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A GUIDE FOR SYSTEMIZATION PLANNING

10 NOVEMBER 1988

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PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION
(PM CML DEMIL)

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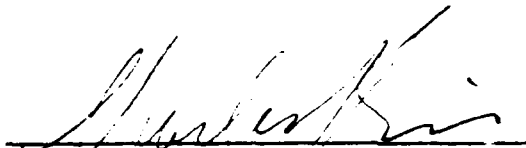
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PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION
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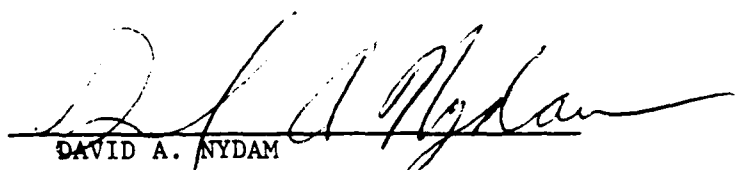
DEPARTMENT OF THE ARMY
OFFICE OF THE PROGRAM MANAGER FOR
CHEMICAL DEMILITARIZATION

GUIDE FOR SYSTEMIZATION PLANNING

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I. INTRODUCTION

A. Background. The Johnston Atoll Chemical Agent Disposal System (JACADS) is currently entering the final period of preparation prior to commencing toxic operations in August 1989. The Equipment Installation Contractor (EIC) is currently conducting field testing of his installed equipment. The Operations and Maintenance Contractor (OMC) is about to begin acceptance testing of the equipment.

All equipment needed to dispose of M55 rockets is expected to be accepted - that is, to have passed OMC Acceptance Testing - by 15 November 1988. At this time, all planning and preparation for the next step of the JACADS project - systemization - must be completed. Systemization will last from 15 November 1988 until the start of toxic operations in August 1989, a total of 9 months. Further equipment will enter systemization as it is accepted.

B. Definition. Systemization is all the steps which need to be accomplished between acceptance of a plant with functioning equipment and the point where toxic operations commence. This period will include the following activities:

(1) A series of discrete tests of the process equipment to prove proper coordinated operation.

(2) System interlock verification and certification.

(3) Monitoring equipment siting and workup.

(4) Completion of workforce hiring and training.

(5) Laboratory certification.

(6) A period of simulated operations.

(7) A series of operations and readiness inspections (ORIs) to identify problems, suggest corrections and monitor compliance prior to the preoperational survey (see Section VIII).

(8) A preoperational survey to verify readiness to proceed to toxic operations.

In addition, all necessary support functions must be concurrently blended with plant functions to achieve a smooth, logistically sound operation. During the time in which the plant and laboratory are being systemized, other supporting operations should also be drilled and readied for operations. These include:

(1) Installation security.

(2) Chemical surety.

(3) Chemical munition transportation.

(4) Coordinated emergency response (off/on post)

(5) Warehouse/resupply operations

(6) Chemical laundry

It should also be emphasized that proper preparation and Government review of the Standard Operating Procedures (SOPs) prior to systemization is of high importance. Processing of SOPs too close to systemization will result in rushed reviews with little or no comments. This will result in problems becoming apparent during operational readiness inspections.

The final test of systemization is the preoperational survey. Of particular concern will be the review of signed and approved SOPs. It is of vital importance that all of the criteria being looked for by the Preoperational Survey Team have been satisfied. If they have not - OPERATIONS WILL BE DELAYED WHILE REPAIRS ARE MADE. This cannot be emphasized enough. It is of vital importance that each contractor read and understand this guide, prior to preparing his systemization plan. This guide will be applicable for JACADS and any other disposal program to include the Chemical Stockpile Disposal Program (CSDP) plants.

C. Purpose of the Guide. The purpose of this guide is to lay out a philosophy and an organizational framework for preparing a detailed systemization plan and conducting systemization. This document specifically defines the goals which the U.S. Army wishes to achieve during the systemization period. Some summarized schedules for achieving these goals are provided in Appendix B.

II. MANAGEMENT ORGANIZATION

A. General. The management organization for systemization must shift decisively to an onsite management configuration. Program management from a distance by means of infrequent reviews simply will not suffice during this portion of the project. This is not to say that the project management personnel will change, but that technical management on-site must be increased, and that more decision making will occur on-site.

B. On-Site. The management of the systemization effort will be run by a multi-agency Government team. This team will be headed by the Contracting Officer's Representative (COR). The COR is the individual with authority to direct the contractor, and it is fitting that he be vested at this point with matching responsibility to make the system work. Except at JACADS, it is expected that the COR will be the head of the PM Cml Demil Field Office, and that the remaining Government positions on the team will be filled by the PM Cml Demil Field Office staff. The structure of this team should be as follows:

Systemization Team Leader	COR	1
Process Equipment Test Officer	Contractor	1 per test
Process Equipment Certification Officer	Government	1 per test
Interlock Verification Officer	Contractor	1
Interlock Certification Officer	Government	1
Agent Monitor Workup Officer	Contractor	1
Agent Monitor Certification Officer	Government	1
Laboratory Officer	Contractor	1
Laboratory Certification Officer	Government	1
Safety Officer	Contractor	1
Safety Certification Officer	Government	1
Training Officer	Contractor	1
Training Certification Officer	Government	1
Operations Readiness Officer	Contractor	1
Operations Readiness Inspector	Government	1
PM Cml Demil Field Officer*	Government	1

* When not the COR

For JACADS purposes, due to the size of the PM Cml Demil Field Office, many team slots will have to be filled from USACAW, or by expansion of the Field Office. Currently, two key assignments for JACADS are anticipated as follows:

- (1) Systemization Team Leader - Mr. Gary McCloskey, USACAW.
- (2) PM Cml Demil Field Officer - Mr. Richard Misiewicz, PM Cml Demil.

Each of these officers has a specific responsibility in preparing the plant for both the preoperational survey inspection and actual operations. These duties are spelled out in detail in succeeding sections of this guide.

Note that the team should also include a Government representative from the host installation. This individual would be responsible to coordinate installation support matters such as munitions transport training or joint emergency response drills.

C. PM Cml Demil. The PM Cml Demil at Aberdeen Proving Ground (APG) will monitor all tests. An engineer at PM Cml Demil will be assigned as the Systemization Monitor for each test. The monitor shall be responsible for monitoring test progress by reviewing test data, talking to the PM Cml Demil Field Officer and attending critical reviews. The monitor shall keep management informed as to test progress, and shall be capable of briefing other Government agencies or higher Headquarters, as required.

D. Relationship to Systems Management Team (SMT). Overall management of the disposal program remains the responsibility of the SMT Chairman. As systemization begins, a Test Director appointed by the PM for Cml Demil shall be responsible to ensure each of the critical areas (process equipment testing, interlock verification, agent monitoring workup, laboratory certification, training and operations readiness) are part of the SMT review agenda, and are being briefed by the responsible Government officers, or their designated assistants.

III. PROCESS EQUIPMENT TESTS

A. General. Each critical piece of process equipment, as defined in this Section, will undergo a thorough test or several tests to ensure that it is:

- (1) Functioning properly.
- (2) Capable of doing its required job.
- (3) Capable of passing regulatory tests such as RCRA trial burn testing.
- (4) Interfaces properly with the rest of the process line.

In order to properly manage this effort, each test shall have a Process Equipment Test Officer who is responsible for conducting all aspects of the test. This will generally be a contractor. Each test will also have a Process Equipment Certification Officer provided by the Government. The Certification Officer is responsible to review all data generated by the contractor, to physically observe each test, and to recommend certification or retesting of the equipment to the Systemization Team Leader.

B. Test Methods.

Each test, as defined in this Section, will be conducted according to a specific test plan. A standard test plan format is provided in Appendix A. These test plans shall be developed by the contractor and approved by the Government. Specifically, each test plan will be reviewed by the Installation staff, the SMT Chairman and by the Systemization Team Leader. The Installation Commander and the SMT Chairman will sign test plans approving them for the Government, after consideration of comments from the Systemization Team Leader and the Installation staff. Prior to the beginning of each test, a test plan signed by the Systemization Team Leader will be in the possession of the contractor.

The signed test plan will be the blueprint for each test. Only the Systemization Team Leader, or the Process Equipment Certification Officer acting for him, can approve deviations to the test. Deviations should be infrequent or avoided completely. Deviations, when allowed, will be reported to the Installation Commander, Office of the PM Cml Demil, by the Systemization Team Leader within 24 hours. Any other systemization team using the test plan will also be notified (i.e., a change to a test at Newport Army Ammunition Plant (NAAP) will be passed along to the teams at Pueblo Army Depot (PUDA), APG, and Lexington Bluegrass Army Depot (LBDA), so that all teams starting up at the same time use the same plan).

The first test which must be performed, prior to all other testing, is a data acquisition and transfer test. This test (on the Process Data Acquisition and Recording System (PDAR)) must demonstrate the following:

- (1) Ability to acquire all data for the succeeding tests and for disposal operations.

(2) Ability to produce the required summary reports for the succeeding tests and disposal operations.

(3) The ability to transfer this data to the PM Cml Demil.

Following the data acquisition and transfer test, a series of blank fuel oil tests will be run. These tests on the furnaces idling and without load will serve to:

(1) Gather further experience as to how the four furnaces operate.

(2) Gather air monitoring background data for Products of Incomplete Combustion (PICs) prior to agent being in the system (background sampling).

These tests will be run at JACADS and all CSDP plants. Note that at JACADS, it will be necessary to do the data acquisition and transfer test later than the blank fuel oil tests. This is not desirable for the CSDP plants, and it is a lesson learned from JACADS that for the CSDP this activity should start earlier.

Next, pending the granting of a TSCA permit for PCB contaminated shipping and firing tubes, a propellant burn test will be run in the Deactivation Furnace System (DFS). Since the retort at JACADS is larger than any retort the Army has previously built for demilitarization, this test will be performed to validate the designed feed rates for the M55 rocket. This test will be run only at JACADS. It is not necessary to rerun it at the CSDP plants. Note that immediately prior to the propellant burn at JACADS, a preoperational survey will be conducted for handling of propellant in the JACADS facility. The Safety Officer and the Government Safety Certification Officer will take the necessary steps to ensure that this survey is run, and that all findings are incorporated prior to the start of this test. The Systemization Team Leader, based on the results of this survey, will notify the contractor to begin propellant burn operations.

After the blank fuel oil tests (and at JACADS propellant burn tests), 5X tests will be run for the Metal Parts Furnace (MPF), Dunnage Incinerator (DUN) and DFS. For each of these furnaces, each type of representative feed will be processed at the maximum anticipated rate. During this test the laboratory will also test their procedures for analyzing incineration waste, liquid waste and stack gas. In all, there will be 14 different 5X tests. JACADS will run 12 of these, and other CSDP facilities will run some or all of these tests depending on the types of munitions stored at the specific Installation. These are listed in detail with proposed schedules in the next Section.

During both the blank fuel oil testing and 5x testing, the testing of the Continuous Environmental Monitoring System (CEMS) will be accomplished. The testing will cover both "cold" and "hot" conditions, the latter scheduled during selected 5X tests. The CEMS will include, as a minimum, the propane, chlorine (JACADS only), SO_x, NO_x, CO, CO₂, and O₂ monitors as called for by the Monitoring Plan^x for each CSDP/Cryo plant.

Completion of these tests is defined as the approval of a test as successful by the Systemization Team Leader based on the recommendations of the Process Equipment Certification Officer and satisfying all test requirements as specified in the approved test plan. The Process Equipment Certification Officer will be responsible to recommend approval or disapproval to the Systemization Team Leader. The Systemization Team Leader will decide - based on the recommendation given, consultation with the Installation, and consultation with PM Cml Demil - whether to accept the recommendation. The Systemization Team Leader will decide whether or not a test has been completed successfully, and will have sole authorization to notify the contractor. Following the completion of these tests, the plant will be ready to begin the final training phase of systemization.

C. Test Schedule.

Test schedules are to be set up on each disposal program to follow the example set by the JACADS program. The JACADS program schedule is shown on Table 1.

On the CSDP program, each plant need not duplicate each of the munitions 5X tests done at JACADS. Based on JACADS (or cryofracture) data, tests 13, 14, 16 and 17 can be consolidated into a projectile 5X test. Likewise, tests 18, 19 and 20 can also be consolidated into one test. This will be done by choosing the munition in each of these groups which takes the longest time to achieve 5X condition at JACADS (or cryofracture), and using it to demonstrate the 5X characteristics of the CSDP plant at each site. This will reduce the number of tests and time required for 5X certification of the CSDP plants, with no reduction in confidence of performance. Due to the major process differences between JACADS and the Cryofracture facility, the entire range of 5X testing will be exercised for the Cryofracture pilot plant.

D. Mechanical Integration Testing.

During the period of furnace and monitoring testing (Tests 1-24 described in the previous section), all mechanical and demilitarization equipment will also be systemized. This will be done by exercising the equipment, at first individually, and then in unison as a system. Equipment will be started and integrated sequentially in the order in which the munitions move through the system. Thus mechanical startup and integration will start in the Unpack Area (or Container Handling Area) and end in the Furnace Exit and Residue Handling Areas. This period of mechanical integration will also be used for continued hands-on training (see Section VII).

A recommended scheme for systemizing equipment is as follows:

(1) Mechanical Systemization Stage I (Bulk)

- Ventilation Balancing and Certification
- Bulk Airlock and Conveyor
- Munitions Change Car (Second Floor)
- Munitions Processing Bay/Conveyors
- Bulk Drain Station (BDS)
- Munitions Processing Bay Lifts
- Munitions Change Car (First Floor)

TABLE I
JACADS TEST SCHEDULE

TEST NUMBER	TEST	START DATE	STOP DATE	DATE
1	Data Acquisition and Transfer Test	D	D + 2 months	2 months
2	DFS Blank Fuel Oil Test	D	D + 2 weeks	2 weeks
2A	DFS Surrogate Incineration Test (RCRA)	NA	NA	2 weeks
3	LIC Blank Fuel Oil Test	D + 2 weeks	D + 5 weeks	3 weeks
3A	LIC Surrogate Incineration Test	NA	NA	3 weeks
4	MPF Blank Fuel Oil Test	D + 5 weeks	D + 7 weeks	2 weeks (Concurrent with 5)
4A	MPF Surrogate Incineration Test	NA	NA	2 weeks (Concurrent with 5A)
5	DUN Blank Fuel Oil Test	D + 5 weeks	D + 7 weeks	2 weeks (Concurrent with 4)
5A	DUN Surrogate Incineration Test	NA	NA	2 weeks (Concurrent with 4A)
NA	Contingency	D + 7 weeks	D + 9 weeks	2 weeks
6	DFS Mine 5X Test	D + 9 weeks	D + 10 weeks	1 week
7	DFS Projectile 5X Test	D + 10 weeks	D + 11 weeks	1 week
8	DFS Rocket 5X Test	D + 11 weeks	D + 12 weeks	1 week
9	DFS Propellant Burn Test	D + 12 weeks	D + 14 weeks	2 weeks
10	DUN Rocket Dunnage 5X Test	D + 14 weeks	D + 15 weeks	1 week
11	DUN Mine Dunnage 5X Test	D + 15 weeks	D + 16 weeks	1 week
12	DUN Charcoal Incineration Test	D + 16 weeks	D + 18 weeks	2 weeks
13	MPF 105mm 5X Test	D + 18 weeks	D + 19 weeks	1 week
14	MPF 155mm 5X Test	D + 19 weeks	D + 20 weeks	1 week
15	Continuous Environmental Monitoring System Test (Hot Testing)	D + 18 weeks	D + 20 weeks	2 weeks (Concurrent with 13 & 14)
16	MPF 8 inch 5X Test	D + 20 weeks	D + 21 weeks	1 week
17	MPF 4.2 inch 5X Test	D + 21 weeks	D + 22 weeks	1 week
18	MPF MC-1 5X Test	D + 22 weeks	D + 23 weeks	1 week
19	MPF MK94 5X Test	D + 23 weeks	D + 24 weeks	1 week
20	MPF TC 5X Test	D + 24 weeks	D + 25 weeks	1 week
21	MPF TMU 28/B 5X Test	NA	NA	1 week
22	MPF MK116 5X Test	NA	NA	1 week
NA	5X Contingency	D + 25 weeks	D + 29 weeks	4 weeks
23	Electrical Grounding Test	(Conducted concurrent with other tests)	(Conducted concurrent with other tests)	2 weeks
24	Protective Clothing Ingress/ Egress	(Conducted con current with other tests)	(Conducted con current with other tests)	4 weeks

MPF Input and Exit Conveyors
Various other Buffer Conveyors

(2) Mechanical Systemization Stage II (Rocket)

Rocket Input Airlock and Conveyors
Blast Doors
Rocket Shear Machine (RSM)
Blast Gates and Tipping Valves
Heated Discharge Conveyor
Waste Disposal Equipment

(3) Mechanical Systemization Stage III (Projectile)

Projectile Input Airlock and Conveyors
Blast Doors
Projectile Mortar Disassembly Machine (PMD)
Burster Size Reduction Kit
ECR Conveyors
Projectile Tilt Machine
Pick and Place Machine (Corridor)
Munitions Change Car (Second Floor)
Munitions Processing Bay Conveyors
Multipurpose Demil Machine (MDM)
Pick and Place Machines (Munitions Processing Bay)
Munitions Processing Bay Lifts
Munitions Change Car (First Floor)
MPF Input and Exit Conveyors
Various other Buffer Conveyors

These three stages will be scheduled as follows:

- (1) Stage I - a minimum of 2 months
- (2) Stage II - a minimum of 2 months
- (3) Stage III - a minimum of 3 months

At NAAP, PBA, APG and PUDA the schedules will be adjusted to accommodate the absence of one or two stages due to the types of munitions to be disposed of. Mines will be systemized as a part of the disposal operation due to the nature of the equipment and due to their placement late in the order of disposal.

At JACADS, due to time constraints on the current schedule and due to process control limitations, Stage I will be followed by Stage II with only one ECR configured for rockets. A partial systemization of Stage III will be accomplished using the other ECR. Stage III at JACADS will have to be finished during operations. Following the Stage I Mechanical Systemization, the JACADS workforce will switch over to rocket line operations in preparation for startup. This will be re-emphasized with further rocket systemization and training during the final 8 weeks of hands-on training prior to the preoperational survey (see Section VII).

During this final period of hands-on training, at least one week should be run at the maximum rate of rocket processing anticipated to give the workers a feel for actual operations, and to provide management with a glimpse of possible bottlenecks such as dunnage buildup in the plant.

IV. SYSTEM INTERLOCK VERIFICATION AND CERTIFICATION

Each disposal plant, of necessity, is designed with a series of both permissive and prohibitive interlocks. These interlocks either permit or initiate certain actions based on one key sensor/action; or prohibit certain actions until a key condition is satisfied.

The Preoperational Survey Team will have two principal requirements in this area. The first is that the team will require an interlock list which clearly portrays what the interlocks are in the disposal plant. This list must also have a descriptive chart showing the other parameters which each interlock affects.

The second requirement is that there must be a signed certification sheet showing that each interlock has been tested in the presence of the Government Interlock Certification Officer. The Interlock Certification Officer is responsible to have visually observed the function of each interlock, and that all the parameters affected by each interlock are affected as predicted in the descriptive chart provided by the contractor. During all tests and demonstrations of the interlocks, the Government Safety Certification Officer shall also be present.

In order to place the proper emphasis on these important inspections, it is recommended that the contractor appoint an Interlock Verification Officer. This individual would serve as the coordinator for interlock documentation, as the contractor's expert on interlocks, as the contractor's Field Testing Officer for all interlocks and as the Government's main point of contact on the subject of interlocks. The Government Interlock Certification Officer and the contractor's Interlock Verification Officer would work closely together to assure all systems were operating properly, and were completely documented and certified for the Preoperational Survey Team.

Note: Programming of PLCs is an integral portion of interlock verification and certification. Changes to PLC programming should be examined in relation to required interlocks and verified and certified using the same process as described above. A mechanism for documenting, controlling, and authorizing changes applicable to the demil plants needs to be provided.

V. MONITORING EQUIPMENT SITING AND WORKUP

A. General.

In the JACADS Plant, the Cryofracture Plant and the CSDP Plants, there will be a need to site and properly startup air monitoring equipment. A proper startup is technically important, but the term proper, as it is used here, also infers a timely startup. Past Army experience shows that contractors have consistently under-estimated the time and effort required to bring an air monitoring system to proper operating condition.

B. Siting.

The contractor will propose a specific location for each alarm and monitor within the rooms/areas detailed in the Monitoring Plan. Key documents in this siting process will be the Monitoring Plan and the Safety Submission. However, there should also be ventilation data from the U.S. Army Environmental and Hygiene Agency (AEHA), or another reliable expert source, which shows that each room's ventilation patterns have been investigated, and that each monitor is placed at a point which maximizes its ability to detect agent in the area. This document should be organized on a room by room basis, with clear discussion and conclusions so that the Preoperational Survey Team can quickly assess the data taken, and the reasons why the alarm was sited at its particular location.

The final siting of each alarm or monitor will be a recommendation made by the contractor. In order to facilitate the work to be performed in this area, it is recommended the contractor assign an Air Monitoring Workup Officer. In addition to recommending the siting of each monitor, this individual will be responsible for scheduling the workup of each monitor to include precision and accuracy (P&A) testing, installation, calibration and control panel/alarm integration. Note that actual P&A testing of monitors outside of the plant is a separate issue and must begin long before systemization begins in order for the plant startup schedule to be successfully maintained.

The final decision on siting of alarms and monitors will rest with the Government. To this end, the Government will appoint an Air Monitoring Certification Officer. This individual shall be responsible for evaluating the contractor's data and documentation and assuring that it is of adequate quality to satisfy the Preoperational Survey Team's inspection. He shall also present his recommendation to the Systemization Team Leader for siting of the monitors. Within the latitude allowed by the Monitoring Plan, siting of the monitors shall be the sole decision of the Systemization Team Leader, using the recommendations of the contractor, the Government staff and the Air Monitoring Certification Officer.

Following approval and documentation of the sites, the Air Monitoring Certification Officer shall inspect the installation. He shall ensure that the monitors are installed in accordance with the approved Siting Plan and will prepare documentation which certifies the installation at each location.

Ultimately, the Preoperational Survey Team should be able to review a complete history of how each monitor was sited. They should be able to read the

ventilation test record for each room, the recommendation and reason for siting the alarm in each room, and the Air Monitoring Certification Officer's report signed and certifying that the equipment has been installed as recommended by the Systemization Team Leader.

C. Workup.

The Air Monitoring Workup Officer is responsible, after P&A testing and siting of the equipment, for the final workup of the equipment. He shall insure that P&A testing data for each method (bubbler/DAAMS) and each machine (ACAMS) are kept available for the Preoperational Survey Team's inspection.

Following siting of the equipment the Air Monitoring Workup Officer shall insure that each monitor can be properly calibrated such that the required air monitoring levels can be met. He shall also insure that each monitor is fully functional and integrated with the surrounding action or shutdown alarms. He shall further insure that each device is producing data which is being properly captured by the PDAR.

The Government Air Monitoring Certification Officer will observe the testing of each air monitor and will sign a certification sheet. This sheet will certify that:

(1) The machine is properly calibrated.

(2) The monitor is properly interfaced with the required alarms.

(3) Each station is functioning as required and is (for ACAMS) transmitting data to the PDAR. For bubbler stations the Air Monitoring Certification Officer will check critical flow orifices, both temperatures and other essential criteria.

The Preoperational Survey Team will request copies of the above information. They will verify the completeness of these records, and will do spot checks of the equipment. Therefore, all siting and workup should be done in a meticulous and professional fashion to thoroughly satisfy the Preoperational Survey Team.

Following the certification of the stations by the Government, but prior to the preoperational survey, the air monitoring equipment will be run with all of the other process equipment to insure full system integration. This will occur during the final 2 months prior to the preoperational survey. During this time full integration of the alarms with the system will be assured. This will include conducting exercises to ensure that monitoring personnel and plant personnel are well trained in responses to alarms. Exercises will be repetitive drills to ensure a response from the workforce to air monitoring alarms will be "second nature" due to intensive training.

VI. LABORATORY CERTIFICATION

A. General. Laboratory certification is conducted to ensure that the chemical laboratory can precisely and accurately analyze for the presence of chemical agents in the work area and incinerator stack environments. The certification process documents:

(1) The effective transfer of training of the monitoring/analysis technology to the JACADS/CSDP/Cryo facility.

(2) The effective training of methods to identify by means of quality control, a lack of precision or accuracy in analyses.

(3) The effective training of data recording and transfer techniques within the laboratory.

In order to verify that the certification is properly conducted, a series of steps must be satisfied by each laboratory operator. These steps are as follows:

(1) Formal classroom training (Chemical Demilitarization Training Facility (CDTF) except JACADS).

(2) Operator Certification (CDTF except JACADS).

(3) On-site laboratory certification for XCSM (On-site).

(4) ACAMS acceptance P&A (On-site).

(5) Work area P&A (On-site).

(6) Perimeter P&A (On-site).

(7) Brine/Ash/Residue P&A (On-site).

(8) Stack gas P&A (On-site).

(9) CSM certification (On-site).

Each of these steps will be monitored by a Laboratory Officer, who is responsible for ensuring that all aspects of testing have been properly completed. He is also responsible for coordinating with the Training Officer to insure training is adequate and complete.

The Laboratory Officer will be a contractor, and a member of the laboratory core (staff). Each step of the certification will also be monitored by a Laboratory Certification Officer provided by the Government. The Laboratory Certification Officer is responsible to review all data generated by the contractor, to physically observe each test and to recommend certification or retesting to the Systemization Team Leader.

B. Methods. There are two phases of laboratory certification:

- (1) Hands-on training.
- (2) On-site P&A verification.

Prior to either of these phases, a training program of classroom instruction is provided (see Section VII). Only after this classroom training is complete will hands-on training begin.

Hands-on training is conducted on-site at JACADS, but will be conducted at the CDTF laboratory for the CSDP and cryofracture plants. This training will include training of a core group of key management personnel and training of the workforce separately. After construction of the CDTF, all core and workforce groups will be trained at the CDTF to ensure commonality of training. Training will involve hands-on operation of all air monitoring and analysis equipment followed by repeated calibrating analyses of XCSM samples of agent. The operators will have to show that they can set up, operate and analyze, within strict criteria, each piece of analysis and monitoring equipment on each of the three agents. Repeated successful analysis within the strict criteria will result in an operator being certified to operate a method for a specific agent.

Following formal classroom training and operator certification of the core group, the core will move to the on-site laboratory. They will then:

- (1) Certify the on-site laboratory for XCSM.
- (2) Perform the ACAMS P&A in the on-site laboratory for acceptance of ACAMS.
- (3) Install laboratory equipment.

Meanwhile, 50% of the workforce for the laboratory would be hired and would undergo formal classroom and operator certification training at the CDTF. This 50% group would then move to the respective on-site laboratory to accomplish the following tasks:

- (1) Work area P&A testing.
- (2) Perimeter P&A testing.
- (3) Brine/Ash/Residue P&A testing.
- (4) Install monitoring equipment in the plant (see Section V).

Meanwhile, the second 50% of the workforce (the 100% group) would be hired and would undergo formal classroom and operator certification training at the CDTF. This 100% group would then move to their respective on-site location to participate in the final laboratory workup as follows:

- (1) Stack gas P&A testing.

(2) CSM certification of the laboratory.

For each of the steps involving technical testing, particularly the P&A testing, a signed test plan will be the blueprint for each test. Only the Systemization Team Leader, or the Laboratory Certification Officer acting for him, can approve deviations to the test. Deviations, when allowed, will be reported to the Installation Commander and to PM Cml Demil, or their staffs, by the Systemization Team Leader within 24 hours. Any other systemization team using the test plan will also be notified.

Completion of these tests as successful is defined by the approval of the Systemization Team Leader, based on the recommendations of the Laboratory Certification Officer. The Laboratory Certification Officer will be responsible to recommend approval or disapproval to the Systemization Team Leader. The Systemization Team Leader will decide - based on the recommendation given, consultation with the Installation, and consultation with PM Cml Demil - whether to accept the recommendation. The Systemization Team Leader will decide whether a test has been successful or must be repeated, and he will be solely authorized to notify the contractor.

VII. Training

A. General.

Some training will be provided at all sites to a cadre of management staff and key personnel up to 18 months prior to operations. This training is not outlined in this section as it is highly specialized and individualized at each site. The training discussed here is the training to be provided to the main body of the plant workforces. Training will be conducted according to the following schemes:

JACADS Classroom Training	2 months	Sep - Oct 88
JACADS Process Equipment Testing	9 months	Nov - Jul 89
JACADS Final Hands-on Training	2 months	Jun - Jul 89
JACADS Preoperational Survey	1 month	Aug 89

(All JACADS Training is performed on-site.)

CSDP Classroom Training	2.5 months	CDTF*
CSDP Initial Hands-on Training	3.5 months	CDTF*
CSDP Process Equipment Testing	6-9 months	On-site+
CSDP Final Hands-on Training	2 months	On-site+
CSDP Preoperational Survey	1 month	On-site

Cryo Classroom Training	2.5 months	On-site*
Cryo Initial Hands-on Training	3.5 months	On-site*
Cryo Process Equipment Testing	9 months	On-site+
Cryo Final Hands-on Training	2 months	On-site+
Cryo Preoperational Survey	1 month	On-site

Note: See schedules laid out in Appendix B.

(*) This training is actually intermixed in the training cycle for each group of students.

(+) Final hands-on training conducted concurrently the last 2 months of process equipment testing.

The reason for the difference in philosophy between JACADS and the other plants is historical. JACADS was originally planned as a stand alone disposal facility. Since it was originally not part of a larger matrix of plants, there was no reason to provide any other training than on-site training.

With the advent of the CSDP plants, it became obvious that a more centralized training program would be required. The answer to this was the creation of a CDTF at Aberdeen Proving Ground. The CDTF will be used to train critical course material to personnel from all of the CSDP plants to assure a uniform and high level of training.

The schedule for construction of the CDTF precludes using it as a training facility for JACADS. Use of the CDTF for the Cryofracture plant will not be possible due to the unique nature of the cryofracture plant. Use of the CDTF for the other CSDP facilities will be mandatory.

CSDP personnel will be trained in three training cycles at the CDTF. Each cycle will include intermixed classroom and hands-on training. The last cycle of personnel will not participate in process equipment testing onsite, but will go from the CDTF directly to hands-on training.

B. Classroom Training.

For a period not less than 2 months (for JACADS this should be in late 1988), a period of intensive classroom training should be given to the workforce. This training should be given just prior to the process equipment test phase at JACADS, and just prior to the initial hands-on training for the CSDP plants (see previous Section). As stated in Section VII A, CSDP classroom training will be held at the CDTF at Aberdeen Proving Ground, MD.

Since the process equipment test phase (9 months, including the final hands-on training of 2 months), and the preoperational survey phase (1 month) follow the classroom training phase (2 months), the workforce for single shift operations must be hired 12 months prior to toxic operations (for JACADS). This is a workforce of approximately 180 personnel. This includes operations, laboratory and management personnel.

The material to be taught is covered in detail in the JACADS Training Plan. The training material consists of an orientation course, an overview of the program and a site safety course. It also consists of the required sit-down sessions where the SOPs are read, as required by regulation, and specific material from the SOPs is taught.

In addition, during classroom training and during the remaining phases of training, the operator shall develop a testing program for his operators. This program shall consist of a series of written exams for use in evaluating the workforce understanding of all taught material. Each course will have an associated test, although some courses may be combined in one test. The records of the testing will be used to evaluate the need for further training of individual operators. The Government Training Certification Officer will be given access to all test material and will certify that each operator has been tested in each required area.

The goal of classroom training is to provide a phase which enables the operators to go from the stage of being new hires to the point at which certain basic tests can begin, such as the blank fuel oil incineration tests. This training is to be accomplished in a period of 60 days.

To ensure training is properly managed, the contractor shall appoint a Training Officer who shall represent the contractor in all matters regarding workforce training. The Government, in order to assure proper monitoring of the effort will assign a Training Certification Officer. During classroom training, the training certification officer will review the contractor's records of training, and will ensure all operators have attended the required

courses, have passed the required tests and have signed the required paperwork. He will sign and certify that this is the case for each operator. The training certification officer will also attend any classes he chooses to spot check training, and will ensure that lesson plans are being adhered to, that instructors are capable and professional and that all courses are being taught as contractually required. In the case of Government provided courses he will perform the same function, as well as being responsible for status (schedule and cost).

The training officer will recommend to the Government the initiation of process equipment testing (for JACADS) or initial hands-on training (for CSDP/Cryo) at the completion of classroom training, when he is satisfied classroom training is complete. The training certification officer will forward his recommendations to the Systemization Team Leader. The Systemization Team Leader will have the final decision as to when to terminate classroom training, or whether to repeat certain (or all) courses.

C. Hands-on Training.

Hands-on training for JACADS will start with the process equipment testing phase. Initial hands-on training for the cryofracture plant will be onsite while initial hands-on training for CSDP plants will begin at the CDTF.

Initial hands-on training at the CDTF will last approximately 3.5 months. Since the process equipment tests must be repeated at each plant, the operators for the cryofracture and CSDP plants will actually receive 3.5 months more training than the JACADS operators.

Further hands-on training will be conducted concurrently with the process equipment testing outlined in Section III. The integration of this training with the required process equipment tests, which are primarily incineration oriented, shall be the responsibility of the training officer. It will require close coordination with his counterparts, the process equipment test officers. Failure of these contractors to integrate their work will seriously jeopardize the success of the program schedule. Therefore, the Government, through the training certification officer and the process equipment certification officer, will closely monitor this effort. These two Government officers must coordinate closely to assure themselves that the contractor is maximizing the use of the time (and taxpayers dollars) afforded to him for both training and the necessary equipment tests.

As previously described in Section III, certain 5X testing may be done based on the munition within a group (for instance projectiles) which takes the longest to achieve 5X conditions. Thus, instead of testing all 4 types of projectiles in a CSDP plant, it may only be necessary to test 1 type. This will consequently shorten some of the process equipment testing schedule. This would result in a shortening of the systemization period. However, the CSDP program is currently committed to a series of surrogate incineration tests in order to obtain the facility RCRA permits which JACADS is not required to conduct. These surrogate tests will add approximately the same amount of time as the condensed time previously removed. Consequently the process equipment test phase remains 9 months long, even with the use of JACADS produced data.

Also of note is the pilot cryofracture schedule. This systemization would have to be further extended to perform the full battery of 5X tests, as the system is not comparable to the JACADS data. Also required for the cryofracture plant will be the surrogate burns required by EPA under RCRA.

D. Operations Training.

Following CDTF and/or in-plant hands-on training, the workforce will be ready to begin a period of intense operations oriented training. This should last approximately 2 months and should occur immediately prior to the preoperational survey. This training will also serve as a continued period of testing of the process equipment prior to operations.

There should be two main thrusts of operations training (called systems optimization on the JACADS schedule). The first is the operation of the plant with all systems in a realistically integrated fashion. Where possible, substitute munitions should be processed at realistic rates during this time.

The second is the repeated exercising of the plant and laboratory contingency procedures. It can not be emphasized enough that these must be repeatedly drilled until they are second nature to the workforce. This kind of exercise should, in fact, make up the majority of the eight week period. It is also required that the plant operator plan a program to continue this training during operations. This continued training would take the form of refresher training, periodic drills and update training on new equipment. It is particularly advised that drills be conducted during periods of prolonged downtime to keep the workforce trained and active.

During this period, the training officer shall be responsible for assembling a Drill Schedule and for conduction Drill Evaluations. The training certification officer will attend the evaluations and will provide the Government's comments to each drill. Also included will be the comments provided by the Operations Readiness Officer and the Operations Readiness Inspector (see Section VIII).

At the completion of the operations training (systems optimization) phase, the training officer and operations readiness officer will submit a signed recommendation to their Government counterparts recommending the start of a preoperational survey. This will be indorsed or provided with comments by the Government officers to the Systemization Team Leader. Based on the written recommendations, the recommendations of his training certification officer and operational readiness inspector, and based on his own observations, the Systemization Team Leader will either request the contractor to continue operations training in specific areas, or will recommend the start of a preoperational survey.

E. Emergency Training.

Contingency or emergency training is one of the most important blocks of training to emphasize during systemization. This is because it is not exercised on a daily basis during operations, as are many of the other blocks of instruction. It is also because the effect of an error during a real

emergency can be extremely damaging. Therefore it is critical to emphasize emergency training during systemization.

Emergency training should consist of some initial classroom training followed by repeated drills to sharpen the proficiency and cooperation of the participants. Emergency exercises should be plant-wide, post-wide and community-wide in nature. On Johnston Atoll, the analog to this are exercises at JACADS, exercises with both JACADS and Red Hat participating, and Island-wide exercises. At least one community/Island-wide exercise should be run to test and sharpen coordination skills prior to the start of actual toxic operations. More than one is preferable.

Some suggested plant-wide exercises to be run during this period might include the following:

- (1) Agent detected in the unpack area
- (2) Agent detected in the DPE support area
- (3) Agent detected in the toxic maintenance area (Cat C)
- (4) Agent detected in the stacks
- (5) Major spill in the processing areas of the MDB
- (6) Scrubber fan loss
- (7) Filter fan loss
- (8) Power failure
- (9) DFS retort failure
- (10) Water line break
- (11) Propane leak
- (12) Fuel oil leak
- (13) Caustic/Brine/Salt spill
- (14) DPE emergencies
- (15) Air compressor failure
- (16) Flooding

Some suggested post-wide exercises might include the following:

- (1) Agent detected in the stacks
- (2) General plant evacuation

- (3) Chlorine leak
- (4) Fire in the MDB
- (5) Agent transportation accident

Some suggested community-wide exercises might include the following:

- (1) Agent spill during transportation
- (2) Agent excursion from the stack (major)
- (3) Agent accident requiring treating of casualties at local hospitals
- (4) After hours reporting of agent symptoms by a worker

It is as some particular note that the last exercise mentioned was run in the Pine Bluff community prior to BZ operations and was a particularly valuable exercise. It has historically been one of the more realistic exercises during past years of demilitarization operations for low-level nerve agent exposures.

It is important that, after emergency operations are trained, that they be demonstrated for the Training Certification Officer. The Training Certification Officer shall observe each of the exercises described in the Plant Contingency Plan and will certify the exercise as being adequately trained, or will require further exercises, at the direction of the Systemization Team Leader.

Finally it is vital that emergency training be periodically drilled during operations as refresher training. Periods of downtime are appropriate for such training. The Training Certification Officer shall insure the plant operator runs periodic exercises during plant operations.

VIII OPERATIONAL READINESS

Operations Readiness inspections will begin at all plants 12 months prior to toxic operations. The operations readiness inspections will be conducted by the following principal players:

(1) The Operations Readiness Officer - a contractor responsible for coordinating visits of the Operations Readiness team, documenting their findings, documenting contractor responses and fixes, and scheduling drills. He is responsible for overall operations readiness status, and works closely with the training officer.

(2) The Operations Readiness Inspector - a member of the Government field office who verifies contractor progress as regards operational readiness findings and certifies in writing their resolution. He provides liaison with PM Cml Demil personnel, keeping them apprised of the exact status of contractor readiness.

(3) The Operations Readiness Team - a team of Government technical experts who will periodically visit the plant and conduct a detailed assessment of the status of facilities, equipment, procedures, and training (or any combination of these) with regard to system and readiness for toxic operations.

A series of operations readiness inspections will be conducted. The first, twelve months prior to operations, will look for major equipment or structural violations, such as a transformer being located too close to a building. This will allow sufficient time for critical major renovations, if necessary. It will also familiarize the team with the site.

Thereafter, inspections will be made at intervals of about 12 weeks. The team will evaluate all of the items that a preoperational survey team would evaluate. This will include a detailed survey of the plant itself as well as support activities as follows:

- (1) The toxic storage yard.
- (2) Transportation of the munitions.
- (3) Laboratory and monitoring operations (plant).
- (4) Laboratory operations (depot).
- (5) Warehouse activities.
- (6) Medical readiness.
- (7) Preventive Maintenance.
- (8) Spare and repair parts.
- (9) Process waste disposal.

- (10) Filter unit set up and procedures.
- (11) Protective clothing and laundry support.
- (12) Emergency response team support (for both agent and industrial accident situations).
- (13) Quality Assurance and safety procedures.
- (14) Fire fighting support.

In the plant itself; in addition to facility readiness, the following will be checked for:

- (1) System safety program plan implementation.
- (2) Training certifications.
- (3) PRP documentation.
- (4) Security readiness.
- (5) Completeness of documentation - SOPs, Contingency Plans, Maintenance Procedures, Preventive Maintenance Procedures and Administrative Procedures.
- (6) Conformance of the plant to the approved drawings, and Hazard Analysis, and an audit trail for any approved changes.
- (7) Adequacy of SOPs with regard to regulation and approvals.

The final operational readiness inspection will be made 4 to 6 weeks prior to the preoperational survey. At the time of the final operational readiness inspection, an adequate number of copies of the documentation (required by paragraph 4.a. of Preoperational Surveys, Postoperational Surveys, and Safety Evaluations, 16 Oct 87), will be provided to Chairman of the Preoperational Survey Team. Following the last inspection, the Operational Readiness Officer shall recommend to the Government that the plant is ready for toxic operations. The Operational Readiness Inspector, working in close coordination with the Training Certification Officer, will indorse or provide comments to the Systemization Team Leader. Based on the contractor's written recommendation, the recommendations of the Operational Readiness Inspector and the Training Certification Officer, and his own observations, the Systemizations Team Leader will either request another operational readiness inspection following further corrections, or he will recommend the start of a preoperational survey.

It is important to note that the Operational Readiness Team will require, for each visit, a meeting room with chairs and tables to use as a base of operations. They will also need hard hats, protective masks and other

necessary items for visiting the site, as well as support to assist them in entering secured areas. The meeting room will require a word processor (IBM compatible) with typing/clerical support. All of these items should be provided by the Contractor through the operations readiness officer. Government project personnel should plan for this in their contract tasking.

APPENDIX A
STANDARD TEST PLAN FORMAT

STANDARD TEST PLAN FORMAT
PM CML DEMIL

CHAPTER	TITLE
1	Objective
2	Background
3	Introduction
4	Schedule
5	Test Procedures
6	Personnel Requirements
7	Equipment and Material Requirements

APPENDIX B
SUMMARIZED SYSTEMIZATION SCHEDULES

SYSTEMIZATION - JACADS

CLASSROOM TRAINING 2 Months
Sep - Oct 88

PROCESS EQUIPMENT TESTING 9 Months
Nov - Jul 89

FINAL HANDS-ON TRAINING 2 Months
Jun - Jul 89

PREOPERATIONAL SURVEY 1 Month
Aug 89

TOTAL: 12 Months

OPERATIONS READINESS INSPECTIONS (EVERY THREE MONTHS)

SYSTEMIZATION CSDP/CRYOFRACTURE

CLASSROOM TRAINING (CTF)*

2.5 Months

INITIAL HANDS-ON TRAINING (CTF)*

3.5 Months

PROCESS EQUIPMENT TESTING

APC, NAAP

6 Months

OTHER SITES

9 Months

CRYOFRACTURE

9 Months

FINAL HANDS-ON TRAINING

2 Months

PREOPERATIONAL SURVEY

1 Month

OPERATIONS READINESS INSPECTIONS (EVERY THREE MONTHS)

TOTALS: APC/NAAP - 13 Months
OTHER CSDP - 16 Months
CRYOFRACTURE - 16 Months

* Onsite for Cryofracture

* These periods of instruction actually intermixed.

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