, para 3.4.2.).	Verify that the installation properly disposes of any clothing that is heavily contaminated with pesticides. (4)(5)
7-90. No concentrated pesticides may be discarded to the sanitary sewer or storm drain (MIL-HDBK 1028-A, para 3.5.2.1, implementing FGS-FRG 11-9a and 11-9b).	Verify that no concentrated pesticides are discarded to the sanitary sewer or storm drain. (1)(4)(5)

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Table 7-1

Substances That May Not Be Used as Pesticides in Germany

(FGS-FRG Table 11-1)

NUMBER	SUBSTANCE
1	Acrylnitril
2	Aldrin
3	Aramit
4	Arsenic Compounds
5	Atrazin
6	Binapacryl
7	Lead Compounds
8	Cadmium Compounds
9	Captafol
10	Carbaryl
11	Chlordan
12	Chlordecon (Kepone)
13	Chlordimeform
14	Chloroform
15	Chlorpikrin
16	Crimidin
17	1, 2-Dibromethan
18	1, 2-Dichlorethan
19	1, 3-Dichlorpropen
20	Dicofol with a content of less than 780 g/kg Dicofol or more than 1 g/kg DDT or DDT compounds
21	Dieldrin
22	Dinoseb, its acetates and salts
23	Endrin
24	Ethylenoxid
25	Flouride Acetic Acid and its derivatives
26	HCH, technical

(continued)

Table 7-1 (continued)

NUMBER	SUBSTANCE
27	Heptachlor
28	Hexachlorbenzol
29	Isobenzan
30	Isodrin
31	Kelevan
32	Maleinacidhydrazid and its salts, other than Cholin, Kalium and sodium salts
33	Maleinacidhydrazid-Cholin/Kalium and sodium salts with a content of more than 1 mg/kg free Hydrazin, expressed as an acid equivalent
34	Morfamquat
35	Nitrofen
36	Pentachlorphenol
37	Polychlorterpene
38	Mercury Compounds
39	Quintozen
40	Selen Compounds
41	2, 4, 5-T
42	Tetrachlorcarbon

Table 7-2

Substances with a Limited Ban on Application in Germany

(FGS-FRG Table 11-2)

NUMBER	SUBSTANCES	APPLICATION ONLY AUTHORIZED
1	Aldicarb	For the treatment outside of Water Protection Areas and Mineral Spring Protection Areas for the cultivation of ornamental plants, sugar beets, tree nurseries, grape nurseries and for the production of strawberry plants.
2	Hydrocyanic Acid and Hydrocyanic Acid- producing Compounds	For fumigation to fight parasites in mills, store rooms, supply rooms, and other rooms in food stores and in the means of transportation and storage in containers of dormant plants in greenhouses.
3	Clopyralid	For treating the farm scratching thistle and in the cultivaiton of fodder and sugar beets, outside of Water Protection Areas and Mineral Spring Protection Areas.
4	Deiquat	For destroying weeds, accelerating the maturity process of rape, till beans, and fodder peas as well as destroying the leaves of clover and "Luzerne" (another fodder plant) used for the production of seed.
5	Methyl bromide (Monobrommethane)	For fumigation in mills, store rooms, supply rooms, and other rooms in food stores, vacuum chambers, gas-tight small silos, means of transportation and containers, and beneath gas-tight canvas covers used to prevent parricides from attacking supplies. For the treatment of the soil outside of Water Protection Areas and Mineral Spring Protection Areas for the cultivation of ornamental plants, nurseries, grape nurseries and for the production of plant potatoes in cultivation gardens.
6	Phosphoretted Hydrogen developing Compounds, except for Zincphosphid used as bait	For fumigation in store rooms, supply rooms, silo cells, means of transportation and containers, and beneath gas-tight canvas covers used to prevent parricides attacking supplies; outside of Water Protection Areas and Mineral Spring Protection Areas against the mole (Arvicola terrestris L.), hamster (Cricetus vricetusL.), and the mole (Talpa europaeaL.); only with the consent of local German authorities.
7	Carbon Disulphide	For the treatment of the soil against the phylloxera vastatrix (Daktylosphaira Vitifoliae Fitch) in viniculture only with the consent of local German authorities.
8	Thallium-I-sulfate	In closed rooms
9	Zincphosphid	In bait; outside of forests only in hidden laid-out bait

Table 7-3

Application Restrictions on Pesticides in Germany
(FGS-FRG Table 11-3)

Number	Substance	Specific Restrictions

SECTION A

1	Amitrol	Application from aircraft is prohibited.
2	Daminozid	Application for fruit growing is prohibited.
3	Lindan	Application in mills, flour silos, supplies of grain and grain produce is prohibited.
4	Paraquat	Application for the cultivation of grain is prohibited.
5	Parathion	Application permitted for the cultivation of grain if the amount does not exceed 250 grams of the active agent per hectare and it is not applied during a growing period.
6	Parathionmethyl	Application permitted for the cultivation of grain if the amount does not exceed 250 grams of the active agent per hectare and it is not applied during a growing period.
7	Quartz Crystal (Quarzmehl)	Application in grain supplies and in rooms that store grain is prohibited.

SECTION B

Number	Substance	Comments on Restrictions
1	Alloxydim	
2	Amitrol	
3	Asulam	
4	Benalaxyl	
5	Benazolin	
6	Bendiocarb	
7	Bentazon	
8	Bromacil	
9	Calciumcarbid	

(continued)

Table 7-3 (continued)

Number	Substance	Specific Restrictions
10	Carbetamid	
11	Cabofuran	
12	Carbosulfan	
13	Chloramben	
14	Chlorthiamid	
15	Cyanazin	
16	Dazomet	
17	Diazinon	
18	Dicamba	
19	Dichlobenil	
20	Dikegulac	
21	Dimefuron	
22	Dimethoat	Restrictions are not applicable to the use of plant protection sticks in potted plants in the non-professional sector.
23	Dinoterb	
24	DNOC	
25	Ethridimuron	
26	Ethiofencarb	
27	Ethoprofos	
28	Etrimfos	
29	Flamprop	
30	Fluazifop	
31	Fluroxypyr	
32	Aloxyfop	
33	Exazinon	
34	Isocarbamid	
35	Karbutilt	
36	Lindan	The restriction only applies when used against bark-beatles by applying a water mixture or scattering the dry product on removed bark.
37	Mefluidid	

(continued)

Table 7-3 (continued)

Number	Substance	Specific Restrictions
38	Metalaxyl	
39	Metam-Natrium (=Sodium)	
40	Metazachlor	
41	Methamidophos	The restriction only applies when applied as a water mixture.
42	Methomyl	
43	Methylisothiocyanat	
44	Metribuzin	
45	Monochlorbenzol	
46	Monolinuron	
47	Natriumchlorat	
48	Nitrothalisopropyl	
49	Obstbaumkarbolineum (Anthracenoel)	
50	Oxadixyl	
51	Oxamyl	
52	Oxycarboxin	
53	Picloram	
54	Propachlor	
55	Propazin	
56	Propoxur	
57	Prothoat	
58	Pyridat	
59	S 421 (Synergist)	
60	Sethoxydim	
61	Simazin	
62	TCA	
63	Tebuthiuron	
64	Terbacil	
65	Terbumeton	
66	Thiazafluron	
67	Thiofanox	

(continued)

Table 7-3 (continued)

Number	Substance	Specific Restrictions
68	Triclopyr	

Table 7-4

Restricted-Use Pesticides

(40 CFR 152.175)

The following uses of pesticide products containing the active ingredients specified below have been classified for restricted use and are limited to use by or under the direct supervision of a certified applicator.

Active Ingredient	Formulation	Use Pattern	Classification[1]	Criteria Influencing Restriction
Acrolein	As sole active ingredient. No mixtures registered.	All uses	Restricted	Inhalation hazard to humans. Residue effects on avian species and aquatic organisms.
Aldicarb	As sole active ingredient.	Ornamental uses (indoor and outdoor).	do	Other hazards-accident history.
	No mixtures registered.	Agricultural crop uses.	Under further evaluation.	
Aluminum phosphide	As sole active ingredient. No mixtures registered.	do	do	Inhalation hazard to humans.
Azinphos methyl	All liquids with a concentration greater than 13.5 percent.	do	do	do
	All other formulations.	do	Under further evaluation.	
Carbofuran	All concrete suspensions and wettable powders 40 percent and greater.	do	do	Acute inhalation toxicity.
	All granular formulations.	Rice	Under evaluation.	
	All granular and fertilizer formulations.	All uses except rice.	do	
Chloropicrin	All formulations greater than 2 percent.	All uses.	Restricted	Acute inhalation toxicity.
	All formulations.	Rodent control.	Restricted	Hazard to nontarget organisms.
	All formulations 2 percent and less.	Outdoor uses (other than rodent control).	Unclassified	

*do means same as above (previous row).

(continued)

Table 7-4 (continued)

Active Ingredient	Formulation	Use Pattern	Classification[1]	Criteria Influencing Restriction
Clonitralid	All wettable powders 70 percent and greater. All granulars and wettable powders. Pressurized sprays 0.55 percent and less.	All uses. Molluscide uses. Hospital antiseptics.	do do Unclassified	Acute inhalation toxicity. Effects on aquatic organisms.
Dicrotophos	All liquid formulations 8 percent and greater.	All uses.	Restricted	Acute dermal toxicity; residue effects on avian species (except for tree injections).
Disulfoton	All emulsifiable concentrates 65 percent and greater, all emulsifiable concentrates and concentrate solutions 21 percent and greater with fensulfothion 43 percent and greater, all emulsifiable concentrates 32 percent and greater in combination with 32 percent fensulfothion and greater. Nonaqueous solution 95 percent and greater. Granular formulations 10 percent and greater.	do Commercial seed treatment. Indoor uses (greenhouse).	Restricted Restricted do	do Acute inhalation toxicity. Acute dermal toxicity. Acute inhalation toxicity.
Ethoprop	Emulsifiable concentrates 40 percent and greater. All granular and fertilizer formulations.	do do	do Under evaluation.	Acute dermal toxicity.
Ethyl parathion	All granular and dust formulations greater than 2 percent fertilizer formulations, wettable powders, emulsifiable concentrates, concentrated suspensions, concentrated solutions.	do	Restricted	Inhalation hazard to humans. Acute dermal toxicity. Residue effects or mammalian, aquatic, avian species.

*do means same as above (previous row).

(continued)

Table 7-4 (continued)

Active Ingredient	Formulation	Use Pattern	Classification[1]	Criteria Influencing Restriction
Ethyl parathion (continued)	Smoke fumigants.	do	do	Inhalation hazard to humans.
	Dust and granular formulations 2 percent and below.	do	do	Other hazards-accident history.
Fenamiphos	Emulsifiable concentrates 35 percent and greater.	do	do	Acute dermal toxicity.
Fonofos	Emulsifiable concentrates 44 percent and greater.	All uses.	do	Acute dermal toxicity.
	Emulsifiable concentrates 12.6 percent and less with pebulate 50.3 percent and less.	Tobacco	Unclassified	
Methamidophos	Liquid formulations 40 percent and greater.	All uses.	Restricted	Acute dermal toxicity; residue effects on avian species.
	Dust formulations 2.5 percent and greater.	All uses.	Restricted	Residual effects on avian species.
Methidathion	All formulations.	All uses except stock safflower and sunflower.	Restricted	Residue effects on avian species.
	All formulations.	Nursery stock, safflower, and sunflower.	Unclassified	Residue effects on avian species.

*do means same as above (previous row).

(continued)

Table 7-4 (continued)

Active Ingredient	Formulation	Use Pattern	Classification[1]	Criteria Influencing Restriction
Methomyl	As sole active ingredient in 1 percent to 2.5 baits (except 1 percent fly bait).	Nondomestic outdoor agricultural crops, ornamental and turf. All other registered uses.	Restricted	Residue effects on mammalian species.
	All concentrated solution formulations.	do	do	Other hazards, accident history.
	90 percent wettable powder formulations (not in water soluble bags).	do	do	do
	90 percent wettable powder formulation in water soluble bags.	do	Unclassified	
	All granular formulations.	do	do	
	25 percent wettable powder formulations.	do	do	
	In 1.24 percent to 2.5 percent dusts as sole active ingredient and in mixtures with fungicides and chlorinated hydrocarbon, inorganic phosphate and biological insecticides.	do	do	
Methyl bromide	All formulations in containers greater than 1.5 lb.	All uses.	Restricted	Other hazards, accident history.
	Containers with not more than 1.5 lb of methyl bromide with 0.25 percent to chloropicrin as an indicator.	Single applications (nondomestic use) for soil treatment in closed systems.	Unclassified	
	Containers with not more than 1.5 lb having no indicator.	All uses.	Restricted	do

*do means same as above (previous row).

(continued)

Table 7-4 (continued)

Active Ingredient	Formulation	Use Pattern	Classification[1]	Criteria Influencing Restriction
Methyl parathion	All dust and granular formulations less than 5 percent.	do	do	Other hazards-accident history. All foliar applications restricted based on residue effects on mammalian and avian species.
	Microencapsulated. All dust and granular formulations 5 percent and greater and all wettable powders and liquids.	do	do	Residue effects on avian species. Hazard to bees. Acute dermal toxicity. Residue effects on mammalian and avian species.
Nicotine (alkaloid)	Liquid and dry formulations 14 percent and above.	Indoor (greenhouse).	Restricted	Acute inhalation toxicity.
	All formulations.	Applications to cranberries.	Restricted	Effects on aquatic organisms.
	Liquid and dry formulations 1.5 percent and less.	All uses (domestic and nondomestic).	Unclassified	
Paraquat (dichloride) and paraquat bis(methylsulfate)	All formulations and concentrations except those listed below.	All uses.	Restricted	Other hazards. Use and accident history, human toxicological data.
	Pressurized spray formulations containing 0.44 percent Paraquat bis(methylsulfate) and 15 percent petroleum distillates as active ingredients.	Spot weed and grass control.	do	
	Liquid fertilizers containing concentrations of 0.025 percent paraquat dichloride and 0.03 percent atrazine; 0.03 percent paraquat dichloride and 0.37 percent atrazine, 0.04 percent paraquat dichloride and 0.49 percent atrazine.	All uses.	Unclassified	

*do means same as above (previous row).

(continued)

Table 7-4 (continued)

Active Ingredient	Formulation	Use Pattern	Classification[1]	Criteria Influencing Restriction
Phorate	Liquid formulations 65 percent and greater.	do	Restricted	Acute dermal toxicity. Residue effects on avian species (applies to foliar applications only). Residue effects on mammalian species (applies to foliar application only).
	All granular formulations.	Rice	Restricted	Effects on aquatic organisms.
Phosphamidon	Liquid formulations 75 percent and greater.	do	do	Acute dermal toxicity. Residue effects on mammalian species. Residue effects on avian species.
	Dust formulations 1.5 percent and greater.	do	do	Residue effects on mammalian species.
Picloram	All formulations and concentrations except tordon 101R.	do	do	Hazard to nontarget organisms (specifically nontarget plants both crop and noncrop).
	Tordon 101 R forestry herbicide containing 5.4 percent picloram and 20.9 percent 2, 4-D.	Control of unwanted trees by cut surface treatment.	Unclassified	
Sodium cyanide[3]	All capsules and ball formulations.	All uses.	Restricted	Inhalation hazard to humans.
Sodium fluoroacetate	All solutions and dry baits.	do	do	Acute oral toxicity. Hazard to nontarget organisms. Use and accident history.

*do means same as above (previous row).

(continued)

Table 7-4 (continued)

Active Ingredient	Formulation	Use Pattern	Classification[1]	Criteria Influencing Restriction
Strychnine	All dry baits pellets and powder formulations greater than 0.5 percent.	do	do	Acute oral toxicity. Hazard to nontarget avian species. Use and accident history.
	All dry baits pellets and powder formulations.	All uses calling for burrow builders.	do	Hazard to nontarget organisms.
	All dry baits, and pellets, and powder formulations 0.5 percent and below.	All uses except subsoil.	do	do
	do	All subsoil uses.	Unclassified	do
Sulfotepp	Sprays and smoke generators.	All uses.	Restricted	Inhalation hazard to humans.
Zinc Phosphide	All formulations 2 percent and less.	All domestic uses and nondomestic uses in and around buildings.	Unclassified	
	All dry formulations 60 percent and greater.	All uses.	Restricted	Acute inhalation toxicity.
	All bait formulations.	Nondomestic outdoor uses (other than around buildings).	Restricted	Hazard to nontarget organisms.
	All dry formulations 10 percent and greater.	Domestic uses.	Restricted	Acute oral toxicity.

*do means same as above (previous row).

NOTES:

[1] Under evaluation means no classification decision has been made and the use/formulation in question is still under active review within the USEPA.

[2] Percentages given are the total of dioxathion plus related compounds.

[3] NOTE: M-44 sodium cyanide capsules may only be used by certified applicators who have also taken the required additional training.

The provisions are effective as of 8 August 1995.

INSTALLATION:	COMPLIANCE CATEGORY: PESTICIDE MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		

SECTION 8

PETROLEUM, OIL, AND LUBRICANT (POL) MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 8

PETROLEUM, OIL, AND LUBRICANT (POL) MANAGEMENT

A. Applicability of this Section

This section applies to U.S. Air Force (USAF) installations that store, transport, dispose of, or use petroleum, oil, and lubricant (POL), including petroleum-based fuels. The section presents review action items that respond to regulations, procedures, and organizational mechanisms designed to prevent or limit the accidental release of POL materials to surface water, groundwater, or soils. Procedures to control volatile organic compounds (VOCs) from POL sources are addressed in Section 1, *Air Emissions Management.*

This section covers management of POL, pipeline delivery systems, truck fill stands, immediate operating storage areas, and fueling/defueling flightline operations. Spill prevention and response requirements are also included here. POL materials addressed include jet fuel (JP-4, fuel oil, JP-8), aviation gasoline (AVGAS), motor gasoline (MOGAS), diesel fuel, and lubricating oils. Waste petroleum-based solvents (including PD-680) are addressed in Section 4, *Hazardous Waste Management.*

The regulatory requirements in this section are based on Department of Defense (DOD) regulations, Air Force Regulations (AFRs), and Air Force Instructions (AFIs) that apply at overseas installations. Management Practices (MPs) are derived from U.S. Environmental Protection Agency (USEPA) regulations that are not mandatory overseas but are important to follow to preserve the health and safety of Air Force (AF) employees and protect the environment.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 9, outlines the criteria for the control and abatement of pollution from the storage, transfer, and distribution of petroleum products. Chapter 18 contains criteria for the installation spill plan and spill response.

C. U.S. Air Force Documents

- AFI 13-212, Volume 1, *Weapons Ranges*, 28 July 1994, includes a number of provisions relevant to the handling of used POL generated at air-to-surface weapons ranges.

- AFI 23-201, *Fuels Management*, 1 October 1996, provides managers at all AF activities with policy and procedures for fuels operations.

- AFI 23-502, *Recoverable and Unusable Liquid Petroleum Products*, 6 April 1994, sets goals, assigns responsibilities, and provides guidance for recovering usable and disposing of unusable liquid petroleum products. The Instruction applies to lubricating oils, aviation fuel, distillates, and gasoline.

- Air Force Manual (AFM) 85-16, *Maintenance of Petroleum Systems*, governs the maintenance of permanently installed storage and dispensing systems for petroleum and unconventional fuels.

- AFTO 42B-1-23, *Management of Recoverable and Waste Liquid Petroleum Products*, provides guidelines for collecting, segregating, and processing reclaimed, recoverable, and waste petroleum products.

D. Responsibility for Compliance

- The Base Environmental Protection Committee (EPC) is usually responsible for drafting and reviewing the installation spill plan prior to its promulgation by the Base Commander and for the annual review and update of the plan. Often, the EPC delegates the specific preparation of the plan to the Base Civil Engineer (BCE) for implementation by the Base Environmental Coordinator (BEC).

- The Emergency Response Team (ERT) responds to spills, when requested by an Installation On-Scene Coordinator (IOSC) or Off-Base Spill Coordinator (OBSC), and performs spill containment, recovery, cleanup, disposal, and restoration activities as directed by the IOSC/OBSC. The ERT is a multidisciplinary team often including the following: BCE, BEC, Bioenvironmental Engineering Services (BES), Fire Chief, Security Police Chief, Public Affairs Officer, Base Fuels Officer, Safety Chief, and Staff Judge Advocate (SJA).

- The Base Fire Department provides support in emergency response, spill events, exercises, and fire protection activities. In addition, the department will be responsible for making periodic fire safety inspections of flammable/combustible storage and handling areas, hazardous waste storage areas, and accumulation points on the installation.

- The Safety Manager is responsible for conducting workplace safety evaluations and inspections of the handling and storage of hazardous materials and waste. The Safety Manager will provide the appropriate manager with a report of his or her findings and recommended corrective actions. The Safety Manager is also responsible for ensuring the prompt and accurate investigation of any hazardous material mishaps that result in injury or property damage.

- The Base Fuels Management Officer (BFMO) is responsible for the safe and efficient receipt, storage, handling, issuing, and accounting of all petroleum products and for all general operations and inspections.

- The Base Civil Engineer (BCE) is responsible for the maintenance of all installed petroleum storage and dispensing systems. This responsibility often is discharged by the Liquid Fuels Maintenance (LFM) shop. The BCE also is responsible for the calibration of permanently installed meters.

- The Base Environmental Coordinator (BEC) monitors all POL activities that may affect the environment and usually is responsible for the coordination of the EPC review and updates of the spill plan. The BEC often coordinates notification of reportable spills on behalf of the IOSC.

- The Bioenvironmental Engineering Services (BES) takes samples to determine the chemical nature, pollutant concentration, and extent of each reportable-quantity spill as required for response actions and documentation.

E. Definitions

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Commander* - the person responsible for controlling the actions under discussion. This may be a person other than an accommodation or installation commander. Such would be the case, for example, if the action dealt with a non-base operations function (FGS-FRG, Appendix A).

- *Competent* - an agency, authority, individual, official, person, etc., who meets any of the following criteria: (FGS-FRG, Appendix A)
  1. specifically designated as competent by FGS-FRG
  2. specifically designated as competent by the authority of a German government [agency]
  3. specifically designated as competent by or meets the qualifications of competency of a recognized German trade organization or association
  4. based on experience, training, and/or authority granted per DOD/component policy or regulations, judged by the responsible commander to be a capable and appropriated organization/ individual to accomplish the task in question.

- *Discharge (of a pollutant)* - any addition of any pollutant or combination of pollutants to waters of the host nation from any point source (FGS-FRG, Appendix A).

- *Emergency Response Team (ERT)* - a team performing emergency functions as defined and directed by the IOSC or OBSC (FGS-FRG 20).

- *Environment* - the natural and physical environment, excluding social, economic, and other environments (FGS-FRG, Appendix A).

- *Generating Activity* - a base agency (host, tenant, or contractor) that generates recoverable or unusable petroleum products (AFI 23-502, Attachment 1, Section B).

- *Hazardous Material* - material containing one or more hazardous substances (FGS-FRG, Appendix A).

- *Hazardous Substance* - any substance that is capable of posing an unacceptable risk to health, safety, or the environment if improperly handled, stored, issued, transported, labeled, or disposed of. Such substances display a characteristic listed in Table 3-1 or contain one or more of the substances listed in Table 4-1 or in the *Joint Transportation of Hazardous Materials* (USAREUR Reg. 55-4 and USAFE Reg. 75-3) (FGS-FRG, Appendix A).

- *Hazardous Waste* - a discarded material that may be solid, semi-solid, liquid, or contained gas and either exhibits a characteristic of a hazardous waste as described in Table 3-1, or contains a substance listed as hazardous in Table 4-1 or the *Joint Transportation of Hazardous Materials* (USAREUR Reg. 55-4 and USAFE Reg. 75-3) (FGS-FRG, Appendix A).

- *Hazardous Waste Fuel* - a waste petroleum product mixed with a hazardous waste or exhibiting a characteristic of hazardous waste, in which there is an intent to discard (AFI 23-502, Attachment 1, Section B).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Installation On-Scene Coordinator (IOSC)* - the official who coordinates and directs DOD control and cleanup efforts in accordance with the installation spill and response plan at the scene of a hazardous substance spill resulting from DOD activities on or near the installation. This official is designated by the IC (FGS-FRG, Appendix A).

- *Leak or Leaking* - any instance in which an article, container, or piece of equipment has an opening, no matter what its size, that has allowed the unintentional release of any of its contained substances (FGS-FRG, Appendix A).

- *Management Practice (MP)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *Off-Base Spill Coordinator (OBSC)* - the official who coordinates and directs DOD control and cleanup efforts in accordance with an organization's (as opposed to the installation's) spill and response plan at the scene of a hazardous substance spill off an accommodation due to DOD activities. The OBSC is designated by the commander of the organization that prepared the spill and response plan (FGS-FRG, Appendix A).

- *Off-Specification Product* - product which has one or more off-specification characteristics (e.g., color, vapor pressure, flashpoint, etc.). Off-specification products can be blended as regraded products. Off-specification products are not identified as hazardous waste fuel (AFI 23-502, Attachment 1, Section B).

- *On-Specification Product* - product of suitable quality for return to the base inventory. AFTO 42B-1-23, Table 4-1, *Management of Recoverable and Waste Liquid Petroleum Products*, sets the criteria for a suitable quality. Do not consider as off-specification if solids and water that can be removed by rotation through on-hand separators are present (AFI 23-502, Attachment 1, Section B).

- *Petroleum, Oil, Lubricant (POL)* - a class of hazardous materials that includes, but is not limited to, petroleum and petroleum-based substances comprised of complex blends of hydrocarbons derived from crude oil through process of separation, conversion, upgrading, and finishing; such as motor fuels, residual fuel oils, lubricants, petroleum solvents, and used oils that have not been contaminated with other hazardous substances. Uncontaminated used oils are to be treated as POL products unless classified as waste by a competent authority. Once so classified, the used oil becomes a hazardous waste (FGS-FRG, Appendix A).

- *Pipeline* - includes new and existing pipes, pipeline rights of way, auxiliary equipment (e.g., valves, manifolds, etc.), and buildings or other facilities used in the transportation of POL (FGS-FRG, Appendix A).

- *Point Source* - with respect to wastewater, any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, or rolling stock; but not including vessels, aircraft, or any conveyance that merely collects natural surface flows of precipitation (FGS-FRG, Appendix A).

- *Property* - a site, building, object, structure, or a collection of such items (FGS-FRG, Appendix A).

- *Qualified* - see *Competent.*

- *Recoverable Products* - products that still have useful physical or chemical properties; see Off-Specification Product and On-Specification Product (AFI 23-502, Attachment 1, Section B).

- *Recyclable Products* - products determined to be surplus to AF needs that are burned for energy recovery (e.g., JP-4 contaminated with hydraulic fuel and used lubricating oil are recyclable products when burned for energy recovery as a fuel) (AFI 23-502, Attachment 1, Section B).

- *Reportable Quantity (RQ)* - is defined as follows (FGS-FRG 18-7b(1)):
  1. the amount spilled exceeds the amount in the RQ column in Table 4-1, Part 1
  2. the spill contains a hazardous substance listed in Table 4-1, Parts 2 or 3, and the amount spilled exceeds:
     a. 450 g (1 lb) of a substance with a WGK number of 3 (acutely hazardous)
     b. 4.5 kg (10 lb) of a substance with a WGK number of 2 (hazardous)
     c. 450 kg (100 lb) of a substance with a WGK number of 1 (marginally hazardous)
  3. the spill contains POL products or POL wastes that exceed 416 L (110 gal).

- *Spill* - an uncontained release of a hazardous substance, to include POL, on the land or into the water (FGS-FRG, Appendix A).

- *State* - the political subdivision referred to as a *Land* in Germany (FGS-FRG, Appendix A).

- *Unusable Petroleum Product* - product that is no longer suitable for any use on an installation due to excessive contamination or quality degradation (AFI 23-502, Attachment 1, Section B).

- *Used Oil* - any oil or other waste POL product that has been refined from crude oil, or is a synthetic oil, has been used, and as a result of such use, is contaminated by physical or chemical impurities. Used oil exhibiting the characteristics of reactivity, ignitability, and corrosivity is still considered used oil, unless it has been mixed with other hazardous waste. However, used oil that exhibits the characteristic of toxicity as described in Table 3-1 is a hazardous waste and will be managed as such. In addition, used oil mixed with hazardous waste is a hazardous waste and will be managed as such (FGS-FRG, Appendix A).

- *Used Oil Burned for Energy Recovery* - used oil that is burned for energy recovery is termed 'used oil fuel.' Used oil fuel includes any fuel produced from used oil by processing, blending, or other treatment. To be burned, the emissions must meet the requirements of Chapter 2 of FGS-FRG (see Section 1, *Air Emissions Management*) (FGS-FRG, Appendix A).

- *Water Protection Area* - an area established by a German state to protect public water supplies, supplement groundwater, or prevent harmful runoff of precipitation and flooding, as well as to prevent entry into the water of soil constituents or substances used to treat manure and plants. The state will

publish a set of restrictions for each area designated applicable to all, including DOD components (FGS-FRG, Appendix A).

- *Waters of the Host Nation* - surface waters including the territorial seas recognized under customary international law, including (FGS-FRG, Appendix A):
  1. all waters that are currently used, were used in the past, or may be susceptible to use in commerce
  2. waters that are or could be used for recreation or other purposes
  3. waters from which fish or shellfish are or could be taken and sold
  4. waters that are used or could be used for industrial purposes by industry
  5. waters, including lakes, rivers, streams (including intermittent streams), sloughs, prairie potholes, or natural ponds
  6. tributaries of waters identified in 1 through 5 above.

(NOTE: Waste treatment systems, including treatment ponds or lagoons, are not waters of the host nation. This exclusion applies only to man-made bodies of water which neither were originally waters of the host nation nor resulted from impoundment of waters of the host nation.)

PETROLEUM, OIL, AND LUBRICANT (POL) MANAGEMENT

GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
All Installations	8-1 through 8-4	(1)(2)(11)
POL Management	8-5 through 8-13	(1)(3)(4)(5)(7)(8)(9)(10)
Pipelines	8-14 through 8-30	(1)(2)(3)(4)(7)
Used POL/Waste POL	8-31 through 8-40	(1)(2)(3)(4)(5)(8)(9)
Spill Prevention and Response		
Installation Spill Plan	8-41 through 8-51	(1)(2)(4)(5)(6)
Spill Response Actions	8-52 through 8-56	(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)
Reporting Requirements	8-57 through 8-60	(1)(2)(6)(7)

(a) CONTACT/LOCATION CODE:

(1) BEC (Base Environmental Coordinator)
(2) BCE (Base Civil Engineer)
(3) BFMO (Base Fuels Management Office)
(4) LFM (Liquid Fuels Maintenance)
(5) BES (Bioenvironmental Engineering Services)
(6) Base Fire Department
(7) Power Production
(8) AAFES (Army/Air Force Exchange Service) Service Station Manager
(9) Generating Activities
(10) Vehicle Maintenance Shop
(11) Base Staff Judge Advocate

PETROLEUM, OIL, AND LUBRICANT (POL) MANAGEMENT

Records To Review

- Records of all spills, leaks, and associated site assessment/cleanup activities (for 3 yr)
- Installation Spill Plan
- Records of spill response training

Physical Features To Inspect

- Refueling facilities
- Washrack areas
- Vehicle maintenance areas
- Oil separators
- Oil and hazardous substance sites

People To Interview

- BEC (Base Environmental Coordinator)
- BCE (Base Civil Engineer)
- BFMO (Base Fuels Management Office)
- LFM (Liquid Fuels Maintenance)
- BES (Bioenvironmental Engineering Services)
- Base Fire Department
- Power Production
- AAFES (Army/Air Force Exchange Service) Service Station Manager
- Generating Activities
- Vehicle Maintenance Shop
- Base Staff Judge Advocate

COMPLIANCE CATEGORY: PETROLEUM, OIL, AND LUBRICANT (POL) MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
ALL INSTALLATIONS	
8-1. Copies of all relevant DOD directives/ instructions, U.S. Air Force (USAF) directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (1)(11) (NOTE: Among the relevant documents are the following: - AFI 13-212, Volume I, *Weapons Ranges*, 28 July 1994 - AFI 23-201, *Fuels Management*, 1 October 1996 - AFI 23-502, *Recoverable and Unusable Liquid Petroleum Products*, 6 April 1994 - AFM 85-16, *Maintenance of Petroleum Systems*.)
8-2. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning POL management have been issued since the finalization of the manual. (1)(2) Verify that the installation is in compliance with newly issued regulations.
8-3. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to POL management. (1)(11) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
8-4. The Fuels Management Flight Commander (FMFC) must take specific actions to ensure appropriate environmental management of fuel (AFI 23-201, A10.1)	Verify that the FMFC develops local operating procedures for collection, segregation, storage, and disposition of waste and reusable bulk petroleum products in accordance with AFI 23-502, *Recoverable and Unusable Liquid Petroleum Products.* (3) Verify that the FMFC ensures that adequate spill prevention and cleanup materials are readily available.

(1) BEC (Base Environmental Coordinator) (2) BCE (Base Civil Engineer) (3) BFMO (Base Fuels Management Office) (4) LFM (Liquid Fuels Maintenance) (5) BES (Bioenvironmental Engineering Services) (6) Base Fire Department (7) Power Production (8) AAFES (Army/ Air Force Exchange Service) Service Station Manager (9) Generating Activities (10) Vehicle Maintenance Shop (11) Base Staff Judge Advocate

COMPLIANCE CATEGORY: PETROLEUM, OIL, AND LUBRICANT (POL) MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
POL MANAGEMENT	
8-5. BFMO must appoint a Fuels Environmental Coordinator (AFI 23-201, para 1.5).	Verify that BFMO has appointed a Fuels Environmental Coordinator. (3) Verify that the Fuels Environmental Coordinator carries out the following functions: - follows the guidance in FGS-FRG and the policies contained in Air Force Policy Directives (AFPDs) and AFIs - consults with agencies (such as the EPC, Base Environmental Manager, BCE, BES, and SJA).
8-6. Certain equipment must be located in or near the fuels management area (AFI 23-201, para 1.14.1).	Verify that the following are located in or near the fuels management area: (3) - a vehicle washrack equipped with an oil-water separator and located within or near the refueling unit parking area - a liquid degreasing machine capable of cleaning engines on mobile fueling equipment. Verify that the discharge from the degreaser drains into an oil-water separator.
8-7. Installations that transport or distribute POL products by road, rail, or water must meet the requirements for the transport of hazardous materials (FGS-FRG 9-10, implementing FGS-FRG 5-8).	Verify that hazardous materials shipments are accompanied throughout by shipping papers that clearly describe the quantity and identity of the material and include an MSDS. (1)(3)(4) Verify that all drivers of hazardous material shipments are trained and briefed on the hazardous materials in the shipment, including: - health risks of exposure - physical hazards of the material, including the potential for fire, explosion, and reactivity. Verify that hazardous materials are identified as "Ignitable," "Corrosive," "Reactive," or "Toxic" in both the shipping papers and the briefing for the driver. Verify that supervisory personnel do a walk-around inspection of the vehicles before and after the material is loaded. Verify that all packages are labeled in accordance with USAFE Reg 75-3, *Joint Transportation of Hazardous Materials.*
8-8. All fuels elements must be evaluated at least once every 6 mo (AFI 23-201, para 8.7).	Verify that the Quality Control and Inspection (QC&I) Supervisor evaluates each fuels element at least once every 6 mo (not to exceed 180 days). (3) (NOTE: The QC&I function does not evaluate itself.)

(1) BEC (Base Environmental Coordinator) (2) BCE (Base Civil Engineer) (3) BFMO (Base Fuels Management Office) (4) LFM (Liquid Fuels Maintenance) (5) BES (Bioenvironmental Engineering Services) (6) Base Fire Department (7) Power Production (8) AAFES (Army/Air Force Exchange Service) Service Station Manager (9) Generating Activities (10) Vehicle Maintenance Shop (11) Base Staff Judge Advocate

COMPLIANCE CATEGORY: PETROLEUM, OIL, AND LUBRICANT (POL) MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
8-8. (continued)	Verify that a fuels element is revisited after 30 days (but within 45 days) to check any negative indicator found during the semiannual assessment. Verify that at least 10 no-notice spot checks are performed each week. Verify that all shifts are spot checked. Verify that spot checks are conducted during exercises and contingencies. (NOTE: At bases with fewer than 20 full-time fuels personnel, at least two no-notice spot checks are performed per week.)
8-9. Facilities and equipment for storing, handling, or using oils should be designed to prevent or minimize spills to the environment and should be periodically tested and inspected (MP).	Verify that one of the following preventive systems, or an equivalent, is used: (1)(4)(5) - absorbent material - sand bags/temporary curbing devices - dikes, berms, or retaining walls sufficiently impervious to contain spilled oil - culverting gutters or other drainage system - weirs, booms, or other barriers - spill diversion ponds - retention ponds. Verify that each oil storage area: - has adequate supplies of appropriate materials that are readily accessible - has equipment that is in good condition.
8-10. POL products may be unloaded near water under certain conditions only (FGS-FRG 9-8c).	Verify that POL products are unloaded near water only if there are no grounds to believe that such procedures will create drainage problems, water pollution, or degrade the properties of water. (1)(2)(3)(4)(7)(8)(10)
8-11. Installations must avoid transferring POL on the banks of waterways (FGS-FRG 9-8c(1)).	Verify that the installation avoids carrying out transfers of POL on the banks of waterways. (1)(2)(3)(4)(7)(8)(10) (NOTE: This prohibition does not apply if adequate safety systems and protective measures are used.)

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COMPLIANCE CATEGORY: PETROLEUM, OIL, AND LUBRICANT (POL) MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
8-12. Secondary containment must be provided for all loading and unloading facilities and must be managed properly (AFI 23-201, para A10.1).	Verify that all loading and unloading facilities have secondary containment that is impermeable to petroleum products. (3) Verify that no drainage water is discharged from the secondary containment if the water contains residual petroleum products or hazardous chemicals.
8-13. The storage of POL products must conform to the requirements for the storage of hazardous materials (FGS-FRG 9-3).	Verify that the storage of POL products conforms to the requirements of FGS-FRG, Chapter 5, *Hazardous Materials*. (3)(4)(5)(7)(8)(9)(10) (NOTE: Particular attention should be paid to the requirements on the separation of POL products from other hazardous materials and to the requirements for secondary containment.) (NOTE: Findings written against requirements in Section 3, *Hazardous Materials Management*, should use the question number, criterion, and the citation from this checklist item. The checklist item number and citation from Section 3 should be included in the details portion of the finding form.)
PIPELINES	(NOTE: The requirements of this section apply to pipelines both on and off accommodations (including hydrant fueling systems), but they do not apply to pipelines that are part of a storage facility.)
8-14. If a permit has been issued for the construction or operation of a pipeline, its conditions must be met (FGS-FRG 9-11a).	Determine whether a permit has been issued for the construction or operation of a pipeline. (1)(2)(3)(4)(7) Verify that the installation meets the conditions established in that permit.
8-15. Installations must coordinate with appropriate German authorities in accordance with component policy and regulations before constructing a pipeline (FGS-FRG 9-11a and 9-11a(1)).	Verify that the installation coordinates with appropriate German authorities in accordance with component policy and regulations before constructing pipelines. (1)(2)(3)(4)(7) (NOTE: This requirement applies only if a construction permit has not been issued.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
8-16. Installations must not design or construct pipeline facilities that do not at a minimum meet recognized U.S. industry standards (FGS-FRG 9-11a(1)).	Verify that the installation does not design or construct any pipelines that fail to meet U.S. industry standards as a minimum. (1)(2)(3)(4)(7) (NOTE: This requirement includes corrosion protection for the outside walls of pipes.)
8-17. Pipelines must be located so as to present the minimum danger to people, property, and the pipeline itself (FGS-FRG 9-11a(2)).	Verify that pipelines are so located that they present the minimum danger to people, property, and the pipeline itself. (1)(2)(3)(4)(7) Verify that no pipeline passes through a water protection zone or other critical water conservation area.
8-18. Pipelines must be constructed by qualified persons or firms (FGS-FRG 9-11a(1)).	Verify that the installation uses only qualified persons or firms to construct pipelines. (1)(2)(3)(4)(7)
8-19. Pipelines must be inspected by qualified persons before being put into operation (FGS-FRG 9-11a(1)).	Verify that pipelines are inspected by qualified persons before being put into operation. (1)(2)(3)(4)(7) (NOTE: For USAFE purposes, the only persons considered qualified to conduct these inspections are officials of the Technischer Überwachungsverein (TÜV), who charge for their services, or the USAFE Fuels Facility Engineer.)
8-20. Any significant element or part of the system that is essential for operations or safety must be connected to a remote control office or operations center that is constantly occupied (FGS-FRG 9-11a(3)).	Verify that any significant element or part of the system that is essential for operations or safety is connected to a remote control office or operations center that is constantly occupied. (1)(2)(3)(4)(7)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
8-21. If no operating permit has been issued, installations must coordinate with appropriate German authorities (FGS-FRG 9-11a).	Determine whether an operating permit has been issued. (1)(2)(3)(4)(7) Verify that, if no operating permit has been issued, the installation coordinates with appropriate German authorities to ensure that no operational conflicts exist. (NOTE: This requirement applies only if a construction permit has not been issued.)
8-22. All pipeline facilities that carry POL must be tested and maintained (FGS-FRG 9-11a(4)).	Verify that all pipeline facilities that carry POL are tested and maintained. (1)(2)(3)(4)(7) (NOTE: This testing and maintenance may be done in accordance with German industry standards as long as those standards are at least as protective of the environment as U.S. industry standards.)
8-23. If a permit has been issued for the facility, the installation must meet the testing and maintenance requirements specified in the permit (FGS-FRG 9-11a(4)).	Determine whether a permit has been issued for the facility. (1)(2)(3)(4)(7) Verify that the installation meets the testing and maintenance requirements specified in the permit.
8-24. Operators of pipelines that handle POL must prepare and follow a procedural manual for operations, maintenance, and emergencies (FGS-FRG 9-11a(4)(a)).	Verify that the installation has prepared and follows a procedural manual for operations, maintenance, and emergencies. (1)(2)(3)(4)(7) Verify that the parts required for emergency repairs are kept on hand.
8-25. Installations must meet hydrostatic testing requirements for their pipelines (FGS-FRG 9-11a(4) (b)).	Verify that each new pipeline system and each system in which pipe has been replaced or relocated is hydrostatically tested in accordance with recognized German or equally protective U.S. standards. (1)(2)(3)(4)(7) Verify that pipelines that exhibit leaks in the course of such testing are not put into operation until corrective measures have been completed.
8-26. Installations must meet pipeline inspection requirements (FGS-FRG 9-11a(4)(c)).	Verify that the installation thoroughly inspects its pipelines at least every 2 yr. (1)(2)(3)(4)(7) Verify that, in addition, the pipeline route is walked by a linesman at specified intervals.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
8-26. (continued)	Verify that the linesman inspects operating equipment, cathodic protection, checks for leaks or damage, and files a written report. Verify that pressurized equipment is inspected at least every 3 mo.
8-27. Air Force operated offsite pipelines should be inspected at least once per week by air patrol, and once a year by line walker or vehicle patrol (MP).	Verify that records confirm that inspections were performed. (1)(3)(4) Verify that any detected leaks were reported and leaking pipes repaired or replaced. (NOTE: This MP is based on guidance found in AFM 85-16, Chapter 8.)
8-28. All Air Force operated above and underground fuel piping systems at transfer operations, pumping and in-plant processing operations should be managed according to specific parameters (MP).	Verify that pressure tests have been conducted once a year. (3)(4)(7) (NOTE: Check under remarks Section of AF Form 172 if the testing pressure was maintained during the 2 h period.) Verify that confirmed leaks have been reported and leaking pipes repaired or replaced. Verify that pipelines are walked at least twice a year and that any suspicious circumstances lead to immediate investigation to include pressure testing of the line and excavation if soil conditions permit. (NOTE: This MP is based on guidance outlined in AFM 85-16, Chapter 8.)
8-29. All underground aviation fuel transfer pipelines should be subject to a hydrostatic pressure test on a 5-yr recurring basis (MP).	Verify that hydrostatic pressure tests were conducted as required by reviewing attachments to AF Form 172 and interviewing LFM personnel. (4) Verify that detected leaks were corrected through repair or replacement by inspecting test results. Verify that 150 percent of normal pressure was maintained during the 4-h test period by reviewing the Remarks section of AF Form 172. (NOTE: This MP is based on guidance outlined in AFM 85-16, Chapter 8.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
8-30. Buried fuel piping should have a protective wrapping and coating and should be cathodically protected if soil conditions warrant (MP).	Verify that buried fuel piping is properly protected from corrosion. (3)(4)(7) Verify that the voltage is greater than -0.85 V, but not more than -3.0 V (monthly), for impressed current systems. Verify that the voltage is greater than -0.85 V, but not more than -3.0 V (biannually), for sacrificial anode systems. Verify that leak detection and failure are reported.
USED OIL/WASTE OIL	(NOTE: Used oil which is to be recycled is managed as a hazardous material and may be stored in an aboveground storage tank (AST) or in an underground storage tank (UST).)
8-31. Installations must reuse or reprocess used oil (FGS-FRG 9-9a).	Verify that, if possible, the installation reuses or reprocesses used oil. (1)(2)(9) (NOTE: Oil that is reprocessed is not considered to be a waste and is to be managed as a hazardous material, not as a hazardous waste.)
8-32. Installations must have in place a program for the management of recoverable and unusable liquid petroleum products (AFI 23-502, para 6.2 through 8.7).	(NOTE: This requirement applies to lubricating oils, aviation fuel, distillates, and gasoline.) Verify that the installation has a comprehensive program to manage the segregation and collection, reuse, or recycling of recoverable petroleum products and the disposition of unusable petroleum products. (1)(3)(4) (NOTE: Documentation may be in the form of a plan or a base operating instruction.) Verify that the program includes: - specific responsibilities and criteria for the collection, storing, returning to inventory, reusing, recycling, and disposing of all unusable petroleum products and hazardous waste fuels generated at the base - identification of generating activities by organization - a list of all recoverable and unusable products and hazardous waste fuels generated by an organization, including source, approximate quantity, and condition - specific responsibilities of base organizations - the methods and facilities available to the base to collect, store, return to inventory, reuse, recycle, and dispose of products - accounting procedures for recoverable and unusable petroleum products and procedures to credit organizations using the guidelines in AFMAN 23-110, *USAF Supply Manual* - specific base and organizational procedures for the entry, exit, and control of unusable petroleum product vehicles

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
8-32. (continued)	- stress on sound conservation and property management of unusable products - where feasible, specification of positive product control by designating pick up locations, verifying pick up quantities, and whenever possible, using a single entry and exit. (NOTE: The priorities for disposition of products are: - return on-specification fuel to the base inventory or use as the original grade - return off-specification fuel to the base inventory and blend into the original or different grade making a regraded product - recycle products on base by reusing in secondary applications such as a heating fuel - categorize any remaining products as surplus, send them as recyclable products to the Defense, Reutilization and Marketing Office (DRMO), credit DRMO sales to the base Resource, Recovery, and Recycling (RRR) account - contract with a service company to remove nonrecylable waste from the base.) Verify that the BCE has developed procedures at the base level for the disposal of petroleum products. Verify that generating activities have obtained enough containers to properly segregate and store recoverable and unusable products and hazardous waste fuel by product type. Verify that the generating activity submits data on the quantity and identity of recoverable and unusable petroleum products, as required, to the designated installation environmental component of the program.
8-33. Used oil must not be used as dust suppressant or for road surface treatment (FGS-FRG 6-9(f)).	Verify that the installation does not use used oil for dust suppression or road treatment. (1) (NOTE: This criterion is mistakenly assigned the letter (d) in FGS-FRG.)
8-34. Accumulation points must be set up for used petroleum products generated as part of the operation and maintenance of air-to-surface weapons ranges (AFI 13-212, para 1.10.2.1).	Determine whether the installation operates air-to-surface weapons ranges that generate used petroleum products. (1)(3)(5) Verify that accumulation points have been set up for such weapons ranges. Verify that arrangements have been made for periodic transport of such products to a storage facility.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
8-35. Installations must meet specific requirements with regard to used oils that are to be reprocessed or burned (FGS-FRG 6-9b and 6-9d).	Verify that used oils that are to be reprocessed or burned are tested for PCBs and halogens at the collection point. (1)(2)(9) Verify that such used oils do not contain more than 2 mg/kg of PCBs or more than 2 mg/kg of halogens. (NOTE: Used internal combustion engine oil, gear lubrication oil, and petroleum-based machine, turbine, and hydraulic oils may be reprocessed. Other used oils may be reprocessed if it can be shown that they do not contain harmful substances that would make reprocessing more difficult or that might accumulate in the reprocessed products.)
8-36. Used oils must not be mixed with other substances (FGS-FRG 6-9c, 6-9d, and 9-9b).	Verify that used oils are not mixed with other substances. (9) Verify that synthetic oils based on PCB or halogenated substitutes are not mixed with other used oils. Verify that synthetic oils based on PCB or halogenated substitutes are collected, transported, and disposed of separately. (NOTE: Such oils may be found in transformers, capacitors, and hydraulic equipment.) Verify that the following types of oils are not mixed with any other waste or waste oils: - used internal combustion engine oil - gear lubrication oil - and petroleum-based machine, turbine, and hydraulic oils.
8-37. Installations may burn used oil fuel in certain devices only if specific requirements are met (FGS-FRG 6-9e).	Verify that the installations burns used oil fuel in the following devices only: (1)(2) - industrial furnaces - industrial boilers located on the site of a facility engaged in a manufacturing process where substances are transformed into new products, including the component parts of products, by mechanical or chemical processes - utility boilers used to produce electric power, steam, heated or cooled air or other gases or fluids - used oil-fired space heaters with a capacity of not more than 0.5 MBtu/h, provided that they burn only used oil that the installation generates and that the combustion gases are properly vented to the ambient air. Verify that the above devices are used only if both the fuel and the emissions meet the requirements of Section 1, *Air Emissions Management.*

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
8-38. Installations that generate used oil and market it directly to a burner should meet specific standards (MP).	Verify that the installation prepares and sends the receiving facility an invoice detailing the following for off-specification used oil: (1)(2)(5)(8)(10) - an invoice number - the names and addresses of the shipping and receiving facilities - the quantity of off-specification oil to be delivered - the dates of shipment or delivery. Verify that copies of the invoices are kept for 3 yr. Verify that, for used oil that is not off-specification, copies of the waste analyses are kept for 3 yr. Verify that the installation has a signed notice from the burner that the oil will be burned only in approved furnaces and/or boilers.
8-39. POL products that become part of the waste stream must be managed as hazardous waste (FGS-FRG 6-9a and 9-2).	Verify that POL products that become part of the waste stream are managed as hazardous waste. (3)(4)(5)(7)(8)(9)(10) (NOTE: See Section 4, *Hazardous Waste Management.*) (NOTE: Once the generating activity decides to discard the POL products rather than reuse, recover, or recycle them, the POL products are considered hazardous waste.) (NOTE: Findings written against requirements in Section 4, *Hazardous Waste Management*, should use the question number, criterion, and the citation from this checklist item. The checklist item number and citation from Section 4 should be included in the details portion of the finding form.)
8-40. The FMFC has specific responsibilities with regard to the management of waste fuel (AFI 23-201, para A10.2).	Verify that the FMFC: (3) - designates interim storage and final disposition locations and procedures for off-specification bulk products and product-water mixtures under fuels management control - does not use installed hydrants, storage sumps, or slop tanks to collect or store waste fuels - obtains written MAJCOM approval to use stock listed vehicles and trailers for the collection and transport of waste fuels or oils - clearly marks and completely isolates the tanks and equipment used for waste products from active product storage and equipment to prevent contamination - ensures that there is direct supervision when waste materials are delivered to waste product tankage in the fuels area by the generating activity - properly trains fuels personnel who handle hazardous waste.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
SPILL PREVENTION AND RESPONSE **The Installation Spill Plan**	
8-41. The IC must prepare, maintain, and implement a plan that provides for the prevention, control, and reporting of spills of hazardous substances (FGS-FRG 18-3a and 9-12).	Verify that the IC has prepared, maintains, and implements a plan that provides for the prevention, control, and reporting of spills of hazardous substances. (1)(2) (NOTE: FGS-FRG appears to envisage only one plan with three sections; one section each is devoted to prevention, control/response, and reporting. The control/response section of the plan may, FGS-FRG states (18-5), be considered a contingency plan.) Verify that each POL facility has a copy of the plan. Verify that the plan addresses each POL storage and distribution facility specifically. Verify that the plan is certified by a competent authority. Verify that the plan is updated at least every 5 yr.
8-42. Commanders of organizations that handle, use, generate, or transport hazardous substances off DOD accommodations in the FRG must also prepare, maintain, and institute a plan for their off-accommodation activities (FGS-FRG 18-3b).	Determine whether the organization has off-accommodation activities where hazardous substances are handled, used, generated, or transported. (1)(2) Verify that the organization has prepared, maintained, and instituted a plan for the prevention, control, and reporting of spills of hazardous substances at their off-accommodation activities. (NOTE: This requirement does not apply if the off-accommodation activities are fully covered by the plan of the installation at which the organization is based.) Verify that the plan for off-accommodation activities is updated every 5 yr and whenever the activities change significantly in either nature, size, or scope.
8-43. Installations must coordinate with local officials when preparing a spill plan (FGS-FRG 18-4(b)(1) and 18-4(b)(2)).	Verify that the installation has coordinated with local officials in the preparation of its spill plan. (1)(2) Verify that available German material and personnel are included in the plan. Verify that private enterprises that have appropriate equipment at their disposal are included in the plan.

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8-43. (continued)	Verify that the emergency plans of DOD-operated fire departments include information on: - the nearest German fire departments with a spill response capability - units and facilities of the German disaster protection services - other U.S. or German agencies or individuals whose expertise or advice may be helpful.
8-44. Installations must consider including specific equipment for dealing with possible disasters when developing the plan (FGS-FRG 18-4g(1)).	Verify that the installation considers the following equipment for dealing with possible disasters for inclusion in the plan: (1)(2) - tank/pump trucks that have permits (if not DOD-owned) for the substance to be removed, and/or other appropriate empty containment equipment or facilities - oil separators, oil suction equipment - towing vehicles - lifting equipment - digging equipment - drilling and prospecting equipment for determining the depth to which substances have penetrated - watercraft and construction equipment for setting up booms in flowing waters - tarpaulins and foils.

8-45. Installations must meet specific requirements with regard to the contents of the prevention section of the plan (FGS-FRG 18-4).	Verify that the prevention section of the plan contains the following: (1)(2)
	
	- name, title, responsibilities, duties, telephone number, and/or radio call sign/ frequency (as appropriate) of the designated IOSC and/or OBSC
	- names, titles, responsibilities, addresses, and telephone numbers of German authorities to be contacted if necessary
	- discussion of the circumstances under which contact should be made with German authorities
	- designation of who on the U.S. side is authorized to make or direct contact with German authorities
	- for a plan covering spills on or in the vicinity of an accommodation, general information on the accommodation including:
	  - name
	  - type or function
	  - location and address
	  - charts of drainage patterns
	  - designated water protection areas
	  - maps showing locations of storage, handling, and transfer facilities
	  - critical water resources
	  - land uses
	  - possible migration pathways

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8-45. (continued)	- for a plan covering off-accommodation spills, general information as to:
	  - the nature of the activities
	  - the spill hazards deemed possible
	  - maps showing where the activities could take place
	  - comments and/or data on areas of special concern or risk
	- an inventory of storage, handling, and transfer facilities that could possibly produce a spill of a RQ of a hazardous substance
	- for each listing in the inventory, a prediction of:
	  - the direction and rate of flow
	  - the total quantity of hazardous substances that might be spilled as a result of a major failure
	- an inventory of all hazardous substances at storage, handling, and transfer facilities
	- a detailed description of countermeasures, including structures and equipment for diversion and containment of spills, for each facility listed in the inventory
	
	(NOTE: Measures should permit, as far as practical, reclamation of spilled substances.)
	
	- facilities for the removal and treatment of residual substances
	- a description of deficiencies in spill prevention and control measures at each facility listed in the inventory, including required corrective measures, procedures to be followed to correct listed deficiencies, and any interim control measures that may be in place
	- written procedures for:
	  - operations to preclude spills of hazardous substances
	  - inspections
	  - recordkeeping requirements.

8-46. Installations must meet specific requirements with regard to the contents of the control/response section of the plan (FGS-FRG 18-5).	Verify that the control/response section of the plan identifies resources for cleaning up spills both on and off accommodations caused by DOD activities and procedures for providing assistance to other agencies (U.S. or German) when requested. (1)(2) (NOTE: The control/response section of the plan may be considered a contingency plan.) Verify that, in addition, the control/response section of the plan contains the following, as a minimum: - provisions specifying the responsibilities, duties, procedures, and resources to be used to contain and clean up spills - a description of general safety and fire prevention precautions for spill cleanup actions - the responsibilities, composition, and training requirements of the Emergency Response Team (ERT)

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8-46. (continued)	- procedures for ERT alert and response, to include:
	  - access to a reliable communications system for timely notification of a hazardous substance spill
	  - PAO involvement
	- a current roster of the persons, and alternates, who must receive notice of a hazardous substance spill, including the following information:
	  - name
	  - organization
	  - mailing address
	  - work and home telephone numbers
	- without compromising security, provisions for notifying the emergency coordinator after hours
	- provisions for notifying the IC and local authorities in the event of a hazard to human health or the environment
	- assignment of responsibilities for making the necessary notifications, including notification to emergency service providers
	- surveillance procedures for early detection of hazardous substance spills
	- a prioritized list of critical water resources that will be protected in the event of a spill
	- other resources addressed in prearranged agreements that are available to the installation to clean up or reclaim a large spill that is the result of DOD activities, if such spill exceeds the response capability of the installation
	- cleanup methods, including procedures and techniques used to identify, contain, disperse, reclaim, and remove POL and hazardous substances used in bulk quantity on the installation
	- procedures for the proper disposal of recovered substances and contaminated POL and absorbent materials
	- procedures to be accomplished before the resumption of operations
	- a public affairs section that describes the procedures, responsibilities, and methods for releasing information in the event of a spill.
	
	(NOTE: Cleanup methods may include collecting, covering, pumping off, diluting, bonding, and interim storage, as well as flushing with water to reduce the concentration of liquids, solutions, or compounds mixable with water. Emulsifying or dispersing substances that are harmful to water should be avoided.)
	
	(NOTE: Measures that may be required for treatment of gases and dispersed dusts include precipitation (spraying) and dilution (aeration measures).)
	
	(NOTE: Solid substances that have been released should be dealt with by covering, bonding, and/or removing them.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
8-47. Installations must meet specific requirements with regard to the contents of the reporting section of the plan (FGS-FRG 18-7).	Verify that the reporting section of the plan addresses the following topics: (1)(2) - recordkeeping when emergency procedures are invoked, to include documentation of the action taken by the ERT or any other responsible crews - notification of IOSC or OBSC - channels through which the IOSC or OBSC will make required notifications.

8-48. Installations that store hazardous wastes must meet specific requirements with regard to their contingency plans (FGS-FRG 18-6).	Determine whether the installation stores hazardous wastes. (1)(2)
	Verify that the installation's contingency plan is updated annually or when there are significant changes to operations.
	(NOTE: The contingency plan is equivalent to the control/response section of the spill plan.)
	Verify that the contingency plan includes the following:
	- names and telephone numbers of all persons qualified to act as Emergency Coordinator
	- without compromising security, provisions for notification of the Emergency Coordinator after hours
	- arrangements for emergency services, including a description of arrangements with installation and/or local police departments, fire departments, hospitals, contractors, and emergency response teams
	- means to contact emergency services, including a telephone number or some other means of contacting the appropriate emergency services provider on a 24-h basis
	- a list of all emergency equipment at the facility, where this equipment is required
	- the location and a physical description of each item on the list, and a brief outline of its capabilities.
	- an evacuation plan for personnel, where there is a possibility that evacuation would be necessary, that describes:
	  - signal(s) to be sued to begin evacuation
	  - evacuation routes
	  - alternate evacuation routes (in cases where the primary routes could be blocked by releases of hazardous waste or fires)
	- a designated meeting place.

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COMPLIANCE CATEGORY: PETROLEUM, OIL, AND LUBRICANT (POL) MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
8-49. Commanders who are responsible for establishing plans must also provide the training necessary to ensure that personnel and equipment are effective (FGS-FRG 18-8).	Verify that commanders who have established spill plans also provide the training necessary to ensure that personnel and equipment are effective. (1)(2)
8-50. Installations must meet specific requirements with regard to emergency coordinators (FGS-FRG 18-6a).	Determine whether the installation spill plan lists more than one individual as emergency coordinator. (1)(2) Verify that one person is named primary coordinator. Verify that others are listed in the order in which they would assume responsibility. Verify that the designated emergency coordinator is thoroughly familiar with the following: - all aspects of the contingency plan - all operations and activities involving hazardous waste - the location and characteristics of waste handled - the location of all relevant records - the storage layout. Verify that the emergency coordinator has the authority to commit the resources needed to carry out the contingency plan.
8-51. The materials and equipment needed to manage a spill should be readily available (MP).	Verify that materials and equipment needed to manage a spill as specified in the plan are readily available, including, for example: (1)(2)(3)(4)(5)(6)(7)(8)(9)(10) - respiratory protection - absorbents - ear/eye protection - spill kits - protective clothing - neutralizers.

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COMPLIANCE CATEGORY: PETROLEUM, OIL, AND LUBRICANT (POL) MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
Spill Response Actions	
8-52. Installations must follow the guidance in the spill plan (FGS-FRG 9-13).	Verify that, in the event of a spill, the installation follows the guidance in its spill plan. (1)(2)(3)(4)(5)(6)(7)(8)(9)(10) Verify that the following steps are taken immediately in the event of a POL spill: - stop the leak - control the spill - call for help. Verify that the following follow-on steps are taken in the event of a POL spill: - act to prevent migration of the released POL into soils and nearby surface waters - continue to monitor and mitigate any fire and safety hazards posed by vapors or free product - determine soil and water cleanup action - begin removal of free product as soon as possible.
8-53. Installations must follow certain priorities in responding to a spill (FGS-FRG 18-5b).	Verify that the following priorities are adhered to in the course of responding to a spill: (1)(2)(3)(4)(5)(6)(7)(8)(9)(10) - rescue any persons and animals that are in danger - protect the human and animal populations - protect emergency crews - protect waters - prevent the spread of damage - recover dead persons and animals - recover objects that are in immediate danger.
8-54. Installation spill response must meet specific criteria (FGS-FRG 18-5b(1) through 18-5b(3)).	Verify that, if the ultimate response depends on the concentration of the spilled substance, the concentration is determined by the appropriate analytical method or equipment. (1)(2)(3)(4)(5)(6)(7)(8)(9)(10) Verify that, upon discovering a spill, action is taken to determine how best to: - approach the spill site - place response vehicles, equipment, and personnel - control access to the site.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
8-54. (continued)	(NOTE: Other immediate response measures may include the following: - warning the people in the vicinity of the site - rescuing people - fighting fires - preventing the spread of fire or the possibility of explosion - avoiding sources of ignition - making timely requests for additional personnel and equipment - informing the competent information organization (e.g., the local poison information center) and treatment facilities of accidents that involve poisons - warning the authorities responsible for the water supply and the disposal of wastewater.) Verify that the following measures are taken, where necessary, after those that save lives: - sealing leaking containers - collecting substances that are harmful to water - preventing further spreading - preventing poisoning and burns from caustics - collecting and disposing of grit, absorbents, and damming materials - preventing penetration into the sewage system and/or open water - collecting substances that are harmful to water and have enter into water by using booms, etc. - suppressing gases, vapors, and dusts - transferring substances from damaged tanks until the danger of further leaks has passed - determining the substance's type and potential for harm - determining the extent of the endangered area - notifying and warning the population.
8-55. The DOD organization that owns/controls the facility or container from which a substance is leaking must remove any polluted soil and treat or dispose of it properly (FGS-FRG 18-5a(4)).	Verify that the DOD organization that owns/controls the facility or container from which a substance is leaking removes any polluted soil and treats or disposes of it properly. (1)(2) (NOTE: If the DOD organization is not able to do so, the German local district authorities may take the necessary measures. The cost incurred by such German authorities to clean up a spill caused by a DOD component is reimbursable.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
8-56. Interim storage facilities for residual substances from spill response actions must be designed in such a way that neither ground- nor surface water are endangered (FGS-FRG 18-4g(2)).	Verify that interim storage facilities for residual substances from spill response action are designed in such a way that even an extended storage period does not endanger either ground- or surface water. (1)(2) (NOTE: Interim storage facilities for residual substances are not required but may be necessary. The design safety requirement applies only if it is necessary to use such facilities.)
Reporting Requirements	

8-57. The IOSC or OBSC must be notified immediately in certain circumstances (FGS-FRG 18-7b).	Verify that the IOSC or OBSC is notified immediately if: (1)(2)(6)(7)
	
	- the spill exceeds an RQ
	- the spill occurs inside a DOD accommodation and cannot be contained within a required berm or secondary containment
	- the spill occurs outside a DOD accommodation and:
	  - immediate cleanup is not accomplished, or
	  - German government or private assistance is used to respond to the spill, or
	  - private property (including soil) is damaged or is removed as part of the cleanup actions
	- a water resource is polluted or threatened with pollution.

8-58. The IOSC or OBSC must notify the appropriate military department and/or defense agency and the Executive Agent in certain circumstances (FGS-FRG 18-7c).	Verify that the IOSC or OBSC notifies the appropriate military department and/or defense agency and the Executive Agent in the following circumstances: (1)(2)
	
	- the spill contains POL products or POL wastes that exceed 416 L (110 gal)
	- the spill occurs inside a DOD accommodation and cannot be contained within a required berm or secondary containment
	- the spill occurs outside a DOD accommodation and:
	  - immediate cleanup is not accomplished, or
	  - German government or private assistance is used to respond to the spill, or
	  - private property (including soil) is damaged or is removed as part of the cleanup actions
	- a water resource is polluted or threatened with pollution
	- if the IOSC or OBSC determines that the spill is significant.
	
	Verify that the IOSC or OBSC submits a written follow-up report of such spills.

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8-59. German authorities must be notified of spills in certain circumstances (FGS-FRG 18-5a(1) through 18-5a(3) and FGS-FRG 18-7d).	Verify that the person in charge at a scene outside of a DOD accommodation immediately notifies the German police to obtain necessary assistance if the spill exceeds the following amounts: (1)(2)
	
	- the spill contains a hazardous substance listed in Table 4-1, parts 2 or 3, and the amount spilled exceeds:
	  - 450 g (1 lb) of a substance with a WGK number of 3 (acutely hazardous)
	  - 4.5 kg (10 lb) of a substance with a WGK number of 2 (hazardous)
	  - 450 kg (100 lb) of a substance with a WGK number of 1 (marginally hazardous)
	- the spill contains POL products or POL wastes that exceed 416 L (110 gal).
	
	Verify that the German police are immediately notified of accidents associated with hazardous substances in the following circumstances:
	
	- if assistance from German agencies (such as the fire department) is required
	- if any effect of the accident will affect civilians, persons and/or property outside the boundaries of the accommodation, or ground- and/or surface water.
	
	(NOTE: The German emergency number is 110.)
	
	(NOTE: If assistance is requested from German authorities, immediate response is the responsibility of the local German fire department, supported by whatever expert assistance is available.)
	
	Verify that the local German water district authorities are notified if a spill of a hazardous substance could be expected to result in concentrations that could change the quality of ground- or surface water in such a way that human health or the environment could be threatened or otherwise seriously affected, or if the local use of water could be impaired.
	
	(NOTE: If time permits, these authorities should be consulted and should agree on the remediation action that will be taken.)

8-60. BFMO must report fuel-related mishaps in accordance with specific requirements (AFI 23-201, para 1.8).	Verify that BFMO reports fuel-related mishaps in accordance with AFI 91-204, *Investigating and Reporting Mishaps*, and to MAJCOM and DFO/DFR as soon as possible by telephone. (3) Verify that BFMO sends a follow-up message within 24 h to the MAJCOM with an info copy to HQ USAF/LGSP, DFSC-FQ, and the applicable DFO/DFR. Verify that BFMO sends an advisory message within 30 days to MAJCOM with an info copy to USAF/LGSP on the outcome of the investigation and lessons learned. Verify that BFMO coordinates with the base environmental manager on follow-up messages for reportable fuels spills.

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INSTALLATION:	COMPLIANCE CATEGORY: PETROLEUM, OIL, AND LUBRICANT MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		

SECTION 9

SOLID WASTE MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 9

SOLID WASTE MANAGEMENT

A. Applicability of this Section

This section addresses the collection, storage, and disposal of solid waste on Air Force (AF) installations. Solid waste is considered to be nonhazardous trash, rubbish, garbage, bulky wastes, liquids, or sludges generated by any AF installation operations and activities. This section also addresses the management of medical/pathological waste. The handling and disposal of asbestos waste materials are addressed in Section 11, *Toxic Substances Management.*

Recycling and resource recovery activities are also included in this section because this form of solid waste management is required by Department of Defense (DOD) and U.S. Air Force (USAF) directives.

The regulatory requirements in this section are based on DOD regulations and Air Force Policy that apply at overseas installations. Management Practices (MPs) are nonregulatory but are important to follow to preserve the health and safety of AF employees and protect the environment.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 7, includes criteria concerning the identification, classification, collection, transportation, storage, treatment, and safe disposal of solid waste. Chapter 8 addresses the management of medical waste.

- *Overseas Environmental Baseline Guidance Document* (OEBGD), October 1992, on which FGS-FRG was based, is cited in those instances in which it contains valid requirements that were not taken up into the Final Governing Standards for Germany.

- DOD Directive (DODD) 4165.60, *Solid Waste Management*, 1 October 1976, provides guidance and direction to all DOD facilities relative to solid waste collection, disposal, material recovery, and recycling in agreement with the *Solid Waste Disposal Act* (SWDA).

C. U.S. Air Force Documents

- No additional documents.

D. Responsibility for Compliance

- Base Civil Engineering (BCE) is responsible for site location, licensing, construction, and operation of onbase landfills and for the storage and transportation of solid wastes to either onbase or offbase disposal activities.

- Bioenvironmental Engineering Services (BES) is responsible for reviewing and coordinating asbestos disposal plans and operations.

E. Definitions

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Animal Body Parts* - parts of animals from slaughtering, including blood, bristles, feathers, furs, skins, horns, claws, bones, and wool, and other accumulating parts of animals that are not used for human consumption (FGS-FRG, Appendix A).

- *Animal Carcass Disposal Facility* - permitted facility that is operated by a designated person/organization to store, treat, use, or dispose of animal carcasses or body parts (FGS-FRG, Appendix A).

- *Animal Carcasses* - dead, stillborn, or unborn animals, as well as slaughtered animals not used for human consumption (FGS-FRG, Appendix A).

- *Animal Products (as waste)* - products from animals, in particular prepared meat, eggs, and milk that the owner wants to get rid of or the safe disposal of which is required. Animal excrement is not considered a product (FGS-FRG, Appendix A).

- *Beverage Packaging* - closed and primarily closed containers, for example, bags, cans, bottles, and boxes made of any kind of material, for liquids (other than yoghurt and kefir) to be consumed as beverages (FGS-FRG, Appendix A).

- *Bottom Ash* - the solid material that remains on a hearth or falls off the grate after thermal processing is complete (DODD 4165.60, para V(A)).

- *Bulky Waste* - large items of solid waste such as household appliances, furniture, large auto parts, trees, branches, stumps, and other oversized wastes whose large size precludes or complicates their handling by normal solid wastes collection, processing, or disposal methods (FGS-FRG, Appendix A).

- *Category A Waste* - nonradioactive wastes generated at DOD-controlled medical facilities that do not have special disposal requirements from an infection prevention or an hygienic point of view. These include the following: (FGS-FRG 8-3a):
    1. household waste and wastes similar to household waste that are not generated as a direct result of health service activities (e.g., magazines, paper, plastic, and glass)
    2. industrial wastes similar to household waste (e.g., wrapping material and cardboard cartons)
    3. wastes generated in kitchens or canteens
    4. disinfected Category C wastes.

- *Category B Waste* - nonradioactive wastes within the medical facility that do have special handling or disposal requirements from an infection prevention or an hygienic point of view. These include the following: (FGS-FRG 8-3b):

1. wastes contaminated with blood, secretions, and excretions (e.g., bandages, plaster casts, throw-away clothing, faeces diapers; expendable articles, including syringes, hypodermic syringes, and scalpels
2. large amounts of fluids (secretions, excretions).

- *Category C Waste* - non-radioactive wastes both within and outside the medical facility that have special disposal requirements from an infection prevention point of view. These include the following: (FGS-FRG 8-3c):
  1. Wastes that carry or may carry pathogenic agents of infectious diseases. These pathogenic agents include, but are not limited to, cholera, leprosy, anthrax, paratyphoid fever (types A, B, and C), plague, pocks, poliomyelitis, dysentery (bacterial), rabies, rabbit fever (tularemia), viral hemorrhagic fever, brucellosis, diphtheria, meningitis/encephalitis, Q-fever, *Rotz*, tuberculosis (active form), and viral hepatitis. ***Also included in this category is any pathogen that DOD medical personnel deem to be infectious.***
  2. Wastes that are generated in facilities such as infectious wards, dialysis wards, and dialysis centers with yellow dialysis, pathology, blood banks, and physicians' practices, as well as in veterinary medical practices and clinics. These wastes are normally generated through the treatment of a patient, for example, material contaminated with infectious secretions or excretions. This usually does not include wrapping materials.
  3. Wastes from facilities and medical activities such as microbiological cultures generated in institutes for hygiene, microbiology, and virus research, as well as in laboratory medicine and in physicians' practices with similar activities. These include:
     a. test animals the disposal of which is not regulated in some other fashion, where the spreading of infectious diseases is of concern
     b. litter and excrement from test animal facilities, where the spreading of infectious diseases is of concern.

  (NOTE: Medical authorities may require special handling (e.g., separate collection or disinfection) of Category C wastes beyond that mandated in FGS-FRG, Chapter 8, *Medical Waste Management*, depending on the type of pathogenic agent and the infection danger.)

- *Category D Waste* - wastes with special disposal requirements from an environmental point of view (hazardous wastes). Examples are (FGS-FRG 8-3d):
  1. solid mineral wastes, such as glass and ceramic wastes with dangerous contaminations and used filters or absorption media (silica, active soils, active charcoal) with dangerous contaminations
  2. wastes from plant protection agents and pesticides as well as from pharmaceutical products, such as old stocks and residues of plant protection agents and pesticides, wastes resulting from the production and preparation of pharmaceutical products (including cytostatics), and disinfectants
  3. laboratory wastes and chemical residues identified as hazardous materials in Section 3, *Hazardous Materials Management*, such as inorganic acids, acid mixtures, pickling solutions (acidic), lye, lye mixtures, pickling solutions (alkaline), tetrachloromethane, solvent mixtures containing halogenated organic solvents, benzene, toluene, xylene, methanol and other liquid alcohols, solvent mixtures without halogenated organic solvents, fine chemicals, and the remains of laboratory organic or inorganic chemicals
  4. wastes from X-ray laboratories, such as those that contain lead or silver, fixing baths, developing baths, and other concentrates

5. nonferrous wastes, such as dental amalgams, nickel-cadmium batteries, batteries that contain mercury, dry cells, mercury, residues that contain mercury, mercury vapor lamps, fluorescent tubes
6. mineral oils and synthetic oils, such as transformer oils, heat carrier oils, hydraulic oils, products or wastes that contain polychlorinated biphenyls, fuels, and lubricants
7. old or otherwise unsuitable medications without cytostatics.

- *Category E Waste* - non-radioactive medical wastes that have additional disposal requirements from an ethical point of view, such as body parts and organ wastes (FGS-FRG 8-3e).

- *Cell* - compacted solid wastes that are enclosed by natural soil or cover material in a land disposal site (40 CFR 241.101 as adopted by DODD 4165.60, para V(A)).

- *Class A Compost* - compost that does not exceed the maximum contaminant levels given in Table 9-1, Part I (FGS-FRG 7-16a).

- *Class B Compost* - compost that fails to meet the standards for Class A Compost (FGS-FRG 7-16b).

- *Collection* - the act of consolidating solid wastes (or materials that have been separated for the purpose of recycling) from various locations (FGS-FRG, Appendix A).

- *Collection Points* - facilities in which animal carcasses, animal body parts, and products are delivered, collected, and stored before disposal in animal carcass disposal facilities (FGS-FRG, Appendix A).

- *Commander* - the person responsible for controlling the actions under discussion. This may be a person other than an accommodation or installation commander. Such would be the case, for example, if the action dealt with a non-base operations function (FGS-FRG, Appendix A).

- *Commercial Solid Waste* - all types of solid wastes generated by stores, offices, restaurants, warehouses, and other nonmanufacturing activities, excluding residential and industrial wastes (FGS-FRG, Appendix A).

- *Competent* - an agency, authority, individual, official, person, etc., who meets any of the following criteria: (FGS-FRG, Appendix A)
  1. specifically designated as competent by FGS-FRG
  2. specifically designated as competent by the authority of a German government [agency]
  3. specifically designated as competent by or meets the qualifications of competency of a recognized German trade organization or association
  4. based on experience, training, and/or authority granted per DOD/component policy or regulations, judged by the responsible commander to be a capable and appropriated organization or individual to accomplish the task in question.

- *Construction and Demolition Waste* - the waste building materials, packaging, and rubble resulting from construction, remodeling, repair, and demolition operations on pavement, houses, commercial buildings, and other structures (FGS-FRG, Appendix A).

- *Cover Material* - material that is used to cover compacted solid wastes in a land disposal site (FGS-FRG, Appendix A).

- *Cytostatics* - (German *Zytostatika*) substances that slow down the growth of cancerous cells (FGS-FRG, Appendix A).

- *Daily Cover* - cover material that is spread and compacted on the top and side slopes of compacted solid wastes at least at the end of each operating day in order to control vectors, fire, moisture, and erosion and to assure an aesthetic appearance (40 CFR 241.101 as adopted by DODD 4165.60, para V(A)).

  (NOTE: In addition to the above definition, soil that is spread and compacted or synthetic material that is placed on the top and side slopes of compacted solid waste at least at the end of each operating day in order to control vectors, fire, moisture, and erosion and to assure an aesthetic appearance (FGS-FRG, Appendix A).)

- *Disposal* - includes the delivery, pick-up, collection, transport, storage, burying, burning, treatment, and/or utilization of animal carcasses, animal body parts, and products (FGS-FRG, Appendix A).

- *Double Packaging* (German *Umverpackungen*) - additional packaging around the retail packaging that is used to facilitate self-service sales, to reduce or prevent the possibility of theft, and/or for advertising purposes (FGS-FRG, Appendix A).

- *Environment* - the natural and physical environment, excluding social, economic, and other environments (FGS-FRG, Appendix A).

- *Final Cover* - cover material that serves the same function as daily cover but, in addition, may be permanently exposed on the surface (FGS-FRG, Appendix A).

- *Fly Ash* - suspended particles, charred paper, dust, soot, and other partially oxidized matter carried in the products of combustion (40 CFR 240.101 as adopted by DODD 4165.60, para V(A)).

- *Food Waste* - the organic residues generated by the handling, storage, sale, preparation, cooking, and serving of foods, commonly called garbage (FGS-FRG, Appendix A).

- *Generation* - the act or process of producing solid waste (FGS-FRG, Appendix A).

- *Groundwater* - water present in the unsaturated zone of an aquifer (40 CFR 241.101 as adopted by DODD 4165.60, para V(A)).

- *Human Blood and Blood Products* - (includes serum, plasma, and other blood components) items contaminated with liquid or semiliquid blood or blood products, items saturated or dripping with blood or blood products, or items caked with blood or blood products that are capable of releasing these materials during handling (FGS-FRG, Appendix A).

- *Industrial Solid Waste* - solid waste generated by industrial processes and manufacturing (FGS-FRG, Appendix A).

- *Infectious Agent* - any organism (such as a virus or bacteria) that is capable of being communicated by invasion and multiplication in body tissues and capable of causing disease or adverse health impacts in humans (FGS-FRG, Appendix A).

- *Infectious Medical Waste* - solid waste, produced by medical, dental, or veterinary treatment facilities that is specially managed because it has the potential for causing disease in man and may pose a risk to both individuals or community health if not managed properly. These wastes fall into medical waste Categories B and C. The term includes microbiology waste, pathology waste, human blood and blood products, potentially infectious materials, sharps, and infection wastes from isolation rooms (including only those items that are contaminated, with infectious agents or pathogens, and excretion exudates and discarded material contaminated with blood) (FGS-FRG, Appendix A).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Institutional Solid Waste* - solid waste generated by educational, health care, correctional, and other institutional facilities (FGS-FRG, Appendix A).

- *Intermediate Cover* - cover material that serves the same function as daily cover but must resist erosion for a longer period of time because it is applied in areas where additional cells are not to be constructed for extended periods of time (40 CFR 241.101 as adopted by DODD 4165.60, para V(A)).

- *Management Practice (MP)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *Microbiology Waste* - includes cultures and stocks of etiologic agents that, due to their species, type, virulence, or concentration, are known to cause disease in humans (FGS-FRG, Appendix A).

- *Noninfectious Medical Waste* - waste created in medical and dental treatment facilities that is not classified as infectious because it has been determined to be incapable of causing disease in humans or it has been treated to render it noninfectious. These wastes fall into Categories A, D, and E. Wastes in Categories D and E still require special handling (FGS-FRG, Appendix A).

- *Open Burning* - burning of solid wastes in the open, such as in an open dump (FGS-FRG, Appendix A).

- *Open Dump* - a land disposal site at which solid wastes are disposed of in a manner that does not protect the environment, are susceptible to open burning, and are exposed to the elements, vectors, and scavengers (40 CFR 240.101 as adopted by DOD Directive 4165.60, para V(A)).

- *Pathology Waste* - includes human tissues and organs, amputated limbs or other body parts, fetuses, placentas, and similar tissues from surgery, delivery or autopsy procedures. Animal carcasses, body parts, blood, and bedding are also included (FGS-FRG, Appendix A).

- *Potentially Infectious Materials* - include human body fluids such as semen, vaginal secretions, cerebrospinal fluid, pericardial fluid, pleural fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids (FGS-FRG, Appendix A).

- *Qualified* - see *Competent.*

- *Recycle* - to reprocess what would otherwise be waste so that substances in the waste may be used again (e.g., to recycle aluminum cans). Reutilization, recycling, or processing of what would otherwise be waste may be accomplished by other than waste management facilities (FGS-FRG, Appendix A and 7-5d(3)).

- *Residential Solid Waste* - the wastes generated by the normal activities of households, including, but not limited to, food wastes, rubbish, ashes, and bulky wastes (FGS-FRG, Appendix A).

- *Resource Recovery Facility* - Any physical plant that processes residential, commercial or institutional solid waste, biologically, chemically, or physically, and recovers useful products, such as shredded fuel, combustible oil or gas, steam, metal, glass, etc., for resale or reuse (DODD 4165.60, Enclosure 2, J).

- *Retail Packaging* (German *Verkaufsverpackungen*) - all types of closed or open packaging used by the consumer to carry the product home or to hold it until used. This includes disposable dishes and cutlery (FGS-FRG, Appendix A).

- *Returnable Packaging* - containers that, after consumption, are used again several times for the same purposes (FGS-FRG, Appendix A).

- *Reutilization* - using an item, without significant reprocessing, that would otherwise become waste again, for its original or a different purpose (e.g., refilling soft drink bottles or using a waste material as a fuel). Reutilization, recycling, or processing of what would otherwise be waste may be accomplished by other than waste management facilities (FGS-FRG, Appendix A and 7-5d(3)).

- *Rubbish* - a general term for solid waste, excluding food wastes and ashes, taken from residences, commercial establishments, and institutions (FGS-FRG, Appendix A).

- *Sanitary Landfill* - a land disposal site employing an engineered method of disposing of solid wastes on land in a manner that minimizes environmental hazards by spreading the solid wastes in thin layers, compacting the solid wastes to the smallest practical volume, and applying and compacting cover material at the end of each operating day (FGS-FRG, Appendix A).

- *Scavenging* - the uncontrolled and unauthorized removal of materials at any point in the solid waste management system (FGS-FRG, Appendix A).

- *Sharps* - includes hypodermic needles, syringes, biopsy needles and other types of needles used to obtain tissue or fluid specimens, needles used to deliver intravenous solutions, scalpel blades, pasteur pipettes, specimen slides, cover slips, glass petri plates, and broken glass potentially contaminated with infectious waste (FGS-FRG, Appendix A).

- *Sludge* - the accumulated semiliquid suspension of settled solids deposited from wastewaters or other fluids in tanks or basins. It does not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial wastewater effluent, dissolved materials in irrigation return flows, or other common water pollutants (FGS-FRG, Appendix A).

- *Solid Waste* - garbage, refuse, sludge, and other discarded materials, including solid, semisolid, liquid, and contained gaseous materials resulting from industrial and commercial operations and from community activities. It does not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial wastewater effluent, dissolved materials in irrigation return flows or other common water pollutants. Substances collected by not-for-profit and commercial enterprises for proper recycling is not considered waste (FGS-FRG, Appendix A and 7-5d(3)).

- *Solid Waste Storage Container* - a receptacle used for the temporary storage of solid waste while awaiting collection (FGS-FRG, Appendix A).

- *State* - the political subdivision referred to as a *Land* in Germany (FGS-FRG, Appendix A).

- *Storage* - the interim containment of solid waste after generation and prior to collection for ultimate recovery or disposal (FGS-FRG, Appendix A).

- *Thermal Processing* - processing of waste material by means of heat (40 CFR 240.101 as adopted by DODD 4165.60, para V(A)).

- *Transport Packaging* - all types of containers and wrappings used to protect goods from damage in transit from the producer to the vendor (FGS-FRG, Appendix A).

- *Ultimate Consumer* - the buyer who does not sell the goods delivered to him/her to any other consumer (FGS-FRG, Appendix A).

- *Vector* - a carrier, usually an arthropod, that is capable of transmitting a pathogen from one organism to another (FGS-FRG, Appendix A).

- *Waste* - moveable property that the owner wants to dispose of or the proper management of which is necessary in the public interest, especially for the protection of the environment. When recycling, moveable property left by its owner to a corporation responsible for waste management or to a third party commissioned by that corporation is also defined as waste until it or the substances or energy produced from it are returned to economic circulation (FGS-FRG, Appendix A).

- *Waste Management* - the production of substances or energy from waste (waste utilization) and the depositing of waste, as well as its collection, transportation, treatment, and storage (FGS-FRG, Appendix A).

- *Working Face* - that portion of the land disposal site where solid wastes are discharged and are spread and compacted prior to the placement of cover material (40 CFR 241.101 as adopted by DODD 4165.60, para V(A)).

- *Yard Waste* - grass and shrubbery clippings, tree limbs, leaves, and similar organic materials commonly generated in residential yard maintenance (also known as green waste) (FGS-FRG, Appendix A).

SOLID WASTE MANAGEMENT
GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
All Installations	9-1 through 9-13	(1)(2)(7)
Recycling	9-14 through 9-18	(1)(2)
Solid Waste Storage and Collection	9-19 through 9-28	(1)(2)
Land Disposal Sites		
Specific Wastes	9-29 through 9-34	(1)
Operations	9-35 through 9-55	(1)(2)(3)
Closure and Postclosure	9-56 through 9-59	(1)(2)
New Landfills	9-60 through 9-62	(1)(2)
Thermal Processing Facilities	9-63 through 9-76	(1)(2)
Resource Recovery Facilities	9-77 and 9-78	(1)(2)
Sewage Sludge		
Composting	9-79 through 9-81	(1)(2)(3)
Application	9-82 through 9-86	(1)(2)(3)
Transportation of Solid Waste	9-87 through 9-89	(1)(2)
Animal Carcasses and Animal Parts	9-90 through 9-102	(1)(2)(3)
Plant Waste	9-103 and 9-104	(1)(2)
Packaging Waste	9-105 through 9-111	(1)(2)(4)(5)(6)
Medical Waste		
General	9-112 through 9-118	(1)(3)
Specific Wastes	9-119 through 9-129	(1)(3)
Storage and Transportation	9-130 through 9-136	(1)(3)
Treatment	9-137 through 9-141	(1)(3)
Spills	9-142	(1)(3)
Recordkeeping	9-143	(1)(3)

(a) CONTACT/LOCATION CODE:

(1) BEC (Base Environmental Coordinator)
(2) BCE (Base Civil Engineer)
(3) BES (Bioenvironmental Engineering Services)
(4) Shoppette Manager
(5) Base Exchange Manager
(6) Commissary Manager
(7) Base Staff Judge Advocate

SOLID WASTE MANAGEMENT

Records To Review

- Record of current nonhazardous solid waste management practices
- Documentation of locations (map) and descriptions of all nonhazardous waste treatment, storage, and disposal facilities (TSDFs)
- Records of operational history of all active and inactive TSDFs
- Environmental monitoring procedures or plans
- Records of resource recovery practices, including the sale of materials for the purpose of recycling
- Solid waste removal contracts and inspection records

Physical Features To Inspect

- Resource recovery facilities
- Incineration and land disposal facilities (active and inactive)
- Areas where hazardous and nonhazardous wastes are disposed of
- Construction debris areas
- Waste receptacles
- Solid waste vehicle storage and washing areas

Sources To Interview

- BEC (Base Environmental Coordinator)
- BCE (Base Civil Engineer)
- BES (Bioenvironmental Engineering Services)
- Shoppette Manager
- Base Exchange Manager
- Commissary Manager
- Base Staff Judge Advocate

COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
ALL INSTALLATIONS	(NOTE: The requirements of FGS-FRG Chapter 7, *Solid Waste*, apply to solid waste from which **all hazardous substances have been removed.** Waste that contains hazardous substances must be handled as hazardous waste in accordance with the requirements of Section 4, *Hazardous Waste Management.*)
9-1. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (1)(2)(7) (NOTE: Among the relevant documents is DODD 4165.60, *Solid Waste Management--Collection, Disposal, Resource Recovery, and Recycling Program,* 4 October 1976.)
9-2. Installations must meet regulatory requirements issued since the finalization of the manual (A finding under this checklist item will have the citation of the new regulation as the basis of the finding).	Determine whether any new regulations concerning solid waste management have been issued since the finalization of the manual. (1)(2)(7) Verify that the installation is in compliance with newly issued regulations.
9-3. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to solid waste management. (1)(7) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-4. Installations must cooperate, to the extent possible, with German officials in the solid waste management planning process (FGS-FRG 7-4).	Verify that the installation cooperates, to the extent possible, with German officials in the solid waste management planning process. (2) Verify that the installation has a program to ensure that any actions required by a permit issued to a German agency on behalf of the U.S. forces are accomplished. (NOTE: *Technische Anleitung (TA) Abfall* and *TA Siedlungsabfall* are German federal guidelines that are the basis for many permits. DOD components should be familiar with these guidelines when entering into discussions of waste management with German officials.)
9-5. Installations must develop and implement a solid waste management strategy (FGS-FRG 7-5a).	Verify that the installation has developed and implemented a strategy for reducing solid waste disposal. (1)(2) Verify that this strategy includes recycling, composting, and waste minimization efforts whenever practical.

9-6. Certain installations must appoint a person to be responsible for waste management (FGS-FRG 7-5b).	Determine whether the installation has any of the following facilities: (1)(2)
	
	- permanent waste disposal facilities for the storage or deposit of wastes
	- permanent waste disposal facilities with a throughput of more than 0.75 tons/h:
	  - for the burning or thermal disintegration (gasification, degassing) of waste
	  - decomposition of wastes
	- permanent waste disposal facilities for burning wastes from hospitals
	- permanent waste disposal facilities with an area of more than 4000 m^2 for storing or handling junked cars.
	
	Verify that the installation has appointed a person to be responsible for waste management.

9-7. Solid waste must be disposed of in certain ways only (FGS-FRG 7-3 and 7-5d(1)).	Verify that solid waste collected from DOD facilities and operations is placed in a DOD-controlled waste facility only if: (1)(2) - the facility meets all the standards of FGS-FRG and - is in compliance with any permit issued. Verify that, in all other cases, DOD solid waste is disposed of by ensuring its delivery to a permitted German waste disposal facility.

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-8. Waste that is produced within an area must be managed and disposed of in that area in compliance with specific general principles (FGS-FRG 7-5c and 7-5e).	Verify that waste is not transported to other areas outside that in which it is produced. (1)(2) (NOTE: For the purposes of this requirement, the state is considered the area.) Verify that waste is managed in such a way that the common good is not compromised and that the following are avoided: - endangering human health and reducing physical comfort - endangering livestock, birds, game, and fish - harming water, soil, and plants - causing damage to the environment by air pollution or noise - damaging the interests of nature preservation, landscape preservation, or city planning - endangering or disturbing the public safety. (NOTE: Waste reutilization has priority over other kinds of disposal if the following conditions are met: - it is technically feasible - additional costs compared to other management processes are not unreasonable, and - a market for the substances or energy produced exists or can be developed.)
9-9. Waste must be collected, transported, treated, and stored in such a way that opportunities for reutilization or recycling can be exploited (FGS-FRG 7-5f(1)(a)).	Verify that the installation collects, transports, treats, and stores its waste in such a way that opportunities for reutilization or recycling can be exploited. (1)(2) (NOTE: Once the decision is made to recycle the material it is no longer classified as waste.)
9-10. Installations must leave waste for persons authorized to collect or transport it only if the owner of the waste management facility certifies a willingness to accept such waste (FGS-FRG 7-5d(2)).	Verify that the owner of the waste management facility used by the installation has certified a willingness to accept the installation's waste. (2) (NOTE: The certificate is also required when the owner of the waste transports it to the waste management facility and leaves it there for the operator of the facility to deal with.)

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-11. Buildings and all other facilities that are constructed, modified, or leased after the effective date of the FGS-FRG must provide for storage areas that can be easily cleaned and maintained and that allow for safe and efficient collection of solid waste (FGS-FRG 7-7).	Verify that buildings and facilities in the design phase will have appropriate solid waste storage areas. (1)(2)
9-12. Installations must not use open burning as a method of solid waste disposal (FGS-FRG 7-14).	Verify that open burning is not permitted on the installation. (1)(2) (NOTE: Plant wastes that result from agriculture or gardening may be burned in outlying areas if technical reasons prevent their being returned to the soil, but specific criteria must be met (see checklist item 9-104).) (NOTE: Incinerators that comply with the requirements of Section 1, *Air Emissions Management*, may be used for solid waste disposal.)
9-13. The use of dangerous sewage sludge on soil used for agriculture, forestry, or horticultural purposes is prohibited (FGS-FRG 7-17a).	Verify that no dangerous sewage sludge is applied to soil used for agriculture, forestry, or horticultural purposes. (1)(2)(3)
RECYCLING	
9-14. AF installations must institute recycling programs, where cost effective, and must reduce the volume of solid waste materials at the source (FGS-FRG 7-5f; DODD 4165.60, para V(A), V(C), and V(D)).	Verify that a solid waste reduction/resource recovery program exists. (1)(2) Verify that efforts are made to reduce the volume of solid waste materials at the source.

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-15. Reusable and/or marketable materials should be collected at regular intervals (MP).	Verify that reusable and/or marketable materials are collected at regular intervals. (1)(2)
9-16. Installations with office facilities of over 100 office workers must recover high-grade paper (DODD 4165.60, para V(L)).	Determine whether the installation has over 100 office workers. (1)(2) Verify that high-grade paper is separated at the source of generation. Verify that high-grade paper is separately collected. Verify that high-grade paper is sold for recycling.
9-17. Installations where more than 500 families reside must recycle newspapers (DODD 4165.60, para V(J)).	Determine whether the installation has more than 500 families residing on it. (1)(2) Verify that used newspapers are separated at the source of generation. Verify that used newspapers are separately collected. Verify that used newspapers are sold for recycling.
9-18. Installations that generate 10,160 kg (10 tons) or more of waste corrugated containers per month must sell this material for recycling (DODD 4165.60, para V(K)).	Determine whether the installation generates 10,160 kg (10 tons) or more of waste corrugated containers per month. (1)(2) Verify that waste corrugated containers are collected separately. Verify that waste corrugated containers are sold for recycling. (NOTE: Alternatively, waste corrugated containers may be used as an energy resource.)
SOLID WASTE STORAGE AND COLLECTION	
9-19. Installations must use solid waste storage containers that meet specific design standards (FGS-FRG 7-8).	Verify that storage containers are leakproof, waterproof, and vermin-proof, including sides, seams, and bottoms. (1)(2) Verify that storage containers are durable enough to withstand anticipated usage without rusting, cracking, or deforming in a manner that would impair serviceability. Verify that storage containers have functional lids.

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-20. Installations must store containers in accordance with specific requirements (FGS-FRG 7-9).	Verify that containers are stored on a firm, level, well-drained surface that is large enough to accommodate all of the containers. (1)(2) Verify that the storage area is clean and free of spills.
9-21. Installations must store all solid wastes and materials separated for recycling according to specific guidelines (FGS-FRG 7-5f(1)(b) and DODD 4165.60, para V(A)).	Verify that all solid wastes and materials separated for recycling are stored so as not to constitute a fire, health, or safety hazard or provide food or harborage for vectors. (1)(2) Verify that such materials are contained or bundled to prevent spillage. Verify that all solid waste containing food wastes is stored in covered or closed containers that are nonabsorbent, leakproof, durable, easily cleaned, and designed for safe handling. Verify that solid waste containers are of an adequate size and number to contain all waste generated between collections. Verify that reusable containers are capable of being serviced without the collector coming into contact with the waste.
9-22. Installation personnel should be periodically informed about materials that may not be put in solid waste receptacles (MP).	Verify that a program exists at the installation to keep personnel informed about proper waste disposal practices. (1)(2)
9-23. Installations must maintain collection equipment according to certain standards if such equipment is considered to be operating in interstate or foreign commerce (DODD 4165.60, para V(A)).	Verify that all such vehicles used for the collection and transportation of solid waste meet all applicable standards established by the Federal Government, including: (1)(2) - Motor Carrier Safety Standards (49 CFR 390 through 396) - Noise Emission Standards for Motor Carriers Engaged in Interstate Commerce (40 CFR 202) - Federal Motor Vehicle Safety Standards (49 CFR 500 through 580) (Federally owned collection equipment only).

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-24. All collection equipment must meet specific standards (DODD 4165.60, para V(A)).	Verify that all vehicles used for collection and transportation of solid wastes or materials separated for recycling are enclosed and have suitable covers to prevent spillage. (1)(2) Verify that equipment used in the compaction, collection, and transportation of solid waste or materials separated for recycling is constructed, operated, and maintained adequately. Verify that the following types of equipment meet the standards established by the American National Standards Institute: - rear-loading compaction equipment - side-loading compaction equipment - front-loading compaction equipment - tilt-frame equipment - hoist-type equipment - satellite vehicles - special collection compaction equipment - stationary compaction equipment.
9-25. All installations must collect solid wastes or materials separated for recycling according to a certain schedule (DODD 4165.60, para V(A)).	Verify that solid wastes that contain food wastes are collected at a minimum of once a week. (1)(2) Verify that bulky wastes are collected at a minimum of once every 3 mo. Verify that all wastes are collected with sufficient frequency to inhibit the propagation or attraction of vectors and the creation of nuisances.
9-26. Installations must collect solid waste in a safe and efficient manner (DODD 4165.60, para V(A)).	Verify that solid wastes or materials separated for recycling are collected in a safe, efficient manner. (1)(2) Verify that the operator of the collection vehicle immediately cleans up any spillage caused by his or her operations.
9-27. Installations should inspect receptacles for industrial shop waste quarterly to verify that hazardous wastes are not being deposited in them (MP).	Verify that receptacles are inspected quarterly. (1)(2) Verify that corrective actions are taken where indicated.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-28. Installations must meet specific requirements with regard to the management of bulky wastes (FGS-FRG 7-6).	Verify that bulky wastes are stored so as not to create an attractive nuisance and to avoid the accumulation of solid waste and water in and around the bulky items by removing all doors from large household appliances and covering the items. (1)(2) Verify that bulky wastes are screened for the presence of hazardous constituents and ozone depleting substances. Verify that readily detachable or removable hazardous constituents are segregated and disposed of properly. (NOTE: See Section 4, *Hazardous Waste Management.*)
LAND DISPOSAL SITES	(NOTE: The provisions of this section apply to installations that operate a MSWLF. In addition, they apply to facilities used for the storage or other handling of junked vehicles. Vehicles (including trailers) that have been determined to be abandoned according to component policies and regulations are classified as waste.)
Specific Wastes	
9-29. Installations must investigate options for composting organic waste (FGS-FRG 7-12e).	Verify that the installation has investigated options for composting organic waste as an alternative to landfilling or treatment prior to landfilling. (1)(2)
9-30. Installations must develop procedures for dealing with yard waste and construction debris (FGS-FRG 7-12(g)).	Verify that the installation has developed procedures for dealing with yard waste and construction debris that keep it out of the landfill to the maximum extent possible (e.g., composting, recycling). (1)(2)
9-31. Wastes that may produce exothermal reactions must be landfilled in such a way that the temperature at the landfill base will not exceed 25 °C (FGS-FRG 7-12k).	Verify that wastes that may produce exothermal reactions are landfilled in such a way that the temperature at the landfill base will not exceed 25 °C. (1)(2) (NOTE: Depending on the nature of the waste, exothermic reactions may arise as a result of combining with water or reacting with other wastes.)
9-32. Bulky wastes must be disposed of in a specific fashion (DODD 4165.60, para V(A)).	Verify that automobile bodies, furniture, and appliances are either salvaged or crushed and pushed onto the working face near the bottom of the cell. (1)(2) Verify that demolition and construction debris, tree stumps, and large timbers are pushed onto the working face near the bottom of the cell.

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-33. Water treatment plant sludges must be covered with soil or MSW (DODD 4165.60, para V(A)).	Verify that water treatment plant sludges are covered with soil or MSW. (1)(2)
9-34. Incinerator and air pollution control residues must be disposed of in a specific fashion (DODD 4165.60, para V(A)).	Verify that incinerator and air pollution control residues are incorporated into the face and covered as necessary to prevent them from becoming airborne. (1)(2)
Operations	(NOTE: These standards apply only to installations that operate their own solid waste landfills. If a permit has been issued that contains restrictions more protective of the environment, the more protective elements of the permit take precedence over the provisions in FGS-FRG.)
9-35. The IC (or his/her designated representative) of an installation that operates a permanent waste management facility or a facility that accumulate waste must appoint one or more designated persons responsible for waste management (FGS-FRG 7-12a and 7-12a(2)).	Verify that the IC or his/her designated representative has appointed one or more persons responsible for waste management. (1)(2) Verify that only persons who possesses the required expertise and reliability are appointed. Verify that, if several persons are appointed, the tasks of each are clearly specified. (NOTE: The IC or his/her designated representative is responsible for coordinating their tasks if several persons are appointed.) Verify that the IC supports the designated responsible person in carrying out his/her tasks. (NOTE: This obligation extends to the provision of support staff, space, facilities, equipment, and resources.)
9-36. Persons designated responsible for waste management must fulfil certain responsibilities (FGS-FRG 7-12a(1)).	Verify that the person responsible for waste management supervises the path of waste from its generation through its transportation to its final disposal. (1)(2) Verify that the person responsible for waste management ensures that all activities are in compliance with FGS-FRG and any permits issued. Verify that the person responsible for waste management informs the staff of the facility of dangers to the environment caused by waste produced or managed there and of ways to prevent such dangers.

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-36. (continued)	Verify that the person responsible for waste management seeks to improve the waste management process, including the recycling of waste. Verify that, in facilities that accumulate waste, the person responsible for waste management works toward the development and introduction of waste reduction procedures that are less harmful to the environment. Verify that, in facilities that accumulate waste, the person responsible for waste management works toward the safe and proper utilization of residual materials or their proper management as waste. Verify that the person responsible for waste management reports annually to the IC or his/her designated representative on the measures taken or planned.
9-37. Installations must implement programs to detect and prevent the disposal of certain wastes in their landfills (FGS-FRG 7-12d and 7-12o).	Verify that the installation has a program that effectively prevents the disposal in the landfill of hazardous waste, infectious waste (including Category C and E wastes), PCB waste, and other waste determined to be unsuitable for the specific landfill. (1)(2)(3) Verify that the installation prohibits the disposal of bulk or noncontainerized liquids in the landfill, if possible.
9-38. Land disposal sites that accept special wastes must have approval of the responsible agency (DODD 4165.60, para V(A)).	Determine whether the land disposal site accepts special wastes. (1)(2) Verify that the land disposal site has agency approval to accept special wastes.
9-39. Installations must use certain standard sanitary landfill techniques as part of their operations (FGS-FRG 7-12b(1) through 7-12b(4) and DODD 4165.60, para V(A)).	Verify that standard techniques of spreading and compacting solid wastes are used. (1)(2) Verify that the landfill is divided into cells that can be filled and capped individually. Verify that the storage capacity of a cell can accommodate one day's worth of delivery. Verify that machinery is on hand to allow for immediate placement and compaction of waste into a cell. Verify that, on any operating day, solid waste handling equipment is capable of: - spreading solid waste in layers no more than 0.6 m (2 ft) thick while confining it to the smallest practicable area - compacting the spread solid wastes to the smallest practicable volume.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-39. (continued)	Verify that the waste is compacted as densely as possible. Verify that the filling and compacting are carried out in such a way that little settling of the dump body can be expected. Verify that, in Rheinland-Pfalz, waste is placed with tamping plate compressors and crawlers. Verify that, if area placement is used in Rheinland-Pfalz: - the waste is spread out horizontally in a suitable operational area - the waste is then reduced in size - compressed with the tamping plate compressor through several passes. Verify that, in Rheinland-Pfalz, the compressed layer is not thicker than 30 to 50 cm.
9-40. Installations that operate land disposal sites must provide a list of excluded materials to regular users and develop criteria for unacceptable materials (DODD 4165.60, para V(A)).	Verify that a list of excluded materials is displayed prominently at the entrance to the site. (1)(2) Verify that a list of excluded materials is given to all regular users of the site. Verify that the installation has established criteria for unacceptable wastes based on site-specific factors. (NOTE: Examples of site-specific factors are: - hydrology - chemical and biological characteristics of the waste - available alternative disposal methods - environmental and health effects - safety of personnel.)
9-41. Installations must establish specific delivery conditions for solid waste, pasty waste, sludge, and liquid waste (FGS-FRG 7-12c(1) and 7-12c(2)).	Verify that the installation has established specific delivery conditions for solid waste, pasty waste, sludge waste, and liquid waste. (1)(2) Verify that, if waste is delivered in containers and stored: - solid and pasty waste is stored in multicompartmented facilities - sludge waste is stored in multicompartmented facilities or aboveground storage tanks (ASTs) - liquid waste is stored in ASTs.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-42. Installations must meet specific requirements with regard to intermediate storage of waste (FGS-FRG 7-12c(3)).	Verify that intermediate storage is operated in such a way that the following are not negatively affected: (1)(2) - subsequent utilization - subsequent thermal, chemical/physical, or biological treatment - the settling of the waste. Verify that waste is accepted for intermediate storage only if there is proof that it will later be properly disposed of.
9-43. Specific requirements as to cover material must be met at land disposal sites (FGS-FRG 7-12b(5) and DODD 4165.60, para V(A)).	Verify that cover material is applied as necessary to: (1)(2) - minimize fire hazards - minimize infiltration of precipitation - minimize odors - minimize blowing litter - control gas venting - control vectors - discourage scavenging - provide a pleasing appearance. Verify that daily cover is placed over disposed solid waste at the end of each operating day, regardless of weather. Verify that intermediate cover is applied on areas where additional cells are not to be constructed for extended periods of time. Verify that, if temporary covering is used, such covering does not destabilize the landfill geometry, allow drainage water to flow out, or interfere with any gas collection and control system. Verify that final cover is applied on each area as it is completed or if the area is to remain idle for over 1 yr.
9-44. Open burning is prohibited at landfills (FGS-FRG 7-12f).	Verify that there is no open burning at the landfill. (1)(2)

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9-45. Land disposal sites must be designed, constructed, and operated in such a way as to protect the health and safety of personnel (FGS-FRG 7-12h and DODD 4165.60, para V(A)).	Verify that a safety manual is available to personnel. (1)(2) Verify that personal safety devices are provided to facility personnel. Verify that equipment is provided with safety devices. Verify that there are provisions to extinguish fires. Verify that communications equipment is available on site. Verify that scavenging is prohibited. Verify that traffic signs or markers are provided to promote an orderly traffic pattern to and from the discharge area. Verify that the following steps are taken to avoid the dangers of dump gas: - entry into spaces where the existence of dump gas is possible (especially drain water control and collection shafts) occurs only after an examination of the O_2 content - persons enter such spaces only if they are wearing respiratory protection - measures are taken to prevent explosions - if there is a tight fitting cover, measures are taken to collect and withdraw gases. (NOTE: Gases may be burned off, withdrawn via biofilters, or utilized.)
9-46. Installations must control decomposition gases at land disposal sites (FGS-FRG 7-12j and DODD 4165.60, para V(A)).	Verify that decomposition gases are not allowed to migrate laterally from the land disposal site. (1)(2) Verify that decomposition gases do not pose an explosion or toxicity hazard. Verify that methane generated by the MSWLF unit does not exceed 25 percent of the lower explosive limit for methane in facility structures. (NOTE: The lower explosive limit for methane is 5.0 percent by volume.) Verify that gas concentrations are monitored and trapped or withdrawn as required.
9-47. Installations must control vectors at land disposal sites (FGS-FRG 7-12i and DODD 4165.60, para V(A)).	Verify that conditions at the land disposal site are unfavorable for the harboring, feeding, and breeding of disease vectors. (1)(2) Verify that vector control contingency programs are implemented when necessary to prevent or rectify vector problems.

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9-48. Land disposal sites must be designed and operated in an aesthetically acceptable manner (FGS-FRG 7-12L and DODD 4165.60, para V(A)).	Verify that blowing litter is controlled through portable litter fences or other devices. (1)(2) Verify that wastes that are easily moved by wind are covered as necessary to prevent their becoming airborne. Verify that onsite vegetation is cleared only as necessary. Verify that natural windbreaks are maintained. Verify that buffer strips and/or berms are used to screen the site from nearby residences and major roadways. Verify that salvage material is removed from the site frequently. Verify that pulverulent and odor-intensive waste is managed in such a way that no significant emissions are caused. Verify that the active portion of the landfill does not generate an offensive odor. Verify that precautions are taken to avoid pollution of public streets by traffic to or from the dump.
9-49. Installations must operate land disposal sites in such a way as to protect water quality (FGS-FRG 7-12m(1) and DODD 4165.60, para V(A)).	Verify that surface watercourses and runoff are diverted from the land disposal site. (1)(2) Verify that the land disposal site is constructed and graded to promote rapid surface water runoff without excessive erosion. Verify that the site is regraded as necessary to avoid ponding of precipitation and to maintain the integrity of cover material. Verify that siltation or retention basins or other approved methods of retarding runoff are used where necessary to avoid stream siltation or flooding problems. Verify that leachate collection and treatment systems are used where necessary to protect groundwater and surface water resources. Verify that solid waste and leachate are not in contact with groundwater or surface water. Verify that aquifers will not be contaminated.

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9-50. Installations must have a properly designed sampling and testing program that meets specific requirements to ensure that groundwater is not being polluted (FGS-FRG 7-12m(2)).	Verify that the installation has such a program that has been coordinated with the appropriate German authorities. (1)(2)(3) Verify that an appropriate number of test wells have been properly located to ensure full and representative coverage. Verify that a control well has also been installed that will not be affected by the landfill. Verify that surface waters that flow through or from the site are also tested. Verify that samples (at least 1 L) are collected in clean glass or plastic vessels. Verify that all other items used in sampling are clean. Verify that pumped groundwater samples taken about 15 min after pumping starts to ensure that samples are representative. Verify that all care is taken to ensure that samples are collected properly if scoop samples are required or if the permeability of the soil is such that pumping is impossible. Verify that samples are stored in a cool dark place and properly protected during transfer and storage.. Verify that testing is carried out by competent personnel. Verify that the parameters listed in Table 9-2 are tested for both surface water and groundwater. Verify that a complete examination is conducted as soon as the testing system can be established and as often thereafter as is necessary to determine the effect of the landfill on surface water and groundwater. (NOTE: The frequency will depend on the site.) Verify that a short examination to determine a baseline is conducted shortly after the end of the first complete examination. Verify that additional short examinations are conducted between complete examinations as required to ensure early detection of changes in water quality.

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9-51. Examinations must also be conducted at each location where leachate is disposed of (e.g., put into collection basins or drainage ditches) (FGS-FRG 7-12i).	Verify that examinations are conducted as follows: (1)(2)(3) - one complete and two short examinations per year prior to operating the landfill (i.e., while in the planning and construction stages) - two complete examinations (spring and fall) and two short examinations (summer and winter) per year during the first and second years of operation - one complete examination and two short examinations every year from the third year of operation until 2 yr after closure - one complete examination every from the third year after closure.
9-52. Installations must control public access to landfill facilities (FGS-FRG 7-12(n)).	Verify that public access to landfill facilities is controlled. (1)(2) Verify that, in Rheinland-Pfalz, the dump area is fenced.

9-53. Landfills must be equipped with specific measuring devices (FGS-FRG 7-12p).	Verify that the installation's landfill is equipped, at a minimum, with the following: (1)(2)
	- groundwater monitoring systems, with one measuring point upstream and three measuring points downstream of the active landfill cell
	- devices that monitor settlement and deformation of the landfill cap and body
	- a weather data acquisition system that includes:
	  - a device to measure precipitation
	  - a device to measure temperature
	  - a device to measure wind
	  - a device to measure humidity.

9-54. Operators of land disposal sites must maintain records of their operations (FGS-FRG 7-12q).	Verify that records on the operations of the landfill are maintained. (1)(2)
9-55. The records kept by operators of land disposal sites must contain certain information (DODD 4165.60, para V(A)).	Verify that records include at least: (1)(2) - major operational problems, complaints, or difficulties - results of leachate sampling and analyses - results of gas sampling and analyses - results of groundwater and surface water quality sampling and analyses upstream and downstream from the site - vector control efforts - dust and litter control efforts - quantitative measurements of the solid wastes handled - description of solid waste materials received.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
Closure and Postclosure	
9-56. Installations should survey for and be aware of old disposal sites (MP).	Verify that the installation has conducted a survey for old disposal sites. (1)(2)
9-57. Installations must prepare a written closure plan that meets specific requirements (FGS-FRG 7-13e).	Verify that the installation has a written closure plan. (1)(2) Verify that the closure plan is kept as part of the installation's permanent records. Verify that the closure plan includes the following, at a minimum: - a description of the monitoring and maintenance activities required to ensure the integrity of the final cover - a survey plot showing the exact site location - a description of planned uses during the postclosure period - the duration of the postclosure period, to be a minimum of 5 yr.
9-58. Installations must take specific actions in the course of closure and postclosure operations (FGS-FRG 7-13a through 7-13d).	Verify that restoration of the site is funded. (1)(2) Verify that all actions necessary to prevent harm to the public good are taken. Verify that action is coordinated with the appropriate German officials in accordance with component policies and regulations. Verify that a final cover is installed that is designed to minimize infiltration and erosion. Verify that the infiltration layer is made up of a minimum of 46 cm (18 in.) of earthen material, geotextiles, or combination thereof, that have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present or a permeability no greater than 0.00005 cm/s, whichever is less. Verify that the erosion layer is a minimum of 21 cm (8 in.) of earth material that can sustain native plant growth.
9-59. Installations should, upon closure of a site, record a detailed description with the area's land recording authority (MP).	Verify that, upon closure of a site, a detailed description is recorded with the area's land recording authority. (1)(2)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
New Landfills	
9-60. Installations must not initiate new or expand existing waste landfill units without approval of the component and only after showing that unique circumstances necessitate a new unit (FGS-FRG 7-10).	Determine whether the installation is planning to start a new landfill or expand an existing one. (1)(2) Verify that appropriate component approval has been received.
9-61. The design and operation of new landfills must incorporate certain broad factors (FGS-FRG 7-11 and DODD 4165.60, para V(A)).	Verify that the following broad factors are taken into account in the design and operation of the new landfill: (1)(2) - location restrictions in regard to airport safety (i.e., bird hazards), floodplains, wetlands, aquifers, seismic zones, and unstable areas - procedures for excluding hazardous waste - cover material criteria (e.g., daily cover) - aquifer protection criteria and control - disease vector control - explosive gas control - air quality criteria and control (e.g., no open burning) - controlled access - liquids restrictions - recordkeeping requirements - inspection program. Verify that the following have been evaluated: - the onsite soil characteristics - climatic conditions - socioeconomic factors. Verify that the design is coordinated with the appropriate German authorities in accordance with component policies and regulations. (NOTE: Such coordination is normally accomplished as part of the *Auftragsbauen-grundsätze-1975* (*Principles for Contracting Construction Projects-1975*) (ABG-75) process.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-62. Plans for the design, construction, and operation of new sites or modifications to existing sites must be prepared or approved by a professional engineer (DODD 4165.60, para V(A)).	Verify that a professional engineer has prepared or approved plans. (1)(2)
THERMAL PROCESSING FACILITIES	
9-63. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must provide special areas for certain wastes while they await processing (DODD 4165.60, para V(A)).	Verify that storage areas for bulky wastes, digested and dewatered sludges from wastewater treatment facilities, raw sewage sludges, and septic tank pumpings are clearly marked. (1)(2) (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)
9-64. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must train personnel in any unusual handling requirements for accepting certain wastes (DODD 4165.60, para V(A)).	Verify that personnel are thoroughly trained to handle bulky wastes, digested and dewatered sludges from wastewater treatment facilities, raw sewage sludges, and septic tank pumpings. (1)(2) (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-65. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must inform regular users about materials that are excluded (DODD 4165.60, para V(A)).	Verify that regular users are given a list of excluded materials. (1)(2) Verify that a list of excluded materials is posted prominently at the facility. (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)
9-66. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must have certain procedures and precautions to deal with unacceptable wastes that are delivered to or left at the facility (DODD 4165.60, para V(A)).	Verify that there is an operating plan that specifies procedures and precautions to be taken if unacceptable wastes are delivered to or left at the facility. (1)(2) Verify that operating personnel are thoroughly trained in such procedures. (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)
9-67. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must meet certain site selection criteria (DODD 4165.60, para V(A)).	Verify that the facility is located in an area zoned for industrial use and has adequate utilities to serve it. (1)(2) Verify that the site is accessible by permanent roads leading from the public road system. (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
9-68. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must have plans for the design of new facilities or modification of existing facilities prepared or approved by a professional engineer (DODD 4165.60, para V(A)).	Verify that a professional engineer prepares or approves plans for the design of new facilities or modification of existing facilities. (1)(2) (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)
9-69. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must operate in a manner that protects water quality (DODD 4165.60, para V(A)).	Verify that all waters discharged from the facility are treated to meet the most stringent of applicable water quality standards. (1)(2)(3) Verify that, when monitoring instrumentation indicates excessive discharge contamination, appropriate adjustments are made to lower the concentrations to acceptable levels. Verify that, in the event of an accidental spill, the local regulatory agency is notified immediately. (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)
9-70. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must operate in a manner that protects air quality (DODD 4165.60, para V(A)).	Verify that emissions do not exceed applicable, existing emission standards. (1)(2)(3) Verify that all emissions, including dust from vents, are controlled. Verify that, when monitoring equipment indicates excessive emissions, appropriate adjustments are made to lower the emissions to acceptable levels. (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)

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9-71. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must control vectors (DODD 4165.60, para V(A)).	Verify that a housekeeping schedule is established and maintained. (1)(2) Verify that solid waste and residue do not accumulate at the facility for more than 1 week. (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)
9-72. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must operate in an aesthetically acceptable manner (DODD 4165.60, para V(A)).	Verify that a routine housekeeping and litter removal schedule is established and implemented. (1)(2) Verify that solid wastes that cannot be processed by the facility are removed on a weekly basis. (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)
9-73. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must dispose of residue and other solid waste products resulting from the thermal process in an environmentally acceptable manner (DODD 4165.60, para V(A)).	Verify that the furnace operator records, in a log, the estimated percentage of unburned combustibles. (1)(2) Verify that, if residue or fly ash is collected in a wet condition, it is drained of free moisture. Verify that residue and fly ash are transported by means that prevent the loads from shifting, falling, or blowing from the container. (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)

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9-74. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must be designed, operated, and maintained in a manner to protect the health and safety of personnel (DODD 4165.60, para V(A)).	Verify that procedures are developed for operation in emergency situations. (1)(2) Verify that approved respirators or self-contained breathing apparatus are available at convenient locations. Verify that training in first aid practices and emergency procedures are given to all personnel. Verify that personal safety devices are provided to all personnel. Verify that any regular user or individual who poses a safety hazard is barred from the facility and reported to the responsible agency. (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)
9-75. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must follow certain general operation criteria (DODD 4165.60, para V(A)).	Verify that the facility supervisor is experienced in the operation of the type of facility designed. (1)(2) Verify that alternate and standby disposal and operating procedures are established for implementation during emergencies, air pollution episodes, and shutdown periods. Verify that a routine maintenance schedule is established. Verify that engineering drawings are updated as the facility is modified. Verify that key operational procedures are prominently posted. Verify that equipment manuals, catalogs, spare parts lists, and spare parts are readily available at the facility. Verify that training opportunities are available for personnel. (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)

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9-76. Installations with thermal processing facilities designed to process or that are processing 50,800 kg (50 tons) or more per day of MSW must provide records and monitoring data (DODD 4165.60, para V(A)).	Verify that extensive monitoring and recordkeeping are practiced during: (1)(2)(3) - the first 12 to 18 mo of operation of a new or renovated facility - periods of high air pollution - periods of upset conditions at the facility. Verify that operating records are kept in a daily log and include as a minimum: - the total weight and volume of solid waste received during each shift, including the number of loads received, the ownership or specific identity of delivery vehicles, and the source and nature of the solid wastes accepted - furnace and combustion chamber temperatures recorded at least every 60 min and as changes are made, including explanations for abnormally high and low temperatures - rate of operation, such as grate speed - overfire and underfire air volumes and pressure and distribution recorded at least every 60 min and as changes are made - weights of bottom ash, grate siftings, and fly ash, individually or combined, recorded at intervals appropriate to normal facility operation - estimated percentages of unburned material in the bottom ash - water used on each shift for bottom ash quenching and scrubber operation - power produced and utilized during each shift - quality, production totals, and consumption rates if steam is produced - auxiliary fuel used for each shift - gross calorific value of daily representative samples of bottom ash, grate siftings, and fly ash - required emission measurements and laboratory analyses - complete records of monitoring instruments - problems encountered and methods of solution. (NOTE: Representative samples of process waters should be collected and analyzed as recommended by the responsible agency.) (NOTE: Sampling time should be varied so that all shifts are monitored on a weekly basis.)

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9-76. (continued)	Verify that an annual report is prepared and that it includes the following information: - minimum, average, and maximum daily volume and weight of waste received and processed, summarized on a monthly basis - summary of the laboratory analyses, including at least monthly averages - number and qualifications of personnel in each job category - total work-hours per week - number of state certified or licensed personnel - staffing deficiencies - serious injuries, their cause, and preventive measures instituted - identification and brief discussion of major operational problems and solutions - adequacy of operation and performance with regard to environmental requirements, general level of housekeeping and maintenance, testing and reporting proficiency, and recommendations for corrective actions - copy of all significant correspondence, reports, inspection reports, and any other communications from enforcement agencies. Verify that a methodology for evaluating the facility's performance has been developed. (NOTE: This does not apply to hazardous, agricultural, or mining wastes.)
RESOURCE RECOVERY FACILITIES	
9-77. Certain installations must establish and/or use resource recovery facilities to separate and recover materials, energy, or both, from solid waste (DODD 4165.60 (V)(F) and 4165.60(V)(H)).	Determine whether the installation generates 101,600 kg (100 tons) or more per day of residential, commercial, and institutional solid waste after complying with waste reduction and source separation policies. (1)(2) Verify that the installation establishes and/or uses resource recovery facilities. Verify that joint or regional civilian community resource recovery facilities are utilized whenever possible.
9-78. Installations that establish or utilize a resource recovery facility must design such facilities to process a standard amount of solid waste (DODD 4165.60, para V(A)).	Verify that the facility is designed to process at least 65 percent (by wet weight) of the input solid waste into recycled material, fuel, or energy. (1)(2)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
SEWAGE SLUDGE **Composting**	
9-79. Installations must coordinate the construction of a facility for composting sewage sludge with the appropriate German officials (FGS-FRG 7-15a).	Verify that the installation coordinates the construction of a facility for composting sewage sludge with the appropriate German officials. (1)(2) (NOTE: Such a facility is subject to all the relevant requirements of FGS-FRG.)
9-80. Composting facilities that process 5000 tons [approximately 4540 metric tons] of sludge from a domestic wastewater treatment plant annually must meet specific standards (FGS-FRG 7-15b).	Verify that a record is maintained of the characteristics of the waste, sewage sludge, and other materials, including the source and volume or weight of the material. (1)(2)(3) Verify that access to the facility is controlled. Verify that all access points are secured when the facility is not in operation. Verify that by-products (including residual materials that can be recycled) are stored to prevent vector intrusion and aesthetic degradation. Verify that materials that are not composted are removed periodically. Verify that runoff water that has come in contact with composted waste, materials stored for composting, or residual waste is diverted to a leachate collection and treatment system. Verify that the temperature and retention time for material being composted is monitored and recorded.

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9-80. (continued)	Verify that the compost is analyzed periodically for the following: - percentage of total solids - volatile solids as a percentage of total solids - pH - ammonia - nitrate nitrogen - total phosphorus - cadmium - chromium - copper - lead - nickel - zinc - mercury - PCBs. Verify that compost is produced by a process that further reduces pathogens. (NOTE: Two acceptable methods of production are windrowing and the enclosed vessel method: - windrowing consists of an unconfined composting process involving periodic aeration and mixing such that aerobic conditions are maintained during the composting process - enclosed vessel method involves mechanically mixing compost under controlled environmental conditions: - the retention time in the vessel must be at least 72 h with the temperature maintained at 55 °C [131 °F] - a stabilization period of at least 7 days must follow the decomposition period.)
9-81. Compost produced at a facility that processes 5000 tons [approximately 4540 metric tons] of sludge from a domestic wastewater treatment plant annually must be distributed in accordance with the classification of the compost (FGS-FRG 7-16).	Verify that any distribution or use of compost is coordinated with the appropriate German officials in accordance with existing component policies and regulations. (1)(2)(3) Verify that compost distributed or marketed as commercial fertilizer, speciality fertilizer, soil amendment, or plant amendment is registered with the Executive Agent. Verify that Class A compost is: - stabilized - stored until it has matured (a 60 percent decomposition). Verify that Class B compost is distributed on a restricted basis only.

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9-81. (continued)	(NOTE: Class A compost may be distributed for unrestricted use, including agricultural applications, if it is in compliance with the requirements of checklist items 9-82 through 9-86.) (NOTE: The Executive Agent determines appropriate distribution for Class B compost.)
Application	(NOTE: The requirements of this section apply to anyone who: - operates a wastewater treatment facility with a capacity of more than 300 kg raw BOD per day for a population equivalent of 5000 that distributes sewage sludge for application on land used for agriculture, forestry, or horticulture - operates a wastewater treatment facility with a capacity of less than 300 kg raw BOD per day that treats wastewater from households or similar wastewater that is lightly polluted and distributes sewage sludge for application on land used in agriculture, forestry, or horticulture - applies sewage sludge from facilities described immediately above to land used for agriculture, forestry, or horticulture.)
9-82. Sewage sludge must be treated to ensure proper hygiene and the control of contagious diseases (FGS-FRG 7-17c).	Verify that sewage sludge is treated prior to application by chemical or thermal conditioning, thermal drying, heating, decomposition, chemical stabilizing, or another process such that pathogens are killed. (1)(2) (NOTE: This requirement does not apply if no such treatment is necessary given the origin of the sludge.)
9-83. Installations must not distribute or use treated sewage sludge for agriculture, forestry, or horticulture unless certain conditions are met (FGS-FRG 7-17d).	Verify that an agency designated by the competent German authority examines samples of the sludge for the following chemicals every 6 mo: (1)(2)(3) - lead - cadmium - chromium - copper - nickel - mercury - zinc - nitrogen - phosphates - potassium - calcium - magnesium.

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9-83. (continued)	Verify that the pH value and the levels of the following chemicals in the soil have been determined prior to the start of application: - lead - cadmium - chromium - copper - nickel - mercury - zinc.
9-84. Installations must comply with specific prohibitions and restrictions on the application of sewage sludge to land used for agriculture, forestry, or horticulture (FGS-FRG 7-17e and 7-17f).	Verify that raw sludge is never applied to land used for agriculture, forestry, or horticulture. (1)(2) (NOTE: This prohibition applies regardless of the capacity of the wastewater treatment plant.) Verify that sewage sludge is not applied to land where fruits and vegetables are grown. (NOTE: This prohibition applies regardless of the capacity of the wastewater treatment plant.) Verify that sewage sludge that might cause infectious diseases is not applied to grassland or fields that are cultivated for feed (*Feldfutteranbauflächen*). (NOTE: This prohibition applies regardless of the capacity of the wastewater treatment plant.) Verify that treated sewage sludge is not applied to land used for agriculture, forestry, or horticulture if the concentrations of heavy metals in the sludge exceed the values given in Table 9-1, Part 1. Verify that treated sewage sludge is not applied to land used for agriculture, forestry, or horticulture if the concentrations of heavy mefals in the soil exceed the values given in Table 9-1, Part 2. (NOTE: The German authorities may grant exceptions to this prohibition in some cases.) Verify that sewage sludge is not applied to land used for forestry without the agreement of the appropriate German official. Verify that, if sewage sludge is applied to land used for forestry, it is worked into the soil. Verify that applications of sewage sludge to land used for agriculture, forestry, or horticulture do not exceed 5 metric tons (dry weight)/ha during a 3 yr period.

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9-84. (continued)	(NOTE: Quantities may be doubled if no sewage sludge will be applied to the land for the next 5 yr after the year of application.)
9-85. Operators of wastewater treatment plants that distribute or apply sewage sludge must meet recordkeeping requirements (FGS-FRG 7-17g).	Verify that such operators fill out a manifest and give it to the user or cause it to be handed over by the recipient of the sewage sludge. (1)(2) Verify that the manifest always stays with the sludge. Verify that operators keep a copy of the manifest for 5 yr after the distribution date. Verify that a manifest is filled out and kept for 5 yr by operators of wastewater facilities if they apply or have a third party apply sewage sludge to their own property.
9-86. Operators of sewage treatment plants in Hessen and Rheinland-Pfalz must meet special criteria with regard to disposal of sludge (FGS-FRG 7-17h).	Determine whether the sewage treatment plant is in Hessen or Rheinland-Pfalz. (1)(2) Verify that operators of such plants dispose of the following materials if they are not recycled as part of agricultural activity: - the sludge that accumulates - wastewater that accumulates in trenches that have no outlets.
TRANSPORTATION OF SOLID WASTE	(NOTE: U.S. Forces do not require a permit when transporting wastes in a U.S. government-owned vehicle.)
9-87. Contracted waste haulers must be properly licensed in accordance with German law (FGS-FRG 7-19a).	Verify that contracted waste haulers used by the installation are properly licensed in accordance with German law. (1)(2)
9-88. Vehicles that transport waste on public roads must be provided with warning panels that meet specific standards (FGS-FRG 7-19b).	Verify that vehicles that transport waste on public roads are provided with two rectangular, reflecting, white, warning panels that are marked with a black letter "A". (1)(2) Verify that the warning panels are at least 40 cm long and 30 cm high. Verify that the black letter "A" is 20 cm high and 2 cm thick. Verify that, during transport, the labels are attached and clearly visible in the front and the rear of the vehicle, perpendicular to the axle of the vehicle, and at a height of no more than 1.5 m above the surface of the road.

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9-88. (continued)	Verify that vehicles with trailers display the second warning panel at the rear of the trailer. (NOTE: The driver is responsible for attaching the warning panels.)
9-89. Transborder shipment of waste must be made only in accordance with specific criteria (FGS-FRG 7-19c).	Verify that transborder shipments are not normally made. (1)(2) Verify that, where there is compelling need to make such a shipment, the Executive Agent (EA) is contacted for guidance. Verify that such shipments are made only in accordance with U.S., European Community, and German national laws and regulations issued in implementation of the Basel Convention.
ANIMAL CARCASSES AND ANIMAL PARTS	(NOTE: FGS-FRG assumes that no DOD component will operate a facility to dispose of animal carcasses and parts. If such a facility is considered, the EA should be contacted.)
9-90. Installations must dispose of animal carcasses, animal body parts, and animal products in accordance with certain general principles (FGS-FRG 7-5g).	Verify that such waste is disposed of in such a way that: (1)(2) - the health of humans and animals is not endangered by pathogens of infectious diseases or toxic substances - waters, soil, and feedstuffs are not polluted by pathogens of infectious diseases or toxic substances - the environment is not adversely affected - public law and order are not endangered or disturbed.
9-91. Installations must dispose of certain animal carcasses in accordance with specific criteria (FGS-FRG 7-20b).	Verify that the installation disposes of the following in an animal carcass disposal facility: (1)(2) - bodies of hoofed animals, animals with nails or claws instead of hoofs [i.e., ungulates and unguiculates; FGS incorrectly translates "solid ungulates, ungulates"], dogs, cats, poultry, rabbits, and animals with valuable furs, that are found in the home, in a business, or are otherwise owned by people - bodies of animals kept in zoos or similar facilities and in pet shops - bodies of abandoned or stray animals listed above, except for game living in the wild. (NOTE: The above disposal requirement does not apply to individual bodies of dogs, cats, piglets, rabbits, and lambs or kids (if the lambs or kids are under 4 wk old) or to individual bodies of poultry or small animals and birds kept in pet shops.)

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9-91. (continued)	Verify that animals to which the exemption applies are either: - buried in places permitted by German authorities or on one's own property under a layer of earth at least 50 cm deep - burned in permitted disposal facilities. Verify that no animals to which the above exemption applies are buried in water protection areas or near public thoroughfares or places.
9-92. Installations must dispose of the parts of certain animals in accordance with specific criteria (FGS-FRG 7-20c).	Verify that the installation disposes of animal body parts of the following in an animal carcass disposal facility: (1)(2) - bodies of hoofed animals, animals with nails or claws instead of hoofs [i.e., ungulates and unguiculates], dogs, cats, poultry, rabbits, and animals with valuable furs, that are found in the home, in a business, or are otherwise owned by people - bodies of animals kept in zoos or similar facilities and in pet shops - bodies of abandoned or stray animals listed above, except for game living in the wild. (NOTE: The above disposal requirement does not apply to individual bodies of dogs, cats, piglets, rabbits, and lambs or kids (if the lambs or kids are under 4 wk old) or to individual bodies of poultry or small animals and birds kept in pet shops.) (NOTE: The above disposal requirement does not apply if: - the body parts have been hygienically treated in such a way that the health of human and animals cannot be endangered by pathogens, toxic substances, impurities, or spoiling - the body parts are taken to enterprises that process blood, bristles, feathers, fat, fish, skins, hair, horns, claws, bones, or wool - the body parts are taken to enterprises that produce gelatin, glue, or canned feed [FGS incorrectly translates "feedstuff cans."] - or to pharmaceutical enterprises for technical processing or industrial manufacturing - the body parts accumulate in small quantities in restaurants, institutions that serve food, or in private households.)
9-93. Installations must dispose of animal products in animal carcass disposal facilities (FGS-FRG 7-20e).	Verify that the installation disposes of animal products in animal carcass disposal facilities. (1)(2)

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9-94. Installations must keep animal carcasses, animal body parts, and animal products separate from other wastes (FGS-FRG 7-20d).	Verify that animal carcasses, animal body parts, and animal products are kept separate from other wastes. (1) Verify that they are stored in such a way that they are unaffected by changes in the weather. Verify that animal carcasses are not skinned, opened, or carved up during storage.
9-95. Installations must not feed animal carcasses, animal body parts, or food waste to animals without the permission of the German authorities (FGS-FRG 7-20f).	Verify that the installation does not feed the following to animals without the permission of the German authorities: (1) - animal carcasses - animal body parts - food waste from restaurants or institutions that serve food.
9-96. Installations must meet reporting requirements with regard to animal carcasses (FGS-FRG 7-20g).	Verify that the installation notifies the animal carcass disposal facility in whose area bodies of the following animals have accumulated, if more than individual bodies accumulate: (1) - dogs - cats - poultry - rabbits - animals with valuable furs. Verify that bodies of unknown or abandoned dogs, cats, and other animals are reported as follows: - by the property owner when found on property - by the party in charge of road construction when found on public roads or in public places - by the party responsible for maintenance when found in waters.
9-97. Installations must pick up animal carcasses, body parts, and animal products immediately under certain circumstances (FGS-FRG 7-20h and 7-20j).	Verify that the installation picks up animal carcasses, body parts, and animal products immediately. (1) (NOTE: The requirement applies to the bodies of dogs, cats, poultry, rabbits, and animals with valuable furs only if: - no collection points have been established - more than individual bodies are accumulating - a competent German authority has ordered the pickup. It applies to the bodies of other animals, including game living in the wild, if disposal or pickup has been ordered by a competent German authority.)

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9-97. (continued)	(NOTE: Collection points may be established for animal carcasses, body parts, and animal products that are not being picked up or are not immediately taken to the animal carcass disposal facility. The states establish the standards for collection points, normally during the permitting process.)
9-98. Installations must pick up animal carcasses, body parts, and animal products up at such intervals that proper disposal is ensured (FGS-FRG 7-20h).	Verify that the installation picks up animal carcasses, body parts, and animal products up at such intervals that proper disposal is ensured. (1)(2)
9-99. To the extent that disposal in an animal carcass disposal facility is required and no pick-up obligation exists, the owner of animal carcasses, animal body parts, and/or animal products must deliver them to the specified animal carcass disposal facility and transport them in closed, liquid-proof vehicles or in sealed containers (FGS-FRG 7-20i).	Verify that the owner delivers the animal carcasses, animal body parts, and/or animal products to the specified animal carcass disposal facility. (1) Verify that such items are transported in closed vehicles that are impervious to liquids or in sealed containers.
9-100. Collections points that have not been permitted must comply with specific standards (FGS-FRG 7-20j(1) and 7-20j(2)).	Verify that the collection point consists of at least one closed room that is easy to clean and disinfect. (1)(2) Verify that the entrances to and exits from the collection point are lockable. Verify that pressurized water is available for cleaning. Verify that streets and paths leading to the facility are paved and capable of being disinfected. Verify that there is a moveable, corrosion-proof container or other permanent piece of equipment that is impervious to liquids, easy to clean, and provided with a tight cover. Verify that the equipment has a sufficiently large opening through which it can be filled.

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9-100. (continued)	Verify that it is designed in such a way that its contents cannot be removed by unauthorized persons. Verify that the container itself is impervious to liquids if: - the floor of the room is not impervious to liquids - the surfaces of the walls and doors are not smooth, washable, and disinfectable - the material that is collected is not loaded directly into transport vehicles using appropriate equipment. Verify that the capacity of the room, the container, and the equipment is consistent with the projected amount of accumulation, taking into account frequency of pick-ups. Verify that the room is air conditioned if the temperature outdoors, the amount that accumulates, and/or the frequency of pick-up makes it necessary. (NOTE: A container that is not set up in a room is equivalent to a collection point if: - it is moveable, corrosion-proof, impervious to liquids, easy to clean and disinfect, and provided with a tight cover - it is located on a base that is paved and capable of being disinfected, and - the streets and paths that lead to it are also paved and capable of being disinfected.) Verify that the collection point is open at specified, well-known times. Verify that animal carcasses, body parts, and animal products are collected only in rooms, containers, or equipment that meet the above standards.
9-101. Wrapping, packaging, and other objects must be placed in designated containers made available by the parties who are obligated to dispose of them (FGS-FRG 7-20j(3)).	Verify that wrapping, packaging, and other objects are placed in designated containers made available by the parties who are obligated to dispose of them. (1)(2) (NOTE: Such items may not be given to collection points.)
9-102. The rooms, containers, and equipment of collection points are to be cleaned and disinfected under the close supervision of a veterinarian (FGS-FRG 7-20j(4)).	Verify that the rooms, containers, and equipment of collection points are cleaned and disinfected under the close supervision of a veterinarian. (1)(3)

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PLANT WASTE	
9-103. Installations must under certain circumstances dispose of plant waste through a waste disposal service (FGS-FRG 7-21a).	Determine whether state or local waste plans require that plant waste be disposed of through a waste disposal service. (1)(2) Verify that the installation disposes of its plant waste through a waste disposal service. (NOTE: In all other cases, plant waste may be disposed of outside of a waste disposal facility.)
9-104. Installations that are not required to dispose of plant wastes using a disposal service must meet other plant waste management standards (FGS-FRG 7-21b through 7-21d).	Verify that no odor nuisance results from leaving plant waste from agriculture or gardening to decompose. (1)(2) (NOTE: In outlying areas plant wastes from agriculture or gardening may be burned if technical reasons prevent their being returned to the soil.) Verify that the plant material is gathered into piles or bundles prior to burning. Verify that open-field burning does not take place. Verify that coordination with appropriate German authorities (including the police and fire departments) takes place before burning. Verify that all required fire prevention measures are taken. Verify that the residue is returned to the soil promptly. (NOTE: Plant waste from vineyards and orchards and plant waste that arises from the maintenance of rights of way or waterways, landscape preservation, or clearing arable land may also be burned outside the area on which such waste originates.) (NOTE: Forest wastes, particularly slash, may be left to decay in the forest.)

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PACKAGING WASTE	(NOTE: The standards in this section apply to anyone who produces or distributes non-imported commodity packaging, whether wholesale or retail.) (NOTE: To meet these standards, producers and distributors may delegate their obligations to third parties.) (NOTE: Automats may be used to accept returned packaging and refund deposits.)
9-105. Installations must take certain actions to reduce waste from packaging (FGS-FRG 7-5h).	Verify that substances are used for packaging that are compatible with the environment and do not make recycling more difficult. (4)(5)(6) Verify that the volume and weight of packaging are limited to the absolute minimum necessary for the protection and marketing of what is packaged. Verify that packaging is produced in such a way that it can be refilled if possible. Verify that packaging is recycled if it cannot be reused.
9-106. DOD components that are unable to adhere to the standards below must take specific actions (FGS-FRG 7-22).	Verify that DOD components that are unable to adhere to the standards below establish standards that are at least as protective of the environment. (1) Verify that, if a component develops such standards, it submits a request to the EA to waive the standards below and approve the component's standards.
9-107. Producers and vendors have specific responsibilities with regard to transport packaging (FGS-FRG 7-22a).	Verify that producers and vendors take back transport packaging and either reuse it or submit it to a recycling operation outside of the public waste disposal system. (4)(5)(6) (NOTE: This requirement does not apply if the consumer wants the packaging.) (NOTE: Packaging that is used both as transport and retail packaging is treated as retail packaging.)
9-108. Vendors who sell goods in double packaging must meet specific responsibilities (FGS-FRG 7-22b).	Verify that vendors who sell goods in double packaging either remove the double packaging at the time of sale or provide an opportunity for the consumer to leave the double packaging in appropriate on-site containers for different types of materials. (4)(5)(6) Verify that clearly legible and easily recognizable signs are posted to make the consumer aware of this opportunity.

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9-109. Distributors must take back (free of charge) retail packaging provided to the ultimate consumer at the point of sale or in its immediate vicinity (FGS-FRG 7-22c).	Verify that distributors take back (free of charge) retail packaging provided to the ultimate consumer at the point of sale or in its immediate vicinity. (4)(5)(6) (NOTE: This obligation is restricted to the type, shape, and size of packaging, or packaging materials used for the goods the distributor supplies.) (NOTE: Distributors with a sales area of less than 200 m^2 are obliged to take back only the packaging of those brands they distribute.) (NOTE: The requirements for vendors to take back retail packaging may be avoided if the producers provide an approved system of regular collection of such packaging.)
9-110. Distributors of certain liquid food must collect deposits from their customers (FGS-FRG 7-22d).	Verify that distributors of German nonimported liquid food in one-way beverage containers with a volume of 0.2 L or more collect a deposited per beverage container from their customers. (4)(6) (NOTE: The most common non-imported liquid foods at issue here are beer and bottled water.) Verify that the deposit is at least: - DM 0.50 (or the equivalent in U.S. currency) for containers between 0.2 L and 1.5 L - DM 1.00 (or the equivalent in U.S. currency) for containers with a volume of 1.5 L or more. (NOTE: These deposits include the Value Added Tax, if the purchasing organization is not exempt per the NATO SOFA and any implementing agreements.) (NOTE: The intent is to collect this deposit at each step in the distribution chain until the product is sold to the ultimate consumer.) Verify that the deposit is refunded when the container is returned.
9-111. Distributors of certain non-imported washing agents and detergents must collect deposits from their customers (FGS-FRG 7-22e).	Verify that distributors impose a deposit of DM 2.00 (or the equivalent in U.S. currency) on packaging with a volume of 0.2 L or more used for nonimported washing agents and detergents. (4)(6) (NOTE: No deposit is required for soft packaging and cardboard-based soft packaging that can be refilled.) Verify that distributors impose a deposit of DM 2.00 (or the equivalent in U.S. currency) on packaging capable of containing 2 kg or more of emulsion paints. (NOTE: These deposits include the Value Added Tax, if the purchasing organization is not exempt per the NATO SOFA and any implementing agreements.)

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9-111. (continued)	(NOTE: The intent is to collect this deposit at each step in the distribution chain until the product is sold to the ultimate consumer.) Verify that the deposit is refunded when the packaging is returned.
MEDICAL WASTE	
General	(NOTE: Category A and Category B waste generated in medical facilities may not be excluded from public disposal by a permitted organization.)
9-112. Installations must develop and execute a plan for the management of medical waste (FGS-FRG 8-2).	Verify that the installation has developed and executes a plan that meets the requirements established for the collection, storage, treatment, transportation, and disposal of medical waste, both within and outside of a medical facility. (1)(3)
9-113. Installations must develop contingency plans for the treatment or disposal of Category C and/or Category E medical waste in case the primary means becomes inoperable (FGS-FRG 8-16c).	Verify that the installation has such a contingency plan. (1)(3)
9-114. Radioactive medical waste must be managed in accordance with service directives (FGS-FRG 8-4).	Determine whether the installation disposes of radioactive medical waste. (1)(3) Verify that such waste is disposed of in accordance with AF guidance.
9-115. A designated staff person for waste management must be appointed in certain circumstances (FGS-FRG 8-5).	Determine whether the installation: (1)(3) - operates a hospital or clinic - produces wastes that contain pathogens or are able to cause communicable diseases - operates a permanent waste disposal facility for burning medical waste. Verify that a designated staff person for waste management has been appointed.

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9-116. Installations must comply with basic guidelines for the management of medical waste (FGS-FRG 8-6a through 8-6c).	Verify that the installation takes all possible steps to avoid or reduce the generation of waste, including: - procure durable products rather than disposable products when possible - procure environmentally friendly products when possible (e.g., latex, polypropylene, or polyethylene products rather than products made of polyvinyl chloride (PVC)) - procure products that have only the minimum required wrapping - use state-of-the-art technological processes and materials to reduce laboratory, x-ray, and other operational waste generation - ensure that items that can be reused or recycled do not enter the waste stream - conduct training and foster awareness of the need to reduce waste. Verify that the installation manages waste in such a way that as much as possible can be classified in Category A. (NOTE: In order to accomplish this, wastes with harmful and dangerous substances may be separated or rendered harmless by thermal, chemical, physical, or biological treatment. Additional treatment beyond rendering the waste harmless (e.g., disinfection) may be necessary, depending on the contamination and the reutilization, recycling, or disposal process.) Verify that, where large amounts of Category B fluids are generated, the containers are emptied according to accepted hygienic practices and the contents discharged into wastewater, if sanctioned by DOD medical personnel and agreed to by the local wastewater treatment plant operator.
9-117. Wastes must be kept separated to the greatest extent possible and not mixed (FGS-FRG 6-8d).	Verify that wastes are kept separated to the greatest extent possible and not mixed. (1)(3) Verify that medical facilities segregate wastes in accordance with agreements with the waste disposal organization(s) that collects the waste. (NOTE: This may require segregation into subcategories below the category levels A, B, C, D, or E.)
9-118. All personnel who handle Category B, Category C, and/or Category E medical waste must wear protective apparel or equipment (FGS-FRG 8-15).	Verify that all personnel who handle Category B, Category C, and/or Category E medical waste wear protective equipment such as gloves, coveralls, masks, and goggles, sufficient to prevent risk of exposure to infectious agents or pathogens. (1)(3)

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Specific Wastes	
9-119. Installations must follow certain procedures if the mixing of wastes is unavoidable (FGS-FRG 6-8e).	Verify that mixtures of Category B, C, or E wastes and hazardous waste are handled as infectious hazardous waste. (1)(3) (NOTE: Priority is given to the hazard that presents the greatest risk.) (NOTE: Such mixtures of waste are the responsibility of the generating DOD component, not the Defense Reutilization and Marketing Office (DRMO).) Verify that mixtures of Category B and Category C wastes are handled as Category C wastes. Verify that Category D medical wastes are managed in accordance with the requirements of Section 4, *Hazardous Waste Management.*
9-120. All the generated wastes and residue substances generated in a single facility must be recorded and accounted for (FGS-FRG 6-8g).	Verify that all the generated wastes and residue substances generated in a single facility are recorded and accounted for. (1)(3) Verify that the wastes and residue substances are disposed of separately in accordance with the requirements for the category under which they fall. (NOTE: It makes no difference whether the wastes are generated often or once or in large or small quantities.)
9-121. Installations must dispose of waste only in facilities permitted to handle it (FGS-FRG 8-6h).	Verify that the installation disposes of waste only in facilities that are permitted to handle it. (1)(3) (NOTE: This applies to all types of waste.)
9-122. Installations must not ship medical waste across the German border (FGS-FRG 8-6i).	Verify that no medical waste is shipped across the German border. (1)(3)
9-123. Animal carcasses and animal body parts from veterinary facilities or medical laboratories must be disposed of in accordance with specific requirements (FGS-FRG 8-7a).	Verify that animal carcasses and animal body parts from veterinary facilities or medical laboratories are disposed of in such a way that: (1)(3) - the health of humans and animals is not endangered - water, soil, and crops are not polluted by pathogens of infectious diseases or toxic substances. Verify that animal bodies or parts are disposed of in a permitted facility.

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-123. (continued)	(NOTE: This requirement does not apply if the bodies or parts have been treated so that the health of humans and animals cannot be endangered by pathogens, toxic substances, impurities, or spoiling.) Verify that carcasses, parts of carcasses, litter, manure, liquid wastes, excrement, and any other waste generated by animals that may be sick is disposed of safely.
9-124. Installations must dispose of waste generated by X-ray facilities in accordance with specific procedures (FGS-FRG 8-8).	Verify that X-ray developing and fixer baths are treated as Category D wastes and disposed of as hazardous waste. (1)(3) Verify that wastes that contain silver or heavy metals are recycled to the greatest extent possible.
9-125. Blood, blood products, and other liquid Category C waste must be handled in accordance with specific criteria (FGS-FRG 8-9).	Verify that suction canister waste from operating rooms is either decanted into a clinical sink or sealed into leakproof containers and incinerated. (1)(3) Verify that bulk blood or blood products are only decanted into clinical sinks. Verify that emptied containers that used to hold bulk blood or blood products are managed as Category B or C medical wastes as appropriate.
9-126. Sharps must be managed in accordance with specific criteria (FGS-FRG 8-10 and 8-12e).	Verify that sharps are discarded into rigid receptacles only. (1)(3) Verify that needles are not clipped, cut, bent, or recapped before treatment or disposal. Verify that containers holding sharps are not compacted.
9-127. The handling of anatomical pathology waste (Category E) is subject to specific requirements (FGS-FRG 8-11).	Verify that all anatomical pathology (Category E) waste is placed in containers lined with plastic bags that are a minimum of 3 mils thick, durable, puncture resistant, and have sufficient burst strength to prevent rupture or leaks during ordinary use. (1)(3)
9-128. Anatomical pathology waste must be either incinerated or buried (FGS-FRG 8-11).	Verify that pathological waste is disposed of either by incineration or burial in a permitted facility. (1)(3)

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-129. Medical facilities must accept unused medicines from patients for the purpose of proper disposal (FGS-FRG 8-6d(3)).	Verify that the installation's medical facilities accept unused medicines from patients for the purpose of proper disposal. (1)(3)
Storage and Transportation	
9-130. The internal collection and transportation system must be compatible with the disposal paths outside the facility (FGS-FRG 8-12a).	Verify that the internal collection and transportation system is compatible with the disposal paths outside the facility. (1)(3) (NOTE: This requirement is interpreted to apply both to the facility that generates waste in its relation to disposal paths on the installation and to the installation as a whole in its relation to disposal paths outside its boundaries.)
9-131. Installations must store wastes the improper utilization of which could be a danger to the public in such a way that the wastes are inaccessible to unauthorized persons (FGS-FRG 8-12b).	Verify that the installation stores wastes the improper utilization of which could be a danger to the public in such a way that the wastes are inaccessible to unauthorized persons. (1)(3)
9-132. The internal transfer of wastes to a central depot or to transfer sites must take place in such a way that pathogenic agents do not escape (FGS-FRG 8-12c).	Verify that the internal transfer of wastes to a central depot or to transfer sites takes place in such a way that pathogenic agents do not escape. (1)(3)
9-133. Installations must comply with specific prohibitions and requirements related to the handling of Category C and/or Category E wastes (FGS-FRG 8-12c).	Verify that containers of Category C and/or Category E wastes are not opened or transferred. (1)(3) Verify that Category C and/or Category E wastes are not sorted. Verify that Category C and/or Category E medical waste are transported and stored to minimize human exposure to the extent possible.

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-133. (continued)	Verify that Category C and/or Category E medical waste is not placed in chutes or dumbwaiters. Verify that infectious medical waste is segregated, collected, transported, and stored in firm containers that are: - moisture-resistant - firmly lockable - able to withstand the hazards of being handled and moved - durable enough to resist punctures and prevent rupture or leaks during ordinary use. (NOTE: The locking requirement is to ensure that the container does not open accidentally. The lock need not be of a type that would prevent unauthorized entry.) Verify that such containers are used from the point of generation to the point of disposal. Verify that all containers used to segregate, transport, or store Category C and/or Category E medical waste are clearly marked with the universal biohazard symbol and the legend BIOHAZARD in both English and German. (NOTE: The German equivalent of BIOHAZARD is ANSTECKUNGSGEFAHR.) Verify that all containers used to segregate, transport, or store Category C and/or Category E medical waste include marking that identifies the generator, date of generation, and the contents. Verify that Category C medical waste is not compacted unless it has been converted to Category A waste by treatment.
9-134. Category C and/or Category E medical waste that cannot be treated onsite must be managed during storage in accordance with specific requirements (FGS-FRG 8-12g and OEBGD, Chapter 8, Criterion 14).	Verify that such waste is maintained in a nonputrescent state, using refrigeration as necessary. (1)(3) Verify that storage sites: - are specifically designated - are constructed to prevent the entry of insects, rodents, and other pests - do not allow access by unauthorized personnel - marked on the outside with the universal biohazard symbol and the word BIOHAZARD in English and the language of the host nation.

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-135. Installations must meet marking requirements with respect to containers used to segregate, transport, or store Category B medical waste (FGS-FRG 8-13).	Verify that all containers used to segregate, transport, or store Category B medical waste are clearly marked with the universal biohazard symbol and the legend BIO-HAZARD in both English and German. (1)(3) Verify that all containers used to segregate, transport, or store Category B medical waste include marking that identifies the generator, date of generation, and the contents.
9-136. Facilities for the treatment and compacting of wastes must be located close to storage and transfer sites (FGS-FRG 8-12f).	Verify that facilities for the treatment and compacting of wastes are located close to storage and transfer sites. (1)(3) Verify that organizations that will dispose of waste are consulted when sites for such facilities are established.
Treatment	
9-137. Category C medical waste must be treated in accordance with specific standards (FGS-FRG 8-14a and 8-14b).	Verify that Category C medical waste is treated prior to disposal in accordance with Table 9-3. (1)(3) Verify that, if sterilization is required, sterilizers are maintained at a temperature of 121 ^{o}C (250 ^{o}F) for at least 90 min. Verify that, if sterilization is required, the effectiveness of sterilizers is checked at least weekly using *Bacillus stearo thermophilus* spore strips or an equivalent biological performance test.
9-138. Installations must meet specific requirements with regard to the disinfection of wastes (FGS-FRG 8-14e(1)).	Verify that chemical disinfection of Category B or Category C wastes is conducted using procedures and compounds approved by DOD medical personnel for use on any pathogen or infectious agent suspected to be present in the waste. (1)(3) (NOTE: If it is possible that objects carry pathogenic agents of infectious diseases and installations are ordered to destroy them for that reason (e.g., items from a quarantine situation), proper disinfection may be used in processing these items for disposal rather than incineration.)

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-139. Installations that dispose of disinfected Category C wastes together with household waste must meet specific requirements (FGS-FRG 8-14e(2)).	Determine whether the installation disposes of disinfected Category C wastes together with household waste. (1)(3) Verify that the Category C wastes are thermally disinfected by a method approved by DOD medical personnel. (NOTE: Permitted waste disposal organizations may require that such thermal disinfection be in accordance with procedures that have been checked by the German Federal Health Office and published in the list included in the federal health publication that deals with the checked and recognized disinfectants and procedures.)
9-140. Incinerators used to treat medical waste must meet specific requirements (FGS-FRG 8-14c).	Verify that such incinerators are designed and operated to maintain a minimum temperature and retention time sufficient to destroy all infectious agents and pathogens. (1)(3) Verify that such incinerators meet applicable air emissions criteria in FGS-FRG 2-13. (NOTE: See checklist item 1-68.)
9-141. Ash or residue from the incineration of Category C and/or Category E medical waste must be assessed for hazardous characteristics (FGS-FRG 8-14d).	Verify that ash or residue from the incineration of Category C and/or Category E medical waste is assessed for hazardous characteristics. (1)(3) Verify that ash that is determined to be hazardous waste is managed as hazardous waste. (NOTE: See Section 4, *Hazardous Waste Management.*) Verify that all other residue that is not determined to be hazardous is disposed of in accordance with the requirements of FGS-FRG, Chapter 7. (NOTE: See above in this protocol.)
Spills	
9-142. Spills of Category B, Category C, and/or Category E medical waste must be cleaned up in accordance with specific requirements (FGS-FRG 8-17).	Verify that spills of such medical waste are cleaned up as soon as possible. (1)(3) Verify that response personnel wear PPE that is sufficient to prevent risk of exposure to infectious agents or pathogens. Verify that spills of blood or body fluids are removed with absorbent material. Verify that such absorbent material is then managed as Category C medical waste.

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COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
9-142. (continued)	Verify that surfaces contacted by Category B, Category C, and/or Category E medical waste are washed with soap and water and chemically decontaminated using procedures and compounds approved by DOD medical personnel for use on any pathogen or infectious agent suspected to be present.
Recordkeeping	
9-143. Installations must keep records concerning medical waste (FGS-FRG 8-16a).	Verify that the installation keeps a record tracking medical waste from its place of origin, through the collection, transportation to internal collecting points, treatment, and transfer to permitted disposal organizations. (1)(3) Verify that records concerning medical waste are kept for at least 3 yr after the date of disposal. Verify that such records for Category C and/or Category E medical waste include the following information: - type of waste - amount of waste (by volume or weight) - treatment (if any), including date of treatment - disposition, including date of disposition, and, if the waste is transferred to German facilities, receipts acknowledging the above three items for each transfer.

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Table 9-1

Heavy Metal Concentration Limits for the Application of Sewage Sludge on Land

(Source: FGS-FRG, Table 7-3)

Part 1: The Maximum Concentration of Heavy Metals in Sewage Sludge in milligrams per kilogram of the Dry Sludge Residues

PCB	1
Cadmium	10
Chromium	1, 000
Copper	500
Lead	500
Mercury	5
Nickel	100
Zinc	1, 000

Part 2: The Maximum Concentration of Heavy Metals in Soil in milligrms per kilogram of the Air-dried Soil.

Cadmium	3
Chromium	100
Copper	100
Lead	100
Mercury	2
Nickel	50
Zinc	300

Table 9-2

Groundwater and Surface Water Examinations Required at DOD-Operated Landfills

(Source: FRG-FGS, Table 7-2)

Parameter	Groundwater Examination		Surface Water Examination	
	Complete	Short	Complete	Short
Appearance	X	X	X	X
Odor	X	X	X	X
Temperature	X	X	X	X
pH-value	X	X	X	X
Oxygen content	X	X		
Conductivity	X	X	X	X
Exhaust steam residual (*sic*)	X	X	X	X
Incandescent residual (*sic*)	X		X	
Hydrocarbons	X		X	
Phenols	X		X	
Total Organic Carbon	X		X	X
Oxidizability				
Cr VI+ ->Cr III+	X	X	X	X
Mn VII+ ->Mn II+	X	X	X	X
Putrefiability (*sic*)			X	
Ammonium	X	X	X	
Nitrate	X	X	X	
Nitrite	X		X	
Total N			X	
Chloride	X	X	X	
Phosphorus				X
Sulphate	X		X	
Cyanide	X	X	X	
Acid capacity up to pH 4.3	X	X		
Total hardness	X	X		

(continued)

Table 9-2 (continued)

Sodium	X		X	
Potassium	X		X	
Calcium	X		X	
Magnesium	X			
Zinc	X		X	
Iron	X		X	
Manganese	X		X	
Chromium	X		X	
Nickel	X		X	
Copper	X		X	
Cadmium	X		X	
Mercury	X		X	
Lead	X		X	
Toxic test (e.g., short fish test, daphnien test)	X		X	
Bacteriological examination	X		X	

Table 9-3

Treatment and Disposal Methods for Infectious Medical Waste
(FGS-FRG, Table 8-1)

Type of Medical Waste	Method of Treatment	Preferred Method of Disposal*
Microbiological	Steam sterilization Chemical disinfection Incineration	As a solid waste[1]
Pathological	Incineration[2] Cremation	As a solid waste Cremation
Bulk blood	Note[3]	Domestic wastewater treatment plant
Suction canister waste		Domestic wastewater treatment plant Incineration
Sharps in sharps containers	Steam sterilization Incineration	As a solid waste
* Because final disposal must be accomplished by a permitted operator at a permitted facility, the preferred method may not be possible. Another method may be used if approved by DOD medical personnel.		

1 Consult the relevant requirements of this section for standards for solid waste landfills.

2 Placentas may also be ground and discharged to a domestic wastewater treatment plant that complies with the standards of Section 10, *Water Quality Management*, if permitted by the plant operator.

3 Bulk blood known to be infectious must be treated by incineration or steam sterilization before disposal.

INSTALLATION:	COMPLIANCE CATEGORY: SOLID WASTE MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		

SECTION 10

STORAGE TANK MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 10

STORAGE TANK MANAGEMENT

A. Applicability of this Section

This section applies to U.S. Air Force (USAF) installations that have aboveground storage tanks (ASTs) and/or underground storage tanks (USTs), whether or not those tanks are organizational tanks and regardless of the nature of their contents; that is, it addresses the management of ASTs and USTs, whether they are used to store hazardous substances, hazardous waste, or POL.

The regulatory requirements in this section are based on Department of Defense (DOD) regulations and Air Force Instructions (AFIs) that apply at overseas installations. Management Practices (MPs) are derived from U.S. Environmental Protection Agency (USEPA) regulations that are not mandatory overseas but are important to follow to preserve the health and safety of Air Force (AF) employees and protect the environment.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 9, outlines the criteria for the control and abatement of pollution from the storage, transfer, and distribution of petroleum products. Chapter 6 of that document addresses hazardous waste tank systems, and Chapter 19 details requirements for USTs in general.

- *Overseas Environmental Baseline Guidance Document* (OEBGD), October 1992, on which FGS-FRG was based, is cited in those instances in which it contains valid requirements that were not taken up into the Final Governing Standards for Germany.

C. U.S. Air Force Documents

- AFI 23-201, *Fuels Management*, 1 October 1996, provides managers at all AF activities with policy and procedures for fuels operations.

- Air Force Manual (AFM) 85-16, *Maintenance of Petroleum Systems*, governs the maintenance of permanently installed storage and dispensing systems for petroleum and unconventional fuels.

D. Responsibility for Compliance

- The Safety Manager is responsible for conducting workplace safety evaluations and inspections of the handling and storage of hazardous materials and waste. The Safety Manager will provide the appropriate manager with a report of his or her findings and recommended corrective actions. The Safety Manager is also responsible for ensuring the prompt and accurate investigation of any hazardous material mishaps that result in injury or property damage.

- The Base Fuels Management Officer (BFMO) is responsible for the safe and efficient receipt, storage, handling, issuing, and accounting of all petroleum products and for all general operations and inspections.

- The Base Civil Engineer (BCE) is responsible for the maintenance of all installed petroleum storage and dispensing systems. This responsibility often is discharged by the Liquid Fuels Maintenance (LFM) shop. The BCE also is responsible for the calibration of permanently installed meters.

- The Base Environmental Coordinator (BEC) monitors all POL activities that may affect the environment and usually is responsible for the coordination of the EPC review and updates of the spill plan. The BEC often coordinates notification of reportable spills on behalf of the IOSC.

- The Bioenvironmental Engineering Services (BES) takes samples to determine the chemical nature, pollutant concentration, and extent of each reportable-quantity spill as required for response actions and documentation.

E. Definitions

- *Aboveground Storage Tank (AST)* - any storage tank with a capacity of 300 L (80 gal) or more which is not classified as a UST. No surface of an AST may be on or below the ground surface, and the entire external surface of the tank must be visually inspectable for leaks (FGS-FRG, Appendix A).

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Bulk Petroleum Products* - liquid petroleum products transported by various means and stored in tanks or containers having an individual fill capacity greater than 250 L (approximately 66 gal) (AFI 23-201, Attachment 1).

- *Commander* - the person responsible for controlling the actions under discussion. This may be a person other than an accommodation or installation commander. Such would be the case, for example, if the action dealt with a non-base operations function (FGS-FRG, Appendix A).

- *Competent* - an agency, authority, individual, official, person, etc., who meets any of the following criteria: (FGS-FRG, Appendix A)
    1. specifically designated as competent by FGS-FRG
    2. specifically designated as competent by the authority of a German government [agency]
    3. specifically designated as competent by or meets the qualifications of competency of a recognized German trade organization or association
    4. based on experience, training, and/or authority granted per DOD/component policy or regulations, judged by the responsible commander to be a capable and appropriated organization/ individual to accomplish the task in question.

- *Hazardous Material* - material containing one or more hazardous substances (FGS-FRG, Appendix A).

- *Hazardous Substance* - any substance that is capable of posing an unacceptable risk to health, safety, or the environment if improperly handled, stored, issued, transported, labeled, or disposed of. Such

substances display a characteristic listed in Table 3-1 or contain one or more of the substances listed in Table 4-1 or in the *Joint Transportation of Hazardous Materials* (USAREUR Reg. 55-4 and USAFE Reg. 75-3) (FGS-FRG, Appendix A).

- *Hazardous Waste* - a discarded material that may be solid, semi-solid, liquid, or contained gas and either exhibits a characteristic of a hazardous waste as described in Table 3-1, or contains a substance listed as hazardous in Table 4-1 or the *Joint Transportation of Hazardous Materials* (USAREUR Reg. 55-4 and USAFE Reg. 75-3) (FGS-FRG, Appendix A).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Leak or Leaking* - any instance in which an article, container, or piece of equipment has an opening, no matter what its size, that has allowed the unintentional release of any of its contained substances (FGS-FRG, Appendix A).

- *Management Practice (MP)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *Organizational Fuel Tank* - any tank, other than integral vehicle tanks or hand-carried safety cans, not under exclusive fuels management control. (AFI 23-201, Attachment 5, Section B).

- *Petroleum, Oil, Lubricant (POL)* - a class of hazardous materials that includes, but is not limited to, petroleum and petroleum-based substances comprised of complex blends of hydrocarbons derived from crude oil through process of separation, conversion, upgrading, and finishing; such as motor fuels, residual fuel oils, lubricants, petroleum solvents, and used oils that have not been contaminated with other hazardous substances. Uncontaminated used oils are to be treated as POL products unless classified as waste by a competent authority. Once so classified, the used oil becomes a hazardous waste (FGS-FRG, Appendix A).

- *Qualified* - see *Competent.*

- *Reportable Quantity (RQ)* - is defined as follows (FGS-FRG 18-7b(1)):
  1. the amount spilled exceeds the amount in the RQ column in Table 4-1, Part 1
  2. the spill contains a hazardous substance listed in Table 4-1, Parts 2 or 3, and the amount spilled exceeds
     a. 450 g (1 lb) of a substance with a WGK number of 3 (acutely hazardous)
     b. 4.5 kg (10 lb) of a substance with a WGK number of 2 (hazardous)
     c. 450 kg (100 lb) of a substance with a WGK number of 1 (marginally hazardous)
  3. the spill contains POL products or POL wastes that exceed 416 L (110 gal).

- *Spill* - an uncontained release of a hazardous substance, to include POL, on the land or into the water (FGS-FRG, Appendix A).

- *State* - the political subdivision referred to as a *Land* in Germany (FGS-FRG, Appendix A).

- *Storage Tank* - a fixed container used to store liquids (FGS-FRG, Appendix A).

- *Treatment* - any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste nonhazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume (FGS-FRG, Appendix A).

- *Underground Storage Tank (UST)* - any tank that is at any point beneath the surface of the ground, or has a surface that cannot be visually inspected, that is used to store hazardous substances (including POL). Tanks in collection rooms that are not easily accessible for the purpose of detecting leaks are also considered USTs. The UST's associated underground piping in the storage area is considered part of the UST. Septic tanks, stormwater or wastewater collection systems, flow-through process tanks, surface impoundments, pits, ponds, lagoons, and hydrant fueling systems are not considered USTs (FGS-FRG, Appendix A).

- *Very Hazardous Material or Waste* - a material or waste that contains a hazardous substance that either: (FGS-FRG, Appendix A)
    1. has a WGK number of three in Table 4-1, Part 2,
    2. is listed as belong to Group S in Table 4-1, Part 3, or
    3. is listed with a 'P' in the USEPA Waste number in Table 4-1, Part 1.

- *Water Protection Area* - an area established by a German state to protect public water supplies, supplement groundwater, or prevent harmful runoff of precipitation and flooding, as well as to prevent entry into the water of soil constituents or substances used to treat manure and plants. The state will publish a set of restrictions for each area designated applicable to all, including DOD components (FGS-FRG, Appendix A).

STORAGE TANK MANAGEMENT

GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
All Installations	10-1 through 10-4	(1)(2)(3)(12)
ASTs		
General	10-5 through 10-12	(1)(2)(3)(4)(7)(8)(10)
Management/Operations	10-13 through 10-24	(1)(2)(3)(4)(7)(8)(9)(10)
USTs		
General	10-25 and 10-26	(1)(2)(3)(4)(7)(8)(10)
Design, Procurement, and Installation	10-27 through 10-31	(1)(2)(3)(4)(7)(8)(10)
Inspection Requirements	10-32 through 10-37	(1)(2)(3)(4)(7)(8)(10)
Operations, Maintenance, and Closure	10-38 through 10-49	(1)(2)(3)(4)(7)(8)(10)
State-specific Requirements	10-50 through 10-56	(1)(2)(3)(4)(7)(8)(10)
Hazardous Waste Tank Systems	10-57 through 10-68	(1)(2)(13)

(a) CONTACT/LOCATION CODE:

(1) BEC (Base Environmental Coordinator)
(2) BCE (Base Civil Engineer)
(3) BFMO (Base Fuels Management Office)
(4) LFM (Liquid Fuels Maintenance)
(5) BES (Bioenvironmental Engineering Services)
(6) Base Fire Department
(7) Power Production
(8) AAFES (Army/Air Force Exchange Service) Service Station Manager
(9) Generating Activities
(10) Vehicle Maintenance Shop
(11) Safety Officer
(12) Base Staff Judge Advocate
(13) HWSA (Hazardous Waste Storage Area) Manager

STORAGE TANK MANAGEMENT

Records To Review

- UST inventory
- Records of all spills, leaks, and associated site assessment/cleanup activities

Physical Features To Inspect

- Aboveground storage tanks and dikes
- UST areas

People To Interview

- BEC (Base Environmental Coordinator)
- BCE (Base Civil Engineer)
- BFMO (Base Fuels Management Office)
- LFM (Liquid Fuels Maintenance)
- BES (Bioenvironmental Engineering Services)
- Base Fire Department
- Power Production
- AAFES (Army/Air Force Exchange Service) Service Station Manager
- Generating Activities
- Vehicle Maintenance Shop
- Safety Officer
- Base Staff Judge Advocate
- HWSA (Hazardous Waste Storage Area) Manager

COMPLIANCE CATEGORY: STORAGE TANK MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
ALL INSTALLATIONS	
10-1. Copies of all relevant DOD directives/ instructions, U.S. Air Force (USAF) directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (1)(12) (NOTE: Among the relevant documents are the following: - AFI 23-201, *Fuels Management,* 1 October 1996 - AFM 85-16, *Maintenance of Petroleum Systems.*)
10-2. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning storage tank management have been issued since the finalization of the manual. (1)(2) Verify that the installation is in compliance with newly issued regulations.
10-3. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to tank management. (1) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
10-4. All fuel tanks controlled by BFMO must be equipped with high-level alarms and/or automatic high-level shut-off valves (AFI 23-201, para A10.1).	Verify that all fuel tanks controlled by BFMO have high-level alarms and/or automatic high-level shut-off valves. (3) (NOTE: This requirement applies to both ASTs and USTs under the control of BFMO.) Verify that BFMO has established safe fill levels below the high-level alarm level.

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COMPLIANCE CATEGORY: STORAGE TANK MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
ASTs **General**	
10-5. If a permit has been issued for the construction of the storage facility, its conditions must be met (FGS-FRG 9-5a).	Determine whether a permit has been issued for the construction of the storage facility. (1)(2)(3)(4)(7)(8)(10) Verify that the installation meets the conditions established in the permit.
10-6. Installations must coordinate with appropriate German authorities in accordance with component policy and regulations before constructing storage facilities (FGS-FRG 9-5a).	Verify that the installation coordinates with appropriate German authorities in accordance with component policy and regulations before constructing storage facilities. (1)(2)(3)(4)(7)(8)(10) (NOTE: This requirement applies only if a permit has not been issued.)
10-7. Installations must meet specific requirements with regard to the location of POL storage facilities (FGS-FRG 9-5b).	Verify that the storage facility is not located near water. (1)(2)(3)(4)(7)(8)(10) (NOTE: This prohibition does not apply if the installation can ensure that the facility will not create drainage problems, pollute water, or degrade the properties of water.) Verify that no discharge containing POL can enter a sewer system.
10-8. ASTs and their piping, fittings, and safety devices must be well-constructed and in sound condition (FGS-FRG 9-5c).	Verify that all ASTs, and their associated fittings and safety devices, are well-constructed and in sound condition. (1)(2)(3)(4)(7)(8)(10) Verify that, if an AST and/or any of its associated fittings and safety devices is not well-constructed and in sound condition, it is not operated until corrective actions have been completed.
10-9. ASTs and their piping and fittings must be capable of being inspected or have devices that warn of leaks (FGS-FRG 9-5d).	Verify that all ASTs and their associated fittings and safety devices are either capable of being inspected or have devices that warn of leaks. (1)(2)(3)(4)(7)(8)(10)

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10-10. Each AST must have secondary containment that meets specific requirements (FGS-FRG 9-5e and 9-5f and AFI 23-201, para A10.1).	Verify that every AST is within a containment structure that will accommodate 100 percent of the contents of the tank or connected tanks plus sufficient freeboard to allow for precipitation and expansion of product. (1)(2)(3)(4)(7)(8)(10) (NOTE: Where allowed in the references listed in Table 10-1, a double-walled tank may be used instead of constructing a containment structure.) Verify that the containment structure is constructed of material with a maximum permeability of 10^{-7} cm/s. Verify that any point of discharge (including drainage for stormwater) is physically controllable by a valve. Verify that the valve is closed and locked when not in active use.
10-11. Facilities must be inspected by a qualified person before their first use (FGS-FRG 9-5g).	Verify that facilities are inspected by qualified persons before they are used for the first time. (1)(2)(3)(4)(7)(8)(10) Verify that the inspection shows that the facilities are properly constructed/installed and in good working order. Verify that the installation keeps records of these inspections. (NOTE: For USAFE purposes, the only persons considered qualified to conduct these inspections are officials of the Technischer Überwachungsverein (TÜV), who charge for their services, or the USAFE Fuels Facility Engineer.)
10-12. Storage facilities that are temporarily shut down must be secured (FGS-FRG 9-5h).	Verify that storage facilities that are temporarily shut down are secured in such a way that they do not present an environmental or safety hazard. (1)(2)(3)(4)(7)(8)(10)
Management and Operations	
10-13. Installations must ensure that ASTs are kept in good repair and operated in an orderly manner (FGS-FRG 9-8a).	Verify that the installation has a program to ensure that ASTs are kept in good repair and operated in an orderly manner. (1)(2)(3)(4)(7)(8)(10)

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10-14. Installations must meet specific requirements with regard to the inspection of ASTs (FGS-FRG 9-8a).	Verify that ASTs are inspected by qualified persons every 5 yr. (1)(2)(3)(4)(7)(8)(10) Verify that electrical equipment associated with ASTs (lightning protection, cathodic corrosion protection, electrostatic charge protection) is inspected by a qualified person every 3 yr. (NOTE: For USAFE purposes, the only persons considered qualified to conduct these inspections are officials of the Technischer Überwachungsverein (TÜV), who charge for their services, or the USAFE Fuels Facility Engineer.)
10-15. Dikes around bulk ASTs should be inspected daily (MP).	Verify that dikes are inspected daily. (3)(4)(7)(8)(10) Verify that any deficiencies noted on AFTO Form 39 have been corrected. (NOTE: This MP also applies to diking around tanks that are not under exclusive fuels management control.)
10-16. Facilities that have not been used for more than 1 yr must be inspected before being returned to operation (FGS-FRG 9-8a).	Verify that facilities that have not been used for more than 1 yr are inspected before being returned to operation. (1)(2)(3)(4)(7)(8)(10)
10-17. Installations must meet specific requirements with regard to the filling and emptying of ASTs (FGS-FRG 9-8b).	Verify that persons who fill or empty ASTs first determine that the tanks, piping, and required safety devices are in good repair. (1)(2)(3)(4)(7)(8)(10) Verify that persons who fill or empty ASTs observe/supervise the entire process. Verify that persons who fill ASTs observe load capacity limits. Verify that the transfer of POL with a flashpoint under 55 °C occurs only in areas specifically designated and prepared for such transfers. Verify that pipes and hoses are connected tightly and do not leak when transferring POL and emptying ASTs. Verify that tank trucks or moveable tank containers used to fill storage tanks have an automatic shutoff device or some other device that protects against overflow. Verify that containers that may be filled with fixed line connections are labeled with the allowable operating pressure.

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10-18. The BCE, LFM, and BFMO should have a memorandum of agreement (MOA) pertaining to draining of floating roof tanks and interior dike basins (MP).	Verify that a MOA has been prepared and signed or coordinated through the BES and the BEC. (2)(3)(4)(5) Verify that copies of the MOA are on file at BFMO, the Service Call Desk, LFM, BEC, BCE, and BES. (NOTE: This MP is based on guidelines found in AFM 85-16.)
10-19. Installations must manage discharges from containment structures in accordance with specific criteria (FGS-FRG 9-8d).	Verify that arrangements are made so that discharges from containment structures cannot pollute the environment. (1)(2)(3)(4)(7)(8)(10) Verify that the water is inspected for sheen before draining stormwater from diked areas. Verify that, if a sheen is present, it is collected with adsorbent material or treated using an oil-water separator before drainage. Verify that adsorbent material that exhibits hazardous characteristics is disposed of properly as hazardous waste. (NOTE: See Section 4, *Hazardous Waste Management.*)
10-20. Certain good management practices should be followed when tending diked areas around bulk ASTs (MP).	Verify that drainage valves are attended when open. (3)(4)(7)(8)(10) Verify that drainage water is tested to determine whether it represents a harmful discharge. Verify that water drained from diked areas does not cause a harmful discharge. Verify that personnel draining the diked area know how to identify a discharge. (NOTE: This MP is based on guidelines found in AFM 85-16, Attachment 5.)
10-21. Tank cleaning wastes and tank bottom waters must be tested for other hazardous substances (FGS-FRG 9-8e).	Verify that tank cleaning wastes (sludge and washwaters) and tank bottom waters are tested for other hazardous substances in accordance with the criteria of Section 4, *Hazardous Waste Management.* (1)(3)(4)(5)(7)(8)(9)(10) Verify that hazardous tank cleaning wastes and hazardous tank bottom waters are properly disposed of as hazardous waste. (NOTE: See Section 4, *Hazardous Waste Management.*)

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10-22. ASTs should undergo periodic integrity testing (MP).	Verify that periodic leak tests have been conducted. (3)(4)(7)(8)(10) (NOTE: A decrease in converted fuel volume equal to or greater than 0.65 cm [0.25 in.] constitutes a suspected leak). (NOTE: Such techniques as the following may be employed to test tank integrity: - hydrostatic testing - visual inspection - a system of nondestructive shell thickness testing.) Verify, that the BCE, Environmental Coordinator, and Safety Officer have been notified of all confirmed leaks. Verify that leaking tanks have been repaired or replaced.
10-23. Fuels personnel must be present for all inoculations of leak detection chemicals in BFMO-controlled bulk ASTs (AFI 23-201, para A10.3).	Verify that fuels personnel are present for all inoculations of leak detection chemicals in BFMO-controlled bulk ASTs. (3)
10-24. Installations should inspect MOGAS, diesel, kerosene, and aviation fuel test cell storage tanks periodically (MP).	Verify that inspections have been conducted as required. (1)(3)(4)(7) Verify that leaking or deteriorated tanks have been repaired or replaced. Verify that leaks were reported to the BCE, Environmental Coordinator, and Safety Officer.
USTs **General**	
10-25. Installations must coordinate with local German officials on the installation of certain new USTs (FGS-FRG 19-3a).	Verify that the installation coordinates with local German officials on the installation of the following types of new USTs: (1)(2) - those that store Class AI liquids but not Class B liquids and exceed 10,000 L - those that store Class AII liquids or Class B liquids and exceed 30,000 L - those that do not have at least 0.8 m of soil, masonry, concrete, or a combination of those substances in every direction from the wall of the tank and whose storage capacity exceeds 2000 L for Class AI and 10,000 L for Class AII and B liquids.

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10-26. USTs that store combustible liquids are subject to siting restrictions (FGS-FRG 19-3b(1)).	Verify that USTs that store combustible liquids are placed at least 0.4 m apart and no closer than 1.0 m to the boundary of the storage area. (1)(2)(3)(4)(7)(8)(10) Verify that USTs that store combustible liquids are at least 1 m from supply mains. (NOTE: This distance requirement does not apply if supply mains are protected in another way.) Verify that USTs that store combustible liquids and are completely buried have at least 0.8 m of soil cover. Verify that USTs that store combustible liquids and are completely buried are not located under buildings.
Design, Procurement, and Installation	
10-27. All USTs must be designed, constructed/manufactured, and erected/installed in accordance with specific requirements (FGS-FRG 19-4(a)).	Verify that all USTs are designed, constructed/manufactured, and erected/installed in such a way that there is no cause to suspect any pollution of ground- or surface waters. (1)(2)(3)(4)(7)(8)(10) Verify that, at a minimum, all USTs are designed, constructed/manufactured, and erected/installed in accordance with generally accepted rules of technology.
10-28. All USTs must be manufactured and erected/installed by qualified persons only (FGS-FRG 19-4a(2)).	Verify that all USTs are manufactured and erected/installed by qualified persons only. (1)(2)(3)(4)(7)(8)(10) Verify that, if a commercial firm is employed to do the work, it has the necessary equipment, supplies, materials, and the experts required to accomplish the work in accordance with generally accepted rules of technology. Verify that, in addition, these firms are authorized to affix quality marks of a monitoring agency or quality control association. (NOTE: In the absence of such an authorization, the firm may instead have a signed monitoring agreement with a technical surveillance association that includes at least two yearly inspections.)
10-29. All USTs used for the storage of POL products must meet specific requirements (FGS-FRG 19-4(b)).	Verify that all petroleum UST systems are properly installed. (1)(2)(3)(4)(7)(8)(10) Verify that tanks and piping are provided with corrosion protection. (NOTE: This requirement does not apply if the UST is constructed of fiberglass or other noncorrodible materials.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
10-29. (continued)	Verify that the corrosion protection system is certified by a competent authority. Verify that the UST is provided with spill and overfill prevention equipment. (NOTE: This requirement does not apply if POL is transferred in quantities less than 95 L (25 gal).) Verify that, where spill and overflow protection is required, a spill containment box is installed around the fillpipe. Verify that overflow prevention is provided by one of the following methods: - automatic shutoff device (set at 95 percent of tank capacity) - high level alarm (set at 90 percent of tank capacity). Verify that leak detection systems are capable of detecting an 0.75 L/h (0.2 gal/h) leak rate or a release of 460 L (150 gal) (or 1 percent of tank volume, whichever is greater) within 30 days with a probability of detection of 0.95 and a probability of false alarm of not more that 0.05. Verify that interstitial monitoring is used as the primary system of leak detection on double-walled USTs. Verify that pressurized UST piping is equipped with automatic line leak detectors.
10-30. USTs that store heating oil must meet specific requirements (FGS-FRG 19-4c).	Verify that USTs that store heating oil are of proper design and in good condition. (1)(2) Verify that there is no question as to the structural integrity of such tanks nor their ability to stay leakproof under anticipated stresses (e.g., operating static over or under pressures as well as probable external stresses.) Verify that, before such a tank is placed in an excavation, it is inspected by a qualified person to ensure that it has not been damaged and still meets all standards. Verify that the tank is not used if it does not pass the required inspection. (NOTE: Facility permits may impose further restrictions on USTs that store heating oil.) Verify that, if no facility permit has been issued, the installation coordinates with local authorities before constructing, installing, or modifying a heating oil UST.

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10-31. UST systems with corrosion protection should meet specific requirements (MP).	Determine which UST systems at the installation have corrosion protection. (1)(2)(3)(4)(7)(8)(10) Verify that the corrosion protection system operates continuously to provide corrosion protection to the metal components that routinely contain regulated substances and are in contact with the ground. Verify that all cathodic protection systems are tested within 6 mo after installation and every 3 yr thereafter. Verify that UST systems with impressed current cathodic protection are inspected every 60 days. Verify that inspection records are maintained of the last three inspections for systems with impressed current cathodic protection and of the last two inspections for all other cathodic protection systems. Verify that new USTs are appropriately protected from corrosion. Verify that the voltage is greater than -0.85 V, but not more than -3.0 V (monthly), for impressed current systems. Verify that the voltage is greater than -0.85 V, but not more than -3.0 V (biannually), for sacrificial anode systems. Verify that leak detection and failure are reported.
Inspection Requirements	
10-32. USTs must be inspected by qualified inspectors at specified times (FGS-FRG 19-5a).	Determine whether the UST is located in a water protection zone. (1)(2) Verify that a qualified inspector inspects a UST not in a water protection zone at the following times: - before first use - after a major alteration - at least every 5 yr thereafter. Verify that USTs in water protection zones are inspected at the following times: - before first use - after a major alteration - every 2.5 yr - before they are reused, if they have not been used for more than 1 yr - if a test is ordered because of suspicion of possible pollution - if the tank is to be deactivated (closed).

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10-32. (continued)	Verify that in all cases, if the inspection is contracted, the inspector has a license recognized by the state in which the inspection takes place. (NOTE: For USAFE purposes, the only persons considered qualified to conduct these inspections are officials of the Technischer Überwachungsverein (TÜV), who charge for their services, or the USAFE Fuels Facility Engineer.)
10-33. Pressurized USTs equipped with automatic line leak detectors must either have an annual tightness test or undergo monthly monitoring (FGS-FRG 19-5b).	Verify that pressurized USTs equipped with automatic line leak detectors either have an annual tightness test or undergo monthly monitoring. (1)(2)(3)(4)(7)(8)(10)
10-34. Suction piping must either have a line tightness test every 3 yr or undergo monthly monitoring (FGS-FRG 19-5b).	Verify that suction piping either has a line tightness test every 3 yr or undergoes monthly monitoring. (1)(2)(3)(4)(7)(8)(10)
10-35. Installations must meet inspection requirements for existing USTs and piping on which automatic leak detection systems have not yet been installed (FGS-FRG 19-5b).	Verify that existing USTs and piping on which automatic leak detection systems have not yet been installed are tightness tested annually in accordance with recognized industry standards (U.S. or German). (1)(2)(3)(4)(7)(8)(10) Verify that existing USTs and piping on which automatic leak detection systems have not yet been installed are inventoried monthly to determine system tightness until the automatic leak detection systems are installed.
10-36. Heating oil USTs are subject to inspection requirements (FGS-FRG 19-5c).	Verify that USTs that store heating oil are inspected at least every 5 yr. (1)(2) Verify that heating oil USTs that normally operate with an overpressure greater than 1.5 kg/cm^2 are inspected annually.
10-37. USTs for hazardous materials must have continuous monitoring of the interstitial space (FGS-FRG 19-5d).	Verify that USTs for hazardous materials (see definition) have continuous monitoring of the interstitial space. (1)(2)(3)(4)(7)(8)(10) Verify that, if the continuous monitoring system has not yet been installed, such tanks are tightness tested annually and inspected monthly until a continuous monitoring system is installed and operational.

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10-37. (continued)	(NOTE: Monthly inspection is to include monitoring for liquids or vapors.)
Operation, Maintenance, and Closure	
10-38. All installations must maintain a UST inventory (FGS-FRG 19-6a).	Verify that the installation maintains a UST inventory. (1)(2)(3)(4)(7)(8)(10)
10-39. USTs must be operated, maintained, repaired, and cleaned in accordance with certain requirements (FGS-FRG 19-6b).	Verify that USTs are operated, maintained, repaired, and cleaned in such a way that there is no cause to suspect any pollution of ground- or surface waters. (1)(2)(3)(4)(7)(8)(10) Verify that USTs are operated, maintained, repaired, and cleaned in accordance with the generally accepted rules of technology. Verify that only qualified persons operate, maintain, repair, and clean USTs. (NOTE: To be qualified as a commercial company, a company must have the devices and equipment parts, as well as the expert personnel to accomplish the work in accordance with the generally accepted rules of technology and be authorized to use quality marks of a monitoring or quality control association, or have a signed monitoring agreement with a technical surveillance association that includes at least two yearly inspections.)
10-40. USTs may be filled and emptied only if certain conditions are met (FGS-FRG 19-6c).	Verify that USTs are filled and emptied only if: (3)(4)(7)(8)(10) - all elements involved in the process are functioning properly and in good order - all safety procedures and equipment are in place - the operation is continuously monitored.
10-41. Dome shafts must be secured so that neither water nor unauthorized persons may enter (FGS-FRG 19-6d).	Verify that dome shafts are secured so that neither water nor unauthorized persons may enter. (3)(4)(7)(8)(10)

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10-42. Signs must be placed at storage sites for combustible substances and actions must be taken to keep unauthorized persons out of the area (FGS-FRG 19-6e).	Verify that signs are placed at the entrance to storage sites for combustible substances that indicate that unauthorized access is not permitted. (3)(4)(7)(8)(10) Verify that the installation takes actions to keep unauthorized personnel out of such storage areas.
10-43. Existing USTs that are needed but are not in compliance with the requirements of FGS-FRG must be upgraded to meet those standard or be replaced (FGS-FRG 19-6f).	Determine whether the installation has existing USTs that are needed but are not in compliance with the requirements of FGS-FRG. (1)(2)(3)(4)(7)(8)(10) Verify that such USTs are upgraded or replaced. (NOTE: The phase-in period in Germany has passed.)
10-44. Existing POL USTs and piping must be properly closed if not needed (FGS-FRG 19-6g).	Verify that existing POL USTs and piping are properly closed if not needed. (1)(2)(3)(4)(7)(8)(10)
10-45. Installations must remove all leaking USTs from service and meet other requirements with respect to such tanks (FGS-FRG 19-6h).	Verify that leaking USTs are removed from service immediately. (1)(2)(3)(4)(7)(8)(10) Verify that soil and groundwater contaminated by the release are remediated. Verify that, if the UST is still needed, it is repaired or replaced. Verify that, if the UST is no longer required, it is removed from the ground.
10-46. Fuels personnel must be present for all inoculations of leak detection chemicals in BFMO-controlled bulk USTs (AFI 23-201, para A10.3).	Verify that fuels personnel are present for all inoculations of leak detection chemicals in BFMO-controlled bulk USTs. (3)

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10-47. Installations with a confirmed release from a UST should assemble information about the site and nature of the release (MP).	Verify that the following information is collected: (1)(3)(4)
	- data on the nature and estimated quantities of the release
	- data from available sources and/or site investigations concerning:
	  - surrounding population
	  - water quality
	  - use and approximate locations of wells potentially affected
	  - subsurface soil conditions
	  - locations of subsurface sewers
	  - climatological conditions
	  - land use
	- results of site check
	- results of free product investigation.

10-48. Installations with a confirmed release from a UST, where site investigations have indicated free product, should, to the maximum extent possible, remove the free product (MP).	Determine whether there are release sites where the presence of free product has been confirmed. (1)(3)(4)(6)(7)(8)(9)(10) Verify that free product is removed in such a way that the spread of contamination is minimized.
10-49. Installations must meet specific requirements with regard to USTs that have not been used for 1 yr or more (FGS-FGR 19-6i).	Verify that all of the product has been removed from such tanks. (1)(2)(3)(4)(7)(8)(10) Verify that the tank is either cleaned and filled with an inert substance (e.g., clean sand) or removed. Verify that tank wastes are tested to determine their composition and the proper method of disposal.
State-Specific Requirements **10-50.** USTs in Hessen are subject to inspection requirements (FGS-FRG 19-5g).	(NOTE: Parts 2 and 3 of Table 4-1 contain lists of substances that are water-endangering (i.e., harmful to water).) Determine whether the installation is located in Hessen. (1)(2)(3)(4)(7)(8)(10) Verify that USTs that store substances harmful to water are inspected every 2 yr. (NOTE: To the extent that these facilities are particularly dangerous because of the liquid stored, the storage site, the total amount stored, or for other reasons, the *Wasserschutzgebiet* requirements or permit may require more frequent inspection.)

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COMPLIANCE CATEGORY: STORAGE TANK MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
10-50. (continued)	Verify that such USTs and their auxiliary equipment are inspected by an expert before start up. Verify that, if such USTs are already in operation and have not been inspected, an inspection is carried out immediately. Verify that the inspector issues an inspection certificate for tanks located in water protection areas. Verify that USTs and their auxiliary equipment that do store water-endangering substances but are not located in water protection areas are inspected by a competent person at least every 5 yr. Verify that safety devices on all USTs and the tightness of the tanks and their connections to auxiliary equipment are checked at least once a year by a competent person.
10-51. USTs in Hessen that store substances harmful to water must meet specific requirements (FGS-FRG 19-4a(5)).	Determine whether the installation is located in Hessen. (1)(2) Verify that the installation ensures and documents that the following items, when procured, met the existing standards and required levels of technology and that appropriate inspections have taken place to ensure that they are still functioning properly: - visual and acoustic leak detectors - leak detectors and leak safety devices - linings or casings of nonmetallic materials - limit-value indicator (when using shut-off devices) - mass-produced collection devices - cathodic corrosion protection facilities - interior and exterior coatings. (NOTE: Documentation may consist of manufacturer certifications or specifications, certifications by qualified erectors/installers, inspection reports by competent individuals or organizations, etc.) Verify that containers [i.e., tanks] meet the following criteria: - double-walled steel containers with a leak detector that automatically indicates leaks in the inner and outer container will both visually and acoustically - single-walled steel containers with linings or casings that form a second container wall and have a leak detector that automatically indicates leaks in every container wall both visually and acoustically - single-walled steel containers with a collection room and a leak detector that automatically indicates leaks into the collection room both visually and acoustically

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COMPLIANCE CATEGORY: STORAGE TANK MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
10-51. (continued)	(NOTE: The collection room itself must be waterproof and resistant to the stored liquid. It must also be secured against the penetration of water from precipitation. This type of storage is not suited for flammable liquids of Group A, Danger Classes I and II, or Group B.) - dome shafts that are designed in such a way that any liquid entering them cannot leak out and that are not connected to drainage lines (NOTE: This requirement is waived if the container is filled only by using an automatic shutoff safety device, has a limit value indicator, and a fixed connection line.) - filling and removal points that are not located in a collection room or secured with an automatic shutoff device with a limit value indicator are designed in such a way that any leaking residual amounts or any dripping will be collected and disposed of in a nondetrimental manner - leak detectors and their auxiliary equipment are installed and activated only by qualified personnel - inspections (if required in the design permit) are carried out at the specified periods - a filling point constructed so that leaking substances may not get into surface waters, a sewage treatment plant, or the ground.
10-52. Installations in Hessen must comply with specific restrictions on USTs located in water protection areas (FGS-FRG 19-3a(4) and 19-3b(3)).	Determine whether the installation is located in a water protection area in Hessen. (1)(2) Verify that the installation complies with siting and size restrictions on USTs in water protection zones. (NOTE: Siting and size restrictions are normally included in the *Wasserschutzgebiet* requirements or in the facility's permit.) Verify that, if no siting or size restriction is included in the *Wasserschutzgebiet* requirements or in the facility's permit, no UST is constructed in the narrower zone (normally Zone I and Zone II) of a water protection area without first coordinating with the appropriate officials of Hessen. Verify that, if no siting or size restriction is included in the *Wasserschutzgebiet* requirements or in the facility's permit, no UST is constructed in the broader zone (normally, Zones IIIA and IIIB) of a water protection area without first coordinating with the appropriate officials of Hessen.

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COMPLIANCE CATEGORY: STORAGE TANK MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
10-53. USTs in Hessen that have been closed but not removed, and that are located in an areas where they may be moved by groundwater or floods must be anchored in addition to being filled with a substance (such as sand) that is not harmful to water (FGS-FRG 19-6L).	Verify that USTs in Hessen that have been closed but not removed, and that are located in an areas where they may be moved by groundwater or floods are anchored in addition to being filled with a substance (such as sand) that is not harmful to water. (1)(2)(3)(4)(5)(7)(8)(10)
10-54. USTs in water protection areas in Rheinland-Pfalz are subject to specific restrictions (FGS-FRG 19-3a(4) and 19-3b(3)).	Determine whether the installation is located in a water protection area in Rheinland-Pfalz. (1)(2) Verify that no UST is constructed in the narrower zone (normally, Zones I and II) of a water protection area. Verify that no UST in the broader zone (normally, Zones IIIA and IIIB) of a water protection area has a capacity greater than 40,000 L. Verify that the sum of the capacities of all the tanks at a facility in the broader zone of a water protection area is less than 40,000 L.
10-55. USTs in Rheinland-Pfalz that store substances harmful to water must meet specific requirements (FGS-FRG 19-4a(6)).	Determine whether the installation is located in Rheinland-Pfalz. (1)(2) (NOTE: Restrictions similar to those for such USTs in Hessen are normally included in the permit to construct or install such facilities in Rheinland-Pfalz.) Verify that the installation complies with any such permit restrictions. Verify that, if no permit has been issued, the installation coordinates with appropriate local authorities before USTs are constructed, installed, or modified.
10-56. USTs that store substances harmful to water in Rheinland-Pfalz are subject to inspection requirements (FGS-FRG 19-5h).	Determine whether the installation is located in Rheinland-Pfalz. (1)(2)(3)(4)(7)(8)(10) Verify that competent persons inspect facilities that have USTs that are used to store substances that are harmful to water. (NOTE: This requirement is waived if the liquid substance in the UST can be transferred only after warming.)

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COMPLIANCE CATEGORY: STORAGE TANK MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
HAZARDOUS WASTE TANK SYSTEMS	(NOTE: The requirements of this section apply to tanks used for storing or treating hazardous waste that have a capacity greater than 300 L (80 gal). Tanks with a capacity of 300 L or less will be treated as if they were containers such as drums or cans.)
10-57. The construction of hazardous waste tank facilities must be coordinated with appropriate German authorities in accordance with DOD and component policies and regulations (FGS-FRG 6-8b(1)).	Verify that the construction of hazardous waste tank facilities is coordinated with appropriate German authorities in accordance with DOD and component policies and regulations. (1)(2)(13)
10-58. If a permit is issued for the construction of a hazardous waste tank facility, it conditions must be met (FGS-FRG 6-8b(1)).	Determine whether a permit has been issued for the construction of a hazardous waste tank facility. (1)(2)(13) Verify that the installation meets the conditions of the permit.
10-59. The design of new tanks systems must be subjected to review by a competent authority (FGS-FRG 6-8b(2)).	Verify that, at a minimum, any new tank system's design is reviewed by a competent authority to ensure that the tank system has sufficient structural integrity and is acceptable for the storage or treatment of hazardous waste. (1)(2)(13) Verify that the assessment shows that the foundation, structural support, seams, connections, and pressure controls (if applicable) are adequately designed. Verify that the assessment shows that the tank system has sufficient structural strength, compatibility with the waste(s) to be stored or treated, and corrosion protection to ensure that it will not collapse, rupture, or fail. Verify that the assessment is given in writing and kept with the project file.
10-60. The filling apparatus for tanks must be supplied with a course substance filter for the separation of solid pollutants (FGS-FRG 6-8c).	Verify that the filling apparatus for tanks is supplied with a course substance filter for the separation of solid pollutants. (1)(2)(13)

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COMPLIANCE CATEGORY: STORAGE TANK MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
10-61. Tanks must be provided with specific security and control devices (FGS-FRG 6-8c).	Verify that tanks have the following security and control devices: (1)(2)(13) - level indicator - closeable access door or opening (situated above the permissible fill level in double-wall tanks) - temperature indicator, if the waste is temperature-sensitive - pressure indicator and security device with alarm, if the tank is not vented) - lightning protection system, if the tank contains a flammable or explosive waste - aeration and deaeration device, if the fumes from the stored waste could be hazardous - overfill protection with automatic shut-off and alarm.
10-62. All tanks used to store or treat hazardous waste must have secondary containment that meets specific requirements (FGS-FRG 6-8d).	Verify that all tanks used to store or treat hazardous waste have secondary containment. (1)(2)(13) Verify that the secondary containment is designed, installed, and operated so as to prevent any migration of wastes or accumulated liquid out of the system into the soil, groundwater, or surface water at any time during the use of the tank system. Verify that secondary containment allows the detection and collection of releases. Verify that secondary containment allows liquid to accumulate until it is removed. Verify that the secondary containment has a volume that will contain at least 10 percent of the liquid volume of all stored packages and moveable vessels and at least 100 percent of the volume of the largest liquid-containing vessel. Verify that storage is so configured that a leak from a single tank may not find its way into another storage area. Verify that single-walled tanks are set up in collecting basins that will not allow the mixing of different types of hazardous wastes in the event of a leak. Verify that such basins are sufficiently far apart to ensure that in the event of a leak there is no fire or safety risk. (NOTE: The provisions of this checklist item do not apply to: - tank systems used to store or treat hazardous wastes that contain no free liquids and are situated inside a building with an impermeable floor - tank systems, including sumps, that serve as part of a secondary containment system to collect or contain releases of hazardous wastes.)

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COMPLIANCE CATEGORY: STORAGE TANK MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
10-63. Tank ancillary equipment should also be provided with secondary containment (MP).	Verify that ancillary equipment has secondary containment. (1)(2)(13) (NOTE: The following equipment is exempted from this MP: - aboveground piping that is visually inspected for leaks on a daily basis - welded flanges, welded joints, and welded connections that are visually inspected for leaks on a daily basis - sealless or magnetic coupling pumps and sealless valves that are visually inspected for leaks on a daily basis - pressurized aboveground piping systems with automatic shutoff valves that are visually inspected for leaks on a daily basis.)
10-64. Tanks used for hazardous waste treatment or storage must be operated in accordance with specific procedures (FGS-FRG 6-8e(1)).	Verify that hazardous wastes or treatment reagents are not placed in tanks if they could cause the tank system (including ancillary equipment or containment system) to rupture, leak, corrode, or otherwise fail. (1)(2)(13)
10-65. Tank systems for ignitable, reactive, or incompatible wastes should meet specific requirements (MP).	Verify that ignitable or reactive wastes are not placed in a tank system unless one of the following conditions is met: (1)(2)(13) - the waste is treated, rendered, or mixed before or immediately after placement in the tank system so that it is no longer reactive or ignitable, and the minimum requirements for reactive and ignitable wastes are met - the waste is treated or stored in such a way that it is protected from any material or conditions that may cause the waste to ignite or react - the tank system is used solely for emergencies. Verify that the installation maintains minimum protective distances between waste management areas and any public ways, streets, alleys, or an adjoining property line that can be built upon, as required in Tables 2-1 through 2-6 of the National Fire Protection Association's *Flammable and Combustible Liquids Code* (NFPA 30). Verify that, unless minimum safety requirements are met, incompatible wastes, or incompatible wastes and materials, are not placed in the same tank system. Verify that, unless minimum safety requirements are met, hazardous waste is not placed in a tank system that: - previously held an incompatible waste or material - has not been decontaminated.

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COMPLIANCE CATEGORY: STORAGE TANK MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
10-66. Installations must conduct and log inspections of tank systems and associated equipment (FGS-FRG 6-8e(2) and 6-8e(3)).	Verify that the installation conducts and logs inspections of hazardous waste ASTs once each operating day: (1)(2)(13) - the surface of the tank, to detect signs of corrosion or release waste - the secondary containment system, for evidence of damage or leaks - data gathered from monitoring devices or gauges. (NOTE: The inspections may be logged in the HWSA log; there is no need to keep a separate log for inspections of hazardous waste ASTs.) Verify that all cathodic protection systems are inspected to ensure that they are functioning properly. Verify that the proper operation of cathodic protection systems is confirmed within 6 mo after initial installation and annually thereafter. Verify that all sources of impressed current are inspected and/or tested every other month. Verify that the installation manager documents all tank system inspections.
10-67. Installations must meet specific requirements with regard to tank systems or secondary containment systems from which there has been a leak or spill, or that are unfit for use (FGS-FRG 6-8f).	Verify that such systems are immediately removed from service and repaired or closed. (1)(2)(13) (NOTE: The above requirement is taken from OEBGD Chapter 6, Section 8, Criterion 6, which does not appear to have been included in FGS-FRG.) Verify that the installation also takes the following steps: - stops the flow of hazardous waste to the tank or containment system - inspects systems to determine the cause of the release - contains the visible releases to the environment - immediately inspects the release and, based on that inspection, prevents further migration of the leak or spill to soils or surface water - removes and properly disposes of any contamination of the soil and surface water.
10-68. Installations must follow specific procedures when closing a tank system (FGS-FRG 6-8g).	Determine whether the installation has closed any tank systems. (1)(2)(13) Verify that all waste residues and contaminated containment system components, soils, structures, and equipment have been removed or decontaminated to the extent practicable.

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Table 10-1

Some Criteria for Construction, Maintenance, and Operation of POL Storage Facilities and Pipelines

(FGS-FRG Table 9-1)

DIN #	German Title	English Title
DIN 4043	Heizolsperren, Heizolabscheider - Baugrundsatze, Einbau, Betrieb, Prufung	Heating oil barriers, heating oil cutoffs, building principles, installation, operation, examination
DIN 4119 Teil 1	Oberirdische zylinderische Flachboden - Tankbauwerke aus metallischen Werkstoffen; Grundlagen, Ausfuhrung, Prufungen	Aboveground cylindrical plain ground - tanks made of metallic substances; principles, realization, examinations
DIN 4149 Teil 1	Bautenindeutschen Erdbelbengebieten - Lastannahmen, Messung und Ausfuhrung ublicher Hochbauten	Building in German earthquake areas - loading assumption, measuring, and realization of normal multistore building
DIN 4736 Teil 1	Olversorgungsanlagen fur Olbrenner; Bauelemente, Olforderaggregate, Steuer - und Sicherheitseinrichtungen Olversorgungsbehalter, sicherheitstechnische Anforderungen und Prufung	Oil supply facilities for oil burners; building elements, oil pump aggregates, control and securing devices, oil supplying vessels, security technical requirements, and examinations
DIN 4736 Teil 2	Olversorgungsanlagen fur Olbrenner; Bauelemente, Armaturen, Leitungen, Filter, Zahler, sicherheitstechnische Anforderungen und Prufung	Oil supply facilities for oil burners; building elements, instruments, pipelines, filter, counter, security technical requirements, and examinations
DIN 4737	(z. Z. Entwurf) Olregler fur Verdampfungsbrenner; Funktion, sicherheitstechnische Anforderungen und Prufung	Oil control unit for vaporization burners; function, security technical requirements, and examination
DIN 4755 Teil 1	Olfeuerungsanlagen; Olfeuerungen in Heizungsanlagen, sicherheitstechnische Anforderungen	Oil firing plants; oil firings in heating plants, security, technical requirements
DIN 4755 Teil 2	Olfeuerungsanlagen; Heizol-Versorgung, Heizol-Versorgungsanlagen, sicherheitstechnische Anforderungen, Prufung	Oil firing plants; heating oil supply, heating oil supplying plants, security, technical requirements, examinations
DIN 4798 Teil 1	Schlauchleitungen; Schlauchleitungen fur Heizol EL, Anforderungen, Prufung	Hose lines; hose lines for heating oil EL, requirements, examinations
DIN 6600	Behalter (Tanks) aus metallischen Werkstoffen fur die Lagerung brennbarer Flussigkeiten - Begriffe, Anwendungsbereich, Guteuberwachung	Vessels (tanks) made of metallic substances for the storage of combustible liquids - terms, range area, supervision of the quality

(continued)

Table 10-1 (continued)

DIN #	German Title	English Title
DIN 6608 Teil 1	Liegende Behalter (Tanks) aus Stahl, einwandig, fur unterirdische Lagerung brennbarer Flussigkeiten	Lying vessels (tanks) made of steel, one-walled, for underground storage of combustible liquids
DIN 6608 Teil 2	Liegende Behalter (Tanks) aus Stahl, doppelwandig, fur unterirdische Lagerung brennbarer Flussigkeiten	Lying vessels (tanks) made of steel, double -walled, for underground storage of combustible liquids
DIN 6616	Liegende Behalter (Tanks) aus Stahl, einwandig und doppelwandig, fur oberirdische Lagerung brennbarer Flussigkeiten	Lying vessels (tanks) made of steel, one-walled and double-walled, for aboveground storage of combustible liquids
DIN 6618 Teil 1	Stehende Behalter (Tanks) aus Stahl, einwandig, fur oberirdische Lagerung brennbarer Flussigkeiten	Standing vessels (tanks) made of steel, one-walled, for aboveground storage of combustible liquids
DIN 6618 Teil 2	Stehende Behalter (Tanks) aus Stahl, doppelwandig, ohne Leckanzeigeflussigkeit, fur oberirdische Lagerung brennbarer Flussigkeiten	Standing vessels (tanks) made of steel, double-walled, without leak indication liquid, for aboveground storage
DIN 6618 Teil 3	Stehende Behalter (Tanks) aus Stahl, doppelwandig, mit Leckanzeigeflussigkeit, fur oberirdische Lagerung brennbarer Flussigkeiten	Standing vessels (tanks) made of steel, double-walled, with leak indication liquid, for aboveground storage of combustible liquids
DIN 6618 Teil 4	Stehende Behalter (Tanks) aus Stahl, doppelwandig, ohne Leckanzeigeflussigkeit, mit aussenliegender Vakuum-Saugleitung, fur oberirdische Lagerrung brennharer Flussigkeiten	Standing vessels (tanks) made of steel, double-walled, without leak indication liquid, with outside lying vacuum suction pipeline, for aboveground storage of combustible liquids
DIN 6619 Teil 1	Stehende Behalter (Tanks) aus Stahl, einwandig, fur unterirdische Lagerung brennbarer Flussigkeiten	Standing vessels (tanks) made of steel, one-walled, for undergound storage of combustible liquids
DIN 6619 Teil 2	Stehende Behalter (Tanks) aus Stahl, doppelwandig, fur unterirdische Lagerung brennbarer Flussigkeiten	Standing vessels (tanks) made of steel, double-walled, for underground storage of combustible liquids
DIN 6620 Teil 1	Batteriebehalter (Tanks) aus Stahl, fur oberirdische Lagerung brennbarer Flussigkeiten der Gefahrenklasse A III; Behalter	Battery vessels (tanks) made of steel, for aboveground storage of combustible liquids of the dangerous class A III; vessels
DIN 6620 Teil 2	Batteriebehalter (Tanks) aus Stahl, fur oberirdische Lagerung brennbarer Flussigkeiten der Gefahrenklasse A III; Verbindungsrohrleitungen	Battery vessels (tanks) made of steel, for aboveground storage of combustible liquids of the dangerous class A III, connection pipelines

(continued)

Table 10-1 (continued)

DIN #	German Title	English Title
DIN 6622 Teil 1	Haushaltsbehalter aus Stahl, 620 I Volumen, fur oberirdische Lagerung von Heizol	Domestic vessels made of steel, 620-liter volume, for aboveground storage of heating oil
DIN 6622 Teil 2	Haushaltsbehalter aus Stahl, 1000 I Volumen, fur oberirdische Lagerung von Heizol	Domestic vessels made of steel, 1000-liter volume, for aboveground storage of heating oil
DIN 6622 Teil 3	Haushaltsbehalter (Tanks) aus Stahl fur oberirdische Lagerung von Heizol - Auffangwanne	Domestic vessels (tanks) made of steel, for aboveground storage of heating oil - collection basin
DIN 6623 Teil 1	Stehende Behalter (Tanks) aus Stahl, mit weniger als 1000 I Volumen, fur oberirdische Lagerung brennbarer Flussigkeiten, einwandig	Standing vessels (tanks) made of steel, with less than 1000-liter volume, for aboveground storage of combustible liquids, one-walled
DIN 6623 Teil 2	Stehende Behalter (Tanks) aus Stahl, mit weniger als 1000 I Volumen, fur oberirdische Lagerung brennbarer Flussigkeiten, doppelwandig	Standing vessels (tanks) made of steel, with less than 1000-liter volume, for aboveground storage of combustible liquids, double-walled
DIN 6624 Teil 1	Stehende Behalter (Tanks) aus Stahl, von 1000 bis 5000 I Volumen, einwandig, fur oberirdische Lagerung brennbarer Flussigkeiten der Gefahrenklasse A III	Standing vessels (tanks) made of steel, from 1000- to 5000-liter volume, one-walled, for aboveground storage of combustible liquids of the dangerous class A III
DIN 6624 Teil 2	Liegende Behalter (Tanks) aus Stahl, doppelwandig, fur oberirdische Lagerung brennbarer Flussigkeiten der Gefahrenklasse A III	Lying vessels (tanks) made of steel, double -walled, for aboveground storage of combustible liquids of the dangerous class A III
DIN 6625 Teil 1	Standortgefertigte Behalter (Tanks) aus Stahl, fur oberirdische Lagerung von Heizol und Dieselkraftstoff; Bau-und Prufgrundsatze	Vessels (tanks) made of steel at the determined place/site, for aboveground storage of heating oil and diesel fuel; calculation
DIN 6626	Domschachte aus Stahl fur Behalter zur unterirdischen Lagerung brennbarer Flussigkeiten	Dome shafts made of steel for vessels serving as underground storage for combustible liquids
DIN 6627	Domschachtkragen und gemauerte Domschachte fur Behalter zur unterirdischen Lagerung brennbarer Flussigkeiten	Dome shaft collars and walled dome shafts for vessels serving as underground storage for combustible liquids
RAL-RG 998	Gutebestimmungen fur unterirdische und oberirdische Lagerbehalter	Quality determinations for underground and aboveground storage vessels
RAL-RG 616	Gutebestimmungen fur standortgefertigte Tanks	Quality determinations for tanks made on site.

(continued)

Table 10-1 (continued)

DIN #	German Title	English Title
ZOV-Richtlinien	Richtlinien fur die Installation von zentralen Heizolversorgungsanlagen in Gebauden und Grundstucken (Herausgegeben vom Fachverband Heiz- und Kochgerate - Industrie, Frankfurt)	Guidelines for the installation of central heating oil supplying plants in buildings and estates (published by "Fachverband Heiz- und Kochgerate - Industrie, Frankfurt")
DIN 1626 Teil 2, 3, 4	Geschweisste kreisfoermige Rohre aus unlegierten Staehlen fuer besondere Anforderungen; Technische Lieferbedingungen	Welded circular pipelines made of unalloyed steels for special requirements; technical delivery (shipment) conditions.
DIN 1629 Teil 2, 3, 4	Nahtlose kreisfoermige Rohre aus unlegierten Staehlen fuer besondere Anforderungen; Technische Lieferbedingungen	Seamless circular pipelines made of unalloyed steels for special requirements; technical delivery (shipment) conditions
DIN 2413 Teil 1	Stahlrohre, Berechnung der Wanddicke von Stahlrohren gegen Innendruck	Steel pipes, calculation of the wall thickness of steel pipes against inner pressure
DIN 2413 Teil 2	Berechnung der Wanddicke von Rohrbogen gegen Innendruck	Calculation of the wall thickness of tube bends against inner pressure
DIN 2448	Nahtlose Stahlrohre; Masze, laengenbezogene Massen	Seamless steel pipes; measures, length related measures
DIN 2449	Nahtlose Stahlrohre aus ST 00; Masze und Anwendungsbereich	Seamless steel pipes from ST 00; measures and application range
DIN 2450	Nahtlose Stahlrohre aus ST 35; Masze und Anwendungsbereich	Seamless steel pipes from ST 35; measures and application range
DIN 2605	Rohrbogen zum Einschweissen; Stahlrohre	Pipe bends for welding; steel pipes
DIN 2606	Rohrbogen aus Stahl zum Einschweissen; Bauart 5d	Pipe bends made of steel for welding; type 5d
DIN 2615	Stahlfittings zum Einschweissen; T	Steel fittings for welding; T
DIN 3230 Teil 6	Technische Lieferbedingungen fuer Armaturen; Armaturen fuer brennbare Fluessigkeiten; Anforderungen und Pruefungen	Technical delivery conditions for instruments/fittings; instruments/fittings for combustible liquids; requirements and examinations
DIN 3535 Teil 4	Zrueckgezogen und ersetzt durch DIN 3535 Teil 6 im April 1994	Was withdrawn and replaced by DIN 3535 Teil 6 in April 1994
DIN 3535 Teil 6	Dichtungen fuer die Gasversorgung, Flachdichtungswerkstoffe auf Basis synthetischer Fasern oder Graphit, fuer Gasarmatueren, Gasgeraete und Gasleitungen	Seals for gas supply, flat gasket materials on the basis of synthetic fibers or graphite for gas instruments/fittings; gas devices and gas pipes
DIN 8560	Zurueckgezogen und ersetzt durch die europaeische DIN-Norm DIN EN 287	Was withdrawn and replaced by the European norm DIN EN 287

(continued)

Table 10-1 (continued)

DIN #	German Title	English Title
DIN EN 287	Pruefung von Schweissern, Schmelzschweissern, Staehle	Examination of welding apparatus, fusion welding apparatus, steels
DIN 8564	Schweissen im Rohrleitungsbau, Rohrleitungen aus Stahl, Herstellung und Schweissnahtpruefung	Welding in pipeline construction, pipelines made of steel, construction manufacturer
DIN 17 172	Stahlrohre fuer Fernleitungen fuer brennbare Fluessigkeiten und Gase; Technische Lieferbedingungen	Steel pipes for long-distance pipelines for combustible liquids and gases; technical delivery (shipment) conditions
DIN 17 175	Nahtlose Rohre aus warmfesten Staehlen; Technische Lieferbedingungen	Seamless pipes made of high-temperature resistant steels; technical delivery (shipment) conditions
DIN 17 177	Elektrisch pressgeschweisste Rohre aus warmfesten Staehlen; Technische Lieferbedingungen	Electrical pressure-welded pipes made of high-temperature resistant steels; technical delivery (shipment) conditions
DIN 17 440	Nichtrostende Staehle; Guetevorschriften	Stainless steel (rust-resisting)
DIN 19 630	Richtlinien fuer den Bau von Wasserrohrleitungen; Technische Regeln der DVGW (Deutscher Verband fuer Gas- und Wasserversorgung)	Guidelines for the constructing of water pipelines; technical regulations of the DVGW (German Federation of Gas and Water Supply)
DIN 30 670	Umhuellung von Stahlrohren und Formstuecken mit Polyethylen	Coatings of steel pipes and fittings (adapting pieces) with polyethylene (PE)
DIN 30 671	Umhuellung (Aussendichtung) von erdverlegten Stahlrohren mit Duroplasten	Coatings (outer/external protective deposit) of underground steel pipes with thermosetting plastics
DIN 30 672	Umhuellungen aus korrosionsschutzbinden und waermeschrumpfendem Material fuer Rohrleitungen, fuer Dauerbetriebstemperature in bis 50 Grad Celcius	Coatings made of corrosion-resistant bands and thermal contracting materials for pipelines with a continuous operation temperature up to 50 C
DIN 30 673	Umhuellungen und Auskleidung von Stahlrohren, Formstuecken und Behaeltern mit Bitumen	Coating and lining of steel pipes, fittings (adapting pieces) and vessels with bitumen
DIN 50 049	Metallische Erzeugnisse; Arten und Pruefbescheinigungen; deutsche Fassung der europaeischen Norm DIN EN 10 204	Metal products, types/kinds of examination certificates, German version of the European Norm EN 10 204
VDE 0303 Teil 2	Preuefungen von Isolierstoffen, Durchschlagspannung und Durchschlagfestigkeit bei technischen Frequenzen	Examination of isolating materials, breakdown voltage, and breakdown strength for technical frequencies

(NOTE: Information about the DIN-norms is obtainable from the "Deutsches Institut für Normung (DIN)" in Berlin, tel. 030 - 26010. DIN-norm leafs can be ordered from the "BEUTH-Verlag Gmbh", Berlin, tel. 030-26012260.)

INSTALLATION:	COMPLIANCE CATEGORY: STORAGE TANK MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		

SECTION 11

TOXIC SUBSTANCES MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 11

TOXIC SUBSTANCES MANAGEMENT

A. Applicability of this Section

This section applies to all U.S. Air Force (USAF) installations overseas; it is written in response to regulations and policy that are applicable to the conduct of activities that involve specific programs and is used to determine the compliance status of the management activities associated with:

- Polychlorinated Biphenyls and/or Polychlorinated Terphenyls (PCB/Ts) and in-service and out-of-service PCB/T Items
- asbestos in schools and on the installation
- the AF Radon Assessment and Mitigation Program (RAMP)
- Lead-Based Paint (LBP).

The regulatory requirements in this section are based on the *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Department of Defense (DOD) regulations, and Air Force Instructions (AFIs) that apply at overseas installations. Management practices (MPs) are derived from U.S. Environmental Protection Agency (USEPA) regulations that are not mandatory overseas but are important to follow to preserve the health and safety of AF employees and protect the environment.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 14, discusses the actions and controls needed to abate threats to human health and the environment from the handling, use, storage, and disposal of PCB/Ts. Chapter 15 addresses similar issues for asbestos, and Chapter 16 outlines the criteria for assessing and mitigating radon.

C. U.S. Air Force Documents

PCBs

- There are no AFIs on PCB/Ts; FGS-FRG addresses issues previously covered by various policy letters.

- HQ USAF/CE Letter, *Air Force Policy on Measuring Air Force PCB-Free Status - Action Memorandum*, 21 March 1994, revises how the Air Force's PCB-free status is measured. Instead of measuring the number of PCB items rendered PCB-free, the new metric is the number of installations that are PCB-free based on data in the PCB Module of the Work Information Management System - Environmental Subsystem (WIMS-ES).

Asbestos

- AFI 32-1052, *Facility Asbestos Management*, 22 March 1994, establishes requirements and assigns responsibilities to incorporate facility asbestos management principles and practices into all AF programs.

- Air Force Occupational Safety and Health (AFOSH) Standard 161-4, *Exposure to Asbestos*, January 1980, also contains information on asbestos requirements and control.

Radon

- There are no AFIs on radon; FGS-FRG is the source for all radon-related checklist items in this manual.

LBP

- HQ USAF Policy Letter, *Air Force Policy and Guidance on Lead-Based Paint (LBP) in Facilities*, 24 May 1993, specifies actions necessary to protect facility occupants and workers and the environment from hazardous exposure to lead in LBPs. Table 11-1 summarizes the likelihood of LBP being present and the regulations/guidelines that normally must be followed.

D. Responsibility for Compliance

PCB/Ts

- The Base Civil Engineer (BCE), through the Exterior Electrical Shop or the Base Environmental Coordinator, is responsible for identifying, inspecting, marking (labeling), and properly servicing PCB/T electrical equipment (transformers and capacitors).

- The Base Environmental Coordinator (BEC) is responsible for ensuring that out-of-service items are located in a technically adequate PCB storage facility. Normally, such facilities are located at a Defense Reutilization and Marketing Office (DRMO), and the DRMO is responsible for storage, disposal transportation, and contracting for disposal.

- The Bioenvironmental Engineering Services (BES) is responsible for arranging chemical analytical support in screening electrical equipment for PCB/Ts and for cleanup verification.

Asbestos

- The BCE appoints an Asbestos Program Officer to prepare the Asbestos Management Plan and an Asbestos Operations Officer to prepare the Asbestos Operating Plan. The BCE ensures a sufficient number of in-house technicians and supervisors are trained and equipped to remove, repair, and control asbestos-containing materials (ACMs).

- The Asbestos Program Officer prepares the Asbestos Management Plan, that contains documentation on all asbestos management efforts and the mechanism for oversight of the program.

- The Asbestos Operations Officer prepares and implements the Asbestos Operating Plan.

- The BES takes air samples, evaluates friable materials for the preservation of asbestos, and assigns Risk Assessment Codes (RACs).

Radon

- The BCE is responsible for reviewing radon assessments planning and programming and for instituting radon mitigation for existing and future facility projects.

- The BES is responsible for sampling radon gas levels at installation offices, housing, day care facilities, etc. The BES provides these sample results to the BCE. The BES is also responsible for mitigation.

LBP

- The BCE participates in developing and implementing the management plan for identifying, evaluating, managing, and abating LBP. Additionally, the BCE trains personnel and maintains records of activities.

- The Chief, Aerospace Medicine ensures a coordinated epidemiological analysis of facility lead sampling results and sees to it that positive pediatric lead analysis is accomplished.

- The BES conducts testing and sampling of paint to determine the lead content. The BES participates in inspections and training activities as well.

E. Definitions

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Asbestos* - a generic term used to describe six distinctive varieties of fibrous mineral silicates, including chrysotile, amosite, crocidolite, tremolite asbestos, anthophylite asbestos, actinolite asbestos, and any other of these materials that have been chemically treated and/or altered (FGS-FRG, Appendix A).

- *Asbestos-Containing Material (ACM)* - any material containing more than 0.02 percent asbestos by weight. In Germany, ACM is classified as carcinogenic when the asbestos can occur as a fine dust during handling, as follows (FGS-FRG, Appendix A):
  1. if the mass concentration of asbestos is greater than or equal to 2.00 percent, Group I - extremely hazardous
  2. less than 2.00 percent but greater than or equal to 0.20 percent, Group II - very hazardous
  3. less than 0.20 percent but greater than or equal to 0.02 percent, Group III - hazardous.

- *Asbestos-Containing Product* - any product that contains ACM (FGS-FRG, Appendix A).

- *Asbestos Dust* - minute particles of asbestos or ACM that do not meet the requirements necessary for classification as asbestos fibers (FGS-FRG, Appendix A).

- *Asbestos Fibers* - fibers with a length greater than 5 microns, a diameter less than 3 microns, the length-to-diameter ratio (aspect ratio) of which is at least 3 to 1 (based on FGS-FRG 15-6a(1)).

- *Capacitor* - a device for accumulating and holding a charge of electricity and consisting of conducting surfaces separated by a dielectric (FGS-FRG, Appendix A).

- *Chemical Waste Dump* - a facility where hazardous wastes are disposed of by subsurface burial or internment (*sic*) (FGS-FRG, Appendix A).

- *Chemical Waste Landfill* - a landfill at which a high level of protection against risk of injury to human health or the environment from migration of deposited hazardous wastes to land, water, or the atmosphere is provided by incorporating special methods for locating, engineering, and operating the landfill (FGS-FRG, Appendix A).

- *Competent* - an agency, authority, individual, official, person, etc., who meets any of the following criteria: (FGS-FRG, Appendix A)
    1. specifically designated as competent by FGS-FRG
    2. specifically designated as competent by the authority of a German government [agency]
    3. specifically designated as competent by or meets the qualifications of competency of a recognized German trade organization or association
    4. based on experience, training, and/or authority granted per DOD/component policy or regulations, judged by the responsible commander to be a capable and appropriated organization/ individual to accomplish the task in question.

- *Demolition Activities* - with respect to asbestos, activities that include the removal of insulation and construction materials during demolition, dismantling, etc. (FGS-FRG, Appendix A).

- *Detailed Radon Testing* - a comprehensive testing program for radon (FGS-FRG, Appendix A).

- *Employer* - as used with respect to asbestos, the organization and its responsible person who has hired the employee. For example, the employer for workers in a unit motor pool is the unit and its commander, for workers in an installation facilities engineer shop, it is the installation and its commander, for workers in an Army/Air Force Exchange Service (AAFES) facility, it is AAFES and its manager(s), and for a contractor's workers, it is the contractor (FGS-FRG, Appendix A).

- *Friable Asbestos* - any material containing more than 1 percent asbestos that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure, or any ACM with a density less than 1000 kg/m^3 (FGS-FRG, Appendix A).

- *High-Priority Facilities* - with respect to LBP, facilities or portions of facilities that are or may be frequented/used by children under age seven, which are further prioritized as follows (USAF/CC Policy Letter, 24 May 1993, *AF Guidance on LBP in Facilities*, Section 5a):

    1. child development centers, annexes, and playground equipment
    2. onbase AF licensed family day care homes
    3. youth centers, recreational facilities, and playgrounds
    4. waiting areas in medical and dental treatment centers
    5. AF-maintained DOD schools
    6. military family housing (MFH) currently occupied by families with children under age 7
    7. remaining MFH.

- *In or Near Commercial Buildings* - within the interior of, on the roof of, attached to the exterior wall of, in the parking area serving, or within 30 m [≈98 ft] of a nonindustrial, nonsubstation building (OEBGD, Chapter 14, Definitions).

- *Incinerator* - any of the following: (FGS-FRG, Appendix A)
  1. any furnace used in the process of burning solid or liquid waste for the purpose of reducing the volume of the waste by removing combustible matter, including equipment with heat recovery systems for either hot water or steam generation
  2. an engineered device using controlled flame combustion to thermally degrade hazardous substances such as PCBs.

- *Initial Radon Screening* - short-term radon testing in a statistically representative sample of selected high priority facilities (family housing, child development centers, schools, dormitories, etc.). The purpose of initial screening is to identify installations having high radon levels (FGS-FRG, Appendix A).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Large-Scale Activities* - with respect to asbestos, activities in which large areas of buildings or parts of buildings are remediated (e.g., the removal of sprayed-on asbestos from roof supports, walls, or ceilings (FGS-FRG, Appendix A).

- *Leak or Leaking* - any instance in which an article, container, or piece of equipment has an opening, no matter the size, that has allowed the unintentional release of any of its contained substance(s) (FGS-FRG, Appendix A).

- *Maintenance Activities* - with respect to asbestos, activities that include the inspection, upkeep, and repair of buildings, machines, and equipment (FGS-FRG, Appendix A).

- *Management Practice (MP)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *Mitigation* - for radon, actions taken to reduce radon levels in facilities having radon levels higher than 4 pCi/L [148 Bq/m^3] as identified during detailed radon testing (FGS-FRG, Appendix A).

- *Non-PCB/T Contaminated Item* - an item that is not composed of, does not contain, or does not have on its surface any substance that has 50 mg/kg (50 ppm) or more of polychlorinated biphenyl and/or polychlorinated terphenyl (FGS-FRG, Appendix A).

- *PCB/T Contaminated Item* - an item that is composed of, contains, or has on its surface a substance that has 50 mg/kg (50 ppm) or more of PCB/T (FGS-FRG, Appendix A).

- *Permissible Exposure Limit (PEL)* - an airborne concentration of 0.2 of an asbestos fiber per cubic centimeter (f/cc) as an 8-h time-weighted average (FGS-FRG, Appendix A).

- *Post-Mitigation Monitoring* - follow-up radon testing in facilities where mitigation has been completed. The purpose of post-mitigation monitoring is to ensure that mitigation actions were effective in reducing radon levels below 4 pCi/L [148 Bq/m^3] (FGS-FRG, Appendix A).

- *Radon* - a naturally occurring, odorless, colorless, inert radioactive gas that is formed from the radioactive decay of uranium (FGS-FRG, Appendix A).

- *Remediation Activities* - with respect to asbestos, activities that include the removal or reduction of ACM and, if necessary, their replacement with asbestos-free materials, as well as strengthening and encapsulation or spatial enclosure (FGS-FRG, Appendix A).

- *Restricted Access Area* - areas where access by unauthorized personnel is controlled by fences, other man-made structures, or naturally-occurring barriers such as mountains, cliffs, or rough terrain (Overseas Environmental Baseline Guidance Document (OEBGD), Chapter 14, Definitions).

- *State* - the political subdivision referred to as *Land* in Germany (FGS-FRG, Appendix A).

- *Substantial Contact Area* - an area that is subject to public access on a routine basis or which could result in substantial dermal contact by employees (OEBGD, Chapter 14, Definitions).

- *Technical Value Concentration (Technische Richtkonzentrationen (TRK))* - a German standard for the permissible concentrations of a hazardous substance in the air (FGS-FRG, Appendix A).

- *Threshold Limit Value (TLV)* - a U.S. standard limiting the concentration of chemical substances, physical agents, and biological indices established by the American Conference of Governmental Industrial Hygienists (NOTE: FGS-FRG incorrectly designates these values as Threshold Value Limits (TVLs); this error has been corrected tacitly here every time it occurred) (FGS-FRG, Appendix A).

- *Trigger Threshold* - with respect to asbestos, the concentration which, when exceeded, calls for additional measures for health protection. The trigger threshold is exceeded when the asbestos concentration limit is exceeded. Permanent and safe maintenance of an asbestos concentration below the limit is assumed when measurements of the average concentration of the shift(s) are less than 25 percent of the asbestos concentration limit (i.e., 0.0625 f/cc) (FGS-FRG 15-6(a)(5)).

TOXIC SUBSTANCES MANAGEMENT

GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
PCB Management		
All Installations	11-1 through 11-3	(1)(2)(11)
General	11-4 and 11-5	(1)(3)
PCB/T Records	11-6 through 11-10	(1)(2)(3)
All PCB/T-Contaminated Items	11-11 through 11-14	(1)(2)(3)
PCB/T-Contaminated Transformers	11-15 through 11-21	(1)(3)
Other PCB/T-Contaminated Items	11-22 through 11-24	(1)(3)
PCB/T Spills	11-25 through 11-27	(1)(2)(3)
Inspections	11-28 through 11-32	(1)(3)
PCB/T Storage	11-33 through 11-36	(1)(3)
PCB/T Disposal	11-37 through 11-44	(1)(3)(4)
Asbestos Management		
All Installations	11-45 through 11-47	(1)(11)
General	11-48 through 11-58	(1)(2)(9)(10)
Workplace Requirements	11-59 through 11-80	(1)(2)(5)(6)(9)(10)
Abatement Requirements	11-81 through 11-103	(1)(2)(5)(6)(7)(9)(10)

(a) CONTACT/LOCATION CODE:

(1) BCE (Environmental Planning)
(2) BES (Bioenvironmental Engineering Services)
(3) BCE (Exterior Electric Shop)
(4) DRMO (Defense Reutilization and Marketing Office)
(5) BCE (Contract Programmer)
(6) BCE (Contract Management)
(7) BCE (Chief of Operations and Maintenance)
(8) School Principal
(9) Asbestos Program Officer
(10) Asbestos Operating Officer
(11) SJA (Staff Judge Advocate)
(12) Base Safety Officer
(13) PAO (Public Affairs Officer)

(continued)

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
Asbestos Management (continued)		
Asbestos in Schools	11-104	(8)(9)
Radon Management		
All Installations	11-105 through 11-116	(1)(2)(11)
Lead-Based Paint (LBP)		
All Installations	11-117 through 11-126	(1)(2)

(a) **CONTACT/LOCATION CODE:**

(1) BCE (Environmental Planning)
(2) BES (Bioenvironmental Engineering Services)
(3) BCE (Exterior Electric Shop)
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(5) BCE (Contract Programmer)
(6) BCE (Contract Management)
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(11) SJA (Staff Judge Advocate)
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(13) PAO (Public Affairs Officer)

TOXIC SUBSTANCES MANAGEMENT

Records To Review

- Inspection, storage, maintenance, and disposal records for PCB/Ts and PCB/T Items
- PCB/T Equipment inventory and sampling results
- Asbestos management plan
- Asbestos survey documentation
- Documentation of asbestos sampling and analytical results
- Documentation of preventive measure or action
- Results of air sampling at the conclusion of response action
- Records of asbestos training program
- List of buildings insulated with asbestos or housing ACMs
- Record of demolition or renovation projects completed in the past 5 yr that involve friable asbestos
- Records of radon tests
- LBP Hazard Abatement Plan

Physical Features To Inspect

- PCB/T storage areas
- Equipment, fluids, and other items, used or stored at the facility, that contain PCB/Ts
- Pipe, spray-on, duct, and troweled cementitious insulation, and boiler lagging
- Ceiling and floor pipes

People To Interview

- BCE (Environmental Planning)
- BES (Bioenvironmental Engineering Services)
- BCE (Exterior Electric Shop)
- DRMO (Defense Reutilization and Marketing Office)
- BCE (Contract Programmer)
- BCE (Contract Management)
- BCE (Chief of Operations and Maintenance)
- School Principal
- Asbestos Program Officer
- Asbestos Operating Officer
- (SJA) Staff Judge Advocate
- Base Safety Officer
- (PAO) Public Affairs Officer

COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
PCB/T MANAGEMENT	(NOTE: The requirements of this section of the *Toxic Substances Management* protocol apply to items or substances that contain trichlorinated and more highly chlorinated biphenyls and polychlorinated terphenyls.) (NOTE: An item is considered to be PCB/T-contaminated if it, a substance in it, or a substance on it, has 50 mg/kg (50 ppm) or more of PCB/T. Items that are suspected to be contaminated with PCB/T are treated as such until proven otherwise.)
All Installations	
11-1. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (1)(11) (NOTE: Among the relevant documents is HQ USAF/CE Letter, *Air Force Policy on Measuring Air Force PCB-Free Status - Action Memorandum,* 21 March 1994.)
11-2. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether new regulations concerning PCBs have been issued since the finalization of the manual. (1)(11) Verify that the installation is in compliance with newly issued regulations.
11-3. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to PCB/T management. (1)(11) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Exterior Electric Shop) (4) DRMO (Defense Reutilization and Marketing Office) (5) BCE (Contract Programmer) (6) BCE (Contract Management) (7) BCE (Chief of Operations and Maintenance) (8) School Principal (9) Asbestos Program Officer (10) Asbestos Operating Officer (11) Base Staff Judge Advocate (12) Base Safety Officer (13) PAO (Public Affairs Officer)

COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
General	
11-4. PCB/T-contaminated items (see definition) and rooms, vaults, or storage rooms that contain them must be marked in English and German (FGS-FRG 14-6a).	Verify that PCB-contaminated items and rooms, vaults, or storage rooms that contain them are prominently marked in English and German. (1)(3) Verify that the items or areas are identified as containing PCB/Ts. Verify that there is a warning against improper handling and disposal. Verify that a phone number is provided for use in the event of spills or questions about disposal.
11-5. Items, rooms, vaults, and storage areas that contain more than 5 L of PCB-contaminated liquid must bear warning signs that meet specific criteria (FGS-FRG 14-6b).	Verify that items, rooms, vaults, and storage areas that contain more than 5 L of PCB-contaminated liquid bear warning signs that have the letters "PCB". (1)(3) Verify that the sign is either yellow white and has black letters and a black border. Verify that the letters are 80 mm high and 15 mm wide. (NOTE: These requirements also apply if several products, based on their physical proximity, form one group with a total content of more than 5 L of liquid that contains PCB/Ts.)
PCB Records	
11-6. Certain installations should prepare written annual document logs by 1 July of each calendar year (MP).	Determine whether at any time the installation uses or stores any of the following: (1)(3) - more than 45 kg [99.4 lb] of PCBs in PCB Containers - PCB Transformers with concentrations of 50 ppm or greater - one or more large PCB capacitors of high or low-voltage. Verify that, by 1 January of each calendar year, the installation prepares a written annual log that covers the previous year. Verify that the written annual document log addresses the following: - identification of facility - calendar year covered - manifest number for every manifest generated - total number (by type) of PCB Articles, PCB Article Containers, and PCB Containers placed into storage for disposal or disposed of during the calendar year

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Exterior Electric Shop) (4) DRMO (Defense Reutilization and Marketing Office) (5) BCE (Contract Programmer) (6) BCE (Contract Management) (7) BCE (Chief of Operations and Maintenance) (8) School Principal (9) Asbestos Program Officer (10) Asbestos Operating Officer (11) Base Staff Judge Advocate (12) Base Safety Officer (13) PAO (Public Affairs Officer)

COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**

11-6. (continued)	- total weight placed into storage for disposal or disposed of during the calendar year of:
	  - PCBs in PCB Articles
	  - contents of PCB Article Container
	  - contents of PCB Containers
	  - bulk PCB waste
	- a list of PCBs and PCB Items remaining in service at the end of the calendar year
	- the total weight of any PCBs and PCB Items in containers including identification of container contents and the total number of PCB Transformers, PCB large capacitors of high- and low-voltage, and the total weight of PCBs in PCB Transformers
	- a record of each telephone call or other form of verification to confirm the receipt of PCB waste transported by independent transport.
	
	Verify that the annual document log contains the following for each manifest, for each unmanifested waste, and for any PCBs or PCB Items received from or shipped from another facility owned or operated by the generator:
	
	- date removed from service for disposal (first date material placed in PCB Container)
	- date placed into transport for offsite storage/disposal
	- date of disposal (if known)
	- weight of PCB wastes
	  - total bulk PCB wastes
	  - total in each article (PCB Transformers or capacitors)
	  - total in each container (PCB Containers)
	  - total weight of contents and of the PCB Article (in kilograms) in each PCB Article Container
	- serial number or other unique identification number (except for bulk wastes)
	- description of the contents of PCB Containers and article containers.
	
	Verify that the following information is provided in the annual record:
	
	- all signed manifests generated or received at the facility during the calendar year
	- all certificates of disposal that have been generated or received during the calendar year.
	
	Verify that the annual document log and annual records (manifests, certificates of disposal) are kept for at least 5 yr after the facility stops using or storing PCBs and PCB Items in the listed quantities.

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Exterior Electric Shop) (4) DRMO (Defense Reutilization and Marketing Office) (5) BCE (Contract Programmer) (6) BCE (Contract Management) (7) BCE (Chief of Operations and Maintenance) (8) School Principal (9) Asbestos Program Officer (10) Asbestos Operating Officer (11) Base Staff Judge Advocate (12) Base Safety Officer (13) PAO (Public Affairs Officer)

COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-7. Installations with PCB/T-contaminated items must maintain a written inventory of those items (FGS-FRG 14-7).	Verify that the installation maintains a written inventory of PCB/T-contaminated items. (1)(3) Verify that the inventory contains a current list, by type, of all PCB/T-contaminated items in use, placed into storage for disposal, or disposed of for that year.
11-8. All required periodic inspections must be documented at the installation (FGS-FRG 14-8).	Verify that all required periodic inspections are documented at the installation. (1)(3)
11-9. Installations must retain records of inspections and maintenance histories for 3 yr after disposal of a PCB/T-contaminated item (FGS-FRG 14-8).	Determine whether the installation has disposed of any PCB/T-contaminated items. (1)(3) Verify that records of inspections and maintenance histories are retained for at least 3 yr after the disposal of a PCB/T-contaminated item.
11-10. Installations must document PCB/T testing (FGS-FRG 14-8).	Verify that PCB/T testing is documented in accordance with Table 11-2. (1)(2)(3)
All PCB/T-Contaminated Items	
11-11. No PCB/T-contaminated item may remain in use after 31 December 1999 (FGS-FRG 14-3).	Verify that no PCB/T-contaminated item remains in use after 31 December 1999. (1)(3)
11-12. When PCB items are removed from service, they must be marked with the removal date (FGS-FRG 14-6c).	Determine whether the installation is storing any PCB items that have been removed from service. (1)(3) Verify that all PCB items removed from service are marked with the date on which they were removed from service.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-13. Installations meet specific criteria with respect to the use and maintenance of PCB/T-contaminated items (FGS-FRG 14-3a through 14-3e).	Verify that the installation does not return PCB/T-contaminated items to service after they have been taken out of operation. (1)(3) Verify that the installation does not refill a PCB/T-contaminated transformer more than once. Verify that PCB/T-contaminated transformers are refilled only with oil that does not contain PCB/T. Verify that the one-time refilling of a PCB/T-contaminated transformer takes place only if both the following conditions are met: - the concentration of PCB/T in the oil to be exchanged does not exceed 2000 mg/kg - the PCB/T concentration after refilling will be less than 50 mg/kg after operating for 6 mo. (NOTE: Experience has shown that this action is seldom successful if the PCB/T concentration of the original oil exceeded 1000 mg/kg. Where the concentration is above that level, it is usually cheaper to replace the transformer rather than to try to change its classification.) Verify that no PCB/T-contaminated items from one accommodation are transferred to another and used. (NOTE: Transformers may be temporarily transported to another location for the purposes of maintenance or refilling.) (NOTE: The mixing of identical substances, preparations, or products is permitted as long as they are not used in refilling products that contain PCB/T.) (NOTE: Actions taken for the purposes of proper waste disposal are also permitted.)
11-14. Testing for PCB/Ts must be conducted in accordance with specific requirements (FGS-FRG 14-4).	Verify that tests for PCB/Ts are conducted in accordance with Table 11-2. (1)(2)(3)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
PCB/T-Contaminated Transformers	
11-15. PCB/T-contaminated transformers that are in use or in storage for reuse may not be used in any application that poses a risk of contamination to food or feed (FGS-FRG 14-10).	Verify that no PCB/T-contaminated transformer that is in use or in storage for reuse poses a risk of contamination to food or feed. (1)(3)
11-16. Installations must comply with specific prohibitions on the reuse of PCB/T-contaminated transformers (FGS-FRG 14-12).	Verify that PCB/T-contaminated transformers that have been removed from operation for purposes other than maintenance or refilling are not returned to operation. (1)(3) Verify that the installation never substitutes a PCB/T-contaminated transformer for one that has a lower level of PCB/T contamination. Verify that no PCB/T-contaminated transformer is moved from one accommodation for use at another.
11-17. Certain PCB/T-contaminated transformers must be equipped with electrical protection (FGS-FRG 14-13).	Verify that PCB/T-contaminated transformers that are used in or near commercial buildings or located in sidewalk vaults have electrical protection to minimize transformer failure that would result in the release of PCB/Ts. (1)(3)
11-18. PCB/T-contaminated transformers must be registered with the fire department (FGS-FRG 14-11).	Verify that all PCB/T-contaminated transformers, including those in storage for reuse, are registered with the fire department. (1)(3) (NOTE: It would be useful to provide the following information: - physical location of PCB/T-contaminated transformer(s) - principle constituent of dielectric fluid (i.e., PCB/Ts, mineral oil, silicone oil, etc.) - name and telephone number of contact person knowledgeable about PCB/T-contaminated transformer(s).)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-19. Combustible materials should not be stored near PCB/T-contaminated transformers (MP).	Verify that all combustible materials have been removed from areas within PCB/T-contaminated transformer enclosures (i.e., vaults or partitioned areas) and from areas within 5 m (16 ft) of PCB/T-contaminated transformers or their enclosures. (1)(3) (NOTE: Combustible materials include, but are not limited to, paints, solvents, plastics, paper, and scrap wood.)
11-20. PCB/T-contaminated transformers must be serviced properly (FGS-FRG 14-15).	Verify that servicing activities are properly conducted as follows: (1)(3) - any dielectric fluid used will contain less than 50 mg/kg PCB/T - the transformer coil is not removed during servicing - PCB/Ts removed during servicing are captured and either reused or disposed of properly. (NOTE: The service envisioned here is for maintenance purposes only and does not affect the classification of the transformer as PCB/T-contaminated. It should not be confused with the one-time refilling of a transformer permitted above, where the purpose is to convert the classification to non-PCB/T-contaminated.)
11-21. Installations must take specific actions if a PCB/T-contaminated transformer is involved in a fire (FGS-FRG 14-12).	Verify that, if a PCB/T-contaminated transformer is involved in a fire and subjected to sufficient heat and/or pressure that might result in violent or nonviolent rupture, measures are taken to control water runoff. (1)(3) (NOTE: Blocking floor drains is one way to control water runoff.) Verify that runoff water is tested and treated if required.
Other PCB/T-Contaminated Items	
11-22. Installations must not use capacitors that contain more than 1 L of PCB/T-contaminated liquid (FGS-FRG 14-17).	Verify that no capacitors that contain more than 1 L of PCB/T-contaminated liquid are in use on the installation. (1)(3)
11-23. Installations must comply with restrictions on the use of capacitors that contain 1 L or less of PCB/T-contaminated liquid (FGS-FRG 14-18).	Verify that capacitors that contain 1 L or less of PCB/T-contaminated liquid are used or stored for reuse only if such storage or use does not pose an exposure risk to food or feed. (1)(3)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-24. Installations must service electromagnets, switches, and voltage regulators that may contain PCB/Ts at any concentration in accordance with specific standards (FGS-FRG 14-19).	Verify that PCB/T-contaminated electrical equipment is serviced only with dielectric fluid that contains less than 50 mg/kg PCB/T. (1)(3) Verify that the installation does not service any electromagnets, switches, or voltage regulators that contain PCB/T for which it is necessary to remove and rework any internal components as part of service. Verify that PCB/Ts removed during servicing are captured and disposed of properly.
PCB/T Spills	
11-25. Installations must address PCB/Ts in their spill contingency plan (FGS-FRG 14-9 and 14-20f).	Determine whether the installation has any PCB/T-contaminated items. (1)(3) Verify that PCB/T-contaminated items are addressed in the spill contingency plan. (NOTE: This requirement also applies to PCB/T-contaminated items in temporary storage.) Determine whether PCB/T storage facilities are located where they are at risk from seismic activity, floods, or other natural events. Verify that the installation's spill contingency plan addresses such storage facilities directly. Verify that the installation's spill contingency plan directly addresses the response and cleanup actions required under FGS-FRG 14-9b (see immediately below). (NOTE: See Section 8, *Petroleum, Oil, and Lubricant (POL) Management,* for further details on the contents of the spill contingency plan).
11-26. Spills of PCB/T-contaminated liquids at concentrations of 50 mg/kg or greater must be responded to immediately and cleaned up according to specific standards (FGS-FRG 14-9b).	Verify that the installation responds immediately to spills of PCB/T-contaminated liquids at concentrations of 50 mg/kg or greater. (1)(2)(3) Verify that leaking PCB/T fluid is caught by appropriate containment and not allowed to contaminate the area further. Verify that surfaces located in substantial contact areas are cleaned to 10 µg per 100 cm^2 [15.5 $in.^2$]. Verify that surfaces in all other contact areas are cleaned to 100 µg per 100 cm^2 [15.5 $in.^2$]. Verify that contaminated soil located in restricted access areas is removed until the soil tests no higher than 25 mg/kg PCB/T. Verify that the area is then backfilled with clean soil containing less than 1 mg/kg PCB/T.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-26. (continued)	Verify that contaminated soil located in unrestricted access areas is removed to a minimum depth of 25 cm (10 in.) or until the soil tests no higher than 10 mg/kg PCB/T, whichever is deeper. Verify that the area is then backfilled with clean soil containing less than 1 mg/kg PCB/T.
11-27. Installations should clean up spills in accordance with good practice (MP).	Determine whether any of the following types of spills have occurred: (1)(2)(3) - high-concentration spills - low-concentration spills involving 0.45 kg (1 lb) or more of PCB/Ts by weight - spills of 1023 L (270 gal) or more of untested mineral oil. Verify that the following actions are taken within 24 h of discovering the spill: - the area of the spill is cordoned off or otherwise identified to include the area with visible traces of the spill and a 2-ft [0.6 m] buffer zone - clearly visible signs are placed advising people to avoid the area - the area of visible contamination is recorded and documented, identifying the extent and center of the spill - cleanup of visible traces of the fluid from hard surfaces is initiated - removal of all visible traces of the spill on soil and other media, such as gravel, sand, etc., is started. (NOTE: If there are no visible traces, the area of the spill may be estimated.) Verify that, if the spill occurs in an outdoor substation: - contaminated solid surfaces are cleaned to a PCB/T concentration of 100 µg/cm^2 [0.16 in.^{2}] (as measured by standard wipe tests) - soil contaminated by the spill is cleaned to either 25 ppm PCB/T by weight or 50 ppm PCB - postcleanup samples are collected. (NOTE: The installation may choose the level to which cleanup is conducted if notice is placed in the area to indicate the level of cleanup.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-27. (continued)	Verify that, if the spill occurs in a restricted access area other than an outdoor substation: - high-contact solid surfaces are cleaned to 10 μg per 100 cm^2 [15.5 $in.^2$] (as measured by standard wipe tests) - low-contact, indoor, impervious solid surfaces are decontaminated to 10 μg per 100 cm^2 [15.5 $in.^2$] - low-contact, indoor, nonimpervious surfaces are cleaned to either 10 or 100 μg per 100 cm^2 [15.5 $in.^2$] and encapsulated at the option of the installation - low-contact, outdoor surfaces (both impervious and nonimpervious) are cleaned to 100 μg per 100 cm^2 [15.5 $in.^2$] - soil contaminated by the spill is cleaned to 25 ppm PCB by weight - postcleanup samples are collected. Verify that spills in nonrestricted access locations are decontaminated as follows: - furnishings, toys, and other easily replaceable household items are disposed of and replaced - indoor solid surfaces and high-contact, outdoor solid surfaces are cleaned to 10 μg per 100 cm^2 [15.50 $in.^2$] (as measured by standard wipe tests) - indoor vault areas and low-contact, outdoor, impervious solid surfaces are decontaminated to 10 μg per 100 cm^2 [15.50 $in.^2$] - at the option of the installation, low-contact, outdoor, nonimpervious solid surfaces are cleaned to either 10 or 100 μg per 100 cm^2 [15.50 $in.^2$] and encapsulated - soil is decontaminated to 10 ppm PCB by weight provided that the soil is excavated to a minimum depth of 25 cm or 10 in. and replaced with clean soil - postcleanup samples are collected. Verify that records documenting all cleanup and decontamination are maintained for 5 yr. (NOTE: Neither the occurrence/discovery of the spill on the weekend nor overtime costs are considered acceptable reasons for delaying response.) (NOTE: The final numerical cleanup standards do not apply to spills directly into surface waters, drinking water, sewers, grazing lands, and vegetable gardens.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
Inspections	
11-28. Installations must inspect PCB/T-contaminated transformers (FGS-FRG 14-16).	Verify that PCB/T-contaminated transformers are inspected at least once every 3 mo. (1)(3) Verify that the following are inspected at least every 12 mo: - PCB/T-contaminated transformers with impervious, undrained secondary containment capacities of 100 percent of dielectric fluid - PCB/T-contaminated transformers that have been tested and found to contain less than 60,000 mg/kg PCB/Ts. (NOTE: It would be useful to record the following information as part of each PCB transformer inspection: - location of transformer - dates of each visual inspection - date when any leak was discovered - name of person conducting inspection - location and estimate of the quantity of any leaks - data and description of any cleanup, containment, or repair performed - results of any daily inspections of transformers with uncorrected active leaks.)
11-29. Leaking PCB/T-contaminated items that cannot be immediately repaired or replaced must be inspected daily (FGS-FRG 14-9a).	Verify that the installation inspects leaking PCB/T-contaminated items that cannot be immediately repaired or replaced daily. (1)(3)
11-30. PCB/T-contaminated items placed temporarily in storage areas that do not comply with applicable requirements must be inspected weekly (FGS-FRG 14-21).	Verify that the installation carries out weekly inspections of all PCB/T-contaminated items placed temporarily in storage areas that do not comply with applicable FGS requirements. (1)(3)
11-31. Installations must inspect PCB/T-contaminated items stored on pallets or raised platforms next to storage areas on a weekly basis (FGS-FRG 14-22).	Verify that the installation carries out weekly inspections of all PCB/T-contaminated items stored on pallets or raised platforms next to storage areas. (1)(3)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-32. Installations must inspect all other PCB/T storage areas than the above at least monthly (FGS-FRG 14-23).	Verify that all storage areas other than those above are inspected monthly. (1)(3)
PCB/T Storage	
11-33. The installation's PCB/T storage must comply with the provisions of Section 3, *Hazardous Materials Management*, on (FGS-FRG 14-5).	Verify that the installation's PCB/T storage complies with the requirements of Section 3, *Hazardous Materials Management.* (1)(3) (NOTE: Findings written against requirements in Section 3, *Hazardous Materials Management* should use the criterion and the citation of this checklist item and also include the checklist item number and citation from Section 3 in the comments portion of the finding sheet.)
11-34. Installations must meet specific requirements with regard to the location of PCB/T storage areas (FGS-FRG 14-20e and 14-20f).	Verify that no PCB/T storage area is located in a water protection zone. (1)(3) Verify that, to the maximum extent possible, a new PCB/T storage area is located to minimize the risk of release because of seismic activity, floods, or other natural events.
11-35. PCB/Ts and PCB/T-contaminated items that are to be stored before disposal must be stored in a facility that will ensure the containment of PCB/Ts (FGS-FRG 14-20a through 14-20d and 14-20f).	Verify that PCB/T storage areas meet the following requirements: (1)(3) - the roof and walls of the building exclude rainfall - a 15 cm (6 in.) containment berm surrounds the entire area in which PCB/Ts or PCB/T-contaminated items are stored - berming provides effective containment for twice the internal volume of the largest PCB/T-contaminated item or 25 percent of the total internal volume of all PCB PCB/T-contaminated items stored, whichever is greater - drains, valves, floor drains, expansion joints, sewer lines, or other openings are constructed to prevent an release from the bermed area - floors are constructed of continuous, smooth, and impervious material. (NOTE: The following items may be stored for up to 30 days from the date of removal from service in areas that do not meet the above requirements, if the items are appropriately marked: - nonleaking PCB/T-contaminated items - leaking PCB/T-contaminated items placed in a nonleaking PCB/T container that contains sufficient absorbent material to absorb fluid contained in the PCB/T-contaminated items - PCB/T containers in which nonliquid PCB/Ts have been placed.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-35. (continued)	(NOTE: Nonleaking and structurally undamaged large, high-voltage PCB/T capacitors and PCB/T-contaminated electric equipment that have not been drained of free-flowing dielectric fluid may be stored on pallets or raised platforms next to a storage area that meets the requirements above.)
11-36. Containers used for the storage of PCB/Ts must be at least as secure as those conforming with the Defense Traffic Management Regulations (FGS-FRG 14-24).	Verify that containers used for the storage of PCB/Ts are at least as secure as those that conform to the Defense Traffic Management Regulation. (1)(3)
PCB/T Disposal	
11-37. The installation's PCB/T disposal must comply with the provisions of Section 4, *Hazardous Waste Management* (FGS-FRG 14-5).	Verify that the installation's PCB/T disposal complies with the requirements of Section 4, *Hazardous Waste Management.* (1)(3) (NOTE: Findings written against requirements in Section 4, *Hazardous Waste Management* should use the criterion and the citation of this checklist item and also include the checklist item number and citation from Section 4 in the comments portion of the finding sheet.)
11-38. Installations must return DOD-generated PCB/Ts manufactured in the United States to the Continental United States (CONUS) for delivery to a permitted disposal facility under certain conditions (FGS-FRG 14-29a).	Determine whether disposal of DOD-generated PCB/Ts manufactured in the United States in a German-licensed disposal facility is not possible, is prohibited, or will not be managed in an environmentally sound manner. (1)(3) Verify that the installation returns DOD-generated PCB/Ts manufactured in the United States to the CONUS for delivery to a permitted disposal facility in the above circumstances.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-39. Installations must meet specific requirements with regard to DOD-generated PCB/T manufactured in a country other than the United States that cannot be disposed of in Germany for any reason (FGS-FRG 14-29b).	Determine whether the installation has attempted to dispose of DOD-generated PCB/T manufactured in a country other than the United States and been unable to dispose of them in Germany for any reason. (1)(3) Verify that the Executive Agent has been informed of the situation. Verify that such PCB/T wastes are properly stored until a method of ultimate disposal can be arranged.
11-40. Installations that generate PCB/T waste of 50 mg/kg or greater must maintain an audit trail for the waste (FGS-FRG 14-25).	Verify that the installation maintains an audit trail at least as stringent as the audit trail required for hazardous waste. (1)(3)
11-41. Installations must dispose of PCB/T-contaminated items through the DRMO only (FGS-FRG 14-26a).	Verify that all PCB/T-contaminated items are disposed of through the servicing DRMO. (1)(3)(4)(5)(6) (NOTE: This requirement does not apply if the component has authorized another means of disposal.)
11-42. DRMOs must ensure that any facility used for the disposal of PCB/T-contaminated waste meets specific requirements (FGS-FRG 14-26c).	Verify that DRMO ensures that any facility used for the disposal of PCB/T-contaminated waste meets the standards for incinerators and/or chemical dumps in checklist items 11-43 and 11-44. (4) Verify that a record of the analysis done is kept on file at each DRMO that uses the facility.
11-43. PCB/T-contaminated items may be disposed of in Germany only in licensed/permitted facilities that meet specific requirements (FGS-FRG 14-26b, 14-26c, and 14-28).	Verify that the installation ensures that disposal of PCB/T-contaminated items in Germany occurs by either of the following means only: (1)(3)(4) - by incineration in licensed facilities that have completed all their operational tests successfully - in permitted chemical dumps authorized to dispose of PCB/Ts. (NOTE: As long as there is a reasonable expectation that these facilities will operate in accordance with their license/permit, there is no requirement to witness the disposal.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-43. (continued)	(NOTE: A chemical dump may be assumed to meet all standards if the facility is specifically permitted by the German government to handle PCB/Ts.) Verify that, if DRMO is not used, the organization in charge of the disposal keeps on file a record of the analysis done.
11-44. Incinerators for the disposal of PCB/T-contaminated items must meet specific standards (FGS-FRG 14-27).	Verify that incinerators for the disposal of PCB/T-contaminated fluid or items are as protective of the environment as one which operates in the following manner: (3)(4) - the combustion criteria require maintenance of the introduced liquids for a 2 s dwell time at 1200 ° C, ± 100 °C (2200 °F, ± 212 °F), and 3 percent excess O_2 in the stack gas or maintenance of the introduced liquids for a 1.5 s dwell time at 1600 °C, ± 100 °C (3050 °F, ± 212 °F) and 2 percent excess O_2 in the stack gas - combustion efficiency is maintained at no less than 99.9 percent - the rate and quantity of PCB/Ts that are fed to the combustion system are measured and recorded at regular intervals of not more than 15 min - the temperature of the incineration process is continuously measured and recorded - the flow of PCBs to the incinerator stops automatically if temperature criteria are not met - O_2 and CO are monitored continuously during incineration - carbon dioxide is monitored periodically during incineration. (NOTE: Incinerators that are more protective of the environment may be used.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
ASBESTOS MANAGEMENT **All Installations**	
11-45. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (1)(11) (NOTE: Among the relevant documents are the following: - AFI 32-1052, *Facility Asbestos Management,* 22 March 1994 - AFOSH Standard 161-4, *Exposure to Asbestos,* January 1980.)
11-46. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether new regulations concerning asbestos management have been issued since the finalization of the manual. (1)(11) Verify that the installation is in compliance with newly issued regulations.
11-47. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to asbestos management. (1)(11) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
General	
11-48. Installations must appoint an asbestos program manager (FGS-FRG 15-3).	Verify that the installation has an asbestos program manager who serves as the single point of contact for all asbestos-related activities. (1)(9)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-49. Installations must prepare and implement a written asbestos management plan that meets specific minimum requirements (FGS-FRG 15-4 and AFI 32-1052, paras 2.4 and 5).	Verify that the installation has prepared and implemented a written asbestos management plan. (1)(9)(10) Verify that, at a minimum, the plan addresses the following: - a notification and education program to tell workers, tenants, and building occupants where potentially friable ACM is located and how and why to avoid disturbing it - regular ACM surveillance to note, assess, and document any changes in the ACM's condition - work control/permit systems to control activities which might disturb ACM - operations and maintenance (O&M) work practices to avoid or minimize fiber release during activities affecting ACM - recordkeeping to document O&M activities related to asbestos identification, management, and abatement - medical and respiratory protection programs, as applicable - training for the asbestos program manager and custodial and maintenance staff - procedures to assess and prioritize identified hazards for abatement. (NOTE: According to AFI 32-1052, para 5, the objective of the asbestos management plan is to maintain a permanent record of the current status and condition of all asbestos containing material in an installation's facility inventory.) (NOTE: Since an installation cannot know the current status of all ACM in its facility inventory without conducting an asbestos survey, this FGS requirement is understood to necessitate the carrying out of such a survey. If the installation has not conducted a full-blown asbestos survey, a major finding to that effect will be written using this checklist item.)
11-50. Installations must have a written asbestos operating plan that meets specific minimum requirements (AFI 32-1052, paras 2.4 and 6).	Verify that the installation has prepared and implemented an asbestos operating plan. (1)(9)(10) Verify that the operating plan: - assigns responsibilities - establishes inspection and repair capabilities - provides repair procedures and personnel protection instructions - explains applicable USEPA and Occupational Safety and Health Administration (OSHA) rules, Air Force Policy Directive (AFPD) 32-70, and AFI 91-301.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-50. (continued)	Verify that the operating plan addresses: - the organizational structure for carrying out asbestos-related work - personnel training programs - equipment and supply requirements - identification of worker manuals or other written procedures - yearly budget estimates - procedures for interim control measures and extraordinary precautions - procedures for asbestos certification and asbestos disposition statements on programming documents - requirements for a special response team and in-house inspection capability - contractor requirements to perform analytical work and asbestos abatement.
11-51. Installations must repair or remove damaged ACM and monitor friable ACM (AFI 32-1052, para 2.1 and 2.3).	Verify that damaged ACM is removed or repaired. (1)(9)(10) Verify that friable asbestos is routinely inspected by reviewing inspection logs. (NOTE: Damaged ACM is presumed to be hazardous because of its potential to release airborne asbestos fibers.)
11-52. Friable materials that may be contaminated with asbestos should be tested (MP).	Verify that friable materials that are suspected of being contaminated are tested when located in areas where workers might be exposed. (1)(9)(10)
11-53. Installations must include complete removal of ACM in planning operations and maintenance and military construction program facility projects (AFI 32-1052, para 2.2.3).	Verify that the installation includes complete removal of ACM in planning operations and maintenance and military construction program facility projects, when safety and budgetary considerations permit. (1)(9)(10)
11-54. Installations must remove existing ACM at opportune times during minor construction or repairs (AFI 32-1052, para 2.2.4).	Verify that the installation removes existing ACM at opportune times during minor construction or repairs. (1)(9)(10) (NOTE: This can be verified by reviewing written documentation in the installation's Asbestos Management Plan.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-55. Because products that contain asbestos are considered hazardous materials in Germany, installations must meet specific responsibilities (FGS-FRG 15-5a(1) through 15-5a(7)).	Verify that the employer (see definition) assesses the hazards associated with the handling of ACMs to determine the protective measures that must be taken. (1)(2)(9)(10) Verify that hazards are assessed and protective measures are taken prior to undertaking any activity that involves ACMs. Verify that, if there is doubt as to whether a material contains asbestos, the employer has an analysis performed. Verify that, during remediation and maintenance activities, the employer investigates whether asbestos-free products are available before reinstalling ACM. (NOTE: A source for identifying asbestos-free products is *The Determination of Substitutes for Asbestos-containing Products Available on the Market - Catalogue of Asbestos Replacement Substances (Asbestersatzstoff-Katalog).* Verify that, if there is uncertainty as to the hazards posed by the handling of ACMs, the employer obtains information on the risks and appropriate measures to counter them. (NOTE: The manufacturer or the importer is required to provide such information.) Verify that, if there is any reason to suspect that asbestos may be present in the workplace as dust or fibers, samples are taken to ascertain whether the concentration is a danger to health or the environment. Verify that, in addition, the concentration of other hazardous substances in the air is ascertained and evaluated to determine the protective measures that must be taken. (NOTE: See Section 1, *Air Emissions Management*, for other substances of concern.) Verify that work areas where ACMs are handled and the presence of asbestos fibers cannot be ruled out are partitioned off from other areas and, to the extent technically possible, are sealed off dust-tight. Verify that only authorized personnel enter such partitioned-off areas. Verify that such areas are marked with signs that read as follows: HALT, ZUTRITT VERBOTEN - ASBESTFASERN STOP, ENTRANCE PROHIBITED - ASBESTOS FIBERS. Verify that employees who handle ACM are briefed on the operating procedures to be followed before starting the job and at least once a year thereafter.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-55. (continued)	Verify that the training includes the following: - asbestos handling practices - potential hazards - proper use of personal protective equipment (PPE) - emergency response - disposal practices - relevant information on the ACMs. (NOTE: The information sheet *Asbeststaub - Wie man sich vor möglichen Gesundheitsgefahren schutzen kann* (Asbestos -- How to Protect Yourself against Possible Health Hazards) may be furnished and explained to the employees as part of this training.) Verify that friable ACMs are stored and transported in suitable closed containers. Verify that all rooms, facilities, and equipment used for activities dealing with ACM are regularly cleaned and maintained. Verify that every effort is made to reduce to a minimum the number of people who may be exposed to asbestos or asbestos-containing dust. Verify that materials with fibrous structures, preparations with more than 0.1 percent asbestos, and products that contain these materials are not purchased or sold. (NOTE: An exception is made for replacement parts that contain chrysotile, if asbestos-free substitutes are not available. Diaphragms for electrolysis purposes that contain chrysotile may be used until 31 December 1999. The restriction on sales does not apply to naturally-occurring raw materials that contain less than 0.1 percent free asbestos fibers.)
11-56. In addition to the requirements in the above checklist item, installations must comply with the applicable requirements of Section 3, *Hazardous Materials Management*, in dealing with ACM (FGS-FRG 15-5a).	Verify that, in addition to the requirements in the above checklist item, the installation complies with the applicable requirements of Section 3, *Hazardous Materials Management*, in dealing with ACM. (1)(2)(9)(10) (NOTE: Findings written against requirements in Section 3, *Hazardous Materials Management* should use the criterion and the citation of this checklist item and also include the checklist item number and citation from Section 3 in the comments portion of the finding sheet.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-57. Because waste that contains ACM is considered hazardous waste in Germany, installations must meet specific responsibilities (FGS-FRG 15-5b(1) through 15-5b(8)).	Verify that, in addition to the requirements under this checklist item, the installation complies with the applicable requirements of Section 4, *Hazardous Waste Management*, in dealing with waste that contains ACM. (1)(2)(9)(10) (NOTE: Findings written against requirements in Section 4, *Hazardous Waste Management* should use the criterion and the citation of this checklist item and also include the checklist item number and citation from Section 4 in the comments portion of the finding sheet.) Verify that asbestos-containing wastes are handled, stored, and deposited only in facilities that are permitted for that purpose. Verify that the installation does not operate a facility for the disposal of asbestos wastes. Verify that all hazardous wastes, including asbestos, go to a permitted German disposal facility in accordance with the requirements of Section 4, *Hazardous Waste Management.* Verify that the generation of dust is prevented in the course of waste disposal by using the best available technology. (NOTE: Examples of the best available technology include: - vacuuming with an appropriate asbestos filter system - binding - wetting). Verify that asbestos dust is bound with a binder material (e.g., cement). Verify that asbestos-containing waste is collected at the workplace in appropriate containers and in such a manner that repacking is not required. Verify that, if asbestos-containing waste must be stored temporarily, it is kept moist and covered or stored in closed containers. Verify that containers for asbestos waste are marked and sealed (closed). Verify that the markings include the following (in German): ASBESTOS-CONTAINING WASTE NOXIOUS FINE DUST MAY BE DEVELOPED IF IMPROPERLY HANDLED CONTAINER AND CONTENTS MUST BE DISPOSED OF SAFELY. Verify that the containers are also labeled in English as follows: DANGER - CONTAINS ASBESTOS FIBERS AVOID CREATING DUST CANCER AND LUNG DISEASE HAZARD.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-57. (continued)	Verify that asbestos is handled carefully when being placed into containers, onto pallets, and onto the loading area of a transport vehicle. Verify that waste is never thrown or shaken. Verify that asbestos waste is protected during loading and transport so that no asbestos dust is released. Verify that the material to be transported is moistened if necessary. Verify that, if contractors are used to collect or transport waste that contains asbestos, they are authorized (licensed/permitted) by German authorities to do so. Verify that waste that contains asbestos is delivered to a hazardous waste disposal facility only if a certificate from the operator of that waste disposal facility is available that states that the operator agrees to accept such wastes. Verify that, if the installation has waste that contains ACMs collected or transported, or if it operates a facility where such wastes are generated, the installation maintains records for each waste disposal indicating the following: - the type of waste - the quantity - disposal information. Verify that permanent records documenting the disposal action are maintained.
11-58. Installations must ensure that certain asbestos concentrations are not exceeded in the workplace (FGS-FRG 15-6a(2) through 15-6a(4) and 15-6b).	Verify that the following asbestos concentrations are not exceeded in the workplace: (1)(2)(9)(10) - for chrysotile: 0.25 f/cc - for asbestos-containing fine dust: 2.0 mg/m^3. (NOTE: The asbestos concentration limits for other forms of asbestos have not been established, but it is recommended that an asbestos concentration of 0.25 f/cc be used; in addition, action should be taken, to include the wearing of protective clothing, if the area fiber count exceeds 15,000 f/m^3. In any case, efforts must be taken to minimize concentrations within the technical means available.) (NOTE: The analytical determination of chrysotile fibers is performed using the Raster Electron Microscope (REM) method per ZN 1/120.31. If there is doubt as to the type and quantity of asbestos fibers, an electron microscope scanning in accordance with ZH 1/120.46 can be used.) Verify that emissions of fine asbestos dust from any source do not exceed 0.1 mg/m^3 at a mass flow of 0.5 g/h. (NOTE: The restrictions on emissions of fine dust apply to all six types of asbestos.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-58. (continued)	(NOTE: Analytical results from comparable activities can be used as part of the evaluation for the analysis of the work area if all of the following conditions are met: - the employer is in possession of the documentation - the employer's work procedures are comparable - the work procedures are established in the work plan or in the operating instructions.)
Workplace Requirements	
11-59. Employers must establish operating procedures for handling ACM and publish instructions that meet specific requirements (FGS-FRG 15-7a, 15-7b, 15-7d, and 15-7e).	Verify that employers establish operating procedures that minimize the dangers posed to humans and the environment when handling ACMs. (1)(9)(10) Verify that the employer publishes instructions that describe the above operating procedures, required protective measures, and rules of conduct. Verify that these instructions contain information on actions to be taken in the event of an emergency, the appropriate first aid procedures, and proper disposal of any hazardous waste generated. Verify that both the operating procedures and the instructions are written in an understandable format and in the language(s) of the employees. Verify that both the operating procedures and the instructions are posed at an appropriate place in the work area. Verify that the operating instructions inform employees who handle ACMs of the potential risks and protective measures to be taken. Verify that female employees of child-bearing age are given additional information regarding possible hazards for expectant mothers and restrictions on their employment activities. Verify that the operating procedures and instructions address the fact that expectant mothers are prohibited from working in areas in which asbestos or dust that contains asbestos may be generated. Verify that, if a work plan is required, it is taken into account in developing the operating procedures and instructions. Verify that, for activities outside fixed facilities, a special effort is made to ensure that the instructions contain appropriate information specifically relevant to the situation.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-60. Operating procedures and instructions must follow a particular outline (FGS-FRG 15-7c).	Verify that the operating procedures and instructions follow this outline: (1)(9)(10) - work areas, workplace, activity - hazards for humans and environment - protective measures, rules of conduct, and health measures - conduct during an emergency - first aid - proper disposal.
11-61. Oral instruction must be given before any work is started and at least once annually thereafter (FGS-FRG 15-7b and 15-7e).	Verify that instructions are given verbally [= orally?] before any work is started and thereafter at least once annually. (1)(9)(10) Verify that such [oral?] instructions are relevant to the particular workplace. Verify that, for activities outside fixed facilities, a special effort is made to ensure that the instructions contain appropriate information specifically relevant to the situation. Verify that the contents and date of the [oral?] instructions are documented and confirmed by the attendees' signatures.
11-62. Installations must under certain circumstances designate a person to coordinate work activities involving ACM and to carry out specific responsibilities (FGS-FRG 15-8a, 15-8c, and 15-8d).	Determine whether the installation contracts work out to a contractor. (1)(5)(6) Verify that the installation designates a person to coordinate work activities involving ACM. Verify that the coordinator ensures that everyone who enters the defined work area is aware of the hazards of asbestos fibers and the required precautionary measures. Verify that the coordinator obtains the advice of a competent profession in the event that the coordinator is not sufficiently qualified. (NOTE: These requirements also apply to prime contractors who contract work out to a subcontractor.)
11-63. Contractors must meet specific requirements with regard to the coordination of work activities (FGS-FRG 15-8b).	Verify that, if a contractor takes on jobs the performance of which coincide in time or location with other jobs (involving ACM) being performed by other contractors or parties, the contractor coordinates all activities with the other contractors and parties. (1)(5)(6)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-64. DOD installations and their contractors must meet specific requirements related to monitoring (FGS-FRG 15-9).	Verify that the installation and its contractors conduct a monitoring program in accordance with the procedures and rules established in *The Protection of Workers Against Asbestos Hazards at the Workplace* (ABI.EG Nr. L 263, S. 25). (1)(2)(5)(6) (NOTE: DOD components may use other monitoring programs if they provide the employee the same or a greater level of safety.) (NOTE: The publication referred to above is published by the Federal Minister for Employment in the *Bundesarbeitsblatt.*) Verify that any person who conducts monitoring possesses the necessary expert knowledge and has the necessary facilities. Verify that, if a German contractor conducts the monitoring, the firm used is listed in the register published in the *Bundesarbeitsblatt.* Verify that the employer documents and keeps the monitoring results for at least 30 yr.
11-65. Installations must meet specific requirements with regard to the hygienic protective measures they provide for workers (FGS-FRG 15-10).	Verify that workers who are engaged in the handling of ACM are provided with wash rooms that have showers as well as with rooms that have individual storage facilities for street and work clothing. (1)(9)(10) Verify that changing rooms for street and work clothing are separated from each other by the wash room. Verify that work clothes and protective clothing are cleaned and, if necessary, disposed of by the employer. Verify that work clothes and protective clothing that have been disposed of are replaced by the employer. Verify that employees engaged in handling asbestos do not eat, drink, smoke, or sniff tobacco in the workrooms or outside the work area. Verify that the employer provides a specific area for the above activities that is free from asbestos hazards. Verify that, if disposable protective suits are not worn, the employer ensures that reusable protective suits or work clothes are cleaned regularly. Verify that reusable protective suits or work clothes are thoroughly cleaned upon any interruption of work, during breaks, at the end of the shift, or upon leaving the asbestos hazard area. (NOTE: Thorough cleaning means washing washable clothes, otherwise vacuuming.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-65. (continued)	Verify that work clothes that are deposited for cleaning are collected in appropriately marked containers. Verify that containers in which work clothes are transported to the laundry are appropriately marked. Verify that, in addition to the information provided by marking, the laundering company is informed of the health hazards posed by the inhalation of fine asbestos dust.
11-66. Installations must meet specific requirements with regard to precautionary occupational medical examinations (FGS-FRG 15-11).	Determine whether an asbestos area fiber concentration of 15,000 f/m^3 is exceeded at the workplace. (1)(2)(9)(10) Verify that only those workers who have undergone a physical examination within the last 12 to 36 mo work in such a workplace. Verify that follow-up examinations are given every 12 to 36 mo after working with asbestos has commenced. (NOTE: The use of respiratory protective equipment does not constitute a release from the requirements above.) Verify that the physician writes an examination report and informs the person examined of the results. Verify that the physician issues to the employer and to the examined employee a certificate stating whether the employee is suited for the proposed job or not. (NOTE: Information on physical examinations may be found in UVV "Occupational Medicine Precautions" (*Arbeitsmedzinische Vorsorge*, VGB 100).)
11-67. Installations must not employ certain individuals in work activities in which asbestos fibers may be released (FGS-FRG 15-12).	Verify that no youths are assigned to work activities in which asbestos fibers may be released. (1)(9)(10) (NOTE: This requirement applies to training and apprenticing also.) Verify that neither expectant nor nursing mothers are assigned to work activities in which they may be exposed to asbestos fibers. (NOTE: This prohibition does not apply if such persons will not be exposed because the work activities are properly performed in accordance with applicable standards, policies, and procedures.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-68. Installations must meet specific requirements with regard to PPE (FGS-FRG 15-13).	Verify that the employer determines what PPE is necessary before the work is started. (1)(9)(10) Verify that the employer provides PPE that is suitable for the substances to which the employee may be exposed. Verify that the employer maintains the PPE in a useful and clean condition.
11-69. Employers have specific duties to inform and consult with certain parties (FGS-FRG 15-14).	Verify that the employer consults with the affected employees during the monitoring and assessment of asbestos materials and the determination of protective measures. (1)(9)(10) (NOTE: The employer may instead consult with the Works Council or Personnel Council, if such exists.) Verify that the employer informs affected employees of the results of monitoring performed to determine asbestos concentrations or of the monitoring analysis based on comparable activities. Verify that the employer allows access to the documented monitoring information and provides explanations as to its significance. Verify that, if the employer is required to provide PPE, the employer consults with the affected employees regarding the selection of appropriate PPE and the conditions under which it is to be used. Verify that the employer immediately informs the affected workers and the Works Council or Personnel Council (if any) when the area asbestos fiber concentration exceeds 15,000 f/m^3 in the workplace. Verify that the employer provides an explanation for why the area asbestos fiber concentration exceeds 15,000 f/m^3 in the workplace. Verify that the workers and the Works Council or Personnel Council (if any) are consulted regarding appropriate measures to be taken in such a circumstance. Verify that, in emergency situations, the employer immediately informs the workers and the Works Council or Personnel Council (if any) of the measures that have been taken. Verify that monitoring records are established for measurements taken for the purposes of monitoring asbestos fiber concentrations. Verify that monitoring records are made available by the employer to the Works Council and the Personnel Council (if any).

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-70. Installations must take specific technical safety measures with regard to the release of asbestos fibers (FGS-FRG 15-15a through 15-15i).	Verify that the installation develops work procedures so that, to the extent possible using the best available technology, asbestos fibers cannot be released. (1)(9)(10) Verify that, if the release of asbestos fibers cannot be prevented, the fibers are completely collected at the point of generation, to the extent that this is possible using the best available technology. Verify that, if complete collection of the fibers is not possible, ventilation measures using the best available technology are implemented. (NOTE: VDI 3492 provides a listing of current state of technology procedures.) Verify that ventilated air is handled or cleaned so that asbestos fibers cannot enter the breathing air of other workers. Verify that the concentration of asbestos fibers in the air discharged to the atmosphere does not exceed 1000 f/m^3 per state of technology procedures in VDI 3492. Verify that compliance with the above value is verified by monitoring the air emissions during actual operations in accordance with VDI 3861 upon initial start-up of the system and at least every 3 yr thereafter. Verify that asbestos dust is collected as near as possible to the point of generation. Verify that the exhausted air is cleaned by means of a a suitable dust separator. Verify that the quantity of air returned to the room by the dust-collection equipment does not exceed 10 percent of the fresh air supplied to the room. Verify that, if the air from the dust collectors will be recirculated in the work rooms, the concentration of asbestos dust in the recirculated air does not exceed 0.67 mg/m^3. Verify that, if the collected air is to be exhausted to the atmosphere, the standards of Section 1, *Air Emissions Management*, are met. Verify that the work room is provided with sufficient outside (fresh) air. Verify that exhaust air that has been filtered to remove asbestos fibers is not returned to any work area where ACMs are handled. (NOTE: If the elimination of asbestos fibers can only be accomplished with mobile equipment, then by way of exception, filtered exhaust air may be returned to the work area for the following activities: - working on brake linings (brake lining repair machines) - cleaning brake drums - abatement activities on construction materials and installations, machines, or equipment in enclosed rooms, if these activities are on a small scale.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-71. Installations must meet specific additional requirements on stationary ventilating systems (FGS-FRG 15-15j).	(NOTE: The ventilating system is considered adequate when it is in keeping with the latest technological development and is constructed in such a way that the required asbestos concentration limits are not exceeded.) Verify that, in addition to being adequate in accordance with the above note, the following criteria are met: (1)(2)(9)(10) - fresh air is used for ventilating purposes - the fresh air is taken from the outside atmosphere, or if that is impossible, from rooms whose air is uncontaminated and that are connected directly to the outside atmosphere - the asbestos concentration in the returned air does not exceed 0.025 f/cc for chrysotile or the recommended limit of 0.025 f/cc for other types of asbestos - the amount of returned air at the fresh air inlet does not make up more than 50 percent of the total air flow - a room being ventilated by a fresh inlet air stream has an air exchange equal to one room volume (in m^3) per hour - the dust concentration of the returned air does not exceed 1 mg/m^3, demonstrated by measuring the returned air according to VDI 2066.4 at regular intervals, at least once annually - if there is a stationary suction apparatus, air is returned only during the heat phase - air handling systems (especially the separation system) are serviced regularly - air handling systems receive daily inspection, a monthly attendance [?], a yearly main examination, and appropriate repairs and maintenance as necessary. (NOTE: See VDI 2262.3 for details on establishing a servicing program.)
11-72. Mobile dust filters and industrial vacuum cleaners used in accordance with the provisions of FGS-FRG 15-5b(2) and 15-5i must meet specific requirements (FGS-FRG 15-15k).	Verify that mobile dust filters and industrial vacuum cleaners used in accordance with the provisions of FGS-FRG 15-5b(2) and 15-5i meet the following requirements: (1)(9)(10) - the pass-through rate of the filter material or the combination of filters does not exceed 0.005 percent - the equipment is approved by the Trades Association (*Berufsgenossenschaft*) via type-certification or by competent authorities (NOTE: Experience has shown that the required performance is achieved with equipment of Category K1 preceded by a built-in C-filter (type-certification per ZH 1/487 in combination with the corresponding instructions for testing, or per DIN VDE 0700, part 205). For small units with a capacity up to 1 KW, the Category K1 device with a single-stage filter is sufficient.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-73. The air cleaning system must be maintained as needed, but at least once per year (FGS-FRG 15-15m).	Verify that the air cleaning system (vacuum filter unit and units used to maintain negative air pressure) are maintained as needed, but at least once per year. (1)(9)(10)
11-74. Employers must avoid exposing their employees to carcinogenic hazardous substances at the same time as asbestos (FGS-FRG 15-15n).	Verify that employers avoid exposing their employees to carcinogenic hazardous substances at the same time as asbestos. (1)(9)(10)
11-75. Electric motors must be used whenever possible for powering equipment (FGS-FRG 15-15o).	Verify that electric motors are used whenever possible to power equipment. (1)(9)(10) Verify that, if diesel motors are used, emissions are minimized as far as possible by continuous maintenance and filtering of exhaust gas.
11-76. Components that feed liquids to wet asbestos must meet specific requirements (FGS-FRG 15-15p).	Verify that feed components (such as nozzles) for wetting liquids are designed to deliver an adequate quantity of liquid at the location where the dust is produced. (1)(9)(10) (NOTE: See ZH 1/616, *Safety Rules for Dust-Emitting Manual Equipment and Tools for Processing Asbestos Cement Products.*)
11-77. Installations must not use certain asbestos-containing substances, preparations, and products for maintenance and repair (FGS-FRG 15-16a(1)).	Verify that the following substances, preparations, and products are not used for maintenance and repair if they contain asbestos: (1)(9)(10) - finished products that crumble to powder or produce fine dust - catalytic filters and insulating devices intended for or installed in liquefied gas heaters - paints - substances and preparations for spraying - crocidolite and preparations that contain crocidolite.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-77. (continued)	(NOTE: The prohibition on the use of crocidolite and preparations that contain it does not apply to the following: - asbestos cement pipes - acid- and temperature-resistant gaskets - stuffing box packings - flexible expansion joint torque converters, including the asbestos fibers and intermediates required for their manufacture.)
11-78. Special protective measures must be instituted if maintenance, repair work, and/or construction require the use of friable asbestos products that have no substitute (FGS-FRG 15-16a(2)).	Verify that special protective measures are instituted if maintenance, repair work, and/or construction require the use of friable asbestos products that have no substitute. (1)(9)(10) (NOTE: These measures may include: - bridging encapsulation of the asbestos product (applicable to panels only) - dust-tight isolation of the asbestos product from the room - repair of damaged asbestos products - closing of joints in asbestos-containing structural components.)
11-79. The maintenance of seals, gaskets, and packings that contain asbestos must be accomplished in accordance with specific criteria (FGS-FRG 15-16b).	Verify that, to the extent possible, seals, gaskets, and packings that contain asbestos are removed whole. (1) (NOTE: After long use, gaskets may be stuck to or burned into flange surfaces. If such gaskets are being dismantled, asbestos fibers can be released when the weaker fiber particles (e.g., gasket strings) are destroyed. Asbestos fibers can also be released by dismantling the packings if they cannot be removed from the stuffing box in one piece. The emission of fibers can be prevented or minimized by the use of penetrating liquids and rough shaving tools (scraper or chisel) rather than drills or grinding machines.) Verify that asbestos fibers are vacuumed using a Category K1, type-certified device or its equivalent when removing seals, gaskets, and packings. Verify that the connected seal, gasket, and packing parts are packed into dust-proof containers that also serve as the transport containers. Verify that transferring ACM is avoided. Verify that the following procedures are followed in the event that seals, gaskets, and packings that contain asbestos must be reinstalled because alternative materials are unavailable: - workers use ready-made seals and gaskets - workers avoid damaging the item(s) - scraps and wastes generated during fitting are collected and disposed of properly.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-80. The maintenance of brakes and clutches must be carried out in accordance with specific criteria (FGS-FRG 15-16c).	Verify that brakes and clutch linings that contain asbestos are not installed in motor vehicles if it is technically possible and permissible to use asbestos-free linings, and such linings are available. (1) Verify that, for the dismantling of worn friction surfaces, the friction dust is vacuumed off using a Category K1 type-certified device or its equivalent. Verify that compressed air is never used to blow away particles. (NOTE: Dust binding, wet cleaning may be used if the cleaning agent does not negatively affect the performance of the brakes.) Verify that a Category K1 type-certified device preceded by a C-filter is used if it is necessary to use brushes or wire brushes to clean brake shoes, pads, disks, and drums, or other brake parts. (NOTE: In this case, a wet cleaning should also be performed if the cleaning agent does not negatively affect the performance of the brakes.) Verify that, to the extent possible, worn surfaces are removed from their holders in one piece. Verify that a Category K1 type-certified device preceded by a C-filter is used as part of such removal. Verify that coatings, remnants of friction surfaces, and dust that has been collected by vacuuming, are packed in a dust-free manner and disposed of without emissions. Verify that, when disposing of friction surfaces, the appropriate standards for other hazardous components of the friction materials (if any) are observed. Verify that, if asbestos-containing friction surfaces must be reinstalled because no alternative substances are available, the release of dust during unpacking, preparation, and mounting is avoided by minimizing the unnecessary rubbing of the friction surfaces against one another and against other objects. Verify that, if brake surfaces that contain asbestos must be ground to the correct specifications without removing them, a slowly revolving grinding device is used. Verify that no excessive grinding occurs. Verify that a Category K1 type-certified device or its equivalent is used during grinding to vacuum off the dust. (NOTE: The same general procedures used for brake systems also apply to the maintenance of clutch linings.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
Abatement Requirements	
11-81. The urgency of abatement action must be evaluated in a specific fashion (FGS-FRG 15-17a).	Verify that the urgency of abatement is evaluated using the form and instructions found in Table 11-3. (1)(9)(10) (NOTE: The following products are not assessed using this form; they are simply classified as indicated: - fire prevention vent flaps that contain asbestos - Priority Level III - fire protection doors that contain asbestos and in which the asbestos products are tightly enclosed by the metal surroundings (with the exception of the slots necessary for opening and closing) - Priority Level III.)
11-82. Specific abatement actions are required based on the score that results from the analysis of the urgency of abatement (FGS-FRG 15-17a).	Verify that, for Priority Level I, abatement begins immediately. (1)(9)(10) Verify that, if permanent abatement is not possible and the room must be used, temporary measures are implemented to minimize the concentration of asbestos fibers in the air. Verify that, if temporary abatement is instituted, its effectiveness is demonstrated by air sampling and analysis as follows: - one sampling and analysis procedure immediately after the temporary measures are completed - air samples taken at intervals of approximately 6 mo, always under the same conditions, up to final abatement. Verify that permanent abatement is initiated within 3 yr. Verify that, for Priority Level II, abatement occurs in the medium term. Verify that, for Priority Level II, the facility/product score is reassessed at least every 2 yr. Verify that, for Priority Level III, abatement occurs in the long term. Verify that, for Priority Level III, the facility/product score is reassessed at least every 5 yr.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-83. A work plan that meets specific requirements must be established before the start of work for the demolition of structural facilities and before the removal of ACM from buildings and equipment (FGS-FRG 15-18a).	Verify that a work plan is established before the start of work for the demolition of structural facilities and before the removal of ACM from buildings and equipment. (1)(9)(10) Verify that the plan describes the measures that are required for the protection of workers at the workplace. Verify that it is assured that ACM is removed and disposed of before the actual demolition activities are started, to the extent technically possible and without posing hazards to humans or the environment.
11-84. Prior to renovation or demolition, the installation must determine whether ACM will be removed or disturbed and record the determination in the project authorization document (work order) (FGS-FRG 15-18b(1)).	Verify that facilities are surveyed for ACM prior to renovation and/or demolition and that the determination of action is noted on the work order. (1)(7)(9)(10)
11-85. A written assessment must be prepared and furnished to the Installation Commander prior to certain actions (FGS-FRG 15-18b(2)).	Verify that a written assessment is produced prior to the demolition or renovation of a facility that involves removing or disturbing friable ACM. (9)(10) Verify that a copy of the written assessment is kept on file permanently.
11-86. Installations must remove certain types of ACM prior to any renovation or demolition (FGS-FRG 15-18b(3)).	Verify that, before renovating or demolishing any facility or any part of a facility in which ACM is found, the installation removes: (9)(10) - all friable ACM - ACM with a high degree of probability of becoming friable once disturbed.
11-87. Installations must remove ACM when it poses a threat to release airborne asbestos fibers and cannot be reliably repaired or isolated (FGS-FRG 15-18c).	Verify that ACM that poses a threat has been removed. (9)(10)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-88. Installations must meet specific criteria before and during the removal of asbestos (FGS-FRG 15-18c).	Verify that all workers are trained prior to the removal. (1)(7)(9)(10) Verify that monitoring programs to document exposure levels are in place during asbestos removal. Verify that all workers involved in the removal use properly fitted respiratory protection and PPE.
11-89. Companies hired to remove, bind, or encapsulate ACM must meet specific requirements (FGS-FRG 15-18d).	Verify that companies hired to remove, bind, or encapsulate ACM are familiar with the potential hazards and the required protective measures and have access to the necessary equipment and instruments. (1)(5)(6)(9)(10) Verify that installation has a process in place to ensure that the companies hired to remove, bind, or encapsulate ACM meet the requirements of FGS-FRG 15-18e.
11-90. Work on asbestos products with tools that remove the product surface by sanding, high-pressure cleaning, or scraping is prohibited (FGS-FRG 15-18f).	Verify that no one works on asbestos products with tools that remove the product surface by sanding, high-pressure cleaning, or scraping. (1)(9)(10)
11-91. Installations must take certain protective measures for small-scale activities and a maximum 2 h exposure time (FGS-FRG 15-18g).	Verify that the work area is partitioned off from the rest of the room and is air tight. (1)(9)(10) Verify that access is gained to the work area via multiple, overlapping, plastic sheeting. (NOTE: Workers should not leave the area before they complete the work.) Verify that, to the extent possible, working surfaces are wetted. Verify that dust that is created is vacuumed immediately at the point of generation using a type-certified Category K1 device preceded by a built-in C-filter. Verify that partitions are dismantled only after all the following have taken place: - completion of work activities - a careful cleaning - if necessary, final binding of the remaining fibers - sufficient air exchange (30 times).

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-92. Asbestos cement products must be removed, whenever possible, in a non-destructive manner (FGS-FRG 15-18h).	Verify that asbestos cement products are removed, whenever possible, in a non-destructive manner. (1)(9)(10) Verify that the following process is used to remove asbestos cement products whenever possible: - apply a fiber-binding material to uncoated asbestos cement products or keep them moist during the work activity - unscrew construction parts - after wetting them, break off only those construction parts that cannot be unscrewed - generate as little debris as possible - keep debris moist - place panels on pallets at the point of demolition - collect small pieces in containers - carry asbestos cement pieces from the point of demolition to the transport container or vehicle - do not throw any pieces - moisten all waste before transport, if a fiber-binding material has not been applied or if they have not been packed in a dust-free manner.
11-93. Fiber-binding items that have been contaminated with asbestos must be wetted and disposed of in the same manner as asbestos (FGS-FRG 15-18i).	Verify that fiber-binding items (e.g., glass wool material, carpets, etc.) that have been contaminated with asbestos are wetted and disposed of in the same manner as asbestos. (1)(9)(10)
11-94. Installations must comply with restrictions on the number of hours that employees may work during abatement activities (FGS-FRG 15-18j).	Verify that no employee is assigned to work longer than 8 h/day or more than 40 h/wk. (1)(9)(10) Verify that, with four-shift operations, no employee is assigned to work more than 42 h/wk on average over four successive weeks. (NOTE: These restrictions do not apply if investigations have concluded that the asbestos area fiber concentrations at the workplace are under 15,000 f/m^3.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-95. Installations must meet specific requirements when asbestos removal is undertaken (FGS-FRG 15-18k).	Verify that asbestos products that can be vacuumed (e.g., sprayed asbestos) are separated from the wall, ceiling, etc., as a rule in a wet condition, and vacuumed directly into a dust-tight container. (1)(9)(10) Verify that asbestos products that cannot be vacuumed (e.g., panels) are removed, as a rule in a wet condition, by nondestructive procedures where possible, and placed in sealed containers.
11-96. Installations must meet specific requirements when asbestos encapsulation is undertaken (FGS-FRG 15-18L).	Verify that the product to be encapsulated has sufficient transverse tensile and delamination strength to ensure that the encapsulation will succeed and be durable. (1)(9)(10) Verify that asbestos products are encapsulated, dust-tight, by bridging encapsulation. (NOTE: Products that are highly friable (e.g., sprayed asbestos) may require prior treatment with a penetrating encapsulant.) Verify that only those encapsulants are used that have a test certificate from an official materials testing laboratory. (NOTE: Of particular concern are dust-tight sealing properties, adhesion, and durability.) (NOTE: If a test certificate has been issued for penetrating and bridging encapsulants of plastics, it may be assumed that the original fire protection properties of the structural component will not be affected to an unacceptable degree by such encapsulation.)
11-97. A dust-tight barrier must be constructed between the asbestos product and the room when the asbestos containment (enclosure) method is used (FGS-FRG 15-18m).	Verify that, if the asbestos containment (enclosure) method is used, a dust-tight barrier is constructed between the asbestos product and the room by means of additional structural components. (1)(9)(10) Verify that particular care is taken to ensure that joints will remain dust-tight permanently.

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COMPLIANCE CATEGORY:
TOXIC SUBSTANCES MANAGEMENT
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REGULATORY REQUIREMENTS:	REVIEWER CHECKS:
11-98. Air from the work area may be exhausted to the atmosphere only in a controlled manner using mechanical ventilation systems (FGS-FRG 15-18n).	Verify that air from the work area is exhausted to the atmosphere only in a controlled manner using mechanical ventilation systems. (1)(9)(10) Verify that, if the containment area cannot be constructed dust-tight, it is kept permanently under negative pressure. Verify that the installation maintains records that demonstrate that negative pressure has been maintained throughout the duration of the project.
11-99. Entrance to and exit from abatement work areas must be through decontamination units (FGS-FRG 15-18o).	Verify that entrance to and exit from abatement work areas is accomplished through decontamination units. (1)(9)(10) (NOTE: Decontamination units are not required in cases of minor work, provided that persons and equipment do not leave the work area without being decontaminated and do not leave before the completion of the abatement work.)
11-100. Certain requirements must be met if abatement is performed by vacuuming the asbestos (FGS-FRG 15-18p).	Verify that the entire vacuum system operates under negative pressure conditions during vacuuming. (1)(9)(10) Verify that ventilated air is exhausted to the atmosphere across suitable filters.
11-101. Upon completion of abatement work, the final work must be performed in a specific order (FGS-FRG 15-18q).	Verify that, if the abatement work has been carried out inside a containment area, the following tasks are carried out in the order in which they are listed: (1)(2)(9)(10) - cleaning of all surfaces inside the containment area (e.g., by vacuuming) - encapsulation of residual fibers on all surfaces in the containment area - measurement of the airborne asbestos fiber concentration (in the case of major abatement work) before removal of the containment - demolition of the containment - final cleaning, not earlier than 12 h after the demolition of the containment - final inspection. Verify that, in the case of abatement work without containment, the tasks are carried out in the above order and that final cleaning is accomplished no earlier than 12 h after completion of the work.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-102. Installations must meet specific requirements with regard to air samples taken to check the effectiveness of abatement measures (FGS-FRG 15-18r and 15-18s).	Verify that such samples are taken upon completion of the abatement work but before resuming occupancy of the rooms. (1)(2)(9)(10) Verify that the samples are taken in location primarily occupied by persons during the typical use of the room, or where a high asbestos fiber concentration is expected. Verify that normal operations are simulated. Verify that the worst conditions that may occur during real occupancy are also taken into account. Verify that each measured value for the concentration of asbestos fibers having a length, L, of ≥ 5 µm, a diameter, D, of > 3 µm, and an aspect ration L:D > 3:1, is less than 500 f/m^3 (0.0005 f/cc). Verify that the upper confidence limit of the 95 percent confidence region of asbestos fiber concentration calculated according to Poisson's distribution from the number of asbestos fibers with L ≥ 5 µm, D < 3 µm, and L:D > 3:1 is 1000 f/m^3 (0.001 f/cc). Verify that air sampling is performed only by laboratories that guarantee proper performance of the measurements. Verify that the installation ensures that air sampling is performed in accordance with the requirements of FGS-FRG 15-18t.

11-103. Established protective measures may be removed only under certain circumstances (FGS-FRG 15-19).	Verify that established protective measures are removed only when the handling of asbestos and other substances that contain asbestos has been completed. (1)(2)(9)(10)
	
	Verify that, for extensive projects (e.g. a major remediation), the protective measures are removed only when:
	
	- it can be demonstrated via visual inspection of the abatement area that there are no visible particles that contain asbestos remaining
	- aggressive air sampling of the area indicates that:
	  - each measured value for the concentration of asbestos fibers having a length, L, of ≥ 5 µm, a diameter, D, of > 3 µm, and an aspect ration L:D > 3:1, is less than 500 f/m^3 (0.0005 f/cc)
	  - the upper confidence limit of the 95 percent confidence region of asbestos fiber concentration calculated according to Poisson's distribution from the number of asbestos fibers with L ≥ 5 µm, D < 3 µm, and L:D > 3:1 is 1000 f/m^3 (0.001 f/cc).
	
	Verify that negative air pressure is not maintained in the test area during the above monitoring.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-103. (continued)	Verify that appropriate monitoring of the rooms adjacent to the containment area is conducted if necessary.
Asbestos in Schools	
11-104. DOD schools must meet specific requirements with regard to ACM (FGS-FRG 15-20).	Verify that the responsible DOD schools official(s) ensure that DOD Schools are in compliance with the applicable provisions of the U.S. Asbestos Hazard Emergency Response Act. (8)(9) (NOTE: This requirement applies notwithstanding any of the above provisions and in addition to the following requirements.) Verify that both friable and nonfriable ACM have been identified in elementary and secondary schools. Verify that all suspect materials that are not confirmed to be ACM have been sampled. Verify that samples are analyzed using appropriate techniques. Verify that an accredited DOD inspector has provided a written analysis of all friable, known, or assumed ACM in school buildings. Verify that appropriate response actions are selected and implemented in a timely manner to protect human health and the environment. Verify that all maintenance and custodial persons who may work in buildings that contain ACM receive awareness training regarding asbestos, its uses and forms, location in school buildings, and recognition of ACM. Verify that each school has an asbestos management plan that includes all leased or owned facilities.

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
RADON MANAGEMENT **All Installations**	
11-105. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS. (1)(11)
11-106. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether new regulations concerning radon management have been issued since the finalization of the manual. (1)(11) Verify that the installation is in compliance with newly issued regulations.
11-107. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a and 1-8c).	Determine whether German authorities require permits related to radon management. (1)(11) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)

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COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP

REGULATORY REQUIREMENTS:	REVIEWER CHECKS:
11-108. Installations must prioritize their facilities for radon assessment and mitigation properly (FGS-FRG 16-3).	Verify that the installation has prioritized its facilities in accordance with the following list: (1)(2) - Priority 1: military family housing, day care centers, hospitals, schools, unaccompanied officers/enlisted quarters, confinement facilities, visiting officer/enlisted quarters, and dormitories/barracks - Priority 2: administrative areas having 24-h operations - Priority 3: all other structures routinely occupied over 4 h/day.
11-109. Initial screening samples must be collected from facilities in accordance with a specific schedule (FGS-FRG 16-4).	Verify that the installation has collected initial screening samples from selected priority 1 facilities before 1 October 1994. (1)(2) (NOTE: Priority 2 and 3 facilities are not involved in the initial screening program.) Verify that the samples are collected according to a protocol that yields a statistically representative sample.
11-110. Installations that have only Priority 2 and 3 facilities must conduct radon screening to obtain a statistically representative sample by 1 January 1996 (FGS-FRG 16-6).	Determine whether the installation has only Priority 2 and 3 buildings. (1)(2) Verify that radon screening is being carried out so that a sample is ready by 1 January 1996.
11-111. Detailed testing for radon is required if any initial screening sample results indicate a radon concentration greater than 4 pCi/L [148 Bq/m^3] (FGS-FRG 16-5).	Verify that, if any initial screening sample shows a radon level greater than 4 pCi/L [148 Bq/m^3], 12-mo radon samples are collected from all Priority 1, 2, and 3 facilities. (1)(2)
11-112. Installations must have a QA/QC program to ensure the validity of test results (FGS-FRG 16-8).	Verify that the installation has a QA/QC program to ensure the validity of radon test results. (1)(2)

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Exterior Electric Shop) (4) DRMO (Defense Reutilization and Marketing Office) (5) BCE (Contract Programmer) (6) BCE (Contract Management) (7) BCE (Chief of Operations and Maintenance) (8) School Principal (9) Asbestos Program Officer (10) Asbestos Operating Officer (11) Base Staff Judge Advocate (12) Base Safety Officer (13) PAO (Public Affairs Officer)

COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-113. Installations must mitigate certain facilities according to a specific schedule (FGS-FRG 16-7).	Verify that the installation mitigates facilities that have radon levels above 4 pCi/L [148 Bq/m^3]. (1)(2) Verify that the radon mitigation of such facilities proceeds according to the schedule in Table 11-4.
11-114. Installations must have post-mitigation monitoring programs (FGS-FRG 16-10).	Verify that the installation has a post-mitigation monitoring program to confirm and document the effectiveness of mitigation. (1)(2)
11-115. Installations should maintain or have access to a database that will permanently capture all the information derived from the assessment and mitigation of radon (MP).	Verify that the installation maintains or has access to such a database. (1)(2) Verify that all pertinent radon information is contained in such a database.
11-116. Installations must develop an information package on the potential health effects of radon and provide the information along with the test results to facility occupants (FGS-FRG 16-9).	Verify that the installation has developed an information packet on radon. (1)(2) Verify that the packet and the radon monitoring results are given to facility occupants upon assignment.

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Exterior Electric Shop) (4) DRMO (Defense Reutilization and Marketing Office) (5) BCE (Contract Programmer) (6) BCE (Contract Management) (7) BCE (Chief of Operations and Maintenance) (8) School Principal (9) Asbestos Program Officer (10) Asbestos Operating Officer (11) Base Staff Judge Advocate (12) Base Safety Officer (13) PAO (Public Affairs Officer)

COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
LEAD-BASED PAINT (LBP) **All Installations**	
11-117. Copies of all relevant DOD and AF directive, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation FGS and relevant USAF documents. (1)(11) (NOTE: Among the relevant documents is HQ USAF/CC Policy Letter, *Air Force Policy and Guidance on Lead Based Paint in Facilities*, 24 May 1993.)
11-118. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning LBP have been issued since the finalization of the manual. (1)(11) Verify that the installation is in compliance with newly issued regulations.
11-119. Installations must develop and implement a plan for identifying, evaluating, managing, and abating LBP hazards (HQ USAF/CC Policy Letter 24 May 1993, para 6).	Verify that the installation has a management plan that includes a strategy for: (1) - identifying, evaluating, controlling, and eliminating existing LBP hazards and preventing new hazards from developing - protecting facility occupants, especially children, and workers from LBP hazards - ensuring compliance with all applicable environmental protection requirements and all laws and regulations pertaining to LBP activities.

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Exterior Electric Shop) (4) DRMO (Defense Reutilization and Marketing Office) (5) BCE (Contract Programmer) (6) BCE (Contract Management) (7) BCE (Chief of Operations and Maintenance) (8) School Principal (9) Asbestos Program Officer (10) Asbestos Operating Officer (11) Base Staff Judge Advocate (12) Base Safety Officer (13) PAO (Public Affairs Officer)

COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-119. (continued)	Verify that the plan: - is an integral part of the installation's overall plan for inspecting, constructing, upgrading, repairing, maintaining, and demolishing the facility inventory - is based on local conditions and an evaluation of the health risk from LBP onbase that considers available information on the conditions of the facilities, the results of facility inspections and evaluations, and incidents of lead toxicity resulting from LBP - gives priority to finding and reducing or eliminating the risk of existing hazardous conditions in high-priority facilities - emphasizes in-place management to control existing hazards and reduce the risk of hazardous exposure to acceptable levels - considers abatement of LBP as part of the normal facility renovation and upgrade programs when it is cost-effective - ensures precautions and procedures are incorporated into all maintenance, repair, renovation, and upgrade activities that are performed in-house, by contract, or self-help and that disturb painted surfaces known or likely to contain lead.
11-120. Installations must identify existing and potential LBP hazards in accordance with specific procedures (USAF/CC Policy Letter 24 May 1993, para 7).	Verify that, depending on local circumstances, one of the following is used to identify and evaluate existing and potential LBP hazards: (1) - evaluations of observations from routine facility inspections and activities such as walk-throughs by Public Health (PH), fire and safety inspections, inspections for family day care home licensing, and occupant reports of deteriorated paint - inspections and evaluations specifically designed to locate existing and potential LBP hazards so that appropriate measures can be taken to avoid hazardous lead exposures - facility investigations to determine the source of documented lead exposure. Verify that facility personnel who conduct routine inspections have been instructed to report signs of paint deterioration or children chewing on painted surfaces in high-priority facilities. Verify that there are procedures in place to document and respond to information reported from inspections and occupants concerning potential LBP problems and the resulting evaluations and actions.

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Exterior Electric Shop) (4) DRMO (Defense Reutilization and Marketing Office) (5) BCE (Contract Programmer) (6) BCE (Contract Management) (7) BCE (Chief of Operations and Maintenance) (8) School Principal (9) Asbestos Program Officer (10) Asbestos Operating Officer (11) Base Staff Judge Advocate (12) Base Safety Officer (13) PAO (Public Affairs Officer)

COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-120. (continued)	Verify that facility inspections that are done specifically to identify LBP problems meet the following requirements: - they are focused on high-priority facilities and areas within those facilities with painted surfaces in deteriorated condition - the evaluations are performed by a team consisting of PH and BES representatives or by a qualified contractor - reports of the data results and resulting actions are collected, consolidated, and analyzed by the Chief, Aerospace Medicine for reporting through AF medical channels - permanent records of facility evaluations are maintained by the BCE and/or BES.
11-121. Installations must determine whether LBP is present prior to the start of facility maintenance, repair, modification, and renovation activities (HQ USAF/CC Policy Letter 24 May 1993, para 11).	Verify that the installation determines whether LBP is present prior to the start of maintenance, modification, or renovation activities. (1) (NOTE: This requirement applies to high priority facilities and other facilities likely to contain lead.)
11-122. Installations must restrict the use of LBP (USAF/CC Policy Letter 24 May 1993, para 12).	Verify that the installation does not use paint with more than 0.06 percent lead by weight of the nonvolatile solids. (1) (NOTE: This restriction applies to all facilities, both industrial and nonindustrial.)
11-123. AF personnel who perform tests for LBP and work on painted surfaces must be trained (USAF/CC Policy Letter 24 May 1993, para 13).	Verify that at least one person from BCE has received USEPA certification. (1) Verify that all training is conducted by persons who have been trained at a USEPA-approved Regional Lead Training Center or an equivalent in-house training program presented by a certified trainer. (NOTE: The person from BCE who received USEPA certification may train other installation personnel on potential hazards and proper precautions.)

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Exterior Electric Shop) (4) DRMO (Defense Reutilization and Marketing Office) (5) BCE (Contract Programmer) (6) BCE (Contract Management) (7) BCE (Chief of Operations and Maintenance) (8) School Principal (9) Asbestos Program Officer (10) Asbestos Operating Officer (11) Base Staff Judge Advocate (12) Base Safety Officer (13) PAO (Public Affairs Officer)

COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:**
11-123. (continued)	Verify that a minimum level of training that includes the following is provided for all workers who perform tasks that disturb painted surfaces: - potential hazards of LBP (hazard communication) - work practices to reduce and control dust and debris - handling of debris - hygiene - cleanup procedures.
11-124. Certain personnel must receive training beyond the minimum level (USAF/CC Policy Letter 24 May 1993, para 13).	Verify that the following personnel receive additional training in the requirements of the *Occupational Safety and Health Act* and those of the Department of Housing and Urban Development: (1) - personnel who perform larger jobs in which simple work practices will not reliably reduce or control dust - personnel who assist in LBP evaluations.
11-125. All training related to LBP must be documented (USAF/CC Policy Letter 24 May 1993, para 13).	Verify that all training is documented in official personnel folders. (1)
11-126. Installations must perform a Lead Toxicity Investigation (LTI) when children with elevated blood lead levels have been identified at the installation (USAF/CC Policy Letter, 24 May 1993, para 14).	Determine whether the installation has ever had a case of elevated levels of lead in the blood. (2) Verify that the LTI team consists of representatives from BCE, BES, PH, PAO, and SJA as needed. Verify that the installation conducted an LTI.

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Exterior Electric Shop) (4) DRMO (Defense Reutilization and Marketing Office) (5) BCE (Contract Programmer) (6) BCE (Contract Management) (7) BCE (Chief of Operations and Maintenance) (8) School Principal (9) Asbestos Program Officer (10) Asbestos Operating Officer (11) Base Staff Judge Advocate (12) Base Safety Officer (13) PAO (Public Affairs Officer)

Table 11-1

Summary of Likelihood of Lead-Based Paint Being Present and Regulation/Guidelines Which Normally Must Be Followed

(USAF/CC Policy Letter 24 May 1993)

High-Priority Facilities

Facility Type	LBP Likely	HUD	OSHA	RCRA	AIR
MFH/Day Care Home, Before 1980	Yes	Yes	Yes	Yes	No
MFH/Day Care Home, During/After 1980	No	Yes	No	No	No
Other High Priority Facilities Before 1980	Yes	Yes	Yes	Yes	No
Other High Priority Facilities During/After 1980, Ferrous Metal Surface	Yes*	Yes	Yes	Yes	No
Other High Priority Facilities, During/After 1980, Other Surfaces	No**	Yes	No	No	No

Other Facilities (Not High-Priority)

Facility Type	LBP Likely	HUD	OSHA	RCRA	AIR
Steel Structures	Yes	No	Yes	Yes	Yes
Industrials	Yes	No	Yes	Yes	No
Painted Yellow Pavement Markings	Yes	No	Yes	Yes	No
Nonindustrials, Ferrous Metal Surfaces	Yes*	No	Yes	Yes	No
Nonindustrials, During/After 1980, Other Surfaces	No**	No	No	No	No

* *Consumer Product Safety Act* (CPSA) restrictions uncertain but common practices favor lead present.

** CPSA restriction uncertain but common practices favor lead absent.

HUD - Housing and Urban Development Interim Guidelines

OSHA - Occupational Safety and Health Administration

RCRA - *Resource Conservation and Recovery Act*

(continued)

Table 11-1 (continued)

AIR - National Primary and Secondary Ambient Air Quality Standards

CPSA - *Consumer Product Safety Act*

(NOTE: Likelihood of finding LBP on a particular surface in a facility is based on when it was constructed (before 1980 or during/after 1980), applicability of CPSA restrictions on use of LBP, and common painting practices.)

(NOTE: Although LBP may not be likely, some precautions described in the HUD guidelines will normally be considered in high priority facilities since children are potentially at risk and there is some possibility the LBP is present.)

Table 11-2

Analytical Procedures for Determining the Presence and Concentration of Polychorinated Biphenyls (PCBs) and Polychlorinated Terphenyls (PCTs)

(FGS-FRG Appendix F)

F-1. Overview. The following procedures will be used when testing for the presence and/or concentration of PCBs or PCTs in Germany.

F-2. Sampling and storage of samples.

a. Sampling for the determination of PCB or PCT contents shall be done per DIN 51 750, Parts 1-3. DIN IEC 475 (VDE 0370, Part 3) shall apply to the sampling of dielectric fluids.

b. The sample should be divided into three sub-samples. One goes to the testing laboratory, one goes to the owner of the item of substance being tested, and one is kept in reserve for further testing should it be required for verification.

c. The samples should be kept for 6 months after the analysis. Samples are to be secured in such a way (e.g., by lead seals) that the sample cannot be tampered with. They should be marked with the time and place the sample was taken.

F-3. Determination of PCBs.

a. When applying DIN 51 527, PCBs are determined quantitatively by gas chromatography using capillary columns and electron capture detectors in accordance with Part 1. The maximum permissible error in PCB determination for this procedure is plus or minus 1 mg of PCB per kilogram of test material if the concentration is up to 10 mg/kg.

1. The total PCB concentration is determined by multiplying the concentration found in the test material by 5. Therefore, a substance is PCB-contaminted if the dewatered oily phase of the test material is 11 mg/kg or greater in the test sample.

2. In certain cases (e.g., in the examination of metal processing oils or hydraulic fluids) the procedures in DIN 51 527, Part 1 do not always allow adequate separation of the PCBs from the accompanying substances. If traces of PCB are present together with a high surplus of related organic chlorine compounds (e.g., chlorobenzyltoluene), the analysis may produce significant errors in that the peaks referred to in DIN 51 527, Part 1 cannot be evaluated accurately as a result of superimposition. In such cases, advanced methods must be used for separating PCBs from the sampled material for gas chromatography.

b. Other analytical procedures not using DIN 51 527 may be used to determine if a given substance (e.g., transformer fluid) exceeds various limits. These so-called "rapid tests" are based on the chemical determination of the chlorine content by the resulting color of the reaction. Two tests available are (1) KWIK SKRENE KS 2 P 10, 20, 50 or 500 of SYPROTEC, Canada and Trafo Union (Trafo Letter 686/88 of Trafo Union) and Chlor-N-Oil TM 50 or 500 of EPRI, USA (M. D. Erickson, *Analytical Chemistry of PCBs*, pages 260-263, Butterworth Publications, 1986.). The figures presented give the detection limits and/or range for the PCBs in the test material in mg/kg. The above tests are only based on chloride determination. Dielectrics and hydraulic flu-

(continued)

ids, for example, may contain several non-PCB compounds that contain chlorine. Therefore, these tests may produce a positive results even if no PCBs exist. If the results are positive, they must be confirmed by testing in accordance with DIN 51 527.

F-4. Determination of PCTs. No standard comparable to DIN 51 527, Part 1 available for the determination of PCTs. Fortunately testing for PCTs is rarely required and can be carried out using gas chromatography with a procedure analogous to that given in DIN 51 527, Part 1. However, special measures are required for quality assurance and control.

F-5. Documentation.

a. A test report will be prepared on every analysis providing at least the information required in DIN 66 066, Part 1.

b. Test reports will be retained until three years after the item or product is taken out of operation.

Table 11-3

FORM FOR THE ASSESSMENT OF THE URGENCY OF ABATEMENT OF ASBESTOS

(FGS-FRG Appendix G)

LOCATION (BUILDING & ROOM NUMBER):
PRODUCT/MATERIAL IN QUESTION:

Items to assess	Point values	Assessment points
I - Type of Asbestos Use:		
1. Sprayed-on asbestos	20	
2. Asbestos-containing plaster	10	
3. Lightweight asbestos-containing panels	5, 10 or 15	
4. Other asbestos-containing products	5, 10, 15 or 20	
II - Type of Asbestos:		
5. Amphibole asbestos	2	
6. Other asbestos (white)	0	
III - Surface Structure of the Asbestos Product:		
7. Highly friable fiber structure	10	
8. Nonfriable fiber structure with or without a sufficiently impermeable surface coating	4	
9. Coated, impermeable surface	0	
IV - Surface Condition of the Asbestos Product:		
10. Severe damages	6	
11. Minor damages	3	
12. No damages	0	
V - External Impacts on the Asbestos Product:		
13. Product is subjected to impacts via direct access (floor level to arm's reach)	10	
14. Product is worked on occasionally	10	
15. Product is subjected to physical impacts	10	
16. Product is subject to vibrations	10	
17. Product is subjected to severe climatic changes	10	

(continued)

Table 11-3 (continued)

LOCATION (BUILDING & ROOM NUMBER):
PRODUCT/MATERIAL IN QUESTION:

Items to assess	Point values	Assessment points
18. Product is located in an area of strong air currents	10	
19. Strong air currents are present in the room in which the asbestos product is located	7	
20. If handled improperly, the product may be subject to abrasion	3	
21. Product is not subject to external impacts	0	
VI - Room Use:		
22. Room is used regularly by children, youth, and athletes	25	
23. Room is used constantly or frequently by other persons	20	
24. Room is used occasionally	15	
25. Room is used only rarely	8	
VII - Locations of the Product:		
26. Directly in the room	25	
27. In the ventilation system for the room (in lining or outer wrapping of nonairtight ducts)	25	
28. Behind a nonairtight suspended ceiling or paneling	25	
29. Behind an airtight suspended ceiling or paneling	0	
VIII - Sum of the Assessment Points:		
XI - Abatement Analysis: Priority I - Required Immediately (>80) Priority II - (70-79) Priority III - (<70)		
30. This project is assessed as Priority:_____ _____ (Signature, Title and Date)		

(continued)

The form is intended to serve as a checklist for the assessment of the need for abating asbestos products.

Seven groups with assessment criteria (I to VII) are listed in the table heading. The corresponding assessment is to be recorded in the last column.

These have assessment point scores between 0 and 25. If more than one assessment criteria is scored within a group, then only one - that with the highest assessment point score - should be considered when summing the points.

These seven assessment point scores are added together and yield the corresponding abatement priority (line 30).

I. Type of Asbestos Use (Lines 1 to 4)

Sprayed-on asbestos is a whitish-gray, gray, or gray-blue material that is generally soft and can be indented with the finger. The surface is usually rough even if it has been protected by a cement layer or a coat of paint.

Asbestos-containing plaster and light asbestos containing panels are usually whitish-gray, however, they may also be gray to gray-brown. The material is fairly soft and crumbly and can easily be scratched on the surface with a fingernail.

Other asbestos-containing products, such as cardboard, strings, or foam rubber, are also generally whitish-gray and have little strength.

On many asbestos-containing products, very fine exposed fibers can be seen at fracture locations. Even for experts, it is not easy to make a definitive statement as to whether or not a product contains asbestos. Therefore, a materials analysis of the suspected asbestos-containing product should be performed before abatement efforts are made.

In group I, line 3 - **Light Asbestos-containing Tiles**- tiles, that do not allow emissions of fibers caused by pumping effects or vibrations, are to be assessed **5 points**. This is normally valid for smaller tiles (tiles with a size of less than 0.4 m^2) and for larger tiles, which have sufficient bending stiffness over a
narrow framework base or are directly secured to large building component.

Large-scale tiles, which allow emission of fibers caused by pumping effects and vibrations are to be assessed with **5, 10, or 15 points** according to their intensity of fiber emissions.

In group I, line 4 - **Other Asbestos-containing Products** - the following assessment points should be used:

(continued)

Table 11-3 (continued)

	Assessment-Points
(a) Asbestos cement-(adhesive/mastic), -foam, -filler	5
(b) Asbestos-Carton	10
(c) Asbestos Fabric Mats, Asbestos-String	15
(d) Loose Asbestos Stuffing Materials	20

II. Type of Asbestos (Lines 5 and 6)

All amphibole asbestos is considered carcinogenic and should be assessed 2 points.

III. Surface Structure of the Asbestos Product (Lines 7 to 9)

A highly friable structure can usually be assumed for sprayed-on asbestos and asbestos strings.

A less friable fiber structure is present in asbestos-containing panels, asbestos-containing plaster, asbestos-containing foam rubber, and for sprayed-on asbestos which is completely covered by an additional top coat of paint.

A plastic covering, plaster wrapping, or similar material can be considered as a coated, airtight surface if the covering material does not have damaged or permeable locations.

For asbestos-containing tiles normally a solid fiber structure can be assumed, however, in single cases there can exist a looser fiber structure.

IV. Surface Condition of the Asbestos Product (Lines 10 to 12)

The extent of damage is to be classified according to the three categories given.

V. External Impacts on the Asbestos Products (Lines 13 to 21)

Impacts can occur, for example:

- if the product is directly accessible and can therefore be easily damaged
- from moving cables in or around containment barriers
- if wires or decorations have been attached to or below suspended ceilings, or if suspended ceilings have been opened
- if metal coverings rub against the product
- if a moveable product is subject to friction

(continued)

- if ventilation channels are subject to vibrations, including for example, the switching on and off of the ventilation system

- if coated ceilings, walls, or supports are subject to vibrations or physical influence, for example, through ball throwing

- if roof or wall coverings are subject to strong climatic changes for example, interior coverings without an exterior thermal insulation

- if the product is located directly in the air stream of a ventilation system

- if there are strong air streams present in the room containing asbestos products.

For moveable products such as heat recovery devices, abrasion may occur because of improper operations or malfunctions.

VI. Room Use (Lines 22 to 25)

Schools, kindergartens, gymnasiums, and indoor pools are primarily used by children, youths, and younger adults. These age groups are particularly at risk for asbestos-related diseases because of the long latency period.

Rooms that are constantly or frequently used include all rooms that are regularly used over a time period of several

Rarely used rooms are utility shafts, crawl-ways, etc.

The asbestos-containing tiles produced in the former GDR (German Democratic Republic, DDR) were used in residences, rooms in residences are to be assessed according to Group VI, line 22.

VII. Location of the Product (Lines 26 to 29)

Those products that are situated between the bare floor and the lowest ceiling (intermediate ceiling) are to be classified as located directly in the room.

The linings and wrappings of ventilation ducts or ventilation devices must always be considered for all rooms serviced by these ventilation systems. For duct wrapping, it can be assumed that the ventilated rooms have not been impacted if it is demonstrated that the ducts or ventilation devices are tight.

All nonairtight structures or materials are considered the same as nonairtight suspended ceilings or coverings.

VIII. Assessment Score

The sum of lines 1 through 29.

IX. Abatement Analysis

Determine priority based on Item VIII and place on line 30. Sign and date.

Table 11-4

Radon Mitigation Schedule

(FGS-FRG Table 16-1)

Radon Level (pCi/L)	Mitigation Within:
Greater than 200	1 mo of sample results or move occupants
200 or less, but greater than 20	6 mo of sample results
20 or less, but greater than 8	4 yr
8 or less, but greater than 4	5 yr
4 or less	No action required

INSTALLATION:	COMPLIANCE CATEGORY: TOXIC SUBSTANCES MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		

SECTION 12

WASTEWATER MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 12

WASTEWATER MANAGEMENT

A. Applicability of this Section

This section identifies regulations, responsibilities, and compliance requirements applicable to all wastewater management and discharge on Air Force (AF) installations, including activities and procedures involved in the collection, treatment, and discharge of wastewater.

The regulations, responsibilities, and compliance requirements associated with wastewater discharge at AF installations include, but are not limited to, the following examples:

- sanitary or industrial wastewater discharged directly to a receiving stream or through an onbase treatment facility
- sanitary or industrial wastewater discharge to an offbase publicly owned treatment works (POTW) or to a treatment plant of another Department of Defense (DOD) activity
- stormwater runoff from industrialized areas of the installation to a receiving stream or water body.

Most AF installations have wastewater discharge of one type or another; therefore, this section will be applicable to most installations.

The regulatory requirements in this section are based on DOD regulations and Air Force Instructions (AFIs) that apply at overseas installations. Management Practices (MPs) are derived from U.S. Environmental Protection Agency (USEPA) regulations that are not mandatory overseas but are important to preserve the health and safety of AF employees and protect the environment.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 4 contains criteria to control and regulate discharges of wastewaters into surface waters. It also addresses domestic and industrial wastewater discharges and pollutants from indirect dischargers.

C. U.S. Air Force Documents

- AFI 32-1067, *Water Systems,* 25 March 1994, provides guidelines for managing water and wastewater systems at AF installations.

- AFI 48-119, *Medical Service Environmental Quality Program,* 25 July 1994, provides directive requirements for the Medical Service Environmental Quality Program and identifies responsibilities of participants in that program at AF installations.

- Air Force Manual (AFM) 91-32, *Operation and Maintenance of Domestic and Industrial Wastewater Systems,* specifies detailed operation and maintenance guidelines and requirements for treatment works on AF installations. In particular, requirements for maintenance of operating logs, maps, and records are specified in this AFM.

- HQ USAF/CE Letter, *Oil/Water Separators Operations, Maintenance, and Construction,* 21 October 1994, outlines requirements for the management of existing oil/water separators and the construction of new ones. The letter's requirements with respect to the construction of new oil/water separators are considered to go beyond the intent and scope of the *Overseas Environmental Baseline Guidance Document* and the Final Governing Standards derived from it. Those requirements are therefore not included here.

D. Responsibility for Compliance

- Training of operating personnel to meet proficiency levels consistent with the operator certification requirements that apply to their location is the responsibility of the BCE. The BCE is also responsible for monitoring compliance with, and reporting deviations from, minimum standards outlined in wastewater discharge permits (or equivalents). The BCE's design departments are responsible for the design and construction of wastewater collection and treatment systems as needed on the installation.

- Bioenvironmental Engineering Services (BES) is responsible for monitoring wastewater discharge and streamwater quality at selected locations around the installation and for characterizing discharges.

- Individual Shop Supervisors and Superintendents are responsible for ensuring that the prohibited, unpermitted discharge of wastewater containing toxic or hazardous substances into sanitary or stormwater systems does not occur on the installation.

- The Water and Waste Shop within BCE is responsible for operating and maintaining sewer lines, pretreatment facilities, pump stations, oil/water separators, and other associated facilities around the installation and for taking timely and appropriate corrective actions when deficiencies are discovered.

E. Definitions

- *7-day Average* - the arithmetic mean of a wastewater pollutant parameter value for samples collected over a period of seven consecutive days (FGS-FRG, Appendix A).

- *30-day Average* - the arithmetic mean of wastewater pollutant parameter value for samples collected in a period of 30 consecutive days (FGS-FRG, Appendix A).

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Approved* - in the context of backflow prevention, 'approved' means that the International Association of Plumbing and Mechanical Officials (IAPMO) laboratory has tested the product and that it meets their standards. IAPMO-approved products carry an attached or imprinted IAMPO seal of

approval. BCE can, with MAJCOM coordination, approve the installation of a new product or device not yet approved by IAPMO, but BCE must ensure that it will safely satisfy the intended purpose (AFI 32-1066, para 12.4).

- *BOD_5* - the five-day measure of the pollutant parameter 'biochemical oxygen demand' (FGS-FRG, Appendix A).

- *COD* - chemical oxygen demand (FGS-FRG, Appendix A).

- *Community Water System (CWS)* - a public water system having at least 15 service connections used by year-round residents, or which regularly serves at least 25 of the same persons over six months per year (FGS-FRG, Appendix A).

- *Competent* - an agency, authority, individual, official, person, etc., who meets any of the following criteria: (FGS-FRG, Appendix A)
  1. specifically designated as competent by FGS-FRG
  2. specifically designated as competent by the authority of a German government [agency]
  3. specifically designated as competent by or meets the qualifications of competency of a recognized German trade organization or association
  4. based on experience, training, and/or authority granted per DOD/component policy or regulations, judged by the responsible commander to be a capable and appropriated organization/ individual to accomplish the task in question.

- *DIN* - prefix used on documents published by the *Deutsches Institut für Normung* (DIN), which are the recognized technical standards in Germany (FGS-FRG, Appendix A).

- *Direct Discharge* - any discharge of pollutants into a wastewater stream other than an indirect discharge (FGS-FRG, Appendix A).

- *Discharge of a Pollutant* - any addition of any pollutant or combination of pollutants to waters of the host nation from any point source (FGS-FRG, Appendix A).

- *Domestic Wastewater Treatment Plant (DWTP)* - any DOD or host nation facility designed to treat wastewater before its discharge into waters of the host nation and in which the majority of such wastewater is made up of domestic sewage (FGS-FRG, Appendix A).

- *Ecologically Beneficial Production* - when the processes employed by a plant result in improved ecological conditions (e.g., removing phosphates from wastewater or removing heavy metals in wastewater so that sewage sludge may be used in land reclamation) (FGS-FRG, Appendix A).

- *EDTA* - ethylene diamine-tetracetic acid (FGS-FRG, Appendix A).

- *Effluent Limitation* - any restriction imposed on quantities, discharge rates, and concentrations of pollutants that are ultimately discharged from point sources into waters of the host nation (FGS-FRG, Appendix A).

- *Einwohnerwerten (EW)* - 60 g of BOD_5 stress per day (FGS-FRG, Appendix A).

- *Environment* - the natural and physical environment, excluding social, economic, and other environments (FGS-FRG, Appendix A).

- *Existing Source* - a source that discharges pollutants that was in operation or under construction before 1 October 1994 (FGS-FRG, Appendix A).

- *Indirect Discharge* - an introduction of pollutants in process wastewater to a DWTP (FGS-FRG, Appendix A).

- *Industrial Wastewater Treatment Plant (IWTP)* - any DOD facility designed to treat process wastewater before its discharge to waters of the host nation other than a DWTP (FGS-FRG, Appendix A).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Management Practice (MP)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *New Source* - a sources that discharges pollutants that was built or significantly modified on or after 1 October 1994 (FGS-FRG, Appendix A).

- *Point Source* - with respect to wastewater, any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, or rolling stock; but not including vessels, aircraft, or any conveyance that merely collects natural surface flows of precipitation (FGS-FRG, Appendix A).

- *Pollutant* - with respect to wastewater, includes, but is not limited to, the following: dredged spoil; solid waste; incinerator residue; filter backwash; sewage; garbage; sewage sludge; munitions; chemical wastes; biological materials; radioactive materials; heat; wrecked or discarded equipment; rock; sand; cellar dirt; and industrial, municipal, and agricultural waste discharged into water (FGS-FRG, Appendix A).

- *Process Wastewater* - any water which, during manufacturing or processing, comes into direct contact with, or results from the production or use of, any raw material, intermediate product, finished product, by-product, or waste product (FGS-FRG, Appendix A).

- *Qualified* - see *Competent.*

- *Qualified Random Sample* - a sample formed by mixing random samples. The number of samples mixed and the method of sampling may be dictated (FGS-FRG, Appendix A).

- *Raw Sludge* - sewage sludge taken from wastewater treatment facilities without being treated (FGS-FRG, Appendix A).

- *Sewage Sludge* - sludge, whether dewatered or dried, that accumulates in wastewater treatment facilities as a result of the treatment of wastewater (FGS-FRG, Appendix A).

- *Sludge* - the accumulated semiliquid suspension of settled solids deposited from wastewaters or other fluids in tanks or basins. It does not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial wastewater effluent, dissolved materials in irrigation return flows, or other common water pollutants (FGS-FRG, Appendix A).

- *State* - the political subdivision referred to as *Land* in Germany (FGS-FRG, Appendix A).

- *Surface Treatment* - a process in which the surface of an item is conditioned (e.g., placing an item in a pickling bath or a stripping tank) (FGS-FRG, Appendix A).

- *Surface Waters* - those waters continuously or occasionally flowing in beds, standing, or naturally flowing from springs (see *waters of the host nation*) (FGS-FRG, Appendix A).

- *Total Suspended Solids (TSS)* - the pollutant parameter total filterable suspended solids in wastewater (FGS-FRG, Appendix A).

- *Total Toxic Organics (TTO)* - with respect to wastewater, the sum of all quantifiable values greater than 0.01 mg/L for the toxic organics in Table 12-1 (FGS-FRG, Appendix A).

- *Waters of the Host Nation* - surface waters including the territorial seas recognized under customary international law, including (FGS-FRG, Appendix A):
    1. all waters that are currently used, were used in the past, or may be susceptible to use in commerce
    2. waters that are or could be used for recreation or other purposes
    3. waters from which fish or shellfish are or could be taken and sold
    4. waters that are used or could be used for industrial purposes by industry
    5. waters, including lakes, rivers, streams (including intermittent streams), sloughs, prairie potholes, or natural ponds
    6. tributaries of waters identified in 1 through 5 above.

  (NOTE: Waste treatment systems, including treatment ponds or lagoons, are not waters of the host nation. This exclusion applies only to man-made bodies of water which neither were originally waters of the host nation nor resulted from impoundment of waters of the host nation.)

WASTEWATER MANAGEMENT

GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
All Installations	12-1 through 12-4	(1)(2)(5)
General	12-5 through 12-18	(1)(2)(3)(4)
Point Source Discharges	12-19 through 12-26	(2)(3)(4)
Indirect Discharges	12-27 through 12-33	(1)(2)(3)(4)
Effluent Limitations	12-34 and 12-44	(1)(2)(3)
Monitoring Requirements	12-45	(1)(2)
Facilities in Hessen	12-46 through 12-51	(1)(2)(3)
Facilities in Rheinland-Pfalz	12-52	(1)(2)(3)
Oil/Water Separators	12-53	(1)(4)
Training and Certification	12-54 and 12-55	(3)

(a) CONTACT/LOCATION CODE:

(1) BCE (Environmental Planning)
(2) BES (Bioenvironmental Engineering Services)
(3) Wastewater Treatment Plant Superintendent
(4) BCE (Natural Resources Planner)
(5) Base Staff Judge Advocate

WASTEWATER MANAGEMENT

Records To Review

- Discharge monitoring reports for the past year
- Laboratory records and procedures
- Monthly operating reports for wastewater treatment facilities
- Flow monitoring calibration certification and supporting records
- Ash pond volume certification and supporting records
- Red water inspection records
- Spill Prevention, Control, and Countermeasures (SPCC) Plan
- All records required by SPCC
- Sewage treatment plant operator certification
- Sewer and storm drain layout
- Oil/water separator inventory
- Installation as-built drawings

Physical Features To Inspect

- Discharge outfall pipes
- Wastewater treatment facilities
- Industrial treatment facilities
- Streams, rivers, open waterways
- Floor and sink drains (especially in industrial areas)
- Stormwater collection points (especially in industrial areas)
- Oil storage tanks
- Oil/water separators

People To Interview

- BCE (Environmental Planning)
- BES (Bioenvironmental Engineering Services)
- Wastewater Treatment Plant Superintendent
- BCE (Natural Resources Planner)
- Base Staff Judge Advocate

COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT
Federal Republic of Germany ECAMP

REGULATORY REQUIREMENTS:	REVIEWER CHECKS: February 1997
ALL INSTALLATIONS	
12-1. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation Final Governing Standards and relevant USAF documents. (1)(5) (NOTE: Among the relevant documents are the following: - AFI 32-1067, *Water Systems*, 25 March 1994 - AFI 48-119, *Medical Service Environmental Quality Program,* 25 July 1994 - AFM 91-32, *Operation and Maintenance of Domestic and Industrial Wastewater Systems,* 12 August 1988 - HQ USAF/CE Letter, *Oil/Water Separators Operations, Maintenance, and Construction,* 21 October 1994.)
12-2. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning water quality have been issued since the finalization of the manual. (1) Verify that the installation is in compliance with newly issued regulations.
12-3. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a, 1-8c, and 4-3).	Determine whether German authorities require permits related to drinking water or wastewater management. (1) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
12-4. Outside of the continental U.S. (OCONUS) installations must cooperate with foreign regulatory agencies (AFI 32-1067, para 14.1).	Verify that the installation cooperates with German regulatory agencies, consistent with host nation agreements. (1)(2)

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COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
GENERAL	
12-5. Installations must dispose of wastewater in such a way that the common good is not compromised (FGS-FRG 4-2).	Verify that the installation disposes of wastewater in such a way that the common good is not compromised. (1)(2)(3)
12-6. Certain installations must designate one or more persons to be responsible for water protection (FGS-FRG 4-4a and 4-4c).	Determine whether the installation discharges more than 750 m^3 of wastewater per day. (1)(2)(3)(4) Verify that the installation has designated one or more persons to be responsible for water protection. Verify that only qualified individuals have been designated to be responsible for water protection. Verify that the persons designated to be responsible for water protection are supported by making adequate resources and personnel available to them. (NOTE: FGS-FRG 13-7b also creates an obligation to designate a person(s) or organization(s) responsible for water protection (see checklist item 5-21). Both the appointment under paragraph 4-4 and that under paragraph 13-7 should make specific reference to the relevant portions of FGS-FRG when describing the appointee's duties. Even though the obligations to appoint such a person or organization are independent of one another, the same person or organization may be appointed for both purposes.)
12-7. Individuals responsible for water protection must carry out specific responsibilities (FGS-FRG 4-4b).	Verify that individuals responsible for water protection carry out the following responsibilities: (1)(2)(3)(4) - supervise compliance with provisions, conditions, and obligations of their permit or of FGS-FRG - proper operations and maintenance - measurement of wastewater for quality and characteristics - keep records of test and measurement results - inform the IC of deficiencies and recommend measures for correcting them - apply suitable treatment processes, including the proper use or disposal of residues from wastewater treatment - develop and introduce intraplant procedures for avoiding or reducing the accumulation of different types and amounts of wastewater while working toward ecologically beneficial production - explaining to the plant staff the function of each piece of equipment and the plant's treatment process and ensuring that they understand the impact of and the action to take in case of a malfunction.

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COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
12-8. Installations follow certain basic procedures in complying with the requirements of FGS-FRG (FGS-FRG 4-5b through 4-5f).	Verify that the installation obtains values listed that refer to wastewater being discharged from a wastewater treatment facility according to the applicable technical rules. (1)(2)(3)(4) Verify that the installation does not obtain these values by dilution or mixing. (NOTE: Values listed are based on the methodologies indicated or on equivalent procedures.) Verify that, if a qualified random sample is required, it consists of a mixture of at least five random samples that are taken no less than 2 min. apart within a maximum period of 2 h. (NOTE: If a production-specific limit (e.g., m^3/t, g/t, kg/t) is established, it refers to the design production capacity, unless a different capacity has been established by permit, in which case that capacity applies.) (NOTE: Values are considered complied with if the last five test results do not exceed it in four cases and no result exceeds the value by more than 100 percent. Tests more than 3 yr old are disregarded.)
12-9. Installations must dispose of the wastewater treatment sludges in accordance with specific criteria (FGS-FRG 4-23).	Verify that the installation disposes of wastewater treatment sludges in accordance with the requirements of Section 4, *Hazardous Waste Management*, or Section 9, *Solid Waste Management*, as appropriate. (1)(2)(3)
12-10. BES must conduct periodic evaluations of the treatment works' compliance with applicable standards (AFI 32-1067, para 4.4).	Verify that BES conducts periodic evaluations of compliance with applicable standards. (2)
12-11. BES must characterize and monitor certain discharges for compliance (AFI 48-119, para 9.4.1).	Verify that BES performs stormwater, point and nonpoint ambient water discharge and injection well discharge (groundwater) characterization and compliance monitoring. (2)

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COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
12-12. BES must develop and maintain stream emission inventories (AFI 48-119, para 9.4.1).	Verify that BES develops and maintains stream emission inventories. (2)
12-13. BES must permanently identify all environmental monitoring points and maintain a master record of all locations (AFI 48-119, para 9.4.1).	Verify that BES has permanently identified all environmental monitoring points. (3) Verify that BES maintains a master record of all locations.

12-14. Major treatment works must have plant-specific O&M manuals (AFI 32-1067, para 7.3.1).	Verify that the installation's major treatment works have plant-specific O&M manuals. (3)
	
	(NOTE: Domestic and industrial wastewater treatment plants are the primary facilities covered by this instruction.)
	
	Verify that, if the facilities are present on the installation, plant-specific manuals address the following areas of concern:
	
	- metal finishing and electroplating
	- vehicle and aircraft wash facilities
	- aircraft maintenance
	  - paint stripping
	  - nondestructive inspection
	  - painting
	  - solvent cleaning
	- battery shops
	- photo labs
	- hospitals
	- aircraft deicing
	- fire training.
	
	Verify that plant-specific manuals address the proper operation and maintenance of oil/water separators and lift stations.

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COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
12-15. Specific physical facility information must be developed, maintained, and kept available at treatment facilities (AFI 32-1067, para 10.2).	Verify that the following information is developed, maintained, and kept available at the treatment facilities: (1)(3) - required plant-specific O&M manuals and applicable AF publications - system operating instructions with single-line drawings, including operational and compliance monitoring procedures - up-to-date system as-built drawings along with other system plans and blueprints, including hydraulic water elevation profiles and a drawing of the entire collection and distribution systems - shop drawings, catalogue cuts, and any other equipment information or literature.
12-16. Installations must develop and maintain effective maintenance plans that address specific topics (AFI 32-1067, para 10.3).	Verify that the installation develops and maintains effective maintenance plans that include: (1) - a recurring work schedule - a maintenance history for each major piece of equipment - an essential spare parts list, with spare parts stocked at the treatment facility or other accessible location - a long-range maintenance and improvement plan.
12-17. Each installation must have a system for investigating water pollution complaints from individuals and German water pollution control authorities (FGS-FRG 4-13 and 4-15).	Verify that the installation has procedures for investigating water pollution complaints. (3) Verify that the Executive Agent is involved as appropriate.
12-18. Operators of treatment works must prepare pollution control logs (AFI 32-1067, para 10.1.2).	Verify that operators prepare the following forms: (3) - AF Form 1462, *Water Pollution Control Utility Operating Log (General)* - AF Form 1463, *Water Pollution Control Plant Operating Log--Supplementary.*

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COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
POINT SOURCE DISCHARGES	(NOTE: The requirements in this section apply where the point of wastewater discharge is under DOD control.)

12-19. New point source dischargers of pollutants must meet specific limitations on TSS and pH (FGS-FRG 4-7a).	Verify that all new point source dischargers of pollutants comply with the following effluent limitations: (2)(3)
	- TSS:
	  - 30-day average does not exceed 30 mg/L
	  - 7-day average does not exceed 45 mg/L
	- effluent pH values are maintained between 6.0 and 9.0.
	(NOTE: Discharge at a new source can be exempted from the pH limit if both of the following can be demonstrated:
	- no inorganic chemicals are added to the waste stream as part of the treatment process
	- contributions from industrial sources do not cause the pH of the effluent to be outside the 6.0 to 9.0 range.)

12-20. Existing point source dischargers of pollutants must meet specific effluent limitations on TSS and pH (FGS-FRG 4-7b).	Verify that all existing sources of pollutants to host-nation waters comply with the following effluent limitations: (2)(3)
	- TSS:
	  - 30-day average does not exceed 45 mg/L
	  - 7-day average does not exceed 65 mg/L
	- effluent pH values are maintained between 6.0 and 9.0.

12-21. New and existing point source dischargers of pollutants must comply with specific limits on BOD_5, COD, ammonium/nitrogen, total phosphorous, and cadmium in wastewater discharged into surface water (FGS-FRG 4-6 and 4-8).	Verify that the installation does not exceed the limits on BOD_5, COD, ammonium/nitrogen, and total phosphorous given in Table 12-2. (2)(3) Verify that cadmium values do not exceed 0.2 mg/L as a 2-h mixed sample or as a qualified random sample/spot-check. Verify that analysis for cadmium is accomplished in accordance with DIN 38 406-E22 (March 1988) and/or DIN 19 559 (July 1993).

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COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
12-22. Point source dischargers must comply with monitoring frequency requirements for BOD_5, TSS, and pH (FGS-FRG 4-12).	(NOTE: Monitoring includes both sampling and analysis.) (NOTE: Certain states may require more frequent monitoring. See below.) Determine the capacity of the wastewater treatment plant. (2)(3) Verify that the installation conducts tests in accordance with the following: - capacity less than 380,000 L/day: at least quarterly - capacity of 380,000 L/day up to 3,800,000 L/day: at least monthly - capacity of 3,800,000 L/day up to 19,000,000 L/day: at least weekly - capacity of 19,000,000 L/day or more: at least daily.
12-23. Point source dischargers of wastewater must comply with minimum requirements on settleable solids and COD (FGS-FRG 4-11).	Verify that point source dischargers of wastewater do not exceed 0.5 mL/L settleable solids in the random sample. (2)(3) (NOTE: If the required value for settleable solids is exceeded in an individual sample, 0.5 mL/L may be used to obtain the arithmetic mean if the dry weight of the filterable substances does not exceed 50 mg/L. See test method DIN 38 409-H-2 (July 1980).) Verify that point source dischargers of wastewater achieve a discharge value in a mixed sample that equals a COD decrease of at least 75 percent. (NOTE: A facility is in compliance if the arithmetic mean of the last 5 test results does not exceed the value established. If the fish toxicity value is limiting, compliance is achieved if in the last five tests the limit is not exceeded in four cases. Test more than 3 yr old are disregarded.)
12-24. Installations are prohibited from discharging wastewater that contains certain substances (FGS-FRG 4-9a and 4-10).	Verify that the installation does not discharge wastewater that contains DDT or PCP. (2)(3) Verify that the installation does not discharge wastewater that results from the removal of distillation residue from solvent recycling. (NOTE: Wastewater that contains these substances must be containerized and handled as hazardous waste in accordance with the requirements of Section 4, *Hazardous Waste Management.*)

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COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
12-25. Installations must comply with limits on the discharge of Aldrin and/or Dieldrin and/or Endrin (FGS-FRG 4-9b).	Verify that the installation discharges no more than a total of 3 g/day of these substances. (2)(3) (NOTE: If the wastewater also contains Isodrin, the discharge limitation applies to the sum of the values for Aldrin, Dieldrin, Endrin, and Isodrin.)
12-26. Installations with live fire training facilities that are connected to onsite wastewater treatment plants should discharge the effluent gradually to avoid adverse impact on the wastewater treatment plants (MP).	Verify that there is an effective fuel and water separator. (4) Verify that the fuel and water separator are being properly maintained. Verify that there are self-monitoring reports on fuel and water separators. Verify that wastewater treatment plant discharge is in compliance with permit requirements. Verify that the fuel used for fire training is free from contaminants that can cause adverse environmental impact.
INDIRECT DISCHARGES	(NOTE: These and the following effluent limitations apply to all discharges of pollutants to DWTPs and associated collection systems.)

12-27. Activities or installations that have a significant potential for spills or batch discharges must develop a slug prevention plan (FGS-FRG 4-14f).	Verify that the plan contains the following, at a minimum: (2)(3)
	
	- a description of discharge practices, including nonroutine batch discharges
	- a description of stored chemicals
	- a plan for immediately notifying the DWTP of slug discharges and discharges that would violate standards, including procedures for subsequent written notification within 5 days
	- necessary practices to prevent accidental spills, including:
	  - proper inspection and maintenance of storage areas
	  - handling and transfer of materials
	  - loading and unloading operations
	  - control of plant site runoff
	  - worker training
	- proper procedures for building containment structures or equipment
	- necessary measures to control toxic organic pollutants and solvents
	- proper procedures and equipment for emergency response and any subsequent plans needed to limit damage to the treatment plant or the environment.

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COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
12-28. Installations must develop a base standard wastewater treatment procedure to govern the discharge of industrial and nondomestic waste to the sanitary system by generating activities (AFI 32-1067, para 7.3.2).	Verify that the installation has a base standard wastewater treatment procedure to govern the discharge of industrial and nondomestic waste to the sanitary system by generating activities. (1)(3) Verify that BCE outlines procedures for discharging industrial wastes to the sanitary system. Verify that the procedures describe the following: - pretreatment requirements - discharge procedures - effluent limitations for industrial waste. (NOTE: The base commander or the municipal wastewater authority can impose these requirements.) Verify that generators follow the instructions given by BCE.
12-29. Generators must use pollution control techniques to minimize pollutant discharges (AFI 32-1067, para 7.3.2).	Verify that generators of discharges minimize the discharge of pollutants using the pollution control techniques in AFI 32-7080. (1)(3) (NOTE: See the pollution prevention subsection of Section 6, *Other Environmental Issues*.)
12-30. Installations must not discharge certain materials into a treatment works (FGS-FRG 4-14a, 4-14e, and 4-14g).	Verify that the installation does not discharge any of the following to a DWTP: (1)(2)(3) - petroleum oil - nonbiodegradable cutting oil - products of mineral oil origin - any solid or viscous pollutants that may result in obstructions to plant flow - trucked or hauled waste. (NOTE: DWTPs may specify locations at which trucked and hauled waste may be discharged; the prohibition on discharge of such waste does not apply at such locations.)

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COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
12-31. Installations must not introduce specific pollutants into a DWTP (FGS-FRG 4-14b through 4-14d).	Determine whether the installation has been granted any exemptions or variances concerning its discharges. (1)(3) Verify that pollutants that create a fire or explosion hazard in the collection system or treatment facility are not discharged, specifically: - wastewater with a closed cup flashpoint of less than 60 °C (140 °F) - liquid waste solutions that contain more than 24 percent alcohol by volume with a flash point less than 60 °C (140 °F) - nonliquid wastes which, under standard temperature and pressure, can cause a fire through friction - ignitable compressed gases - oxidizers, such as peroxide. Verify that no pollutant that has the potential to be structurally corrosive is discharged to the DWTP. Verify that no wastewater with a pH lower than 5.0 is discharged to the DWTP. (NOTE: This prohibition does not apply if the treatment facilities and collecting systems are designed to handle such wastewater.) Verify that the following types of waste are not discharged: - wastes that are normally unstable and readily undergo violent changes without detonating - wastes that react violently with water - wastes that form explosive mixtures with water or form toxic gases or fumes when mixed with water - cyanide or sulfide wastes that can generate potentially harmful toxic fumes, gases, or vapors - wastes capable of detonation or explosive decomposition or reaction at standard temperature and pressure - wastes that contain regulated explosives - wastes that produce any toxic fumes, vapors, or gases with the potential to cause safety problems or harm to workers.
12-32. Hazardous waste must not be discharged to the collection system (AFI 32-1067, para 7.3.2).	Verify that no hazardous waste is discharged to the collection system. (1)(3)

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COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
12-33. Installations should periodically survey stormwater discharge (MP).	Verify that the installation's stormwater discharges are uncontaminated. (1)(2)(4) (NOTE: The following sites or activities, and records related to them, may reveal problems with stormwater discharges: - the storm sewer system, its outfalls and discharge points - major industrial shops or areas, such as the following: - battery shop - corrosion control - engine shop - motor pool - paint shop - plating shop - petroleum, oil, and lubricant (POL) area.) (NOTE: Signs of contamination include oil sheen, discoloration, etc.) Verify that any oil/water separators connected to the storm sewer on the installation are operating properly.
EFFLUENT LIMITATIONS	(NOTE: In general, wastewater may be discharged, according to the state of the art, only if the amount of pollutants it contains is kept at a minimum using the following techniques: - treatment of process baths by means of appropriate procedures like membrane filtration, ion-exchange, electrolysis, thermal procedures in order to achieve a relatively long standing time (*Standzeit*) of the process baths - retention of substances contained in the baths by means of appropriate procedures like low-spreading transportation of goods (*verschleppungsarmer Warentransport*), splash protection, optimal bath composition - repeated use of rinse water by means of appropriate procedures like cascade rinsing and circulatory rinsing through ion-exchangers - recovery and return of appropriate substances contained in the rinse water back to the process baths - recovery of EDTA from chemical copper baths and their rinse water.)
Electroplating	
12-34. Wastewater from fat extraction baths, metal stripping baths, and nickel baths must not contain EDTA (FGS-FRG 4-17b).	Verify that wastewater from fat extraction baths [= degreasers?], metal stripping baths, and nickel baths does not contain EDTA. (2)(3)

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COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT
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REGULATORY REQUIREMENTS:	REVIEWER CHECKS: February 1997
12-35. New and existing electroplating facilities that directly or indirectly discharge less than 38,000 L/day (10,000 gal/day) must meet specific standards (FGS-FRG 4-17c).	Verify that the following standards are met: (2)(3) Pollutant — Daily Maximum (mg/L) — 4-day Average (mg/L) Cyanide, amenable — 5.0 — 2.7 Lead — 0.6 — 0.4 Cadmium — 1.2 — 0.7 TTO — 4.57 — --- (NOTE: See Table 12-1 for a list of components of TTOs.) Verify that the installation discharges no more than a total of 3 g/day of Aldrin and/or Dieldrin and/or Endrin. (NOTE: If the wastewater also contains Isodrin, the discharge limitation applies to the sum of the values for Aldrin, Dieldrin, Endrin, and Isodrin.)
12-36. New and existing electroplating facilities that directly or indirectly discharge 38,000 L/day (10,000 gal/day) or more must meet specific standards (FGS-FRG 4-17d).	Verify that the following standards are met: (2)(3) Pollutant — Daily Maximum (mg/L) — 4-day Average (mg/L) Cyanide, total — 1.9 — 1.0 Copper — 4.2 — 2.7 Nickel — 4.1 — 2.6 Chrome — 7.0 — 4.0 Zinc — 4.2 — 2.6 Lead — 0.6 — 0.4 Cadmium — 0.2 — 0.2 Total Metals — 10.5 — 6.8 TTO — 2.13 — --- Verify that the installation discharges no more than a total of 3 g/day of Aldrin and/or Dieldrin and/or Endrin. (NOTE: If the wastewater also contains Isodrin, the discharge limitation applies to the sum of the values for Aldrin, Dieldrin, Endrin, and Isodrin.)

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
12-37. New and existing facilities that electroplate precious metals and that directly or indirectly discharge 38,000 L/day (10,000 gal/day) or more must meet additional standards (FGS-FRG 4-17e through h).	Verify that the following standards are met: (2)(3) Pollutant — Daily Maximum (mg/L) — 4-day Average (mg/L) Silver — 1.2 — 0.7 Verify that wastewater from the application of highly volatile halogenated hydrocarbons (LHKW) does not exceed 0.1 mg/L in a random sample. (NOTE: The value is the sum of trichlorethene [= trichlorethylene], tetrachlorethene [= tetrachlorethylene], 1,1,1-trichlorethane [FGS-FRG has mistranslated *1,1,1-Trichlorethan*], and dichloromethylene [i.e., dichloromethane = methylene chloride], calculated as chlorine.) Verify that wastewater from baths that contain cadmium (including rinsing) does not exceed 0.2 mg/L in a 2-h mixed sample or qualified random sample. (NOTE: For charging facilities *(Chargeanlagen)*, the value applies to random samples.) Verify that wastewater that contains mercury does not exceed 0.05 mg/L in a 2-h mixed sample or qualified random sample. (NOTE: For charging facilities *(Chargeanlagen)*, the value applies to random samples.)
Metal Working or Processing	(NOTE: The requirements of this section apply to wastewater coming primarily from hardening, mechanical shops, vibratory grinding, and metal painting shops. They do not apply to wastewater from cooling systems, treatments systems for industrial water, or from precipitation.)
12-38. Installations must comply with certain standards by pretreatment according to the state of the art (FGS-FRG 4-18b).	Verify that wastewater from the application of highly volatile halogenated hydrocarbons (LHKW) does not exceed 0.1 mg/L in a random sample. (2)(3) (NOTE: The value is the sum of trichlorethene [= trichlorethylene], tetrachlorethene [= tetrachlorethylene], 1,1,1-trichlorethane [FGS-FRG has mistranslated *1,1,1-Trichlorethan*], and dichloromethylene [i.e., dichloromethane = methylene chloride], calculated as chlorine.) Verify that wastewater from baths that contain cadmium (including rinsing) does not exceed 0.2 mg/L in a 2 h mixed sample or qualified random sample. (NOTE: For charging facilities *(Chargeanlagen)*, the value applies to random samples.) Verify that wastewater that contains mercury does not exceed 0.05 mg/L in a 2-h mixed sample or qualified random sample.

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12-38. (continued)	(NOTE: For charging facilities *(Chargeanlagen),* the value applies to random samples.) Verify that the requirements in Table 12-3 and Table 12-4 are met. (NOTE: The values listed in Table 12-3 and Table 12-4 refer to wastewater discard from a wastewater treatment facility for each area of origin. For wastewater coming from more than one area of origin, the respective requirements from each area must be derived from Table 12-3 and 12-4. If wastewater from two or more areas of origin is treated together, the same reduction in the total amount of pollutants with respect to each parameter must be achieved as in a separate treatment.) (NOTE: The production specific limit values for cadmium and cadmium plus mercury are met if the above limits for cadmium and mercury are met and the respective concentration values for cadmium and cadmium plus mercury in Table 12-4 are met.) Verify that, where a factor has not been set for a given substance, the substance is not discharged.
Wastewater Contaminated with Mineral Oil	(NOTE: The requirements of this section apply to wastewater coming primarily from plants with a regular accumulation of wastewater that contains petroleum resulting from maintenance, removal of impregnating substances, and cleaning of vehicles. they do not apply to wastewater from waste disposal on ships, metal working and processing, paint shops, or the cleaning of the interior of transport containers.)
12-39. The discharge of wastewater from facilities is subject to specific requirements according to the state-of-the art (FGS-FRG 4-19b).	Verify that the wastewater does not contain organically bound halogenated compounds coming from washing and cleaning agents or other auxiliary substances. (2)(3) Verify that the wastewater does not contain more than 20 mg/L total hydrocarbons in a random sample. (NOTE: This requirement applies only to discharges from pretreatment facilities where total hydrocarbons is the critical parameter for hazardous substances. It does not apply to wastewater from automated vehicle washing facilities, unless such facilities generate more that 1 m^3 per day of wastewater that contains petroleum.)

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12-39. (continued)	(NOTE: The 20 mg/L value established for total hydrocarbons is complied with if the following conditions are met: - a separator consisting of a separator for low-density liquids according to DIN 1999 with an additional coalescence separator is built into the discharge pipe before mixing with other wastewater, or an equivalent treatment facility is operated - only wastewater containing washing and cleaning agents or unstable emulsions that do not impair the cleaning capacity of the facility is introduced into the facility - the DIN 1999 separator and the additional coalescence separator are built in such a way that when using a heating oil-water mixture in accordance with the testing requirements in DIN 1999, Part 3, a residual concentration of 5 mg/L of heating oil is not exceeded in the discharge pipe - if not maintained by qualified in-house personnel, a maintenance contract with a qualified business exists for maintaining the facility - the facility is inspected for proper condition at intervals of no more than 5 yr - the structuring of the DIN 1999 separator with the additional coalescence separator was based on a wastewater volume of 4 L/s in dry weather, and that volume is not exceeded.)
Runoff from Settlement Wastes	(NOTE: The requirements of this section apply to wastewater coming primarily from the deposit of community wastes (*Siedlungsabfälle*) - household waste and commercial waste that may be deposited together.)
12-40. The discharge of runoff from settlement wastes is subject to specific limitations (FGS-FRG 4-20b).	Verify that the pollutant concentrations in a qualified random sample or 2 h mixed sample does not exceed the following: (1)(2)(3) - 20 mg/L of BOD_5 - 200 mg/L of COD - 50 mg/L of NH_4-N. Verify that a qualified random sample or 2-h mixed sample does not exceed the following levels: - 20 mg/L for filterable substances - 2 for fish toxicity as dilution factor G_F - 0.5 mg/L for adsorbable organically bound halogens (AOX) - 0.05 mg/L for mercury - 0.1 mg/L for cadmium - 0.5 mg/L for chromium - 0.5 mg/L for nickel - 0.5 mg/L for lead - 0.5 mg/L for copper - 2.0 mg/L for zinc.

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12-40. (continued)	(NOTE: The value given for filterable solids is a guide parameter for other substances that do not have an individually established level.) Verify that, for wastewater that contains more than 4000 mg/L of COD before treatment, a COD discharge value in the 2-h mixed sample achieves a discharge value that equals a COD decrease of at least 95 percent. Verify that, for wastewater that contains more than 4000 mg/L of COD before treatment, wastewater is discharged with wastewater of other origin in a joint biological final treatment (*gemeinsamer biologischer Endbehandlung*) only if a degradability test shows that COD is reduced by 75 percent through biochemical treatment. (NOTE: This requirement does not apply if wastewater before the biological final treatment with wastewater of other origin already shows a COD content of less than 400 mg/L.) (NOTE: The biological decomposability of the filtered sample defined as the COD or the DOC Decomposition Degree is determined according to DIN 38 412-L25 (January 1984). The "Inokulum" (referring to inoculate) with 1 g TS is used in the taste rate. The duration of the elimination test corresponds to the time necessary to reach the COD Elimination Degree of the total wastewater in the actual wastewater cleaning facility in the test simulation for the overall wastewater. The restrictions in paragraph 4 of the DIN are not to be taken into consideration. The COD concentration in the test rate (COD between 100 and 1000 mg/L) must correspond as far as possible with the actual wastewater dilution.)
Dry Cleaning	(NOTE: The requirements of this section apply to wastewater coming primarily from the dry cleaning of textiles and rugs as well as from goods made of fur or leather when using solvents with halogenated hydrocarbons.)
12-41. Wastewater from dry cleaning facilities may contain only certain halogenated solvents (FGS-FRG 4-21b(1) and 4-21b(4)).	Verify that the wastewater from dry cleaning facilities contains no halogenated solvents other than tetrachloroethene. (2)(3) (NOTE: The requirement to use allowed solvents is complied with if it is proven that only permitted halogenated hydrocarbons are used.)
12-42. Dry cleaning facilities must meet specific criteria for the discharge of AOX (FGS-FRG 4-21b(2)).	Verify that, for facilities capable of cleaning up to 50 kg of goods at one time, AOX does not exceed 0.5 mg/L in a random sample. (2)(3) Verify that, for larger facilities, AOX does not exceed 0.5 mg/L and 0.25 g/kg of goods cleaned, based on the 1-h throughput capacity of the facility. (NOTE: For larger facilities, a random sample and the 1 h water amount are used to determine compliance.)

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12-42. (continued)	(NOTE: If more than one cleaning machine is operated in the same dry cleaning facility, the sum of the capacity of goods to be cleaned of the individual machines is decisive.) (NOTE: A value established for AOX is also complied with if the content of halogenated hydrocarbons in wastewater was determined through the individual substances used, and when added and calculated as chlorine, does not exceed the values given above.) (NOTE: A value is also complied with if a wastewater treatment facility permitted for the processing of halogenated hydrocarbons is properly installed, operated, and maintained and is inspected before the start-up of operations and at regular intervals of no more than 5 yr with respect to its proper condition.)
Drinking Water Processing, Industrial Processes, Cooling Systems, and Steam Production	(NOTE: The requirements of this section apply to wastewater from the processing of drinking water and industrial water, circulation cooling systems from factories and industrial processes, and from other production facilities during steam production. They do not apply to the introduction of wastewater from freshwater cooling systems or purification systems designed for the re-utilization of water or the washing of stack gas.)
12-43. Settleable solids from drinking and industrial water purification facilities must not exceed certain limits (FGS-FRG 4-22b(1)).	Verify that settleable solids from drinking and industrial water purification facilities do not exceed 0.3 mL/L in a random sample. (2)(3) (NOTE: This requirement applies to wastewater discharges resulting in the purification of water from flowing waters only if the discharge (Q) does not exceed the mean water (MQ). It does not apply to the introduction of residues from back-flushing a filter in times of increased migration of young fish.)
12-44. Installations must comply with certain values for wastewater from circulation cooling systems and other accumulation points during steam production (FGS-FRG 4-22b(2) and 4-22b(3)).	Verify that, for wastewater from circulation cooling systems and other accumulation points during steam production, the installation complies with the values given in Table 12-5. (2)(3) (NOTE: Compliance is achieved if the arithmetic mean of the last five test results does not exceed the standard given in the table. Tests more than 3 yr ago are disregarded.) (NOTE: If a value determined for settleable solids is exceeded in an individual sample, 0.3 mL/L may be used to obtain the arithmetic mean for wastewater originating in the purification of water from flowing waters if the ash content of the dry weight of the settleable solids does not exceed 12 mg/L. See test method DIN 38 409-H-10 (July 1980) in connection with DIN 38 409-H-2-2/3 (July 1980).)

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Monitoring Requirements	
12-45. Installations must meet specific requirements with regard to the monitoring of industrial dischargers (FGS-FRG 4-24).	(NOTE: Monitoring includes both sampling and analysis.) Verify that monitoring by industrial dischargers occurs quarterly. (1)(2) Verify that monitoring includes all required parameters. Verify that samples are collected at the point of discharge and before any mixing with the receiving waters. (NOTE: Sampling for TTO can be avoided if the IC determines that there is no discharge of concentrated TTO into the wastewater and the facility has implemented a TTO management plan.)
Facilities in Hessen	(NOTE: These requirements apply in addition to those given above. If a particular parameter is addressed both in the above sections and in this section, all requirements must be met. In most cases, if the standard given in this section is met, any relevant standards in the above sections will also be met.)
12-46. Parties that store, transfer, produce, treat, or otherwise use hazardous substances must determine whether their wastewater is or may be polluted with hazardous substances (FGS-FRG 4-35).	Verify that the installation determines whether its wastewater is or may be polluted with hazardous substances. (1)(2)(3)
12-47. The operator of a wastewater facility must provide it with certain equipment and carry out necessary analysis (FGS-FRG 4-36a).	Verify that the installation's wastewater facility or facilities have the necessary devices and measuring equipment and carry out necessary analyses. (1)(2)(3) Verify that, as a minimum, analysis includes: - measuring the flow - analysis of wastewater flow into and out of the facility - monitoring the composition of sludge - determination of the parameters serving to control the operation of the facility.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
12-48. The operator of a biological wastewater treatment facility must carry out certain measurements and examinations (FGS-FRG 4-36b).	Determine whether the installation operates a biological wastewater treatment facility. (1)(2)(3) Verify the installation carries out the measurements and examinations shown in Table 12-6.
12-49. For wastewater discharges into waters, backup samples must be taken of the wastewater to be inspected and kept at 4 °C until the analysis of the original sample is available (FGS-FRG 4-36c).	Verify that the installation takes backup samples and keeps them at 4 °C until the analysis of the original sample is available. (1)(2)(3)
12-50. The operator of a wastewater facility must meet certain supervisory requirements (FGS-FRG 4-36d).	Verify that the installation supervises the discharges of third parties into its facility by regular examinations to the extent that nonhousehold waste is discharged. (1)(2)(3) Verify that the installation sets up a wastewater cadastral map that is organized by the catchment area of the treatment facility. Verify that the number and type of examinations is established by the installation based on the type and composition of the wastewater discharged (including hazardous substances).
12-51. Installations must meet specific requirements with regard to testing (FGS-FRG 4-36e).	(NOTE: It is not necessary to take wastewater samples if the desired information on the composition of the wastewater can be determined by direct measurement.) Verify that, if they are not specified in a permit, sampling points are established by an expert and marked. (1)(2)(3) Verify that qualified random samples are used instead of a random sample where a random sample is specified as the testing standard. Verify that the 2-h mixed sample is used where specified. Verify that the 24-h mixed sample is not used unless required by a permit.

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12-51. (continued)	(NOTE: If, during the process of sampling for the 2-h mixed sample, no significant wastewater fluctuation is expected, time-proportional sampling may be used. If significant flow fluctuations are expected, amount proportional sampling is required. In general, the 24-h mixed samples have to be taken amount-proportional. To determine freight balances, splitting the mixed sample into several-day samples (very polluted) and a night sample (low polluted) is best.) Verify that random samples are collected with suitable cropping vessels that have been washed each time before sampling and kept clean. Verify that samples are transported only in glass bottles with ground glass stoppers or plastic containers (of polyvinyl chloride or polyethylene). Verify that glass bottles are used if testing for oil components, solvents, pesticides, mercury, or odor-active substances. Verify that containers meet appropriate DIN or DEV standards. Verify that the sample vessel is rinsed with a part of the sample before filling and then filled to the brim. Verify that a minimum volume of 1 L is obtained. Verify that, if the sample has oily, floating, or greasy components, the vessel is filled to the three-quarters level. Verify that the water sample is not affected by the use of the discharge instrument. (NOTE: Mixed samples may be taken by hand if the use of an automatic discharge instrument is not possible or expedient. Generally, mixed samples are taken with the help of a discharge instrument, which should be controllable, time- and amount-dependent. As a rule, a sewage treatment plant with a capacity of more than 10,000 EW should be equipped with an automatic sampling instrument.) (NOTE: Before taking direct measurements of chemical and physical values, it is normally necessary to determine the organoleptic parameters (i.e., smell, color, and turbidity). Verify that the following direct measurements are taken on the spot: - temperature - O_2 content - pH - biodegradable substances (volume quota) - biodegradable substances (mass concentration) - sludge volume. Verify that the wastewater flow is recorded and registered for every sampling.

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12-51. (continued)	(NOTE: The momentary value (e.g. L/s, m^3/s) is recorded for a random sample, and the relevant flow amount (e.g., m^3/24 h) is recorded for a mixed sample.) Verify that venturi canal (or related systems) and inductive measuring instruments are used for flow measurements in wastewater treatment plants. Verify that, for plants in Size Categories 2, 3, and 4, the momentary flow value is read continually and that the flow amount is summed and or recorded. Verify that, if necessary, a measuring signal is installed to control an automatic sampling instrument to discharge amount-proportional samples. Verify that instruments conform to the standards in DIN 19 559. (NOTE: As a rule, the water amount is to be measured at the outflow of the plant, and for plants in Size Categories 3 and 4, at the inflow as well.) Verify that the outflow measuring instrument is regularly examined by a competent expert or institute (e.g., university, calibration firm). Verify that deficiencies found during the testing program are recorded in the operating log of the plant/system.
Facilities in Rheinland-Pfalz	(NOTE: These requirements apply in addition to those given above. If a particular parameter is addressed both in the above sections and in this section, all requirements must be met. In most cases, if the standard given in this section is met, any relevant standards in the above sections will also be met.)
12-52. Wastewater treatment plants with a daily input greater than 8 m^3/day must meet certain requirements (FGS-FRG 4-38).	Determine whether the wastewater treatment plant has a daily input greater than 8 m^3/day. (1)(2)(3) Verify that the operator determines the degradation rate of the wastewater that enters the facility. Verify that installations performs the analyses and measurements listed in Table 12-7.

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REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
OIL/WATER SEPARATORS **12-53.** Existing oil/water separators must be managed in accordance with specific requirements (HQ USAF/CE Oil/Water Separator Letter).	Verify that the installation has developed and implemented a plan to assess the need for and effectiveness of existing oil/water separators. (1)(4) (NOTE: The goal of the assessment/evaluation is to consolidate or eliminate ineffective units.) Verify that an inventory of all oil/water separators has been conducted that identifies: - all sources of pollutants being discharged from the individual shops connected to each separator - the mode of discharge (e.g., to storm sewer, sanitary sewer, septic tank, or direct discharge to the waters of the host nation). (NOTE: For the purposes of this inventory, oil/water separators include on-line oil and grease/fuel traps and small oil/water separators outside of hangers, corrosion control facilities, fuel transfer/storage operations, AGE equipment maintenance shops, wash racks, etc. Mode of discharge includes discharge to storm sewer, septic tank, or direct discharge to the waters of the host nation.) Verify that the separators are identified on the installation as-built drawings. Verify that the drawings are updated as changes occur.
TRAINING AND CERTIFICATION **12-54.** Operators of wastewater treatment plants must meet training requirements (AFI 32-1067, para 8.1).	Verify that new operators receive classroom training and extensive supervised on-the-job training before being assigned to critical tasks. (3) Verify that experienced personnel receive technical refresher courses and upgrade training. (NOTE: Training requirements may be met by one of the following means: - AF training available through technical schools, career development correspondence courses, and on-the-job training - civilian training courses available at educational institutions, government agencies, and professional and technical associations - correspondence courses from accredited institutions for operators in areas that do not have local resident courses.)

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12-55. Supervisors at wastewater treatment plants must meet specific requirements with regard to safety training for all employees (AFI 32-1067, para 9).	Verify that all employees are familiar with the safety instructions in the following documents, as applicable: (3) - AFM 91-32, *Operation and Maintenance of Domestic and Industrial Wastewater Systems* - Air Force Occupational Safety and Health Standard (AFOSH STD) 127-10, *Civil Engineering* - AFOSH STD 127-25, *Confined Spaces* - AFOSH STD 161-21, *AF Hazard Communication Standard.* Verify that the supervisor maintains current BES baseline and annual industrial hygiene survey reports. (NOTE: The supervisor should use these reports to train workers on occupational health hazards.) Verify that supervisors make safety instructions readily available to all operating personnel. Verify that supervisors train facility personnel on safety procedures and equipment and enforce their proper use at all times. (NOTE: Once trained, individual workers are personally responsible for following safe procedures.)

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Table 12-1

Components of Total Toxic Organics
(FGS-FRG Table 4-12)

Volatile Organics
Acrolein (Propenyl)
Acrylonitrile
Methyl chloride (chloromethane)
Methyl bromide (bromomethane)
Vinyl chloride (chloroethylene)
Chloroethane
Methylene chloride (dichloromethane)
1,1-Dichloroethene
1,1-Dichloroethane
1,2-Dichloroethane
1,2-trans-Dichloroethene
Chloroform (trichloromethane)
1,1,1-Trichloroethane
Carbon tetrachloride (tetrachloromethane)
Bromodichloromethane
1,1,2,2-Tetrachloroethane
1,2-Dichloropropane
1,3-Dichloropropylene (1,3-Dichloropropene)
Trichloroethene
Dibromochloromethane
1,1,2-Trichloroethane
Benzene
2-Chloroethyl vinyl ether (mixed)
Bromoform (tribromomethane)
Tetrachloroethene
Toluene
Chlorobenzene
Ethyl benzene

(continued)

Table 12-1 (continued)

Base/Neutral Extractable Organics
N-nitrosodimethylamine
bis (2-chloroethyl) ether
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1,2-Dichlorobenzene
bis (2-chloroisopropyl)-ether
Hexachloroethane
N-nitrosodi-n-propylamine
Nitrobenzene
Isophorone
bis (2-chloroethoxy) methane
1,2,4-trichlorobenzene
Naphthalene
Hexachlorobutadiene
Hexachlorocyclopentadiene
2-Chloronaphthalene
Acenaphthylene
Dimethyl Phthalate
2,6-Dinitrotoluene
Acenaphthene
2,4-Dinitrotoluene
Fluorene
4-Chlorophenyl phenyl ether
Diethyl phthalate
1,2-Diphenylhydrazine
N-nitrosodiphenylamine
4-Bromophenyl phenyl ether
Hexachlorobenzene
Phenanthrene
Anthracene
Di-n-butyl phthalate
Fluoranthene
Pyrene
Benzidine
Butyl benzyl phthalate
1,2-benzoanthracene (benzo (a) anthracene)

(continued)

Table 12-1 (continued)

Chrysene
3,3-Dichlorobenzidine
bis (2-ethylhexyl) phthalate
Di-n-octyl phthalate
3,4-Benzofluoranthene (benzo (b) fluoranthene)
11,12-Benzofluoranthene (benzo (k) fluoranthene)
Benzo (a) pyrene (3,4-benzopyrene)
Indeno (1,2,3-cd) pyrene (2,3-phenylene pyrene)
1,2,5,6-Dibenzanthracene (dibenezo (a,h) anthracene)
1,12-Benzoperylene (benzo (g,h,i) perylene)
Acid Extractables Organics
2-Chlorophenol
Phenol
2-Nitrophenol
2,4-Dimethylphenol
2,4-Dichlorophenol
4,6-Dinitro-o-cresol
2,4,6-Trichlorphenol
2,4-Dinitrophenol
4-Nitrophenol
p-Chloro-m-cresol
Pentachlorophenol
Pesticides/PCBs
Alpha-Endosulfan
Beta-Endosulfan
Endosulfan sulfate
Alpha-BHC
Beta-BHC
Delta-BHC
Gamma-BHC
4,4-DDT
4,4-DDE (p,p-DDX)
4,4-DDD (p,p-TDE)
Aldrin
Chlordane (technical mixture and metabolites)
Dieldrin

(continued)

Table 12-1 (continued)

Endrin
Endrin aldehyde
Heptachlor
Heptachlor Epoxide (BHC-hexachlorocyclohexane)
Toxaphene
PCB-1242 (Arochlor 1242)
PCB-1254 (Arochlor 1254)
PCB-1221 (Arochlor 1221)
PCB-1232 (Arochlor 1232)
PCB-1248 (Arochlor 1248)
PCB-1260 (Arochlor 1260)
PCB-1016 (Arochlor 1016)
2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)

Table 12-2

Maximum Contaminant Level for Wastewater Discharged into Surface Waters - National Standards

(FGS-FRG, Table 4-1)

Category	Size in kg/day	COD	BOD_5	NH_4 -N	Total Phosphorus
	BOD (Raw)	mg/L	mg/L	mg/L	mg/L
1	< 60	150	40	-	-
2	= 60, < 300	110	25	-	-
3	=300, < 1200	90	20	10	-
4	=1200, < 6000	90	20	10	2
5	≥ 6000	75	15	10	1

NOTES:

1. Above based on a qualified random sample or a 2-h mixed sample.

2. These values apply to a wastewater temperature of 12 °C or more in the discharge pipe of the biological reactor of the wastewater treatment facility.

3. If, the sample comes from a pond facility that is designed for a holding time of 24 h or more, and the sample is clearly colored by algae, COD and BOD_5 must be determined from algae-free sample. In this case the values are reduced by 15 mg/L for COD and 5 mg/L for BOD_5 .

4. The classification of a discharging facility into one of the size categories is dependent on the capacity (*Bemessungswerten*) of the wastewater treatment facility which is based on the BOD concentration of the untreated wastewater (BOD raw). In cases in which the capacity of a wastewater treatment facility was calculated based only on the BOD value of settled wastewater, the following values are to be used for the classification:

category 1: smaller than 40 kg/d BOD settled
category 2: 40 to 200 kg/d BOD settled
category 3: larger than 200 to 800 kg/d BOD settled
category 4: larger than 800 to 4000 kg/d BOD settled
category 5: larger than 4000 kg/d BOD settled

Table 12-3

Maximum Contaminant Level (mg/L) for Wastewater Discharges from Metal Working or Processing Where Control is Accomplished by Generally Accepted Technology - national standards
(FGS-FRG Table 4-2)

SUBSTANCE	MECHANICAL WORKSHOP	MACHINE SHOP	PAINT SHOP
Aluminum	3	3	3
Nitrogen from ammonium compounds	30	-	-
Chemical oxygen demand (COD)	400	400	400
Iron	3	3	3
Fluoride	30	-	-
Nitrogen from nitrite	5	-	-
Hydrocarbons (random samples)	10	10	10
Phosphorus	2	2	2

Table 12-4

Maximum Contaminant Level (mg/L) for Wastewater Discharges from Metal Working or Processing Where Control is Accomplished by State of Technology Methods - National Standards

(FGS-FRG Table 4-3)

SUBSTANCE	MECHANICAL WORKSHOP	MACHINE SHOP	PAINT SHOP
AOX	1	1	1
Arsenic	-	-	-
Barium	-	-	-
Lead	0.5	-	0.5
Cadmium free[1]	0.1	-	0.2
Chlorine	0.5	-	-
Chromium	0.5	0.5	0.5
Chromium IV	0.1	0.1	0.1
LHKW[2]	0.1	0.1	0.1
Cobalt	-	-	-
Cyanide, easily releasable fish toxicity as dilution - rarefaction factor	0.2	-	-
G_F[3]	6	6	6
Copper	0.5	0.5	0.5
Nickel[4]	0.5	0.5	0.5
Mercury[1]	-	-	-
Selenium	-	-	-
Silver	-	-	-
Sulphide	-	-	-
Tin	-	-	-
Zinc	2	2	2

(continued)

Table 12-4 (continued)

FOOTNOTES:

[1] The freight factors refer to the prospective amount of used cadmium and mercury

[2] The sum of Trichlorethen, Tetrachlorethen, 1, 1, 1-Trichlorethan, Dichlormethan - calculated as chlorine

[3] The requirement for fish toxicity is not applicable to the case where the wastewater is being mixed with wastewater from a community which is biologically treated before being discharged into surface water.

[4] In case of chemically reductive nickel separation, 1 mg/L.

Table 12-5

Maximum Contaminant Level (mg/L) from Circulating Cooling Systems and the Accumulation Points During Steam Production - National Standards

(FGS-FRG Table 4-4)

Circulating system of:

	Power plants	Industrial processes	Other accumulation in the production of steam
(random sampling)			
Settleable substances (mL/L)	0.3	0.3	0.3
active chlorine (mg/L)	-	0.3	-
hydrazine (mg/L)	-	-	5
(2 hours mixed sampling)			
COD (mg/L)	30	40	-
phosphorus (mg/L)	3	5	8[1]
vanadium (mg/L)	-	-	3[2]
iron (mg/L)	-	-	7[3]
zinc (mg/L)	-	4	-

FOOTNOTE:

[1] These minimum requirements are only applicable to wastewater flowing from steam boilers.

[2] This minimum requirement is only applicable to wastewater from the cleaning of the stack gas of oil-fired steam boilers.

[3] This minimum requirement is only applicable to wastewater from the cleaning of the stack gas of coal-fired steam boilers and air preheaters.

Table 12-6

Required Checks and Analyses for Wastewater Treatment Facilities with a Biological Processing Phase - Applicable to Hessen Only

(FGS-FRG Table 4-10)

Abbreviations:

d - daily or per charge - examinations must be done for sewage treatment plants less than 50 m^3 in size at least 5 days per week, for bigger plants at least 6 days per week, for commercial and industrial plants every workday on which wastewater from the plant is introduced into the sewage treatment plant.
wd - weekday
w - weekly
m - monthly
y - yearly
c - continuously or per charge

Size of the Waste Water Facility

CHECK OR ANALYSIS	Category 1 up to 60 kg/d BOD_5 (raw)	Category 2 over 60 up to 600 kg/d BOD_5 (raw)	Category 3 over 600 up to 6000 kg/d BOD_5 (raw)	Category 4 over 6000 kg/d BOD_5 (raw)
Inflow facility				
Wastewater quantity			c	c
pH factor	w	wd	d	c
Temperature		wd	d	d
BOD_5	m	m	w	w
COD	m	m	w	w
AOX				m
Outflow prepurification				
Biodegradable substances	w	w	w	
ph factor		w	w	d
BOD_5	m	m	w	w

(continued)

Table 12-6 (continued)

Stimulation Basin

O_2 content	w/wd	w/wd	c	c
Mud volume	w	wd	d	d
Dry substance	m[1]	w[1]	w	d
Loss of glowing	m	w	w	d

Drip-body

Biodegradable substances in the drain			d	d

Filter-bed for 2nd Purification

Visible depth	w[1]	wd[1]	d	d

Outflow Facility

Wastewater quantity	wd/wd[3]	c/c[3]	c	c
Biodegradable substances	w/wd	w/wd	d	d
pH factor	w	w	d	d
Temperature	w	w	d	d
BOD_5	m	w	w	d
COD	m	w	w	d
NH_5 -N	m	w	w	d
PO_4 -P	m	w	w	d
AOX				m

Digestive/Decomposition-Tank

ph factor		wd	d	d
Temperature		c	c	c
CO_2 content		m	w	d
COD in muddy water			m	m
Dry substance			m	m
Loss of glowing and remains of glowing			m	m
Amount of digestive mud		m	w	d

(continued)

Table 12-6 (continued)

Stabilization Basin

O_2 -content	w	w	w	w
Dry substance	m	m	w	w
Loss of glowing	m	m	w	w
Amount of digestive mud	---[2]	m[2]	w	d

Mechanical Drainage

Dry substance			m	w
Biodegradable substance in the filtrate				w
COD in the filtrate				m
Amount of digestive mud		m	w	d

FOOTNOTES:

[1] Quarterly survey/measurement of the mud-surface depending on the type of the facility either in the ventilation-pool or in the filter-bed for the 2nd purification.

[2] The amount of mud and dry substance has to be determined in case the pond/pool gets cleared/vacated.

[3] With existing facilities by was of exception in the inflow so far as the outflow does not yet have a measuring device and a reduction is not made within the facility.

Table 12-7

Required Checks and Analyses for Wastewater Treatment Facilities - Applicable in Rheinland-Pfalz Only

(FGS-FRG Table 4-11)

Abbreviations:

d - daily or per charge - examinations must be done for sewage treatment plants less than 50 m^3 in size at least 5 days per week, for bigger plants at least 6 days per week, for commercial and industrial plants every workday on which wastewater from the plant is introduced into the sewage treatment plant.
wd - weekday
w - weekly
m - monthly
y - yearly
c - continuously or per charge

CHECK OR ANALYSIS	Frequency required based on size: Category 1 up to 60 kg/d BOD_5 (raw)	Category 2 60 kg and smaller than 300 kg/day BOD_5 (raw)	Category 3 300 kg and smaller than 3000 kg/day BOD_5 (raw)	Category 4 3000 kg/day and larger BOD_5 (raw)
Inflow Facility				
Wastewater volume stream[2,4]	-	m^3	c	c
pH factor	w	wd	c	c
Temperature	-	wd	wd	c
BOD_5[1]	m	m	w	w
COD[1]	m	m	w	w
NH_4-N[1]	-	-	m	w
P_{ges}[1]	-	-	w	w
Outflow Prepurification				
Biodegradable substances	-	w	wd	wd

(continued)

Table 12-7 (continued)

Stimulation Basin

O_2 -content	w	wd	c	c
Mud volume	-	m	w	wd
Dry substance	-	m	w	wd
Loss of glowing and remains of glowing	-	m	w	wd

Filter-Bed for Second Purification

Visible depth	-	wd	wd	wd

Digestive Tank

pH factor	-	-	c	c
Temperature	-	-	c	c
CO_2 content	-	-	w	w
Dry substance	-	-	m	m
Loss of glowing and remains of glowing	-	-	m	m
Amount of digestive mud	-	-	w	w

Discharge/Outflow Facility

Wastewater volume stream[2,4]	w[3]	w[3]	c	c
Biodegradable substances	w	w	wd	wd
pH factor	w	wd	c	c
Temperature	w	wd	wd	c
BOD_5[1]	m	w	w	w
COD[1]	m	w	w	w
NH_4-N[1]	-	-	m	w
NO_5-N[1]	-	-	m	w
P_{ges}[1]	-	-	m	w
AOX[1]	-	-	-	m

(continued)

Table 12-7 (continued)

FOOTNOTES:

[1] Use a 2-h mixture sample or qualified random sample.

[2] A hydraulically defined gutter is necessary in order to measure the wastewater volume stream. Feces, mud, and wastewater volumes from small sewage plants respective wastewater pits have to be included separately.

[3] Measurement of the wastewater volume streams shifted in time over a period of 2 h can be done with the help of a measuring weir.

[4] Volume stream = standardized naming for outflow, flow through, etc.

INSTALLATION:	COMPLIANCE CATEGORY: WASTEWATER MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		

SECTION 13

WATER QUALITY MANAGEMENT

Federal Republic of Germany ECAMP

SECTION 13

WATER QUALITY MANAGEMENT

A. Applicability of this Section

This section identifies regulations, responsibilities, and compliance requirements applicable to water use and management on Air Force (AF) installations, including activities and procedures involved in the collection, treatment, storage, and distribution of drinking water.

All AF installations have potable water issues of one sort or another; therefore, this section will be applicable to most installations.

The regulatory requirements in this section are based on DOD regulations and Air Force Regulations (AFRs) and Air Force Instructions (AFIs) that apply at overseas installations. Management Practices (MPs) are derived from U.S. Environmental Protection Agency (USEPA) regulations that are not mandatory overseas but are important to preserve the health and safety of AF employees and protect the environment.

B. DOD Directives/Instructions

- *Environmental Final Governing Standards--Germany* (FGS-FRG), November 1994, Chapter 3, addresses standards for potable water and the management of a drinking water facility.

C. U.S. Air Force Documents

- AFR 91-26, *Maintenance and Operation of Water Supply, Treatment, and Distribution Systems,* 30 August 1984, provides guidance for personnel who maintain and operate water supply, treatment, and distribution systems on AF installations.

- AFI 32-1066, *Plumbing Systems,* 4 May 1994, provides guidance for personnel who maintain and operate plumbing systems on AF installations.

- AFI 32-1067, *Water Systems,* 25 March 1994, provides guidelines for managing water and wastewater systems at U.S. AF bases.

- Headquarters (HQ) USAF/SG Policy Letter, *Water Testing in Child Development Centers (CDCs),* 21 October 1992, provides guidelines for monitoring drinking water at AF CDCs.

D. Responsibility for Compliance

- The Base Civil Engineer (BCE) designs, constructs, and operates the water supply system to provide sufficient drinking water to installation personnel. The BCE is responsible for providing adequate water treatment to assure that drinking water does not exceed the maximum contaminant levels established for human consumption. Training of operating personnel to meet proficiency levels consistent with the operator certification requirements that apply to their location is also the responsibility of the BCE. The BCE maintains an up-to-date map of the complete potable water system, makes

repairs, and maintains the systems. The BCE is also responsible for negotiating and maintaining the base's water supply contract.

- The Director of Base Medical Services, through BES, is responsible for proper sample collection from drinking water systems at AF installations and for determining compliance with drinking water standards.

E. Definitions

- *Accommodation* - those DOD facilities on a single parcel of real estate with defined boundaries. They will normally have been assigned a unique DOD installation/station code as defined by military department regulations issued pursuant to DOD Instruction 4165.14, Chapter 1. Examples are a kaserne, operations site, or training area (FGS-FRG, Appendix A).

- *Accommodation Commander* - the individual responsible for the command and control of the accommodation (FGS-FRG, Appendix A).

- *Action Level* - the concentration of a substance in water that determines the appropriate treatment for a water system (FGS-FRG, Appendix A).

- *Approved* - in the context of backflow prevention, 'approved' means that the International Association of Plumbing and Mechanical Officials (IAPMO) laboratory has tested the product and that it meets their standards. IAPMO-approved products carry an attached or imprinted IAMPO seal of approval. BCE can, with Major Command (MAJCOM) coordination, approve the installation of a new product or device not yet approved by IAPMO, but BCE must ensure that it will safely satisfy the intended purpose (AFI 32-1066, para 12.4).

- *Asbestos* - a generic term used to describe six distinctive varieties of fibrous mineral silicates, including chrysotile, amosite, crocidolite, tremolite asbestos, anthrophylite asbestos, actinolite asbestos, and any other material that has been made by chemically treating or altering them (FGS-FRG, Appendix A).

- *Community Water System (CWS)* - a public water system having at least 15 service connections used by year-round residents, or which regularly serves at least 25 of the same persons over 6 mo/yr (FGS-FRG, Appendix A).

- *Competent* - an agency, authority, individual, official, person, etc., who meets any of the following criteria: (FGS-FRG, Appendix A)
  1. specifically designated as competent by FGS-FRG
  2. specifically designated as competent by the authority of a German government [agency]
  3. specifically designated as competent by or meets the qualifications of competency of a recognized German trade organization or association
  4. based on experience, training, and/or authority granted per DOD/component policy or regulations, judged by the responsible commander to be a capable and appropriated organization/ individual to accomplish the task in question.

- *Concentration Time (CT)* - the product of residual disinfectant concentration, C, in mg/L determined before or at the first customer, and the corresponding disinfectant contact time, T, in minutes (FGS-FRG, Appendix A).

- *Disinfectant* - any oxidant, including but not limited to, chlorine, chlorine dioxide, chloramines, and ozone, intended to kill or inactivate pathogenic microorganisms in water (FGS-FRG, Appendix A).

- *First Draw Sample* - a 1 L [≈0.26 gal] sample of tapwater that has been standing in plumbing at least 6 h and is collected without flushing the tap (FGS-FRG, Appendix A).

- *Groundwater Under the Direct Influence of Surface Water (GWUDISW)* - any water below the surface of the ground with significant occurrence of insects or other microorganisms, algae, or large-diameter pathogens such as *Giardia lamblia*; or significant and relatively rapid shifts in water characteristics, such as turbidity, temperature, conductivity, or pH, which closely correlate to climatological or surface water conditions (FGS-FRG, Appendix A).

- *Installation* - one or more accommodations treated as an entity for command and control purposes (e.g., the real property making up an air base, Area Support Group, or Base Support Battalion) (FGS-FRG, Appendix A).

- *Installation Commander (IC)* - the individual responsible for the command and control of an installation (FGS-FRG, Appendix A).

- *Lead-Free* - a maximum lead content of 0.2 percent for solder and flux, and 0.8 percent for pipes and fittings (FGS-FRG, Appendix A).

- *Lead Service Line* - a service line made of lead that connects the water main to the building inlet, and any lead pigtail, gooseneck, or other fitting that is connected to such line (FGS-FRG, Appendix A).

- *Management Practice (MP)* - practices that, although not mandated by law, are encouraged to promote safe operating procedures.

- *Maximum Contaminant Level (MCL)* - the maximum permissible level of a contaminant in water that is delivered to the free-flowing outlet of the ultimate user of a public water system, except for turbidity, for which the maximum permissible level is measured after filtration. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by water quality, are excluded (FGS-FRG, Appendix A).

- *Non-Public Water System* - a system which is not a public water system. For example, a well serving a building (FGS-FRG, Appendix A).

- *Point-of-Entry (POE) Treatment Device* - a treatment device applied to the drinking water entering a structure to reduce contaminants in drinking water throughout the structure (FGS-FRG, Appendix A).

- *Point-of-Use (POU) Treatment Device* - a treatment device applied to a tap to reduce contaminants in drinking water at that tap (FGS-FRG, Appendix A).

- *Potable Water* - water that has been examined and treated to meet the drinking water standards in FGS-FRG, Chapter 3 (FGS-FRG, Appendix A).

- *Public Water System (PWS)* - a system for providing piped water to the public for human consumption, if such system has at least 15 service connections or regularly serves an average of at least 25

individuals daily at least 60 days of the year. This term includes both community and non-community water systems along with any collection, treatment, storage, and distribution facilities under the control of the operator of such systems, and any collection or pretreatment storage facilities not under such control that are used primarily in connection with such systems. A non-community system is used by intermittent users or travelers and is subclassified into a non-transient non-community (NTNC) system and transient non-community (TNC) system. A NTNC system could be a school or factory with its own water supply where the same people drink the water throughout the year, but not 24 hours a day. A motel with its own well is an example of a TNC system (FGS-FRG, Appendix A).

- *Qualified* - see *Competent.*

- *Sanitary Survey* - an on-site review of the water source, facilities, equipment, operation, and maintenance of a public water system to evaluate the adequacy of such elements for producing and distributing potable water (FGS-FRG, Appendix A).

- *State* - the political subdivision referred to as *Land* in Germany (FGS-FRG, Appendix A).

- *Substantial Modification* - any functional alteration to any existing environmental control facility, the cost of which exceeds $1 million, regardless of funding source (FGS-FRG, Appendix A).

- *Surface Waters* - those waters continuously or occasionally flowing in beds, standing, or naturally flowing from springs (FGS-FRG, Appendix A).

- *Total Trihalomethanes* - the sum of the concentrations in mg/L of chloroform, bromoform, dibromochloromethane, and bromodichloromethane (FGS-FRG, Appendix A).

- *Underground Injection* - a subsurface emplacement through a bored, drilled, driven, or dug well where the depth is greater than the largest surface dimension, whenever a principal function of the well is the emplacement of any fluid (FGS-FRG, Appendix A).

- *Vulnerability Assessment* - an evaluation by DOD which shows that contaminants of concern either have not been used in a watershed area or that the source of water for the system is not susceptible to contamination. Susceptibility is based on prior occurrence, vulnerability assessment results, environmental persistence, and transport of the contaminants, and any wellhead protection program results (FGS-FRG, Appendix A).

- *Water System* - refers to both a PWS and a NPWS, and purchasers who have a distribution system and water storage facilities (FGS-FRG, Appendix A).

WATER QUALITY MANAGEMENT

GUIDANCE FOR CHECKLIST USERS

	REFER TO CHECKLIST ITEMS:	CONTACT THESE PERSONS OR GROUPS: (a)
All Installations	13-1 through 13-5	(1)(2)(6)
Backflow Prevention	13-6 through 13-20	(1)(2)(5)
Drinking Water		
General	13-21 through 13-32	(1)(2)(4)
Water Quality Standards	13-33 through 13-48	(2)(4)
Disinfection and Filtration	13-49 through 13-51	(1)(2)(3)
Child Development Centers	13-52 through 13-56	(2)
Recordkeeping and Notification Requirements	13-57 through 13-67	(1)(2)(4)
Alternative Water Supplies	13-68	(1)(2)
Underground Injection Control	13-69	(2)(3)
Aquifers	13-70	(2)(3)
Training and Certification	13-71 and 13-72	(4)

(a) CONTACT/LOCATION CODE:

(1) BCE (Environmental Planning)
(2) BES (Bioenvironmental Engineering Services)
(3) BCE (Natural Resources Planner)
(4) Water Treatment Plant Superintendent
(5) Backflow Program Manager
(6) Base Staff Judge Advocate

WATER QUALITY MANAGEMENT

Records To Review

- Bacterial and chemical analyses of drinking water, including sampling dates and locations, dates of analyses, analytical methods used, and results of analyses
- Monthly operating reports (flow, chlorine residual, etc.)
- Records of planning and construction of injection wells
- Results of injection well monitoring
- Records of facility projects, including any petition for review, that may potentially cause contamination of a sole source aquifer through its recharge zone

Physical Features To Inspect

- Drinking water collection, treatment, and distribution facilities
- Onbase laboratory analysis facilities
- Underground injection wells

People To Interview

- BCE (Environmental Planning)
- BES (Bioenvironmental Engineering Services)
- BCE (Natural Resources Planner)
- Water Treatment Plant Superintendent
- Base Staff Judge Advocate

COMPLIANCE CATEGORY: WATER QUALITY MANAGEMENT Federal Republic of Germany ECAMP

REGULATORY REQUIREMENTS:	REVIEWER CHECKS: February 1997
ALL INSTALLATIONS	
13-1. Copies of all relevant DOD directives/ instructions, USAF directives, and guidance documents should be maintained at the installation (MP).	Verify that the Base Staff Judge Advocate has available the host-nation Final Governing Standards and relevant USAF documents. (1)(6) (NOTE: Among the relevant documents are the following: - AFR 91-26, *Maintenance and Operation of Water Supply, Treatment, and Distribution Systems*, 30 August 1984 - AFI 32-1066, *Plumbing Systems,* 4 May 1994 - AFI 32-1067, *Water Systems*, 25 March 1994 - HQ USAF/SG Policy Letter, *Water Testing in Child Development Centers*, 21 October 1992.)
13-2. Installations must meet regulatory requirements issued since the finalization of the manual (a finding under this checklist item will have the citation of the new regulation as a basis of finding).	Determine whether any new regulations concerning water quality have been issued since the finalization of the manual. (1)(6) Verify that the installation is in compliance with newly issued regulations.
13-3. Installations must meet specific criteria with regard to permits required under German law (FGS-FRG 1-8a, 1-8c, and 4-3).	Determine whether German authorities require permits related to drinking water or wastewater management. (1)(6) Verify that a German government agency applies for the permit on behalf of the installation. Verify that, if a permit is applied for and granted, the installation complies with the conditions and requirements set forth in it. (NOTE: If a permit requires a more protective standard than those prescribed in FGS-FRG, the standard in the permit is the compliance standard. However, if a permit allows a less protective standard, then the provision of FGS-FRG is the compliance standard, unless a waiver is granted.)
13-4. Outside of the continental U.S. (OCONUS) installations must cooperate with foreign regulatory agencies (AFI 32-1067, para 14.1).	Verify that the installation cooperates with German regulatory agencies, consistent with host nation agreements. (1)(2)

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Natural Resources Planner) (4) Water Treatment Plant Superintendent (5) Backflow Program Manager (6) Base Staff Judge Advocate

COMPLIANCE CATEGORY: WATER QUALITY MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
13-5. Bases must not have dual water supply systems for potable and nonpotable water unless certain conditions have been met (AFI 32-1067, para 12.1).	Verify that the following conditions are met by bases with dual water supply systems: (1) - BCE establishes and maintains a clearly defined separation of the two systems so that nonpotable water cannot contaminate the potable water system - the systems have approved backflow prevention devices to prevent contamination of potable water - the MAJCOM approves the dual system before construction and operation - connections between systems are avoided.
BACKFLOW PREVENTION	(NOTE: Except for laboratory sinks and sinks with hose threaded faucets, backflow preventers integral to a standard plumbing fixture do not come under this program.)
13-6. Installations must establish an effective cross-connection control and backflow prevention program (FGS-FRG 3-3g).	Verify that the installation has established an effective cross-connection and backflow prevention program. (1)(6) Verify that drinking water supply systems are not connected to water supply systems that contain water that is not of drinking water quality.
13-7. The lines of different supply systems (insofar as they are not covered with earth) must be marked with different colors (FGS-FRG 3-3g).	Verify that the lines of different supply systems (insofar as they are not covered with earth) are marked with different colors. (1)(6)
13-8. Installations must have a Backflow Program Manager who fulfills specific responsibilities (AFI 32-1066, paras 6, 8, and 12.2).	Verify that an engineer or appropriate supervisor has been appointed the Backflow Program Manager. (1)(5) Verify that the Backflow Program Manager: - maintains an aggressive program to identify, isolate, record, and correct cross-connections and other potential sources of distribution system contamination - makes sure plumbing personnel can properly test, install, maintain, and repair backflow prevention device - identifies and forecasts training requirements for BCE personnel - reviews all plans and drawings of new or modified water systems to identify potential cross-connections - centrally maintains inspection records and the status of installation and upgrade actions.

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Natural Resources Planner) (4) Water Treatment Plant Superintendent (5) Backflow Program Manager (6) Base Staff Judge Advocate

COMPLIANCE CATEGORY: WATER QUALITY MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
13-9. The installation's Backflow Program Manager must conduct a facility survey of plumbing devices and systems every 5 yr (AFI 32-1066, paras 8, 12.1).	Verify that the Backflow Program Manager conducts a facility survey of plumbing devices and systems every 5 yr. (5) Verify that records are updated to reflect the results of the survey. (NOTE: Military family housing is excluded from the survey unless underground sprinkler systems are installed.) (NOTE: The Backflow Program Manager coordinates the surveys with BES.) Verify that survey personnel locate backflow prevention devices, assess their adequacy, and determine the need for more devices. (NOTE: This information is used to determine potential or existing cross-connections and the degree of hazard they present.) Verify that the results of the survey are recorded on AF Form 848, *Inventory of Cross-Connection Control and Backflow Prevention Devices.*
13-10. BES must fulfill particular responsibilities with regard to cross-connections (AFI 32-1066, para 9).	Verify that BES assigns a degree of hazard to each cross-connection, using the *Uniform Plumbing Code* (UPC). (2) Verify that BES reviews plans for water system modification to prevent cross-connections and to identify existing cross-connections or other potential sources of contamination or pollution and recommends corrective action.
13-11. BCE personnel must eliminate the potential for cross-connections (AFI 32-1066, para 11).	Verify that the potential for cross-connection is eliminated. (1) Verify that, if elimination is not feasible, approved prevention devices are installed. Verify that the devices installed prevent contamination of potable water supplies that are susceptible to backpressure or back-siphonage from fixtures, equipment, appliances, or buildings. Verify that, if the potable water supply is critical, approved backflow preventers are installed in parallel to allow maintenance or repair without system shutdown.
13-12. Severe cross-connections must be eliminated immediately (AFI 32-1066, para 12.2).	Verify that severe cross-connections are eliminated immediately. (1)

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Natural Resources Planner) (4) Water Treatment Plant Superintendent (5) Backflow Program Manager (6) Base Staff Judge Advocate

COMPLIANCE CATEGORY: WATER QUALITY MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
13-13. Installations must take specific actions with regard to existing backflow protection devices (AFI 32-1066, para 12.5).	Verify that existing backflow prevention devices are identified during the survey by a control number. (5) Verify that unapproved devices are replaced in priority depending on the degree of hazard and without waiting for the devices to fail. (NOTE: MAJCOM/CE may be contacted for help when uncertain about a device's category or level of protection.)
13-14. Installations must meet specific requirements with regard to backflow prevention on new dry/wet fire suppression systems (AFI 32-1066, para 12.6).	Verify that double check valve backflow preventers are installed on new dry/wet fire suppression systems that use only water as a fire suppressant. (5) Verify that a reduced pressure type backflow device is used where antifreeze or other hazardous chemicals are added. Verify that backflow preventers are approved and listed for fire protection use by acceptable testing agencies such as Underwriters' Laboratories or Factory Mutual.
13-15. Backflow prevention retrofit work must be performed when systems are down for major renovation (AFI 32-1066, para 12.6).	Verify that backflow prevention retrofit work is performed when systems are down for major renovation. (5) (NOTE: This requirement is waived if a threat dictates that the work be performed sooner.)
13-16. Technicians who test and maintain backflow prevention devices must be certified by MAJCOM (AFI 32-1066, paras 14 and 15).	Verify that MAJCOM-certified technicians perform tests, inspections, and maintenance of backflow prevention devices. (5) (NOTE: Current certificates using forms other than AF Form 483, *Certificate of Competency,* are valid until they expire.) Verify that technicians are recertified by MAJCOM every 3 yr. (NOTE: The MAJCOM recertifies technicians using data furnished by BCE, who requests recertification at least 60 days before the expiration date on AF Form 483. For the purposes of recertification a retraining course is unnecessary if the technician has inspected and tested a representative number (normally 50) of double-check and/or reduced pressure backflow devices since last certified.)

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13-17. Tests and inspections of backflow devices must be conducted on a schedule established by the Backflow Prevention Manager (AFI 32-1066, para 13).	Verify that the Backflow Prevention Manager has established a schedule for testing and inspecting all backflow devices, including air gaps. (5) Verify that the frequency of testing, inspection, and overhaul of each devices is established with due regard to the age, condition, and degree of hazard each prevents. (NOTE: The inspecting and testing schedule should be part of the recurring work program.) Verify that overhauls are performed according to manufacturer recommendations. (NOTE: The following are recommended time intervals for inspection of backflow prevention devices. If the Degree of Hazard is: — Inspect Device Every: Minor — 24 mo Moderate — 24 mo Severe — 6 mo (Air Gap) — 12 mo.)
13-18. Certain tasks must be conducted in the course of inspections of cross-connections (AFI 32-1066, paras 13.1, 13.2, and 13.3).	Verify that certified backflow inspectors inspect all cross-connections to make sure that: (5) - there is an approved air gap - the backflow prevention devices are in good condition - newly installed devices were installed correctly and are free of debris that could interfere with their functioning. Verify that all devices are tested in accordance with the UPC, the *UPC Illustrated Testing Manual*, or the manufacturer's instructions. Verify that defective devices are repaired and retested or replaced. Verify that the inspector records data on all cross-connections on AF Form 845, *Cross-Connection Information*, or an approved computerized version. (NOTE: For an air gap, the test consists of a visual inspection and an "OK" recorded if it is satisfactory.) Verify that the form appropriate for the device is also filled out: - AF Form 843, *Backflow Prevention Inspection Data* - AF Form 844, *Backflow Prevention (Vacuum Breakers) Inspection Data.*

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13-19. Installations must meet specific inspection requirements on newly installed backflow prevention devices (AFI 32-1066, para 13.1).	Verify that newly installed devices are inspected within 1 week of installation. (5) Verify that a follow-up inspection is performed 3 mo later.
13-20. Installations must meet recordkeeping requirements with regard to backflow prevention (AFI 32-1066, para 13.4).	Verify that the installation keeps an inventory of all device locations and an individual record (AF Form 845) for each device. (5) Verify that records of cross-connection control and backflow prevention devices are kept at a central location. Verify that the Backflow Program Manager keeps the records current and complete.
DRINKING WATER **General**	
13-21. Installations must use municipal or regional water supply systems where feasible (AFI 32-1067, para 2).	Verify that the installation uses a municipal or regional water system where feasible. (1) Verify that a life cycle cost analysis is performed to determine the most cost-effective approach.
13-22. Installations must provide proper treatment for all water sources (FGS-FRG 3-4).	Verify that the installation provides proper treatment for all water sources. (1)(2)
13-23. Installations must develop and update as necessary an emergency contingency plan to ensure the provision of potable water despite interruptions from natural disasters and service interruptions (FGS-FRG 3-3j and AFI 32-1067, para 13).	Verify that the installation has an emergency contingency plan that includes, at a minimum: (1)(2) - identification of key personnel - procedures to restore service - procedures to isolate damaged lines - identification of alternative water supplies - installation public notification procedures - a vulnerability assessment. Verify that the plan is updated as necessary.

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13-24. BCE must develop local operating instructions that address specific topics (AFI 32-1067, para 4.3).	Verify that BCE has developed local operating instructions that include the following: (1) - operational monitoring for process control - sampling and testing procedures - emergency operations - maintenance - regulatory compliance requirements.
13-25. Installations must maintain a current map/ drawing of the complete potable water system (FGS-FRG 3-3a).	Verify that the installation maintains a current map/drawing of the complete potable water system. (1)
13-26. Installations must have a Potable Water System Master Plan that is updated at least every 5 yr (FGS-FRG 3-3b).	Verify that the installation has a Potable Water System Master Plan. (1) Verify that the plan is updated at least every 5 yr.
13-27. Each separate water supply source must have a water meter and a raw water sampling point (AFI 32-1067, para 6).	Verify that each separate water supply source has a water meter and a raw water sampling point for water quality monitoring. (1)(4)
13-28. Each active well should have an air line or electric depth gauge to measure drawdown, static level, and pumping level (MP).	Verify that each active well has an air line or electric depth gauge to measure drawdown, static level, and pumping level. (1)(4) (NOTE: This MP is drawn from AFI 32-1067, para 6.)

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13-29. The installation's water system must meet specific requirements concerning positive pressure and maintenance practices (FGS-FRG 3-3f and 3-3h).	Verify that a continuous positive pressure is maintained in the water distribution system. (2)(4) Verify that the water distribution operation and maintenance practices include: - proper repair and replacement of mains procedures (including disinfection and bacteriological testing) - implementation of an effective annual water main flushing program - proper operation and maintenance of storage tanks and reservoirs - maintenance of distribution system components (including hydrants and valves).
13-30. Installations must conduct sanitary surveys of the water system (FGS-FRG 3-3i).	Verify that surveys of the water system, including a review of required water quality analyses, are conducted annually and as warranted. (1)(2) Verify that off-installation surveys are coordinated with the appropriate German authorities.
13-31. Installations must conduct vulnerability assessments (FGS-FRG 3-3j(6)).	Verify that the installation has conducted a vulnerability assessment. (1)(2)
13-32. Installations must use only lead-free pipe, solder, flux, and fittings when installing or repairing water systems and plumbing systems for drinking water (FGS-FRG 3-3e and AFI 32-1067, para 12.4).	Verify that only lead-free materials (see definition) are used. (2)

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Water Quality Standards	(NOTE: These requirements apply regardless of whether the installation produces or purchases water.) (NOTE: See Table 13-1 for comments on testing procedures.)
13-33. Concentrations of chemical substances that may contaminate drinking water or adversely affect its quality must be kept as low as possible using the latest technology and considering the circumstances of each particular case (FGS-FRG 3-3n).	Verify that concentrations of chemical substances that may contaminate drinking water or adversely affect its quality are kept as low as possible using the latest technology and considering the circumstances of each particular case. (2)(5)

13-34. Compliance with water quality standards must be demonstrated by independent testing or validated supplier testing (FGS-FRG 3-5).	Verify that the installation, regardless of whether it produces or purchases water, demonstrates compliance with applicable water quality standards by independent testing or validated supplier testing. (2)(5)
	
	Verify that the results of each test are recorded.
	
	Verify that the record includes the following information:
	
	- the exact location of the sample:
	  - community
	  - road
	  - building number
	  - sampling point
	- time of sampling
	- time and type of test performed
	- the finding.

13-35. Only certain substances may be used in the treatment of drinking water (FGS-FRG 3-4d).	Verify that only those substances listed in Table 13-2 are used in treating drinking water. (2)(5) (NOTE: This includes ions of the substances listed, if they are fed by an ion-exchanger or through electrolysis.) Verify that the additives are used only for the purposes listed in Table 13-2. Verify that the quantities specified in Table 13-2 are not exceeded. Verify that, upon conclusion of the treatment process, neither the content of the additives nor the content of the reaction products in the drinking water exceed the MCLs established in Table 13-2.

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13-35. (continued)	(NOTE: In addition, all MCL requirements for drinking water remain in force at the conclusion of the treatment process.)
13-36. Installations that condition (i.e. soften) their water must not exceed certain values at the end of the conditioning process (FGS-FRG 3-4e).	Determine whether the installation softens its water. (2)(5) Verify that the following values are not exceed upon conclusion of the treatment process: - an alkali-earth content of 1.5 mol/m^3 (equivalent to 60 mg/L), calculated as calcium - an acid capacity $K_{5\,4.3}$ of 1.5 mol/m^3. (NOTE: Water may be softened by ion-exchange if it does not raise the content of sodium ions in the drinking water.)
13-37. DOD water systems must meet specific MCL and testing requirements for total coliform bacteria (FGS-FRG 3-5a).	Verify that PWSs have no more than 5 percent positive samples for the presence of total coliforms per month. (2)(5) (NOTE: The MCL for total coliforms is based only on the presence or absence of total coliforms and is exceeded whenever a routine sample is positive for fecal coliforms or *Escherichia coli (E. coli)* or when any repeat sample is positive for total coliforms.) Verify that the colony count does not exceed 100/mL at incubation temperatures of 20 °C (± 2 °C) and at 36 °C (± 1 °C). Verify that, when the water treatment has been concluded, that the colony count in the disinfected drinking water does not exceed 20/mL at incubation temperatures of 20 °C (± 2 °C). Verify that the above practice is followed unless qualified medical personnel authorize other procedures to be followed that are equally or more protective of human health. (NOTE: Table 13-1 outlines procedures for microbiological testing. Regulated German suppliers can be expected to use these procedures. DOD components should use these procedures unless appropriate medical authorities direct them to use other equal or more protective procedures.) Verify that the installation takes a minimum of 40 samples per month for a system serving up to 41,000 people. Verify that, for populations larger that 41,000, the installation complies with the appropriate sample size given in Table 13-3. Verify that each system has a written, site-specific monitoring plan and collects routine samples according to the schedule in Table 13-3.

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13-37. (continued)	Verify that systems with initial samples testing positive for total coliforms collect repeat samples as soon as possible, preferably on the same day. Verify that repeat samples are taken at the same tap as the original sample and that an upstream and a downstream sample are taken in the vicinity of the tap. Verify that any additional required repeat sampling is performed according to local medical or Executive Agent guidance. Verify that monitoring continues until total coliforms are no longer detected. Verify that, when routine or repeat samples are positive for total coliforms, they are tested for fecal coliforms or *E. coli*. (NOTE: Fecal-type testing can be foregone on a total coliform positive sample if fecal coliforms or *E. coli* are assumed to be present.) Verify that, if the system has exceeded the MCL, the installation notifies the Executive Agent and personnel no later than the end of the next business day that an acute risk to public health may exist.
13-38. Installation water systems must meet specific requirements with regard to inorganic chemical parameters and monitoring (FGS-FRG 3-5b(1), 3-5b(2), and 3-5b(4)).	Verify that the parameters in water distributed to end users do not exceed the limitations in Table 13-4. (2)(5) Verify that the concentration of any inorganic substance not listed in Table 13-4 that is identified as a hazard to human health is limited to the quantity established by competent medical personnel. Verify that systems are monitored for inorganic chemicals as follows: - asbestos: one sample every 9 yr - nitrate and nitrite: annually, except for surface-water supplied systems and any system where testing shows the level to be 50 percent or more of the MCL, in which case testing is accomplished quarterly - all other substances listed in Table 13-4: for every 15,000 m^3 distributed, but in no case less than annually. Verify that, if a system is out of compliance, notification is made to the Executive Agent and to personnel as soon as possible but no later than 14 days after receipt of test results.

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13-39. PWSs must be analyzed within 1 yr of the effective date of FGS-FRG to determine the corrosivity entering the distribution system (FGS-FRG 3-5b(3)).	Verify that the PWS is analyzed within 1 yr of the effective date of FGS-FRG to determine the corrosivity entering the distribution system. (2)(5) (NOTE: The effective date of FGS-FRG is 14 March 1996.)
13-40. Installations that fluoridate their water must meet specific requirements (FGS-FRG 3-5c).	Verify that the fluoride content of drinking water does not exceed the MCL of 1.5 mg/L given in Table 13-4. (2)(5) Verify that the installation collects one treated water sample at the entry point to the distribution system annually. (NOTE: Daily monitoring is recommended for systems practicing fluoridation using the criteria in Table 13-5.) Verify that, if any sample exceeds the MCL, notification is made to the Executive Agent and to personnel as soon as possible but no later than 14 days after receipt of test results.
13-41. DOD water systems must meet specific standards for lead and copper action levels and reporting requirements when these levels are exceeded (FGS-FRG 3-5d).	Verify that the concentration of lead does not exceed 0.015 mg/L. (2)(4) Verify that the concentration of copper does not exceed 1.3 mg/L. (NOTE: Actions such as corrosion control treatment, public education, and removal of lead service lines are triggered if the above lead and copper action levels are exceeded in more than 10 percent of all sampled taps.) Verify that monitoring is carried out in accordance with Table 13-6. Verify that sampling sites selected are as outlined in Table 13-6. Verify that high risk sampling sites are targeted by conducting a materials evaluation of the distribution system. Verify that, if an action level is exceeded, additional water samples are collected as specified in Table 13-6. Verify that optimal corrosion control treatment is pursued. Verify that, if action levels are exceeded after implementation of applicable corrosion control and source water treatment, lead service lines are replaced if it is lead service lines that are causing the excess. Verify that the Executive Agent and installation personnel (U.S. and German) are notified within 14 days when an action level is exceeded.

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13-41. (continued)	Verify that an education program for installation personnel (U.S. and German) is implemented within 60 days.
13-42. Installations must notify their users about lead in drinking water systems (FGS-FRG 3-3e).	Verify that the installation provides public notification concerning the following: (2) - the lead content of materials used in distribution or plumbing systems - the corrosivity of water that has caused leaching - remedial actions that may be taken. (NOTE: This requirement appears to apply regardless of whether or not the action level for lead has been exceeded.)
13-43. DOD water systems must meet specific requirements with regard to synthetic organics (FGS-FRG 3-5e).	Verify that synthetic organic chemicals in water distributed to people do not exceed the limitations outlined in Table 13-7. (2)(4) Verify that the concentration of any synthetic organic substance not listed in Table 13-7 that is identified as a hazard to human health is limited to the quantity established by competent medical personnel. Verify that systems are monitored for synthetic organics according to the schedule in Table 13-8. Verify that, if the system is out of compliance, the Executive Agent and installation personnel (U.S. and German) are notified as soon as possible, but no later than 14 days after the receipt of test results. (NOTE: When the MCLs for synthetic organic chemicals are exceeded, the installation must begin immediate quarterly monitoring and must increase quarterly monitoring if the level of any contaminant is at its detection limit but less than its MCL (see Table 13-8) and must continue until the system is reliable and consistent, and any necessary remedial measures are implemented.)
13-44. DOD water systems must meet specific requirements with regard to TTHMs (FGS-FRG 3-5f).	Verify that PWSs or NTNCWSs that add a disinfectant (oxidant, such as chlorine, chlorine dioxide, chloramines, or ozone) to any part of the treatment process do not exceed an MCL of 0.10 mg/L for TTHMs in drinking water. (2) Verify that systems that add a disinfectant monitor for TTHMs as outlined in Table 13-9. Verify that, if the systems exceed the MCL for TTHMs, the Executive Agent and installation personnel (U.S. and German) are notified as soon as possible, but no later than 14 days after the receipt of the test results, and that remedial measures are undertaken.

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13-45. DOD water systems must meet specific requirements with regard to radionuclides (FGS-FRG 3-5g).	Verify that PWSs and NTNCWSs meet the MCLs for radionuclides and that monitoring is performed as outlined in Table 13-10. (2)(4) Verify that, if the average annual MCL for gross alpha activity, total radium, or gross beta is exceeded, the appropriate German authorities and the public are notified as soon as possible, but no later than 30 days after receipt of the test results. (NOTE: After a violation of an MCL for radionuclides, monitoring will continue (monthly for gross beta, quarterly for gross alpha) until remedial actions are completed and the average annual concentration no longer exceeds the MCL.) Verify that, if any gross beta MCL is exceeded, the major radioactive components are identified.
13-46. Installations must test DOD PWS filtered waters daily for turbidity and must meet a specific MCL for turbidity (FGS-FRG 3-5h).	Verify that the installation tests PWS filtered water for turbidity daily. (2)(4) Verify that the monthly average of daily samples does not exceed 1 Nephelometric Turbidity Unit (NTU) in more than 5 percent of the samples. Verify that the average of 2 consecutive days does not exceed 5 NTU. Verify that water other than installation PWS filtered waters does not exceed 1.5 NTU as determined by the spectral scattering coefficient using Formazin. Verify that the above test is conducted once for every 15,000 m^3 of water distributed, but not less than once annually. Verify that, if the MCL for turbidity is exceeded, the Executive Agent and installation personnel (U.S. and German) are notified as soon as possible, but no later than 14 days after receipt of test results.
13-47. Installations water must meet requirements for additional water quality parameters (FGS-FRG 3-5i through 3-5n).	Verify that the installation meets the following requirements with regard to color: - the spectral absorption coefficient Hg 435 mm does not exceed 0.5 m^{-1}, using a spectrophotometer or filter photometer - testing conducted once for every 15,000 m^3 distributed but not less than once annually. Verify that the installation meets the following requirements with regard to odor: - the odor threshold value does not exceed 2 at 12 °C or 3 at 25 °C - testing conducted once for every 15,000 m^3 distributed but not less than once annually. (NOTE: Testing procedures may be found in *Prüfung auf Geruch und Geschmack,* 6. Lieferung, Ausgabe 1971, B 1/2.)

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13-47. (continued)	Verify that the system does not deliver water at a temperature higher than 25 °C (± 1 °C). Verify that the installation meets the following requirements with regard to pH: - pH value is neither below 6.5 nor over 9.5 - testing conducted monthly for systems distributing less than 1000 m^3 per year - testing conducted weekly for all other systems. Verify that the installation meets the following requirements with regard to conductivity: - conductivity does not exceed 2 mS cm^{-1} - testing conducted once for every 15,000 m^3 distributed but not less than once annually. (NOTE: Single tests are not required if conductivity is recorded continuously.) Verify that oxidizability does not exceed 5 mg/L, computed as O_2.
13-48. Installations must periodically monitor DOD NPWSs for total coliforms and disinfectant residuals (FGS-FRG 3-5o).	Determine whether the installation operates an NPWS. (2)(4) Verify that the installation monitors the NPWS for total coliforms and disinfectant residuals periodically as determined by appropriate medical personnel.
Disinfection and Filtration	
13-49. Installations must maintain a disinfectant residual throughout the water system (FGS-FRG 3-5c).	Verify that the installation maintains a disinfectant residual throughout the water system. (2)(5) (NOTE: This requirement does not apply where an effective ultraviolet or ozone disinfectant process is used.) Determine whether the drinking water is disinfected with chlorine, sodium, magnesium, calcium hypochlorite, or chlorinated lime. Verify that, upon completion of the disinfection process, a residual chlorine content of at least 0.1 mg/L is detectable. Determine whether the drinking water is disinfected with chlorine dioxide. Verify that, upon completion of the disinfection process, a residual chlorine dioxide content of at least 0.05 mg/L is detectable.

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13-49. (continued)	(NOTE: If the drinking water is dechlorinated prior to turnover to the distribution net, the residual content must be detectable before the dechlorination process.)
13-50. Installations that use surface water or GWUDISW to produce potable water must conform to certain treatment requirements (FGS-FRG 3-4a).	Determine whether the installation employs surface water sources or GWUDISW. (1)(2)(3) Verify that the installation meets the surface water treatment requirements specified in Table 13-11.
13-51. Installations that use a groundwater source as their supply of drinking water must disinfect the supplies (FGS-FRG 3-4b).	Determine whether the installation's water supply is groundwater. (1)(2)(3) Verify that, at a minimum, groundwater supplies are disinfected.
Child Development Centers	
13-52. Drinking water at CDCs must be sampled monthly (HQ USAF/SG Policy Letter, 21 October 1992, paras 1 and 4).	Verify that the drinking water at CDCs is sampled monthly. (2) Verify that bacteriological sampling is accomplished monthly. (NOTE: Chemical sampling is generally accomplished once every 3 yr.)
13-53. BES and CDC Directors must coordinate certain efforts (HQ USAF/SG Policy Letter, 21 October 1992, para 2).	Verify that BES and the CDC Director coordinate the following: (2) - determine whether *Lead Contamination Control Act* (LCCA) sampling was thorough and complete - review records to ensure that identified corrective actions to remove sources of lead contamination were completed - ensure that Lead Assessment Program analytical results for drinking water lead concentrations are on file in the CDC administrative office.
13-54. The Director of the CDC must notify BES of certain activities (HQ USAF/SG Policy Letter, 21 October 1992, para 3).	Verify that BES is notified prior to the opening of a new CDC facility and when plumbing lines or fixtures are added or replaced. (2)

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13-55. Certain taps must be taken out of service and resampled (HQ USAF/SG Policy Letter, 21 October 1992, para 3).	Verify that taps with lead concentrations exceeding 20 parts per billion (ppb) are taken out of service and resampled. (2) Verify that remediation is accomplished when successive sample results exceed 20 ppb.
13-56. BES must perform sampling in accordance with LCCA guidance under certain circumstances (HQ USAF/SG Policy Letter, 21 October 1992, para 3).	Verify that BES performs sampling in accordance with LCCA guidance when metallic materials are used in CDC plumbing systems. (2)
Recordkeeping and Notification Requirements	
13-57. In addition to the notifications required under the checklist items above, installations must notify German officials in certain circumstances (FGS-FRG 3-6).	(NOTE: The Executive Agent will coordinate the notification of German authorities.) Verify that German officials are notified if German nationals or off-post water supplies could be affected by a system's noncompliance. (1)(2) (NOTE: Examples of conditions that would normally require such notification are: - MCLs are exceeded - bacterial colony count appears to be constantly increasing - established minimum requirements are not met - if pollution loads of the raw water are discovered that could lead to an exceeding of MCLs.) Verify that German officials are notified of any condition that could effect the water source or the water supply system and have an adverse impact on the quality of the water.

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13-58. All required notifications must meet specific content standards (FGS-3-6a).	Verify that the notices required under this checklist are clear and understandable and address the following topics: (1)(2)(5) - explanation of the violation - any potential adverse health effects - the population at risk - the steps that the system is taking to correct the violation - the necessity for seeking alternative water supply, if any - any preventive measures the consumer should take until the violation is corrected.
13-59. Specific records must be maintained for water systems (FGS-FRG 3-3k).	Verify that records of chemical analyses are kept for at least 10 yr. (2) Verify that records showing monthly operating reports are maintained for at least 3 yr. Verify that records of bacteriological results are maintained for at least 5 yr.
13-60. Installations must document actions taken to correct noncompliance with water quality standards (FGS-FRG 3-3L).	Verify that the installation documents corrective actions taken to correct noncompliance. (2) Verify that such records are kept for at least 3 yr.
13-61. Water treatment logs must be prepared (AFI 32-1067, para 10.1.1).	Verify that operators prepare AF Form 1461, *Water Utility Operating Log (General).* (4) Verify that, if the water requires more than minor treatment, AF Form 1460, *Water Utility Operating Log (Supplemental)*, is prepared.
13-62. Water treatment facilities must manage logs and reports in accordance with specific requirements (AFI 32-1067, paras 10.1).	Verify that daily operating logs and laboratory records are prepared for in-plant use. (4) (NOTE: Computer files and printouts such as the Work Information Management System (WIMS) operating logs are acceptable if they have the same information as the forms.) Verify that permanent records of the printouts are kept as if they were forms. Verify that backup copies of the active computer files are maintained to protect them against accidental loss. Verify that operating logs or computer files are posted daily (covering 1 mo of operation) in neat legible form.

(1) BCE (Environmental Planning) (2) BES (Bioenvironmental Engineering Services) (3) BCE (Natural Resources Planner) (4) Water Treatment Plant Superintendent (5) Backflow Program Manager (6) Base Staff Judge Advocate

COMPLIANCE CATEGORY: WATER QUALITY MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
13-62. (continued)	Verify that the original form or computer printout is kept for the BCE permanent file.
13-63. Specific records must be maintained for wells and pumping stations (AFI 32-1067, para 10.1.2 and 10.2).	Verify that AF Form 996, *Well Data*, is completed and a file kept for each well, beginning with initial construction. (4) Verify that the information is updated after completing a repair, redeveloping a well, or conducting a performance test. Verify that the following daily operating records are maintained for wells and pumping stations: - AF Form 997, *Daily Well Activity Record* - AF Form 998, *Daily Pumping Station Activity Record - Water.*
13-64. Facilities should establish local procedures for preparing coordinating, reviewing, and approving logs and reports (MP).	Verify that water treatment and wastewater treatment facilities establish local procedures for preparing coordinating, reviewing, and approving logs and reports. (4) (NOTE: This MP is found in AFI 32-1067, para 10.1.3.)
13-65. Specific physical facility information must be developed, maintained, and kept available at treatment facilities (AFI 32-1067, para 10.2).	Verify that the following information is developed, maintained, and kept available at the treatment facilities: (1)(4) - required plant-specific Operations and Maintenance (O&M) manuals and applicable AF publications - system operating instructions with single-line drawings, including operational and compliance monitoring procedures - up-to-date system as-built drawings along with other system plans and blueprints, including hydraulic water elevation profiles and a drawing of the entire collection and distribution systems - AF Form 996, *Well Data* - shop drawings, catalogue cuts, and any other equipment information or literature.

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COMPLIANCE CATEGORY: WATER QUALITY MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
13-66. Installations must develop and maintain effective maintenance plans that address specific topics (AFI 32-1067, para 10.3).	Verify that the installation develops and maintains effective maintenance plans that include: (1) - a recurring work schedule - a maintenance history for each major piece of equipment - an essential spare parts list, with spare parts stocked at the treatment facility or other accessible location - a long-range maintenance and improvement plan.
13-67. Installations must notify the MAJCOM Civil Engineer when the potable water supply becomes contaminated (AFI 32-1066, para 6).	Verify that MAJCOM/CE is notified when the potable water supply becomes contaminated. (1)
Alternative Water Supplies	
13-68. Installations must use only approved alternative water sources, if the use of alternative sources is necessary (FGS-FRG 3-3m).	Determine whether the installation uses alternative water sources. (1)(2) Verify that alternative water sources have approval from the IC. (NOTE: This requirement includes POE and POU treatment devices, as well as bottled water supplies.)
Underground Injection Control	
13-69. Underground injection must be carried out in such a way that underground water resources are protected (FGS-FRG 3-3d).	Verify that the installation regulates underground injection so as to protect underground water sources. (2)(3) Verify that, at a minimum, the installation conducts monitoring to determine the effects of any underground injection wells on nearby groundwater supplies.

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COMPLIANCE CATEGORY: WATER QUALITY MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS: February 1997**
Aquifers	
13-70. Installations must protect water supply aquifers from contamination (FGS-FRG 3-3c).	Determine whether the installation is located by a water supply aquifer. (2)(3) Verify that the aquifer is protected by appropriate land management. (NOTE: Appropriate land management includes the proper siting, construction, and maintenance of wells, septic systems, and onsite treatment units.)
TRAINING AND CERTIFICATION	
13-71. Operators of water treatment plants must meet training requirements (AFI 32-1067, para 8.1).	Verify that new operators receive classroom training and extensive supervised on-the-job training before being assigned to critical tasks. (3)(4) Verify that experienced personnel receive technical refresher courses and upgrade training. (NOTE: Training requirements may be met by one of the following means: - AF training available through technical schools, career development correspondence courses, and on-the-job training - civilian training courses available at educational institutions, government agencies, and professional and technical associations - correspondence courses from accredited institutions for operators in areas that do not have local resident courses.)
13-72. Supervisors at water treatment plants must meet specific requirements with regard to safety training for all employees (AFI 32-1067, para 9).	Verify that all employees are familiar with the safety instructions in the following documents, as applicable: (3)(4) - AFR 91-26, *Maintenance and Operation of Water Supply, Treatment, and Distribution Systems* - AFM 91-32, *Operation and Maintenance of Domestic and Industrial Wastewater Systems* - Air Force Occupational Safety and Health Standard (AFOSH STD) 127-10, *Civil Engineering* - AFOSH STD 127-25, *Confined Spaces* - AFOSH STD 161-21, *AF Hazard Communication Standard.* Verify that the supervisor maintains current BES baseline and annual industrial hygiene survey reports. (NOTE: The supervisor should use these reports to train workers on occupational health hazards.)

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COMPLIANCE CATEGORY: WATER QUALITY MANAGEMENT Federal Republic of Germany ECAMP	
REGULATORY REQUIREMENTS:	**REVIEWER CHECKS:** **February 1997**
13-72. (continued)	Verify that supervisors make safety instructions readily available to all operating personnel. Verify that supervisors train facility personnel on safety procedures and equipment and enforce their proper use at all times. (NOTE: Once trained, individual workers are personally responsible for following safe procedures.)

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Table 13-1

Drinking Water Testing Procedures

(FGS-FRG Table 3-11)

The following are accepted methods or procedures in Germany for testing for compliance of various drinking water parameters. They should be used unless competent DOD medical authorities direct other methods or procedures which are as or more effective/protective.

Coliform Bacteria

1. The test for coliform germs in at least 100 mL of water is performed by either:

   a. liquid enrichment with adequately concentrated, yet maximum triple-strength lactose broth (in a final concentration of 1 percent lactose)

   b. membrane filtration whereby the filter is placed in 50 mL of 1 percent lactose broth

2. The incubation temperature is always 36 °C +/-1 °C, the incubation time at least 24 +/-4 h; if negative, up to 44 +/- 4 h.

3. If the lactose broth shows the "formation of gas and acid", the detection shall be quantified to allow the assessment of the extent of contamination by coliform germs. A final diagnosis is not possible with the metabolic characteristic "formation of gas and acid" from lactose at 36 +/ -1 °C alone so that, in addition, at least the following metabolic characteristics must be determined after subculture or pure culture on endo-agar (lactose-fuchsine-sulphite-agar) or McConkey or an equivalent culture medium for a period of 24 +/-4 h at 36 C +/-1 °C:

   a. oxidase reaction (Nadi): negative

   b. splitting-up of lactose, under formation of gas and acid, in 1-percent broth at 36 °C +/-1 °C within 44 +/-4 h

   c. formation of indole from tryptophane-containing broth: negative (positive reaction possible)

   d. exhaustion of citrate as sole carbon source: positive (negative reaction possible)

Colony Number Determination

1. Defined as colony number is the number of colonies visible under six to eight fold magnification which form from the bacteria, found in 1 mL of the water to be examined, in plate cultures with nutritious, peptone-containing culture media (1 percent meat extract, 1 percent peptone) at an incubation temperature of 20 °C +/-2 °C and 36 °C +/-1 °C after an incubation time of 44 +/-4 h.

(continued)

2. The usable culture media differ primarily in the setting agent so that the following methods are possible:

   a. agar-gelatin culture media, incubation temperature 20 °C +/-2 °C and 36 °C +/-1 °C, incubation time 44 +/-4 h

   b. agar-culture media, incubation temperature 20 °C +/-2 °C and 36 °C +/-1 °C, incubation time 44 +/-4 h.

Conductivity. Electrometric measurement.

Escherichia coli

1. The test for *E. coli* in at least 100 mL of water is performed by:

   a. liquid enrichment with maximum triple-strength lactose broth (in a final concentration of 1 percent lactose)

   b. membrane filtration whereby the filter is placed in 50 mL of 1 percent lactose broth

2. The incubation temperature is always 36 °C +/-1 °C, the incubation time at least 24 +/-4 h; if negative, up to +/-4 h.

3. If the lactose broth shows the "formation of gas and acid", the detection shall be quantified to allow the assessment of the extent of contamination by *E. coli*. A final diagnosis is not possible with the metabolic characteristic "formation of gas and acid" from lactose at 36 °C +/-1 °C alone so that, in addition, at least the following metabolic characteristics must be determined after subculture or pure culture on endo-agar (lactose-fuchsine-sulphite-agar) or McConkey or an equivalent culture medium for a period of 24 +/-4 h at 36 °C +/-1 °C:

   a. oxidase reaction (Nadi): negative

   b. formation of indole from tryptophane-containing broth: positive

   c. splitting-up of dextrose or mannitol in 1%-broth at 44 °C +/-1 °C within 24 +/-4 h under formation of gas and acid

   d. exhaustion of citrate as sole carbon source: negative

(Note: If the water samples cannot be examined within 3 h from the time they were taken they shall be kept in a cool place. When sampling water which was disinfected with chlorine, sodium, magnesium or calcium hypochlorite, or chlorinated lime, or chlorine dioxide, the sampling vessels shall be fed with sodium thiosulfate first to neutralize the residual chlorine.)

(continued)

Table 13-1 (continued)

Fecal Streptococci

1. The test for fecal streptococci in at least 100 mL of water is performed either by:

   a. liquid enrichment with adequately concentrated, yet maximum triple-strength azide-dextrose broth (with a sodium azide-final concentration of 0.02 to 0.05 percent and a dextrose final concentration of 0.5 to 1 percent)

   b. membrane filtration whereby the filter is placed in 50 mL of single-concentrated azide-dextrose broth (in a sodium azide-concentration of 0.02 to 0.05 percent).

2. The incubation temperature is always 36 °C +/-1 °C, the incubation time at least 24 +/-4 h; if negative, up to 44 +/- h.

3. The final diagnosis is not possible by way of the growth in azide-dextrose broth (clouding or pH-change) so that at least the following characteristics must be fulfilled in addition:

   a. Culture on kanamycin-aesculin-azide or tetrazolium-azide-agar (e.g., Slanetz-Bartley-Agar).

   b. The incubation temperature is always 36 °C +/-1 °C, the incubation time at least 24 +/-4 h; in case of tetrazolium-azide-agar, up to 44 +/-4 h.

   c. Colonies of typical growth shall be stained by Gram's method; Gram-positive diplococci are regarded as fecal streptococci.

Odor Threshold Value. Gradual dilution with odorless water and testing for odor.

Oxidizability. Volumetric determination by means of potassium permanganate consumption.

pH Value

1. Electronic measurement with glass electrode.

2. Photometric measurement is allowed for water supply facilities delivering less than 1000 m per year.

Sulphite-Reducing Sporulating Anaerobes

1. The test for sulphite-reducing sporulating anaerobes (clostridia) in at least 20 mL water is performed, after heating the sample to 75 °C +/-5 °C for a period of 10 min, either by way of:

   a. liquid enrichment with double-strength dextrose-iron citrate-sodium sulphite broth (DRCM-broth), incubation temperature 36 °C +/-1 °C, incubation period 24 +/-4 h, observation for another 24 +/-4 h

(continued)

Table 13-1 (continued)

b. membrane filtration whereby the membrane filter is placed in dextrose-iron citrate-sodium sulphite broth (DRCM-broth), incubation temperature 36 °C +/-1 °C, incubation period 24 +/-4 h, observation for another 24 +/-4 h.

2. A final diagnosis is not possible by way of the growth in broth (blackening) so that, in addition, at least the following metabolic characteristics must be given:

   a. inoculation to blood-glucose-agar, incubation temperature 36 °C +/-1 °C, incubation period 24 +/-4 h anaerobic.

   b. in case of growth, examination by means of aerobic subculture under the same conditions. anaerobic.

Table 13-2

Additives Permitted for Drinking Water Treatment

(FGS-FRG Table 3-2)

Item No.	Name	Purpose for use	Maximum dosage-mg/L	MCL[1] -mg/L	Reaction products
1	chlorine, sodium, calcium, magnesium hypochlorite, chlorinated lime	disinfection	1.2[2]	0.3[2]	
2	chlorine dioxide	disinfection	0.4	0.2 0.2	chlorite
3	ozone	disinfection oxidation	10	0.5 0.01	trihalomethanes[3]
4	silver, silver chloride, sodium, silver chloride complex, silver sulphate	preservation only in case of nonsystematic use in exceptional cases	(No Set Limit)	0.8	
5	hydrogen peroxide, sodium peroxodisulphate, potassium monopersulphate	oxidation	17	0.1	
6	potassium permanganate	oxidation	(No Set Limit)	(No Set Limit)	
7	oxygen	oxidation oxygen enrichment	(No Set Limit)	(No Set Limit)	6
8	sulphur dioxide, sodium sulphite, calcium sulphite	reduction	5	2	
9	sodium thiosulphate	reduction	6.7	2.8	

(continued)

Table 13-2 (continued)

Item No.	Name	Purpose for use	Maximum dosage-mg/L	MCL[1] -mg/L	Reaction products
10a	sodium orthophosphate, potassium orthophosphate, calcium orthophosphate, sodium and potassium triphosphate, sodium and potassium polyphosphates, sodium, calcium, polyphosphates, calcium polyphosphates	inhibiting corrosion, inhibiting bottom settlings	(No Set Limit)	(No Set Limit)	
10b	sodium silicates in mixture with substances listed under 10a or sodium hydroxide or sodium carbonate or sodium hydrogencarb	inhibiting corrosion	(No Set Limit)	(No Set Limit)	
11	calcium hydroxide, calcium sulfate, calcium chloride, partly calcined dolomite, magnesium carbonate, magnesium oxide, magnesium hydroxide, magnesium chloride, sodium carbonate, sodium hydrogen carbonate, sodium hydroxide, sodium hydrogen sulphate, hydrochloric acid, sulfuric acid	standardize pH value, salt content, calcium content, acid capacity, removal of selenium, nitrate, humic substances, regeneration of sorbentz	(No Set Limit)	(No Set Limit)	
12	magnesium as sacrificial anode	cathodic corrosion protection	(No Set Limit)	(No Set Limit)	

(continued)

Table 13-2 (continued)

FOOTNOTES:

[1] Including the contents prior to conditioning and from other conditioning steps

[2] The permissible maximum amount of the additive may be increased up to 6 mg/L = 170 mmol/m^3 if the microbiological requirements specified in paragraph 3-5a cannot be satisfied in another way or if the disinfection is intermittently impaired by ammonium. The content of uncombined chlorine in the conditioned drinking water must in this case not exceed 0.6 mg/L = 17 mmol/m^3, the limit value for trihalomethanes after the conditioning process is in this case 0.25 mg/L, with an admissible error of the measured value of 0.01 mg/L

[3] Chloroform, monobromate chloromethane, dibrommonochloromethane, bromoform.

Table 13-3

Total Coliform Monitoring Frequency

(FGS-FRG Table 3-3)

Population Served			Minimum Number of Routine Samples Per Month
0	to	41, 000	40
41, 001	to	50, 000	50
50, 001	to	59, 000	60
59, 001	to	70, 000	70
70, 001	to	83, 000	80
83, 001	to	96, 000	90
96, 001	to	130, 000	100

NOTES:

A non-community water system using groundwater and serving 1000 or fewer people may monitor once in each calendar quarter during which the system provides water, provided a sanitary survey conducted within the last 5 yr shows the systems is supplied solely by a protected groundwater source and free of sanitary defects.

Table 13-4

Inorganic chemical maximum contaminant level (MCL)

(FGS-FRG Table 3-4)

CONTAMINANT	MCL (mg/L)
Aluminum	0.2
Ammonium (NH_4)	0.5
Antimony	0.01
Arsenic	0.01
Asbestos (fibers longer than 10um)[1]	$7x10^6$ /L
Barium	1.0
Boron	1.0
Cadmium	0.005
Calcium	1.0
Chloride	250
Chromium	0.05
Copper	1.0
Cyanide	0.05
Fluoride	1.5
Iron	0.2
Lead	0.04
Mercury	0.001
Nickel	0.05
Nitrate (as N)[2]	10
Nitrite (as NO_3)	0.1
Nitrate & Nitrite total[3]	10
Nitrogen (Kjeldahl)	1.0
Phosphorus (as PO_4)	6.7
Potassium	12
Magnesium	50

(continued)

Table 13-4 (continued)

CONTAMINANT	MCL (mg/L)
Manganese	0.05
Selenium	0.01
Silver[4]	0.01
Sodium	150
Sulfate (as SO_4)	240
Zinc	5

FOOTNOTES:

1 Applies to CWS and NTNC system

2 Applies to CWS, NTNC & TNC systems, for all other systems the MCL is 50

3 Applies to CWS, NTNC & TNC systems only

4 In used in water treatment MCL may be 0.05

Table 13-5

Recommended Fluoride Concentrations at Different Temperatures

(FGS-FRG Table 3-5)

Annual Average of Maximum Daily Air Temperatures (°F)	Control Limits (mg/L)		
	Lower	Optimum	Upper
50.0 - 53.7	0.9	1.2	1.5
53.8 - 58.3	0.8	1.1	1.5
58.4 - 63.8	0.8	1.0	1.3
63.9 - 70.6	0.7	0.9	1.2
70.7 - 79.2	0.7	0.8	1.0
79.3 - 90.5	0.6	0.7	0.8

Table 13-6

Monitoring Requirements for Lead and Copper Water Quality

(FGS-FRG Table 3-6)

Population Served	No. of Sites for Standard Monitoring[1,2]	No. of Sites for Reduced Monitoring[3]	No. of Sites for Water Quality Parameters[4]
> 100,000	100	50	25
10,001-100,000	60	30	10
3,301-10,000	40	20	3
501-3,300	20	10	2
101-500	10	5	1
< 100	5	5	1

1. Monitor every 6 mo for lead and copper.

2. Sampling sites must be based on a hierarchal approach. For CWS, priority must be given to: single family residences that contain copper pipe with lead solder installed after 1982, contain lead pipes, or are served by lead service lines; then, structures, including multifamily residences, with the foregoing characteristics; and finally, residences and structures with copper pipe with lead solder installed before 1983. For NTNC systems, sampling sites must consist of structures that contain copper pipe with lead solder installed after 1982, contain lead pipes, and/or are served by lead service lines. First draw samples must be collected from a cold water kitchen or bathroom tap; nonresidential samples must be taken at an interior tap from which water is typically drawn for consumption.

3. Monitor annually for lead and copper if action levels are met during each of two consecutive 6-mo monitoring periods. Annual sampling must be conducted during the 4 warmest months of the year.

4. Samples must be representative of water quality throughout the distribution system and include a sample from the entry to the distribution system. Samples must be taken in duplicate for pH, alkalinity, calcium, conductivity or total dissolved solids, and water temperatures to allow a corrosivity determination (via a Langelier saturation index or other appropriate saturation index); additional parameters are orthophosphate when a phosphate inhibitor is used and silica when a silicate inhibitor is used.

Table 13-7

Synthetic Organic Chemical Maximum Contaminant Level (MCL)

(FGS-FRG Table 3-7)

SYNTHETIC ORGANIC CHEMICAL	MCL (mg/L)
Pesticides, single substance	0.0001
Total pesticides	0.0005
Ethylene dibromide (EDB)	0.0005
All other polychlorinates, polybrominated biphenyls and terphenyls, single substance	0.0001
Total polychlorinated, polybrominated biphenyls and terphenyls	0.0005
Benzene	0.005
Carbon tetrachloride	0.005
Dichlonsmenthane[1]	0.01
o-Dichlorobenzene	0.06
cis-1, 2-Dichloroethylene	0.07
trans-1, 2-Dichloroethylene	0.1
1, 1-Dichloroethylene	0.007
1, 1, 1-Trichloroethane[1]	0.01
1, 2-Dichloroethane	0.005
1, 2-Dichloropropane	0.005
Ethylbenzene	0.7
Monochlorobenzene	0.1
para-Dichlorobenzene	0.075
Styrene	0.1
Tetrachloroethylene[1]	0.005
Trichloroethylene[1]	0.005
Toluene	1.0
Vinyl chloride	0.002
Xylene (total)	10
Polycyclic aromatic hydrocarbons (total)	0.0002
Acrylamide	Treatment technique[2]
Epihydrochlorin	Treatment technique[2]

(continued)

Table 13-7 (continued)

FOOTNOTES:

1 Combined total may not exceed 0.01 mg/L

2 Best available treatment technique relates to polymer addition practices.

Table 13-8

Synthetic Organic Chemical Monitoring Requirements

(FGS-FRG Table 3-8)

Contaminant	Base Requirement[1] Groundwater/Surface Water	Trigger for more monitoring[6]	Waivers
VOCs	Quarterly/Quarterly	>Detection limit[5]	Yes[2,3]
Pesticides/PCBs	4 quarterly samples/3 yrs during likely period for their presence	>Detection limit[5]	Yes[3,4]

FOOTNOTES:

[1] Groundwater systems shall take a minimum of one sample at every entry point which is representative of each well after treatment; surface water systems will take a minimum of one sample at every entry point to the distribution system at a point which is representative of each source after treatment.

[2] Repeat sampling frequency may be reduced to annually after 1 yr of no detection and every 3 yr after three rounds of no detection.

[3] Monitoring frequency may be reduced if warranted based on a vulnerability assessment by the PWS.

[4] Repeat sampling frequency may be reduced to the following if after one round of no detection; systems > 3300 reduce to 2 samples/year every 3 yr, or systems < 3300 reduce to 1 sample every 3 yr.

[5] Detection limits (mg/L):

a. Pesticides and PCBs (0.0001) except for EDB (0.00001); DBCP, Endrine, Heptachlor-epoxide, Lindane, Silvex (0.00002); and Pentachlorophenol (0.00004).
b. Volatile Organic Chemicals (0.0005).
c. Polycyclic aromatic hydrocarbons (0.0002).

[6] Increased monitoring requires a minimum of two samples per quarter for groundwater systems and at least four samples per quarter for surface water systems.

NOTE: Compliance is based on an annual running average for each sample point for systems monitoring quarterly or more frequently; for systems monitoring annually or less frequently, compliance is based on a single sample, unless the DOD Executive Agent requests a confirmation sample. A system is out of compliance if any contaminant exceeds the MCL.

Table 13-9

Total Trihalomethane Monitoring Requirements

(FGS-FRG Table 3-9)

Population Served by System	Number of Samples per Distribution System	Frequency of Samples	Type of Sample
10,000 or more	4	Quarterly	Treated
Less than 10,000	1	Annually	Treated

(NOTES: 1. One of the samples must be taken at a location in the distribution system reflecting the maximum residence time of water in the system. The remaining samples must be taken at representative points in the distribution system. Systems using groundwater sources that add a disinfectant should have one sample analyzed for maximum TTHM potential. Systems that employ surface water sources, in whole or in part, and that add a disinfectant should have one sample analyzed for TTHMs.

2. Compliance is based upon a running yearly average of quarterly samples for systems serving more than 10,000 people. Noncompliance exists if the average exceeds the MCL. For systems serving less than 10,000 people and having a maximum TTHM potential sample exceeding the MCL, a sample for TTHMs must be analyzed. If the TTHM sample exceeds the MCL, noncompliance results.)

Table 13-10

Radionuclide MCLs and Monitoring Requirements
(FGS-FRG Table 3-10)

MCL Contaminant	MCL, pCi/L
Gross Alpha[1]	15
Combined Radium-226 and -228	5
Gross Beta[2]	50
Strontium-90	8
Tritium	20,000
Radon[3]	300

Monitoring Requirements

For gross alpha activity and radium-226 and radium-228, systems must be tested once every 4 yr. Testing will be conducted using an annual composite of four consecutive quarterly samples or the average of four samples obtained at quarterly intervals at a representative point in the distribution system.

Gross alpha only may be analyzed if activity is less than or equal to 5 pCi/L. Where radium-228 may be present, radium-226 and/or radium-228 analyses should be performed when activity is greater than 2 pCi/L. If the average annual concentration is less than half the maximum contaminant level, analysis of a single sample may be substituted for the quarterly sampling procedure. A system with two or more sources having different concentrations of radioactivity must monitor source water in addition to water from a free-flowing tap. If the installation introduces a new water source, these contaminants must be monitored within the first year after introduction.

[1] Gross alpha activity includes radium-226, but excludes radon and uranium.

[2] Gross beta activity refers to the sum of beta particle and photon activity from man-made radionuclides. If gross beta exceed the MCL, i.e., equal a dose of 4 millirem/yr, the individual components must be determined.

[3] MCL for radon is proposed to be effective in 1995.

Table 13-11

Surface Water Treatment Requirements

(FGS-FRG 3-4a)

1. **Unfiltered Systems**

   a. Systems that use unfiltered surface water or groundwater sources under the direct influence of surface water must analyze the raw water for total coliforms or fecal coliforms at least weekly and for turbidity at least daily for a minimum of 1 yr. If the total coliforms and/or fecal coliforms exceed 100/100 milliliters (mL) and 20/100 mL, respectively, appropriate filtration must be applied. Appropriate filtration must also be applied if turbidity exceeds 1 NTU.

   b. Disinfection must achieve at least 99.9 percent inactivation of *Giardia lamblia* cysts and 99.99 percent inactivation of viruses by meeting applicable CT values.

   c. Disinfection systems must have redundant components to ensure uninterrupted disinfection during operational periods.

   d. Daily disinfectant residual monitoring immediately after disinfection is required. Disinfectant residual measurements in the distribution system must be made weekly.

   e. Water in a distribution system with a heterotrophic bacteria concentration less than or equal to 500/mL, measured as heterotrophic plate count, is considered to have a detectable disinfectant residual.

   f. If disinfectant residuals in the distribution system are undetected in more than 5 percent of monthly samples for 2 consecutive months, appropriate filtration must be implemented.

2. **Filtered Systems**

   a. The turbidity of filtered water must be monitored at least daily.

   b. The turbidity of filtered water must not exceed 1 NTU in 95 percent of the analyses in a month, with a maximum of 5 NTU.

   c. Disinfection requirements are identical to those for unfiltered systems.

INSTALLATION:	COMPLIANCE CATEGORY: WATER QUALITY MANAGEMENT Federal Republic of Germany ECAMP	DATE:	REVIEWER(S):
STATUS NA C RMA	REVIEWER COMMENTS:		