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TEST PLAN FOR M55 ROCKET SYSTEM INTEGRATION. BB-39-OPERATIONAL --ETC(U)
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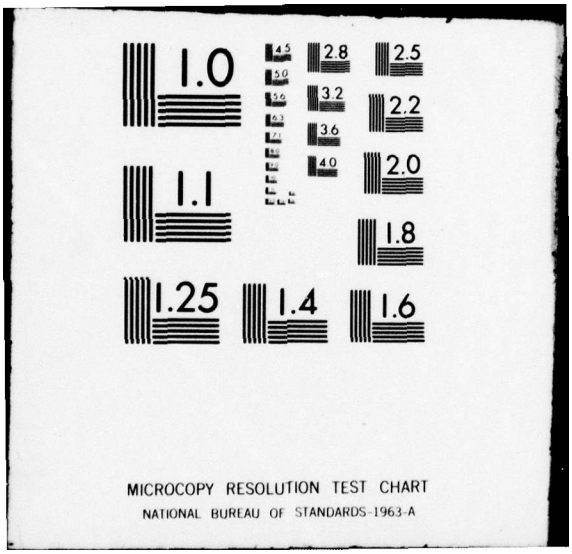
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M55 ROCKET SYSTEM INTEGRATION TEST PLAN

No. CAMDS 39-3

SEPTEMBER 1976

Chemical Agent Munition Disposal System
CAMDS Directorate
Tooele Army Depot
Tooele, Utah 84074

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TEST PLAN

FOR

M55 ROCKET SYSTEM INTEGRATION
BB-#39-OPERATIONAL AND ENGINEERING SUPPORT

TEST NO. CAMDS 39-3

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TEST PLAN NO. CAMDS 39-3

M55 ROCKET SYSTEM INTEGRATION

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TABLE OF CONTENTS

TEST PLAN FOR M55 ROCKET SYSTEM INTEGRATION TEST

I INTRODUCTION

1.1 Purpose - The purpose of this test is to demonstrate that the facilities, equipment, and procedures at the CAMDS Facility, Tooele Army Depot, Tooele, Utah are adequate and properly interfaced to allow the safe and efficient demilitarization of GB-filled M55 rockets while maintaining agent atmospheric emission levels and concentrations in non-mask working areas below minimum requirements specified in Appendix B. The tests are designed to demonstrate the rocket demilitarization rate, operating procedures and system reliability before full scale production is begun. The primary subsystems that comprise the integrated M55 rocket system are the unpack area (UPA), rocket demil machine (RDM), explosive containment cubicle (ECC), ECC hydraulic module (EHM), explosive treatment system (ETS), agent destruction system (ADS), deactivation furnace system (DFS), filter and ventilation system (FIL), detectors (DET), computer control system (CCS), and dunnage incinerator (DUN). Additional support facilities and equipment will be required for toxic operation. These include the communication system (COM), control center (CON), closed circuit TV (CTV), utilities (UTL), chemical laboratory (CML), metal parts furnace (MPF), material handling equipment (MHE), piping (PIP) and the personnel support complex (PSC) complete with the site medical facility (SMF) and life support system.

1.2 Scope - During the M61 Rocket System Integration Test (No. CAMDS 39-2), the subsystems comprising the rocket demil system were interfaced and operated under simulated toxic conditions to gather production data and to demonstrate equipment and procedures to the Pre-operational Survey Team. However, only simulant filled rockets were used and so measurements of agent emissions or work area concentrations could not be made. The M55 Rocket System Integration Test extends the scope of testing to the use of GB-filled rockets. Approval by the Pre-operational Survey Team and the Department of the Army Project Manager for Chemical Demilitarization and Installation Restoration is required before testing begins. Testing will be conducted in two phases. During Phase I, 600 explosive-loaded GB-filled M55 rockets will be processed and during Phase II the number of M55 rockets will be increased to 2500. Phase I is a pilot phase during which the toxic portion of the pre-operational survey will be conducted. Approval by the Pre-operational Survey Team and the DA PM-CDIR is necessary before Phase II testing may begin.

1.3 Background - Previous tests of the system (Nos. CAMDS 39-1 and CAMDS 39-2) considered only simulant-filled rockets. They were designed to examine the function of individual equipment items and their interfacing efficiency in order to test process flow. Saw-tank filtrate containing explosive was processed through the ETS and non-agent, explosive-loaded rockets were processed through the DFS. No agent was processed through the ADS and so testing in this area was limited to the examination of pipes, valves, pumps, etc., with the use of plain decon solution. Agent challenge testing was conducted in order to verify that the process scrubbers could maintain agent emission levels below the minimum requirements, but this did

not provide data for work area concentrations or emissions under actual operational conditions. Therefore, it is necessary to conduct this M55 Rocket System Integration Test as a trial program before full scale production is undertaken in order to verify rocket demilitarization rate, operating procedures, reliability, safety, and control of emissions.

Testing will basically consist of processing explosive-loaded GB-filled M55 rockets from storage through all deactivation and decontamination operations. The process flow for M55 Rockets is shown in Figure 1. Saw-tank decon solution will be filtered and the filtrate processed through the ETS. Agent will be pumped to and processed through the ADS. Explosive-loaded rocket segments and bag filters containing explosive sludge will be processed through the DFS. Brine from the DFS and ADS operations will be dried in the ADS. Non-contaminated scrap and dunnage resulting from unpacking rockets will be burned in the dunnage incinerator. Contaminated scrap and disposable protective ensembles will be processed through the MPF. The filter and ventilation system will be operated according to SOP. Agent detectors will be used at normal locations plus special locations (Appendix C) to monitor stack emission levels and area contamination levels.

Preventive maintenance and repairs will be carried out only as necessary and according to manual/SOP's. All interlocks and alarms will be complete and functional but no special interlock testing will be undertaken.

II OBJECTIVES/DETERMINATIONS

2.1 Objectives - The primary objective of all CAMDS testing is to insure that all CAMDS equipment and procedures are safe, that emission limits are not exceeded, and that detoxification and decontamination procedures are adequate for safe disposal of residual salts and scrap. Sufficient test data must be collected, analyzed, and reported to verify operational safety, emission control, and adequacy of detoxification to obtain the necessary approvals of regulatory agencies. Also, during Phase I of this test the PMO Pre-Operational Survey Team will be assessing operator efficiency, documentation, and protective clothing in order to provide a basis for approval by the DA Project Manager to continue regular demilitarization operations. Specific goals for the M55 Rocket System Integration Test in support of the primary objective are to collect and analyze data for the following purposes:

a) to demonstrate that the facility and staff are in a state of full operational readiness to perform the demilitarization of GB filled M55 rockets;

b) to demonstrate that agent vapor concentrations are minimized and safely controlled within the work areas;

c) to demonstrate that chemical emissions and particulate (i.e., opacity) from scrubber stacks during production activities are below current guidelines specified in Appendix B.

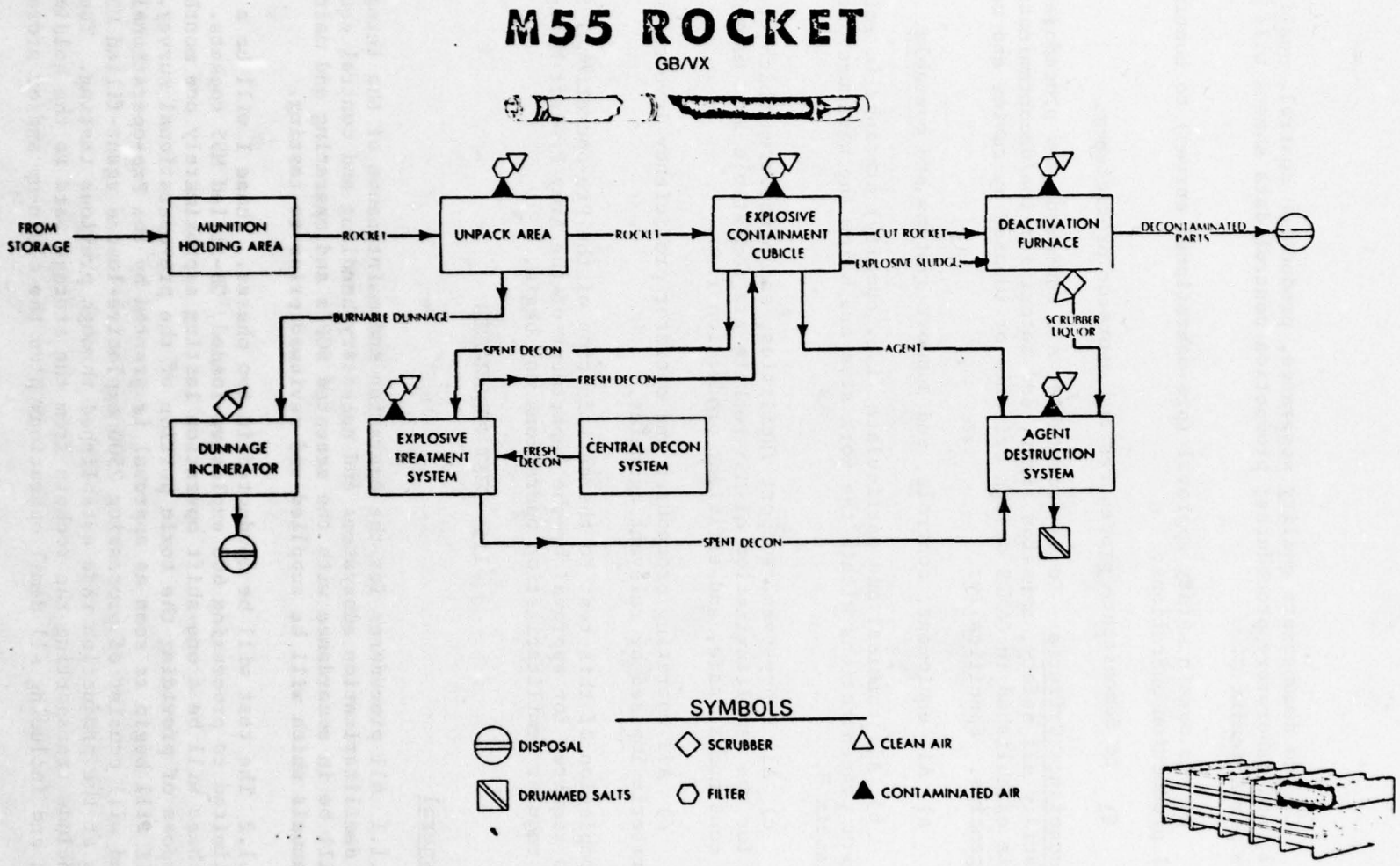


Figure 1. M55 Rocket, GB or VX, Demilitarization Process Flow

d) to demonstrate quality assurance, production control, quality control, and laboratory procedures; production control data sheets will be used as per Appendix G;

e) to obtain safety approval (pre-operational survey) to continue to full production operations;

f) to demonstrate procedures and operator proficiency.

2.2 Acceptance Criteria - To be acceptable, all equipment and procedures must satisfy all safety, emission limit, and detoxification/decontamination criteria established in CAMDS design criteria or imposed by review and regulatory agencies. Specifically:

a) All equipment, controls, and support systems are operable.

b) All chemical and particulate (i.e. opacity) atmospheric emissions and agent concentrations within the work area are below the minimums presented in Appendix B.

c) All subsystems, support facilities, and procedures which are needed for the demilitarization of M55 rockets are compatible in a manner which allows continuous, safe, and efficient production flow.

d) All operating procedures and operator proficiency levels comply with criteria imposed by relevant agencies.

Completion of this test to the satisfaction of the Pre-operational Survey Team is required for approval by the Department of the Army Project Manager before regular demilitarization operations may begin.

III TEST PROCEDURES

3.1 General

3.1.1 All procedures for the operation and maintenance of the integrated rocket demilitarization subsystems and necessary handling and control equipment will be in accordance with the accepted SOP's and operating and maintenance manuals which will be supplied and reviewed prior to testing.

3.1.2 The test will be conducted in two phases. Phase I will be a pilot phase limited to processing 600 explosive-loaded, GB-filled M55 rockets. This pilot phase will be a one-shift operation lasting approximately one month for the purpose of providing the toxic portion of the pre-operational survey. Phase II will begin as soon as approval is granted by the Pre-operational Survey Team and will consist of processing 2500 explosive-loaded agent-filled M55 rockets at the production rate established through previous testing. The test will include transporting the rockets from the storage yard to the holding area, through and including all demil operations plus the clean-up and/or storage of

waste matter. The purpose of the test is to monitor production in order to demonstrate operating, maintenance, quality assurance, quality control, laboratory, and safety procedures as well as equipment performance and emission control. Throughout testing, a time log will be maintained for recording activity in the RDM, DFS, UPA, ECC housing, MPF, ETS, ADS, FIL, and DUN. Data concerning the success or failure of all operations will be recorded and any problems encountered with equipment or procedures will be noted, analyzed and corrected. Stack emissions and agent concentrations in the working area will be monitored and recorded.

3.2 Detail - Phase I

3.2.1 Start-up Procedure - Start all equipment according to SOP's. Detailed starting procedures for the RDM system are presented in the CAMDS Control System Manual IM-335-01-10. Start-up procedures for support equipment and subsystems which interface with the RDM are given in their respective operating manuals and SOP's. A list of relevant documents is presented in Appendix D. As a minimum, the following steps are necessary:

a) Confirm verbally with ADS, Boiler, ETS, FIL/ventilation system, CML, and DFS operators that these systems are ready for RDM processing.

b) Check "Power On" lights on auto/manual control and interlock system control panels. Turn interlock panel switch to "Norm" position.

c) Check operation of indicator light panels using the test push button on each panel. Replace lights as required.

d) Check "Power On" lights on hydraulic system control switch and compressor control switches located on utilities control panel.

e) Turn on hydraulic pump unit and main air compressor. Turn auxiliary compressor switch to "Auto". (EHM at 1000 psi; compressed air supply at 100 psi; agent drain air pressure at 40 psi.)

f) Check hydraulic pump low level and high temperature indication utilities indicator panel.

g) Check air compressor low air, low oil and high temperature indicators on utilities panel.

h) Turn on TV monitors (see CAMDS Manual IM 330-01-10 for detailed operation) for RDM operation.

i) Check status of all filter and agent detection panels. (See applicable manuals for additional detail.)

j) Establish any necessary communication links.

k) Verify that the life support system is operational and that the DPE equipment is available.

3.2.2 Pre-test Equipment Readiness Check - Before feeding any rockets through the RDM, make at least one dry run cycle of the RDM feed, clamp and conveyor mechanisms as well as the operator controlled pumps, valves, and other items in the interfacing subsystems to obtain the test director's approval to being operation testing. Also, as part of the pre-test procedure, record all initial flow control settings, gas and liquid flow rates, pressures, etc. As a minimum, the pre-test check should include the following items on data sheets provided:

a) RDM

1) Activate ECC input conveyor

2) Operate load-conveyor

3) Lower push cylinder

4) Extend and retract push cylinder

5) Raise push cylinder

6) Lower and raise punch clamp

7) Lower and raise the punches

8) Raise the RDM item rollers

9) Extend and retract saw clamps

10) Lower and raise the saw carriage

11) Lower and raise the saws

12) Turn on saws; allow to run for approximately 30 seconds; turn off

13) Extend and retract ECC discharge conveyor system

14) Extend and retract segregator push-off cylinders

b) DFS

For the DFS verify:

1) operation of the DFS feed conveyor

2) rotation of furnace retort

3) burner and exhaust temperatures are at operating conditions

4) operation of discharge and scrap belt conveyors

5) flow through cyclone collector

6) flow through slagging afterburner

7) liquid flow through the quench tower

8) flow through the venturi scrubber

9) caustic recirculation through the packed bed scrubber

10) flow of caustic from the caustic hold tank to the packed bed scrubber

11) liquid flow from the brine tanks in the DFS to the ADS

c) ADS

For the ADS, verify:

1) that sufficient diluted sodium hydroxide is available to perform test operations

2) piping, valves, and pumps by feeding a small quantity of water or sodium hydroxide solution through the batch tanks, GB reaction tanks, recirculation cooler, brine tanks, and dryers

3) circulation of coolant through recirculation cooler

4) air flow through the process vent scrubber

5) caustic recirculation flow through the process vent scrubber

d) ETS

For the ETS, verify:

1) flow of saw-tank decon solution from the hold tank in the ECC housing to the surge tank in the ETS

2) flow of decon solution from the surge tank through the adsorption towers to the ETS hold tank

3) flow of decon solution from the ETS hold tank to the ADS

e) AGENT DETECTORS

Verify that all alarms, bubblers, and detectors plus any extra units used to gather additional baseline data are on and operating. (See Appendix C).

f) UPA

Verify that one pallet of M55 rockets is available in the UPA.

g) EHM

Verify that the EHM is on and at the proper pressure setting.

h) FILTER AND VENTILATION

Verify that all required air-filter and ventilation systems are on and operating.

i) CTV

Verify that all closed circuit TV cameras are operating properly.

j) COM

Verify that all necessary communication links are established.

k) UTL

Verify that utilities such as the steam boilers, and emergency generators are ready to supply the demil system as necessary.

l) LIFE SUPPORT AND DPE SUPPORT

Verify that the life support and DPE support system is ready.

m) AMBULANCE AND MEDICAL SUPPORT

Verify that ambulance and medical support facilities are available.

n) INITIAL SETTINGS

Verify that all initial flow settings, filter air flow rates and pressures, liquid flow rates and pressures, etc., have been recorded.

3.2.3 Phase I Interlock Test - Specific tests of RDM subsystem interlocks were made during the RDM Subsystem Test, No. CAMDS 39-1. A retest of those items which required earlier modification or adjustment must be made. Retest of DFS and ADS interlocks that proved faulty or required modifications during previous acceptance testing must also be performed. Additional tests may be made at the discretion of the test director. As a normal course of operation, verify that automatic control actions and messages occur as required. If an interlock related alarm or shutdown should occur as a part of normal operations, or if an interlock override is necessary, make special note of the time and/or rocket number, record the reason for actuation or override, and verify computer print out of alarms and messages. This data will be included in the final report.

3.2.4 Phase I Operation Test - During Phase I, 600 explosive-loaded GB-agent filled M55 rockets will be processed according to SOP's and data will be collected as specified in Section V and the data sheets. Throughout the test:

a) Maintain a production time log (Operations Division).

b) Verify that all operations are complete and that equipment functions as designed.

c) Note any delays or malfunctions and specify whether they are a result of equipment failure, operator error, or procedural inadequacy.

d) Record all adjustments and/or modifications to equipment, procedures, or machine settings.

3.2.4.1 Munitions will be inspected in the igloos at the storage area, transported to the munitions holding area or the unpack area at the CAMDS site, and reinspected according to SOP's. The time to perform the inspections at both the igloos and CAMDS site as well as the time to transport the munitions will be recorded. Problems with equipment, facilities, or procedures will be noted.

3.2.4.2 The RDM shall be run according to SOP's and the following activities and operations shall be considered:

a) Sequentially number all rockets which will be processed.

b) The contents of the agent catch tank drawer at the RDM drain station will be emptied at the end of each operational shift.

3.2.4.3 The ECC/ETS shall be run according to SOP's and the following activities and operations shall be considered. At regular intervals established through prior testing:

a) Recirculate saw-tank decon solution through the bag filters and decon hold tank in the ECC housing.

b) Note and record the pressure drop across the bag filters. Replace if necessary.

c) Draw a sample of decon solution from the hold tank in the ECC housing and test for pH and carbonate concentration.

d) Pump decon solution from the hold tank in the ECC housing to the surge tank in the ETS.

e) Pump the decon solution from the surge tank, through the adsorption columns, to the ETS hold tank. Record the pressure drop across the adsorption columns and observe the color of the filtrate (sight glass and filter samples) to determine if they must be cleaned.

3.2.4.4 The DFS shall be run according to SOP's and the following activities and operations shall be considered:

a) Record the time that the first warhead segment enters the DFS input conveyor and the time that the first segment exits the DFS scrap conveyor in order to obtain an estimate of the dwell time.

b) Monitor all air, flue gas, and liquid that flows through DFS equipment. Record any abnormalities.

c) Monitor furnace temperature and stack temperature.

d) Monitor flue gases from the DFS scrubber stack for SO_2, O_2 and opacity to determine if they comply with the guidelines specified in Appendix B.

3.2.4.5 The ADS shall be run according to SOP's. The basic layout of the ADS is shown in Figure 2, the GB detoxification process in Figure 3, and the brine reduction process in Figure 4. The following activities and operations shall be considered.

a) Fill both batch tanks with the correct amounts of sodium hydroxide and GB.

b) Select and prepare one of the reaction vessels by adding a small amount of sodium hydroxide to the reaction vessel.

c) Simultaneously gravity-feed the sodium hydroxide and GB from the batch tanks to the reaction vessel.

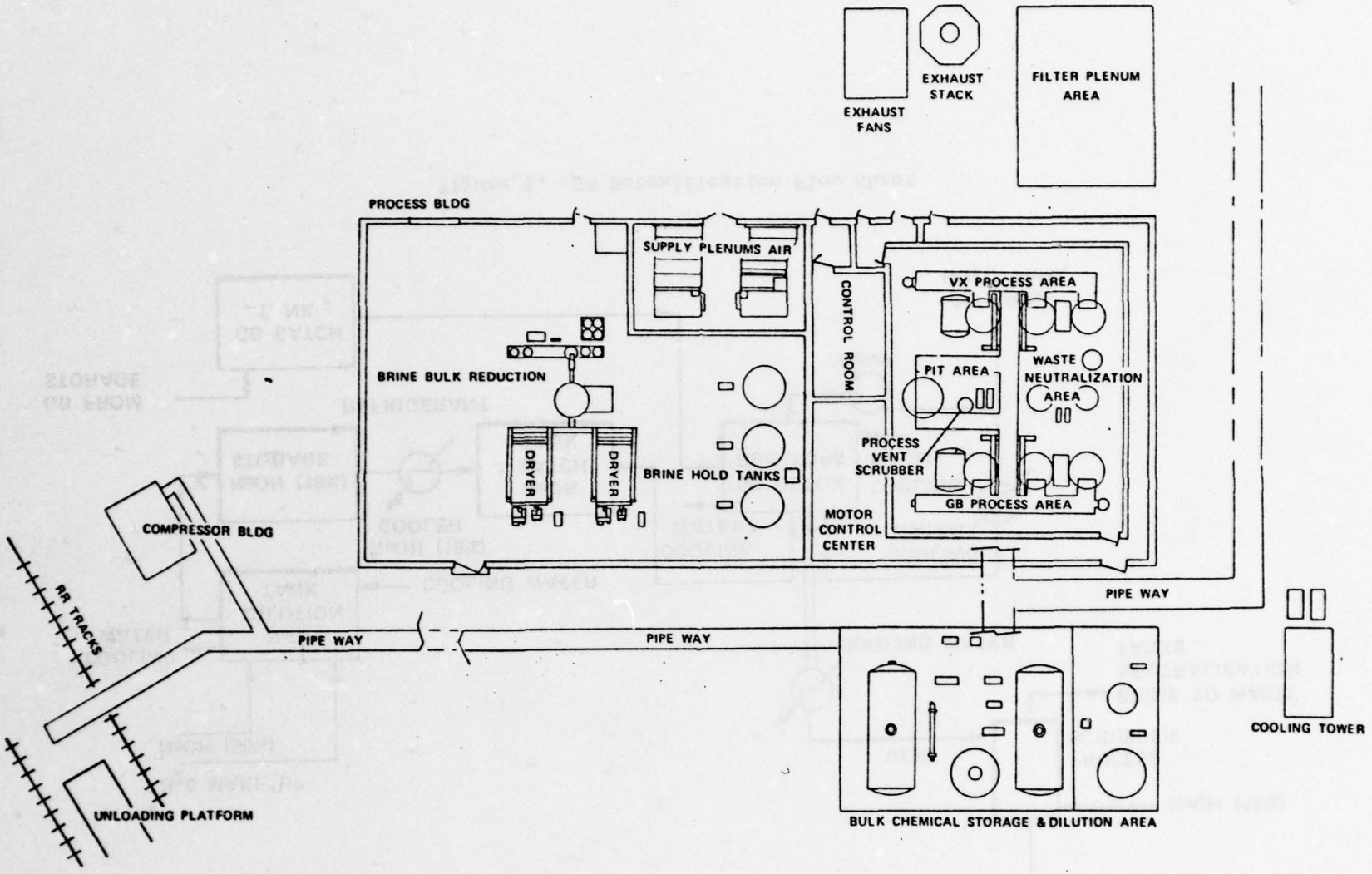


Figure 2. General Arrangement of the Agent Destruction System

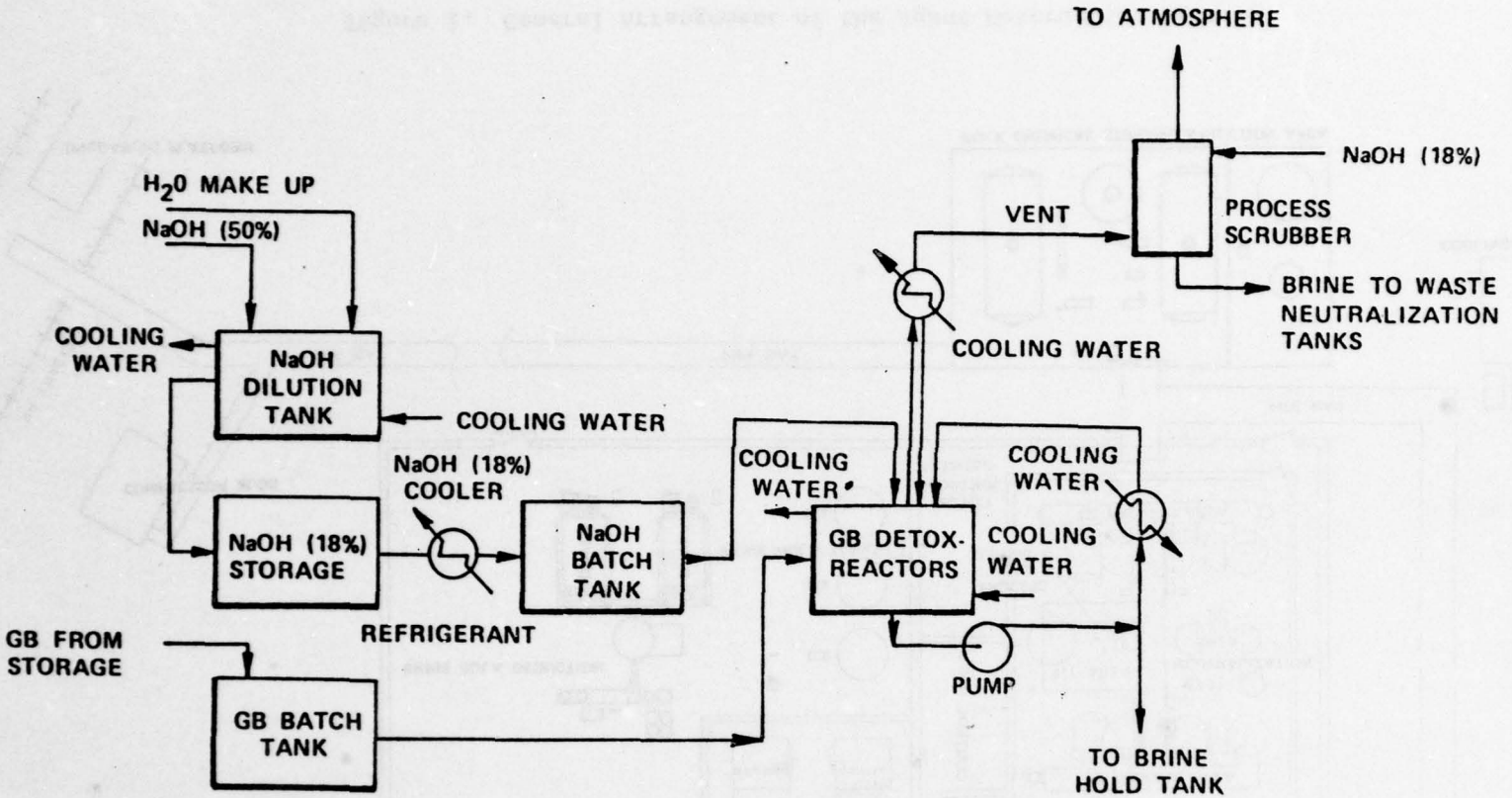


Figure 3. GB Detoxification Flow Sheet

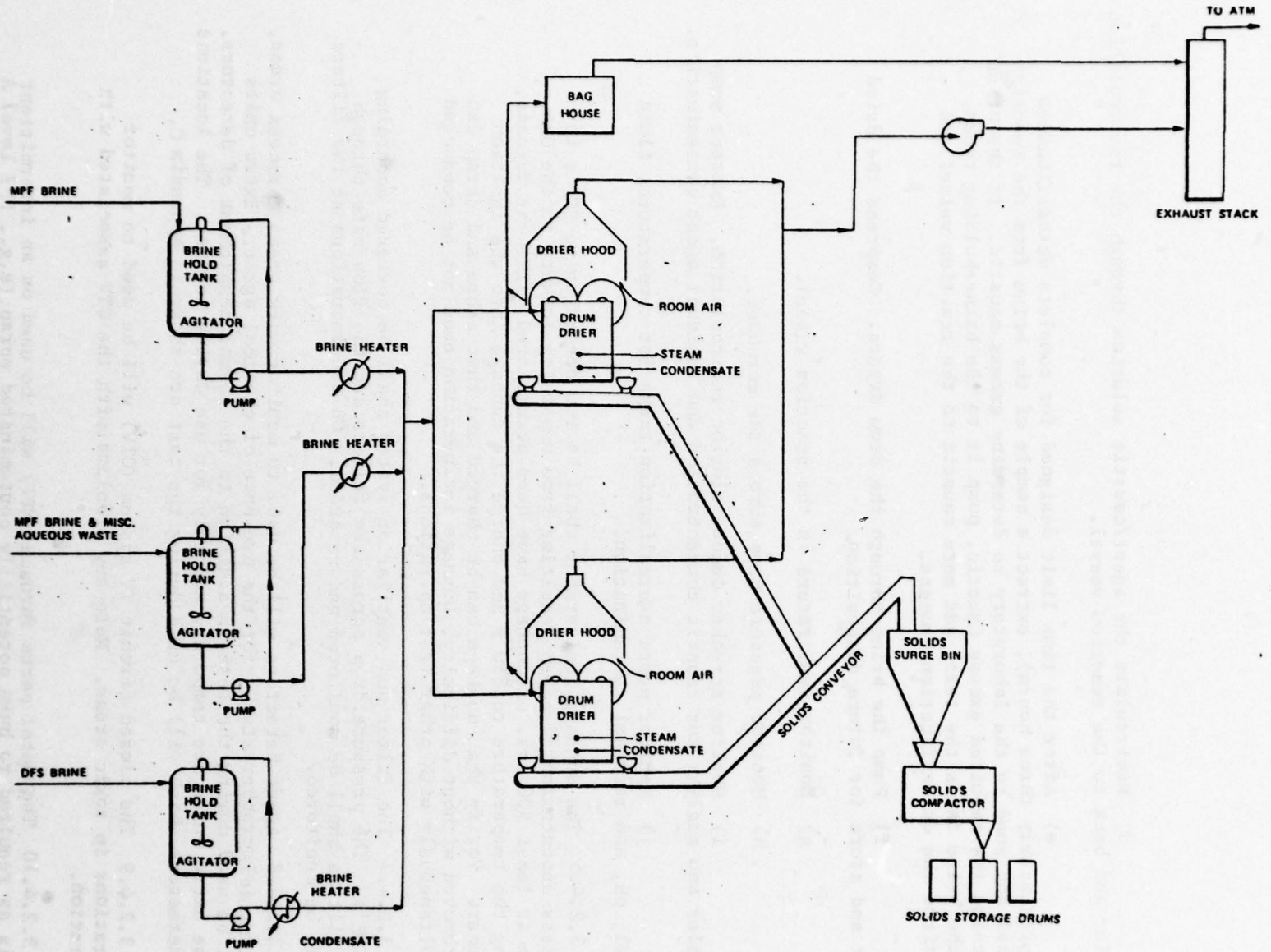


Figure 4. Brine Reduction Flow Sheet

d) Recirculate the agent/caustic solution through the recirculation cooler and back to the reaction vessel.

e) After the time limit designed for complete detoxification (approximately three hours), extract a sample of the brine from the reaction vessel and send to the laboratory to determine excess caustic. If the brine contains the required excess caustic, pump it to the brine-holding tanks. If the brine fails the test, add more caustic to the reaction vessel and continue the detoxification process.

f) Pump the brine through the drum dryers. Compress the dried salt and store for future disposition.

g) Monitor temperature in the reaction vessel.

h) Monitor pressure drop across the scrubber.

i) Monitor scrubber decon-solution recirculation. Extract sump samples and analyze for caustic concentration and residual agent contamination.

j) Monitor waste neutralization tanks for temperature, fluid level, pH, and residual contamination.

3.2.4.6 The dunnage incinerator shall be run according to SOP's to process uncontaminated scrap resulting from unpacking rockets in the UPA. When at least 500 lbs. of dunnage have been accumulated, fire the furnace, bring the temperature to 350°F and charge the dunnage into the ignition chamber. Verify that dunnage can be charged and that ashes and scrap can be removed without difficulty. Dunnage incineration need not be conducted simultaneously with other test operations.

3.2.4.7 The filter and ventilation system shall be operated according to SOP's. The pressure drop across the filters and the flow rate through the filters shall be monitored and recorded. GB concentrations at the filters shall be monitored.

3.2.4.8 Agent detectors will be used to monitor work areas, process areas, filters, and scrubber stacks for the presence of chemical agent. Extra units will be used during the test in addition to the normal complement of detectors. These extra units are temporary and only for use during testing. The locations of detectors which will be used during the test are shown in Appendix C.

3.2.4.9 The closed circuit TV system (CTV) will be used to monitor operations in toxic areas. Note any problems with the CTV associated with operation.

3.2.4.10 The metal parts furnace (MPF) will be used on an intermittent basis as required to burn potentially contaminated scrap (e.g., DPE Level A Clothing). Monitor temperatures and emission levels when the system is in operation.

3.2.5 Phase I Maintenance Test - All regularly scheduled preventive maintenance and repairs will be done in accordance with manuals/SOP's in order to demonstrate the performance of maintenance operations in applicable protective clothing. Maintenance operations will be recorded on video tape and a written time log will be kept outlining the procedures, tools required, personnel used, and any problems encountered. Evaluation of any problems must be made to determine if modification of the equipment or procedure is necessary before testing may continue. A maintenance log will be kept in order to establish life cycle data for system components e.g., saw blades, punches, hydraulic components, etc.

3.2.6 Phase I Shutdown - After the completion of Phase I or whenever else necessary (e.g., repairs) shut down equipment as per SOP's and procedures listed in relevant operating and maintenance manuals. A list of relevant documents is presented in Appendix D. Specific details for the shutdown of the Rocket Demil System are covered in Control System Operation Manual IM-335-01-10. The following steps for the RDM only are presented because these must be completed before subsequent systems can be shut down.

a) Confirm verbally with Unpack Area personnel or shift supervisor that no additional RDM operations are to be performed.

b) Using the Computer System, run the last rocket program (LSTRT) or last munition program (LSTMN).

c) Turn key switches on auto/manual control panels to the OFF position and center all the toggle switches on the two panels.

d) Turn off TV monitors applicable to RDM operations.

3.3 Detail - Phase II

3.3.1 Start-up Procedure - This procedure is the same as outlined in Section 3.2.1.

3.3.2 Pre-test Equipment Readiness Check - Same as outlined in Sect. 3.2.2.

3.3.3 Phase II Interlock Test - Same as outlined in Section 3.2.3.

3.3.4 Phase II Operation Test - During Phase II, 2500 explosive-loaded, agent-filled M55 rockets will be processed according to SOP's at the nominal production rate established through previous testing. Phase II will be a one-shift operation lasting two months. Test procedures are the same as those outlined in Section 3.2.4. Data will be collected as per Section V and the data sheets.

3.3.5 Phase II Maintenance Test - Same as outlined in Section 3.2.5.

3.3.6 Phase II Shutdown - Same as outlined in Section 3.2.6.

IV REQUIREMENTS

4.1 Facilities - The tests will be conducted on site at the CAMDS Site, Tooele Army Depot, South Area. The following facilities will be required in operating condition:

a) Rocket Demil Machine (RDM); complete; installed in ECC.

b) Explosive Containment Cubicle (ECC); complete

c) Unpack Area (UPA); complete with forklift and handling equipment

d) Explosive Treatment System (ETS); complete

e) Communication System (COM); complete

f) Closed Circuit Television Monitors (CTV); complete

g) ECC Hydraulic Module (EHM); complete

h) Computer Control System (CCS); complete with enough hardware (i.e., CRT or tape printer) and software to monitor and control all the necessary equipment and subsystems

i) Agent Destruction System (ADS); complete

j) Utility Housing (UTL); complete

k) Deactivation Furnace System (DFS); complete

l) Ventilation System; complete to UPA, ECC, DFS, ETS, and ADS

m) Emergency Power Generator; complete

n) Metal Parts Furnace (MPF); complete

o) Personnel Support Complex (PSC); complete

p) Personnel Carrier; fully operational

q) DPE Module; complete

r) Site Medical Facility (SMF)

s) Piping (PIP); complete to ECC

t) Material Handling Equipment; RDM conveyors and DFS input conveyor

4.2 Equipment and Materials

4.2.1 Munitions

a) Phase I - 600 each, M55 rockets, explosive-loaded, agent-filled;

b) Phase II - 2500 each, M55 rockets, explosive-loaded, agent-filled;

4.2.2 Clothing and Protective Gear

a) Level A protective suit (M3 and/or Demil Protective Ensemble)(10)

b) Level B protective clothing (5)

c) Level E protective clothing (20)

d) Safety glasses (10 pairs)

e) Leather gloves (10 pairs)

f) Rubber gloves (10 pairs)

g) Chemical Safety Goggles (caustic and acid)

4.2.3 Chemicals and Other Expendables (amt?)

a) Sodium Carbonate for RDM decontamination

b) Diammonium Phosphate for RDM decontamination

c) Filtrasorb 300 activated charcoal

d) GAF polypropylene filter bags; 800, 100, and 25 micron pore sizes

e) Sodium Hydroxide for scrubber and detoxification

f) Sulfuric Acid for cooling tower treatment

g) Slimicide for cooling tower treatment

h) Dichromate Solution for cooling tower treatment

i) Helium for DPE leak test

j) Liquid Nitrogen for helium leak detector

4.2.4 Instruments, Equipment and Special Tools

a) Scale - 100 lb. capacity, 1-lb. sensitivity
- 25 lb. capacity, 1-oz. sensitivity

b) Hand tools (mechanics tool set)

c) Camera - Polaroid (1)
35mm (1)

d) Liquid sample bottles with caps; polypropylene

e) Video tape recorder and tape

f) M5 agent alarm (3)

g) DCAC (M8/Concentrator) (16)

h) Bubblers (including extra temporary units) (29)

i) M10 agent alarm (16)

4.3 Utilities

a) Electricity and Electrical Distribution System (ELE); 208V and 480V

b) Water and necessary piping

c) Compressed Air; 60 CFM at 100 psi (Filtered and Lubricated)

d) Hydraulic Fluid (supplied by EHM) 1000 psi, Max. 10 GPM

e) Steam; not to exceed 150 psig

f) Life Support Air

4.4 Personnel - The following personnel are needed for the tests.

A more detailed assignment of individuals and a listing of the specific duties will be established prior to starting the test.

2 Engineers (CD Test Group)

2 Engineers (CD-O)

2 Engineers (CD-E)

3 Engineers/Equipment Specialists (AEO)

4 Engineers (EA)

5 CMO Operators and Computer Specialist (CD-O)

23 Operators (CD-O)

20 Maintenance (CD-O)

6 Toxic Munitions Handlers (Munitions Division)

1 Safety Engineer

-- AEHA Representatives

-- Pre-op Survey Team

-- Contractor Personnel (ADS, DFS)

-- Demilitarization Protective Ensemble (DPE) Committee

-- Laboratory Division Personnel

-- Boiler Operators (Facilities Division)

-- Production Control and Program Analyst (CD-P)

-- Medical Personnel

-- Security Escort

-- Data Collectors

V DATA REQUIRED

5.1 During the test, data will be collected as per sheets such as those presented in Appendices A and G. The sheets in Appendix G are designed for data that will be collected as part of normal production operations. The sheets in Appendix A are designed for additional data that will be required for the test only. There may be some duplication of the data specified in these two appendices because of the need for different data by the various agencies and groups participating in the test. It should also be noted that the production monitoring data sheets in Appendix G are being evaluated as part of this test and some changes in them may be made before they are used in final operations. For example it may become apparent that some of the data specified for test purposes should be incorporated into the production monitoring data sheets when normal operations are begun. During the test, any additional data that may not be specified on the test data sheets in Appendix A such as problems, malfunctions, or unnecessarily hazardous conditions should be noted. It must be understood by test personnel that the data specified in this section may not be complete nor all-inclusive. Because it is virtually impossible to foresee every condition that may arise during testing and every item of data that will be needed, it may become apparent that data other than that contained in the following lists is necessary or desirable. Thus, it is the prerogative of the test director to delete, expand, or otherwise modify the content, scope, and frequency of data collection as well as the format of the data sheets and/or other recording media as conditions warrant.

5.2 Phases I and II - Data of prime importance is that related to demonstrating equipment performance, interface characteristics, production rates, and optimum equipment settings. Record any problems or malfunction. Observe, record, and analyze the following data plus any other information resulting from tests that would help to demonstrate and/or improve the efficiency and safety of the system. Utilize automatic measuring and recording devices (e.g., computer print out, strip charts, etc.) whenever possible to aid efficiency and reliability of record keeping. As a minimum, consider the following:

5.2.1 For all subsystems comprising the rocket demil system;

a) Note any equipment item (e.g. saw, punch, conveyor, pump, valve, etc.) that does not perform according to desired production or design criteria.

b) Note any operator deficiencies.

c) Note any problems with procedures.

d) Note any interlock that fails to function or fails to present the required message or alarm.

e) Note any problem with piping or tanks

f) Note any problems with controls or interfacing.

5.2.2 Examples of the data for particular subsystems or operations are presented below. This is not a complete list. A more complete list will be established with the approval of the developing agencies and the DA Project Manager's Office.

a) UPA - production rate data (e.g., times for unpacking and loading rockets).

b) RDM - periodic examination of agent catch tank drawer.

c) ECC housing -

1) Pressure drop across the bag filters.

2) Saw tank decon solution (pH and concentration).

d) EHM - hydraulic flow control settings

e) DFS -

1) emission levels from stack (SO_2, O_2, opacity)

2) Temperature of burner and stack

3) scrubber brine concentration and pH

f) ETS -

1) decon solution filtrate pH, concentration, dissolved and particulate explosive content and color.

2) pressure drop across the adsorption columns

g) FIL/ventilation -

1) air flow through the filters

2) pressure drop across the filters

h) ADS -

1) scrubber brine concentration and pH

2) detox operation data

3) dryer operation data

4) bulk chemical dilution data

i) Level A type clothing -

1) hazard area work log

2) problems in donning clothing

3) problems in transport of personnel

4) problems which hamper or prevent performance of operating and maintenance procedures

5) problems in personnel decon procedures

j) Detectors - agent emission levels from the stacks and agent concentration levels in work areas. (See Appendix C)

k) Maintenance Operations -

1) times for performing routine maintenance and repair procedures

2) replacement part (life cycle) data for components such as saw blades, punches, hydraulic components, etc.

l) Miscellaneous

1) periodic temperature measurements in personnel operating areas in the ECC housing, ETS, ADS, DUN, and DFS plus the outside air temperature

2) quantitative measure of expendables such as fuel oil consumed in furnaces, decon solution used, electricity used, etc.

VI TEST SCHEDULE

6.1 It is estimated that it will take a minimum of three months (13 weeks) to prepare for and perform Phases I and II. As nearly as possible, a normal production schedule, including fire watch will be followed.

1) Week 1 - Obtain materials; brief operating, maintenance, security and test personnel; check out monitoring and recording equipment.

2) Weeks 2 through 4 - Phase I; process 600 explosive-loaded, agent-filled M55 rockets.

3) Week 5 - Review data; obtain approval to continue to Phase II; prepare for Phase II.

4) Weeks 6 through 12 - Phase II; process 2500 explosive-loaded, agent-filled M55 rockets.

5) Week 13 - Review, collate, and organize data and results.

VII GENERAL RESPONSIBILITIES

7.1 TEAD - CAMDS Directorate: The CAMDS Directorate will provide all test operators and maintenance personnel; determine sources and arrange for all necessary drawings, manuals, equipment, instrumentation, and test supplies; perform all test operations; and provide a written final report of test results. CD will provide a test director who will be responsible for coordinating and supervising the activities delineated above and will also assign a test officer who will be responsible for the actual operation of equipment during testing. CD will assign a test engineer who will act as a technical consultant and advisor during the test. Finally, CD will provide laboratory quality control, and production control personnel to assist in analysis and data collection.

7.2 TEAD - Ammunition Equipment Office: AEO will assist in monitoring the test, and advising on explosive-munition-related problems that might occur. They will be responsible for providing technical assistance and consultation for the UPA, ECC, RDM, CCS and material handling equipment (MHE).

7.3 TEAD - Director of Supply, Munitions Division: This office will coordinate activity with the ammunition surveillance office to assure that all M55 rockets are properly packaged, handled, and transferred to the CAMDS site. They will coordinate with the CAMDS quality control branch on all M55 rockets removed from the CAMDS site. They will provide required laundry service in Building 544.

7.4 TEAD - Safety Office: The Safety Office will provide a safety engineer who will review all safety requirements specified in the test plan and certify their acceptability prior to testing. He will provide necessary safety-related documents and advise on safety-related problems. He will witness the test and provide written certification that safety requirements have been satisfied or will recommend necessary changes. He will provide final approval on safety requirements associated with modifications or procedure.

7.5 Edgewood Arsenal-Aberdeen Proving Ground: EWA will assist in monitoring the test and serving as consultants for the filters, DFS, ADS, agent detectors, and DPE.

7.6 U.S. Army Environmental Hygiene Agency: AEHA will observe testing and provide an industrial hygiene evaluation of the work area. They will also visually monitor stacks for opacity.

7.7 Pre-Operational Survey Team: The Pre-Operational Survey Team will witness Phase I testing and evaluate equipment and procedures, note deficiencies, and review their findings with the test director and his staff in order to classify the deficiencies as major or minor. They will also submit a written report of their findings to the test director.

7.8 Contractor Personnel: Contractor personnel will serve as technical consultants for their respective equipment items and installations as required by the test director.

7.9 Demilitarization Protective Ensemble (DPE) Committee: A representative of the DPE committee will observe operations performed in DPE Level A type clothing and will act as a consultant for the DPE.

7.10 Individual Personnel Responsibilities

a) Test Director

The test director will:

1) Schedule and coordinate tests with all other testing, making sure that all necessary funding, personnel, equipment, documents, and instrumentation are available for the test. (See check list Appendix H)

2) Provide overall direction for the test.

3) Give final approval to any changes in the test plan or schedule resulting from necessary modifications of equipment, operating procedure, or maintenance procedure.

4) Assure that the test requirements have been met.

5) Verify that a test log is maintained and that a report containing all relevant data, results, and conclusions is written and distributed to appropriate individuals and agencies.

6) Coordinate the preparation of a written final report.

7) Arrange for and insure necessary photographic coverage.

8) Have the authority to discontinue testing at his discretion.

b) Test Officer

The test officer will:

1) Be responsible for front-line supervision and details of the specific test requirements.

2) Assure that all trained personnel, equipment, instrumentation, supplies, equipment and munitions are available at the test site and ready prior to beginning the test.

3) Supervise non-technical aspects of the test on site.

4) Monitor the test site during the test to assure that the proper test plan procedures are being followed and that accurate meaningful data is being collected.

5) Assist in testing as required.

6) Assist in compilation of data and results and in preparation of a written report.

7) Assure that the test site is closed and secured after testing.

c) Test Engineers (EWA and AEO)

The test engineers will:

1) Act as technical advisors and consultants.

2) Determine where immediate equipment fixes are necessary to facilitate the completion of testing.

3) Review test data and recommend changes to equipment design.

d) Engineers/Equipment Specialists (AEO)

The engineers/equipment specialists will act as consultants and technical advisors for the UPA, ECC, RDM, and all material handling equipment (MHE).

e) CMO Operators and Computer Specialist

The CMO operators and computer specialist will:

1) Maintain proper operation of monitor and control computer.

2) Record and correct any abnormalities or malfunctions in computer control.

3) Monitor and control communications system.

4) Monitor and control closed circuit TV operation.

f) Operators

The operators will:

1) Perform actual demil operations, i.e., unpacking rockets from shipping pallets, placing them on input conveyor and initiating cycle operations, operating UPA, ETS, ADS, DFS, and DUN equipment.

2) A forklift operator must bring rockets into the UPA and assist with clean-up, i.e., transfer dunnage to the incinerator.

3) Make comments about problems they encounter in performing their operations and suggestions for improvements.

4) Collect samples where required.

g) Maintenance

Maintenance personnel will:

1) Perform preventive maintenance operations and repairs and keep an equipment life cycle log.

2) Assist with their comments concerning any problems associated with the repair and maintenance operations and make suggestions for improvements.

3) Inspect and change bag filters, and inspect and clean RDM catch tank drawer.

4) Note any item which could represent a future high probability source of malfunction and/or maintenance difficulty.

h) Safety Engineer

The safety engineer will:

1) Monitor test to insure that procedures conform to referenced safety requirements.

2) Provide written comments and recommendations for improvements in equipment and procedures from a safety standpoint.

3) Verify safe distance from RF transmitters.

i) Quality Control Personnel

Quality Control personnel will be responsible for inspecting and certifying the following:

1) inspection of the munitions for leakage at the holding area
2) inspection of salts and metal for the presence of agent
3) inspection of chemicals and expendables to be used in operations

4) inspection of any parts taken from toxic areas
5) inspection of Level A clothing
6) inspection of waste from the air pollution control system (cyclone collector)
7) sampling of process decon solution
8) sampling of process caustic supply
9) sampling of ADS brine and effluent
10) monitoring of DFS furnace parameters, ETS filters, FIL pressures, and process control of agent or explosive-contaminated material
11) perimeter (air) monitoring, plant monitoring, and stack monitoring

j) Laboratory and Detector Personnel

Laboratory and detector personnel will:

1) Maintain detector and bubbler stations within the plant, develop baseline data and run interference studies.
2) Analyze brine samples for carbonate or excess caustic and analyze decon supply and spent decon solution for pH, carbonate, and explosive content.
3) Analyze salts for presence of agent.
4) Conduct tests on chemicals to determine conformance with specifications.
5) Analyze particulate waste from air pollution control system.

k) Production Control Personnel

Production control personnel will schedule and monitor the daily delivery of M55 rockets to the CAMDS site; maintain the records of M55 rocket transfers to assure accountability; maintain daily demil production log; schedule and monitor the disposal of scrap and the delivery of salt to storage; monitor and record the consumption of supplies, repair parts, and utilities; collect, tabulate, and summarize production and quality control data for weekly and monthly production reports; and to expedite the resolution of production scheduling problems.

VIII SAFETY CRITERIA

8.1 Live agent and explosive will be present during both phases of the test. Agent detection plus agent and explosive containment methods must provide maximum safety to operating, maintenance, and control personnel as well as test observers. For these reasons, the precautions listed below are to be followed:

a) The quantity of explosives in the unpack area will not exceed the 50-lb. explosive limit. The quantity of rockets in the munitions holding area will not exceed the quantity that will be processed in a shift.

b) Rockets will not be left on the CAMDS site overnight during this test.

c) Access to the CAMDS site will be controlled by security guards during testing and unauthorized personnel will not be admitted.

d) All operating, maintenance, and test personnel will be outfitted with appropriate protective clothing as per SOP's.

e) Personnel contact with agent-filled munitions and explosive components shall be avoided whenever possible and operations which involve agent must be conducted in areas having adequate ventilation.

f) Emergency medical facilities shall be available at the test site.

g) Contractor personnel and other personnel not associated with the operation will be restircted from approaching within intraline distance to the operations based on the quantity of explosives involved (60 feet for the 50 lbs. in unpack area, appropriate intraline distance from munitions holding area based on the quantity involved). Appropriate signs, barricades, etc., will be put up at the appropriate distances warning unauthorized personnel to stay out of the barricaded area.

h) SOP for the operations will have to be reviewed/approved in accordance with local approval procedures, operators adequately trained, and SOP's posted in the operation locations.

i) Operators will be properly trained using inert simulant-filled rockets and explosive-loaded, simulant-filled M61 rockets prior to handling M55 rockets.

j) Fire protection system in the ECC housing and unpack area will be operational.

k) Prior to testing, the area surrounding the CAMDS site will be surveyed for RF transmitters (e.g., CB radios, portable telephones, walkie talkies, etc.) to assure that no RF hazard exists during M55 rocket demil test operations. All RF transmission devices will be kept a safe distance from the munitions during this test.

8.2 It shall be the test director's responsibility to notify the safety engineer of any changes in equipment or operating procedures that may affect the safety of operating and maintenance personnel.

8.3 Personnel will wear eye protection, rubber gloves and aprons for protection against chemical spills during decon preparation. All emergency showers and eye washes at CAMDS must be operational.

8.4 The test director will be responsible for the notification of the following TEAD activities prior to commencing explosive or toxic agent tests.

a) Fire Department

b) Security Division

c) Safety Division

d) Munitions Division

e) Ammo Surveillance Division

IX REQUIRED DOCUMENTS

9.1 Standing Operating Procedures (SOP's) for the operation, maintenance, and control of the equipment and subsystems comprising the integrated rocket demil system must be available prior to running this test. Required SOP's are listed in Appendix D.

9.2 Operating and Maintenance Manuals for all rocket demil system equipment plus communication and control equipment must be complete and approved prior to testing.

APPENDIX A

TEST DATA SHEETS

DATA COLLECTION

Of primary importance are test data that demonstrate the effectiveness of the rocket demil system. Maintain a time log of major events and operations and record specific quantitative data indicated on the following data sheets plus additional data specified by the test director.

Only one sample of each type of data sheet is provided in this section.

TABLE OF CONTENTS FOR APPENDIX A

group data sheets according to purpose
a. safety
b. process control
c. production rate
d.

PRE-TEST EQUIPMENT

READINESS CHECK LISTS

DATA SHEET - PRE-TEST EQUIPMENT READINESS CHECK LIST (RDM)

TEST PHASE _____

Date:

Observer:

Before feeding rockets through the RDM, make a dry run cycle of the RDM feed, conveyor and clamping mechanism.

	Remarks
1) Activate ECC Input Conveyor.	
2) Operate load-conveyor.	
3) Lower push cylinder.	
4) Extend and retract push cylinder.	
5) Raise push cylinder.	
6) Lower and raise punch clamp.	
7) Lower and raise the punches.	
8) Raise the RDM item rollers.	
9) Extend and retract saw clamps.	
10) Lower and raise the saw carriage.	
11) Lower and raise the saws.	
12) Turn on saws, allow to run for approximately 30 seconds; turn off.	
13) Extend and retract ECC discharge conveyor system.	
14) Extend and retract segregator push-off cylinders.	

DATA SHEET - PRE-TEST EQUIPMENT READINESS CHECK LIST (DFS)

TEST PHASE_____

Date:

Observer:

As a minimum pre-test check for the deactivation furnace system, verify:

	Remarks
1) operation of the DFS feed conveyor;	
2) rotation of the furnace retort;	
3) operation of discharge and scrap belt conveyor;	
4) air flow through cyclone collector;	
5) air flow through slagging afterburner;	
6) liquid flow through the quench tower;	
7) air flow thorugh the venturi scrubber;	
8) caustic recirculation through the packed bed scrubber;	
9) flow of caustic from the caustic hold tank to the packed bed scrubber;	
10) liquid flow from the brine tanks in the DFS to the ADS.	

DATA SHEET - PRE-TEST EQUIPMENT READINESS CHECK LIST (ADS)

TEST PHASE_____

Date:

Observer:

As a minimum pre-test check for the agent destruction system, verify:

	Remarks
1) that sufficient diluted NaOH is available to perform test operations;	
2) piping, valves, and pumps by feeding a small quantity of water or NaOH solution through the batch tank, GB reaction tanks, recirculation cooler, brine tanks, and dryers;	
3) circulation of coolant through recirculation cooler;	
4) air flow through the process vent scrubber,	
5) caustic recirculation flow through the process vent scrubber.	

DATA SHEET - PRE-TEST EQUIPMENT READINESS CHECK LIST (ETS)

TEST PHASE_____

Date:

Observer:

As a minimum pre-test check for the explosive treatment system, verify:

	Remarks
1) flow of saw-tank decon solution from the hold tank in the ECC housing to the surge tank in the ETS;	
2) flow of decon solution from the surge tank through the adsorption towers to the ETS hold tank;	
3) flow of decon solution from the ETS hold tank to the ADS.	

DATA SHEET - PRE-TEST EQUIPMENT READINESS CHECK LIST (MISCELLANEOUS)

TEST PHASE_____

Date:

Observer:

As a minimum pre-test check for each of the following,

	Remarks
1) (DETECTORS) Verify that all alarms, bubblers, and detectors plus any extra units are on and operating.	
2) (UPA) Verify that one pallet of M55 rockets is available in the UPA.	
3) (EHM) Verify that the EHM is on and that the hydraulic pressure is 1000 psi.	
4) (FILTER/VENTILATION) Verify that the filter and ventilation system is on and operating.	
5) (CTV) Verify that all closed circuit TV cameras are operating properly.	
6) (COM) Verify that all necessary communication links are established.	
7) (LIFE SUPPORT)	
8) (AMBULANCE AND MEDICAL SUPPORT)	
9) (INITIAL SETTINGS) Verify that all initial flow control settings, filter air flow rates, pressures, etc., have been recorded.	

OPERATIONS TEST DATA SHEETS

DATA SHEET - SUMMARY OF INITIAL AND FINAL PROCESS CONDITIONS

TEST PHASE _____

Date:

Observer:

Record initial and final conditions just prior to and following testing. Record the net changes for the operating shift.

Location/Equipment Item	Reading		
	Initial	Final	Net Change
Air Temperatures:			
Outside:			
UPA:			
ECC:			
ECC Housing:			
DFS			
ADS:			
ETS:			
UTL:			
Hydraulic Fluid Pressure (EHM):			
Hydraulic Fluid Temperature:			
Air Pressures:			
Utility Module:			
ECC Manifold:			
Water Meter (Total Facility):			
Electric Meter (Total Facility):			
Fuel Oil Meter (Total Facility):			

DATA SHEET - SUMMARY OF INITIAL AND FINAL PROCESS CONDITIONS (Continued)

TEST PHASE_____

Date:

Observer:

Record initial and final conditions just prior to and following testing. Record the net changes for the operating shift.

Location/Equipment Item	Reading		
	Initial	Final	Net Change
Controller Settings:			

DATA SHEET - OPERATIONS TEST; PRODUCTION ACTIVITIES

TEST PHASE_____

SHEET _____ OF_____

TEST AREA/EQUIPMENT ITEM_____

Date:

Observer:

Maintain a time log of production activities throughout the rocket demil system. Note any delays, malfunctions, problems, etc.

Time		Operation/Activity	Remarks
Start	Stop		

DATA SHEET; TRANSFER ACTIVITY SUMMARY

TEST PHASE_____

Date:

Observer:

Record the quantity of material transferred from the following locations on a per-shift basis.

Transfer Activity	Net Amount Transferred	Units of Measure
1) Agent to GB Hold Tank		
2) Agent to Reactor Batch Tank		
3) Reactor Brine to Brine Hold Tank		
4) Brine Dried		
5) Salts Produced (Compacted and Drumed)		
6) 50% NaOH from Hold Tank to Dilution Tank		
7) 18% NaOH from Dilution Tank to System		
8) Liquid Waste:		
Collected in ADS Waste Neutralization Tank		
Transferred to Brine Tank		

DATA SHEET; OPERATIONS TEST; ECC BAG FILTERS

TEST PHASE_____

SHEET_____ OF _____

Date:

Observer(s):

ECC BAG FILTERS

At intervals specified by the test director and at clean-up, record the pressure drop across the bag filters to determine if they must be changed.

Time	Rocket No.	Pressure Drop	Change Necessary		Remarks
			Yes	No	

DATA SHEET - ADSORPTION COLUMNS (ETS);

TEST PHASE _____

SHEET_____ OF _____

Date:

Observer:

At intervals specified by the test director to determine if they must be cleaned, extract samples from the surge tank and hold tank and send to lab.

Time	Pressure Drop	Charcoal Changeout		Remarks
		Yes	No	

DATA SHEET - DECON SOLUTION ANALYSIS

ECC HOUSING AND ETS;

TEST PHASE_____

SHEET____ OF ____

Date:

Observer:

Sample decon solution samples according to the schedule specified by the test director. Label and send to lab for analysis of pH and sodium carbonate concentration.

ECC Housing - extract sample from hold tank.

ETS - extract samples from the ETS surge tank and ETS hold tank.

Sample Label		Sample Source			Analysis		Remarks
Sample No	Time	ECC	ETS (Surge)	ETS (Hold)	pH	Sodium Carbonate (%)	

DATA SHEET - VENTILATION FILTERS

TEST PHASE_____

SHEET _____ OF_____

Date:

Observer:

At intervals specified by the test director, record the pressure drop across and flow rate through the vent air filters.

Time	Filter Location	Pressure Drop	Flow Rate	Remarks

DATA SHEET - SCRUBBER DECON
SOLUTION (ADS & DFS)

TEST PHASE_____

SHEET_____ OF ____

Date:

Observer:

At intervals specified by the test director, extract samples from the ADS and DFS scrubber sumps and analyze for pH and brine concentration.

Time	Scrubber Location	Sample No.	pH	Brine Concentration	Remarks

DATA SHEET - SCRUBBER AND FURNACE

STACK ANALYSIS

TEST PHASE_____

SHEET ____ OF ____

Date:

Observer:

Monitor stacks for temperature and emissions specified in Appendix B

Time	Stack Location	Temperature	SO_2	O_2	Opacity	Remarks

DATA SHEET - REACTION VESSEL (ADS)

TEST PHASE_____

SHEET_____OF_____

Time	Temperature	Sample No.	Excess Caustic Level	Remarks

DATA SHEET, ADS TANK LEVELS

TEST PHASE_____

SHEET____OF_____

Date:

Observer:

Tank	Initial Level		Final Level		Net Change
	%	Gal.	%	Gal.	Gal.
1) 18% NaOH Dilution Tank					
2) 18% NaOH Storage Tank					
3) GB Storage Tank					
4) GB Storage Tank					
5) Brine Tank					

DATE: _____

OBSERVER: _____

NaOH STORAGE & DILUTION ADS CONTROL PANEL (CP-201)

TIME	BATCH CONTROL COUNTERS * Preset, Gal		Totalizing, Gal		ACCOUNTABILITY COUNTERS ** Flows to Dil Tk, Gal		SET POINTS * GPM Makeup	GPM
	H_2O FQC-214A	NaOH FQC-215A	H_2O GQC-214B	NaOH FQC-215B	H_2O FQC-214	NaOH FQC-215	H_2O FIC-214	NaOH FIC-215

* Before & After Transfer

** At end of Each Shift

DATE: _____

OBSERVER: _____

SOLIDS COMPACTOR - LOCAL CONTROL STATIONS - LCS-340, LCS-DL1

LCS-DL1

Time	Feeder Run Time		Drum Fill Time (MIN)		Drum Fill Wt. (Lbs.)		Remarks
	Start	Stop	No.	Min.	No.	Lbs.	

MAINTENANCE

DATA SHEET - MAINTENANCE

TEST PHASE_____

SHEET____OF____

Date:

Observer:

Record times required to perform regular preventive maintenance and malfunction repairs and note any problems during service. Indicate in the "Remarks" section, the type of personnel required, and tools actually needed.

Maintenance Malfunction Repairs	Time	Time to complete	Remarks

APPENDIX B

STACK EMISSION GUIDELINES

Following are the stack emission and working area guidelines for the "M55 Rocket System Integration Test":

Emission	Guidelines
Visible opacity	20% or less. This standard is interpreted to mean that no air contaminant will be emitted which is of such a shade or density as to obscure an observers' vision to a degree in excess of 20 percent. An air contaminant is defined as any fume, smoke, particulate matter, vapor, gas, or any combination thereof, but not including water vapor or steam condensate.
SO_x as SO_2	500 ppm (by volume)

	Stack (1 hr avg)	Working Area (8 hr avg)
GB	0.0003 mg/m^3	0.0001 mg/m^3

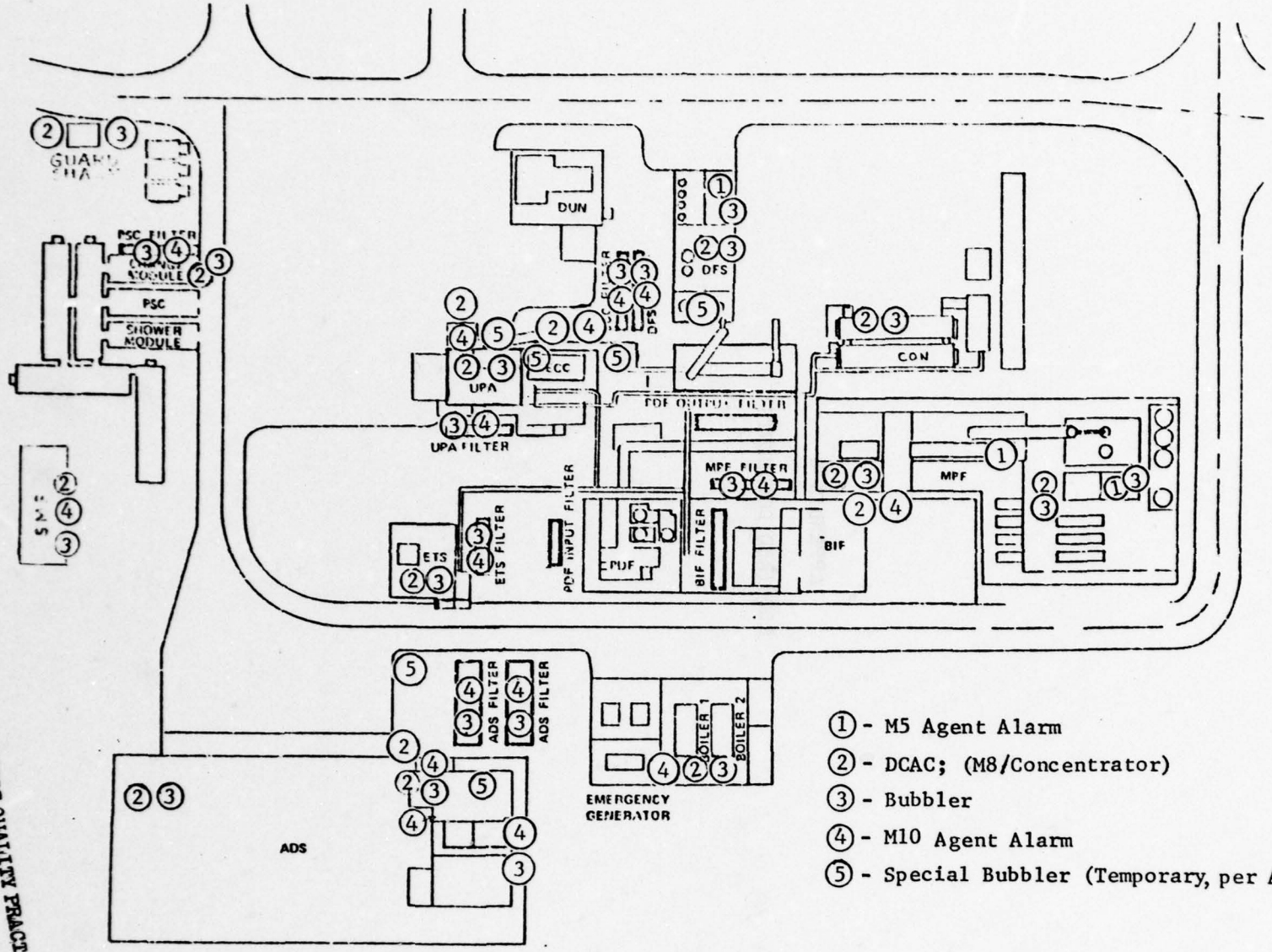
APPENDIX C

LOCATIONS OF DETECTORS FOR THE M55 ROCKET SYSTEM INTEGRATION TEST

Abbreviation	Location	Type	M5 Alarm	DCAC (1)	One-hr. Bubbler	M10 Alarm System (2)	Special Temporary Bubbler
UPA	UPA	Area		X	X		
UPA-S	UPA Airlock Exit	Suit Sniffer				X	
UPA-S	UPA Airlock Exit	Q.C. Suit Check		X			
UPA	UPA Airlock Vestibule	Area					X
ECC	ECC	Area					X
ECC-H	ECC Housing	Area					X
ECC-S	ECC Airlock Exit	Suit Sniffer				X	
ECC-S	ECC Airlock Exit	Q.C. Suit Check		X			
DFS	DFS	Area (Portable)		X	X		
DFS-ES	DFS Exhaust Stack	Stack	X		X		
DFS-CS	DFS Cyclone Separator	Area					X
MPF-CR	MPF-Control Room	Area		X	X		
MPF-S	MPF-Airlock Exit	Suit Sniffer				X	
MPF-S	MPF-Airlock Exit	Q.C. Suit Check		X			
MPF-ES	MPF-Furnace Exhaust	Area		X	X		
MPF-DC	MPF-Discharge Car Canopy	Stack	X				
PF-ES	MPF-Exhaust Stack	Stack	X		X		
CMO	CMO	Area		X	X		
ADS-DA	ADS-Dryer Area	Area		X	X		
ADS-CR	ADS-Control Room	Area		X	X		
ADS-TC	ADS-Toxic Cubicle	Area					X
ADS-TC	ADS-Toxic Cubicle	Process Monitor				X	
ADS-S	ADS Airlock Exit	Suit Sniffer				X	
ADS-S	ADS Airlock Exit	Q.C. Suit Check		X			
PIP-AG	ADS Agent Pipe Shroud	Process Monitor			X	X	
ADS-ES	ADS Exhaust Stack	Stack					X
PSC	PSC	Area		X	X		
	SMF	Suit Sniffer				X	
	SMF	Area		X	X		
	ETS	Area		X	X		
	UTL	Area		X	X	X	
UPA-F	UPA Filter	Stack			X	X	
MPF-F	MPF Filter	Stack			X	X	
DFS-F	DFS Filter	Stack			X	X	
PSC-F	PSC Filter	Stack			X	X	
ADS-F	ADS Filter	Stack			X	X	
ADS-F	ADS Filter	Stack			X	X	
ECC-F	ECC Filter	Stack			X	X	
ETS-F	ETS Filter	Stack			X	X	
	Guard Shack	Area		X	X		
	TOTALS		3	16	23	16	6

Notes: (1) DCAC (Demil Chemical Agent Concentrator) is also known as M8/Concentrator

(2) M10 Alarm System is sometimes referred to as M8 Alarm (M43 Detector)



LOCATIONS OF DETECTORS FOR M55 ROCKET
SYSTEM INTEGRATION TEST

APPENDIX D

REQUIRED DOCUMENTS

Operating manuals and SOP's which will be required for the M61 Rocket System Integration Test include the following:

Operating Manuals

1) IM-304-01-10; Operation and Safety Manual, Deactivation Furnace System (DFS)

2) IM-306-01-10; Operating Manual for Rocket Demil Machine Control System

3) IM-306-01-23; Maintenance Manual for Rocket Demil Machine

4) IM-307-01-13RP; Operating Manual for the Unpack Area

5) IM-313-01-10; Operating Manual for Chemical Unloading, Storage and Dilution

6) IM-313-03-10; Operating Manual for GB or VX Caustic Neutralization

7) IM-313-04-10; Operating Manual for Brine Drying and Salt Handling

8) IM-313-05-10; Operating Manual for Vent Air Scrubber

9) IM-313-06-10; Operating Manual for Heating, Ventilating and Air Conditioning

10) IM-313-07-10; Operating Manual for Plant Water Distribution

11) IM-313-08-10; Operating Manual for Cooling Water Supply and Distribution

12) IM-313-09-10; Operating Manual for Electric Power Distribution

13) IM-313-10-10; Operating Manual for Plant Steam Distribution

14) IM-313-11-10; Operating Manual for Plant Air Distribution

15) IM-314-01-10; Operating Manual for Explosive Treatment System (ETS)

16) IM-335-01-10; CAMDS System Control Manual

Standing Operating Procedures

SOP DRXTE - CD - 1T

A) UNPACK AREA (ECC)

01-01 Unpack M55/M61 Rockets

01-02 Procedure for Entering/Exiting ECC and UPA Airlock

B) DEACTIVATION FURNACE

04-01 Preparation for Startup (Deactivation Furnace)

04-02 Startup of Deactivation Furnace System

04-03 Post Startup Operation of the Deactivation Furnace System

04-04 Normal Short Term Shutdown of the Deactivation Furnace System

04-05 Normal Extended Shutdown of the Deactivation Furnace System (Greater Than 72 Hours)

C) ROCKET DEMIL MACHINE

06-01 RDM Machine Operation

06-02 Correcting RDM Failures

06-03 RDM Machine Operation (Manual Control)

06-04 Transfer and Loading of M55/M61 Rockets to UPA

06-05 Removal From Conveyor and Boxing of M55/M61 Sectioned Rockets for Storage

D) DUNNAGE INCINERATOR

07-01 Preparation for Startup of the Dunnage Incinerator

07-02 Startup of Dunnage Incinerator

07-03 Post Starting Operation of the Dunnage Incinator

07-04 Shutdown of the Dunnage Incinerator

E) ECC HYDRAULIC MODULE

09-01 ECC Hydraulic Module Operation for M55/M61 Rocket Line

F) PERSONNEL SUPPORT COMPLEX

12-01 Personnel Support Complex Entrance and Exit Procedure for Personnel Not Requiring Protective Clothing

12-02 Entrance and Exit Procedures for Personnel Requiring Protective Clothing (M3 Suit)

G) CHEMICAL UNLOAD, STORAGE AND DILUTION SYSTEM

13-01 Sodium Hydroxide Unload Storage and Dilution Preoperational Procedures

13-02 Sodium Hydroxide Unload Storage and Dilution Operating Procedures

13-03 Sodium Hydroxide Unload Storage and Dilution Shutdown Procedures

H) GB CAUSTIC NEUTRALIZATION SYSTEM

13-04 GB Caustic Neutralization Control Panels CP-501 and CP-502 Preoperational Procedures

13-05 Waste Caustic Neutralization Control Panel CP-602 Preoperational Procedures

13-06 GB Storage Tank T-11 and Batch Tank T-12 Preoperational Procedures

13-07 NaOH Batch Tank T-10 Preoperational Procedures

13-08 GB Reactor R-2A and R-2B Preoperational Procedures

13-09 Waste Neutralization Tanks T-14A and T-14B Preoperational Procedures

13-10 Sump Tank T-16 and Pit Sump Preoperational Procedures

13-11 GB Storage Tank T-11 Operation

13-12 GB Caustic Neutralization Process Operation

13-13 Waste Neutralization Operation

13-14 GB Caustic Neutralization Control Panels CP-501 and CP-502 Shutdown

13-15 Waste Caustic Neutralization Control Panel CO-602 Shutdown

13-16 GB Storage Tank T-11 and Batch Tank T-12 Shutdown

13-17 NaOH Batch Tank T-10 Shutdown

13-18 GB Reactor R-2A and R-2B Shutdown

13-19 Waste Neutralization Tanks T-14A and T-14B Shutdown

13-20 Sump Tank T-16 and Pit Sump Shutdown

I) BRINE DRYING AND SALT HANDLING SYSTEM

13-21 Brine Holding Equipment Preoperational Procedures

13-22 Brine Transfer and Drying Equipment Preoperational Procedures

13-23 Salt Handling, Compacting and Drum Unload Equipment Preoperational Procedures

13-24 Brine Holding Equipment Operating Procedures

13-25 Brine Transfer and Drying Equipment Operating Procedures

13-26 Salt Handling, Compacting and Drum Unload Equipment Operating Procedures

13-27 Brine Holding Equipment Shutdown Procedures

13-28 Brine Transfer and Drying Equipment Shutdown Procedures

13-29 Salt Handling, Compacting and Drum Unload Equipment Shutdown Procedures

J) VENT AIR SCRUBBER SYSTEM (ADS)

13-30 Vent Air Scrubber Preoperational Procedures

13-31 Vent Air Scrubber Operating Procedures

13-32 Vent Air Scrubber Temporary Shutdown Procedures to Replace Spent NaOH

13-33 Vent Air Scrubber Equipment Shutdown Procedures

K) HEATING, VENTILATING AND AIR CONDITIONING SYSTEM (ADS)

13-34 Air Handling Unit AHU-1 Preoperational Procedures

13-35 Air Handling Unit AHU-2 Preoperational Procedures

13-36 Air Conditioning Unit ACU-1 Preoperational Procedures

13-37 Unit Heater UH-1 Preoperational Procedures

13-38 Air Handling Unit AHU-1 Operating Procedures

13-39 Air Handling Unit AHU-2 Operating Procedures

13-40 Air Conditioning Unit ACU-1 Operating Procedures

13-41 Unit Heater UH-1 Operating Procedures

13-42 Air Handling Unit AHU-1 Shutdown Procedures

13-43 Air Handling Unit AHU-2 Shutdown Procedures

13-44 Air Conditioning Unit ACU-1 Shutdown Procedures

13-45 Unit Heater UH-1 Shutdown Procedures

L) PLANT WATER DISTRIBUTION SYSTEM (ADS)

13-46 Plant Water Distribution System Preoperational Procedures

13-47 Plant Water Distribution System Operating Procedures

13-48 Plant Water Distribution System Shutdown Procedures

M) COOLING WATER SUPPLY AND DISTRIBUTION SYSTEM (ADS)

13-49 Cooling Water Supply + Distribution Preoperational Procedures

13-50 Cooling Water Supply + Distribution Operational Procedures

13-51 Cooling Water Supply + Distribution Shutdown Procedures

N) ELECTRICAL POWER DISTRIBUTION SYSTEM (ADS)

13-52 Electrical Power Distribution Preoperational Procedures

13-53 Electrical Power Distribution Operational Procedures

13-54 Electrical Power Distribution Shutdown Procedures

O) STEAM DISTRIBUTION SYSTEM (ADS)

13-55 Steam Distribution System Preoperational Procedures

13-56 Steam Distribution System Operating Procedures

13-57 Steam Distribution System Shutdown Procedures

P) EXPLOSIVE TREATMENT SYSTEM

14-01 Prepare Explosive Treatment System (ETS) for Operation

14-02 Operate the Explosive Treatment System (ETS)

14-03 Switch Absorption Columns in Explosive Treatment System

14-04 Replace Charcoal in ETS Adsorption Columns

14-05 Refill Supply Tank During ETS-GB Demil Operations

14-06 Short Term (Overnight or Weekend) Shutdown of ETS.

14-07 Long Term Shutdown of ETS

14-08 Disposal of Waste Charcoal from the ETS (Not Complete)

14-09 Empty Drain Sump in the ETS Housing (Not Complete)

Q) FILTERS

23-01 Operation of Ventilation Filters

R) MUNITION HOLDING AREA

42-01 Receive, Unload and Transfer M55 Rockets to UPA

S) DEMILITARIZATION PROTECTIVE ENSEMBLE

46-01 Donning of the Demilitarization Protective Ensemble (DPE) and Transport of Personnel to Toxic Cubicles

46-02 Doffing of the Demilitarization Protective Ensemble (DPE) and Transport to the PSC.

EMERGENCY STANDING OPERATING PROCEDURES FOR CAMDS DEMIL OF M55 ROCKETS

DRXTE-CD-IT

A) GENERAL

ESOP-01 Emergency Evacuation of the CAMDS Plant

B) UNPACK AREA

ESOP 01-01 Emergency Procedure for Leaker in UPA

C) DEACTIVATION FURNACE SYSTEM

ESOP 04-01 DFS Emergency Shutdown for M55 Rockets

D) EXPLOSIVE CONTAINMENT CUBICLE

ESOP 06-01 Emergency Procedure for M55 Rocket Detonation Inside ECC.

ESOP 06-02 Emergency Shutdown of the RDM Machine

E) AGENT DESTRUCTION SYSTEM

ESOP 13-01 Emergency Procedures for Normal Power Failure in the Agent Destruction System

ESOP 13-02 Emergency Procedures for Control Panel Annunciator Alarms in the Agent Destruction System

ESOP 13-03 Emergency Shutdown Procedures for Evacuation of the Agent Destruction System

F) MUNITION HOLDING AREA

ESOP 42-01 Emergency Procedure for Leaker During Transporting Between MHA and UPA

G) DEMILITARIZATION PROTECTIVE ENSEMBLE

ESOP 46-01 Emergency Evacuation from the Toxic Cubicles While Wearing DPE

APPENDIX E

ABBREVIATIONS OF SUBSYSTEM NAMES

ABBREVIATIONS OF CAMDS SUBSYSTEM NAMES

ADS	- Agent Destruction System
BIF	- Bulk Item Facility
CCS	- Computer Control System
CDS	- Central Decon System
CML	- Chem Lab
COM	- Communication System
CON	- Control Center (Control Module)
CTV	- Closed Circuit TV
DET	- Detectors
DFS	- Deactivation Furnace System
DPE	- Demil Protective Ensemble
DUN	- Dunnage Incinerator
ECC	- Explosive Containment Cubicle
EHM	- ECC Hydraulic Module
ELE	- Electrical Distribution System
ETS	- Explosive Treatment System
FIL	- Filter System
MHA	- Munitions Holding Area
MIN	- Mine Demil Machine
MOR	- Mortar Demil Machine
MPF	- Metal Parts Furnace
PDF	- Projectile Disassembly Facility
PER	- Perimeter Monitoring System
PIP	- Piping
PDM	- Projectile Demil Machine
PPD	- Projectile Pull and Drain Machine
PSC	- Personnel Support Complex
RDM	- Rocket Demil Machine
SCS	- Site Control System
SMF	- Site Medical Facility
UPA	- Unpack Area
UTL	- Utilities

APPENDIX F

COMPUTER CONTROL PROGRAMS

COMPUTER PROGRAMS FOR M55/M61 ROCKET OPERATION

1. Computer programs required for RDM subsystem operation:

STP00 - Initialize RDM machine

STP01 to STP20 -- 20 Programs to operate the functional steps of the RDM

DOOR0 -- Opens ECC doors

D00RC -- Closes ECC doors and secures ECC

SERGRG -- Operates M55/M61 Rocket segregator

DECON -- Handles decon solution between ECC and ETS

DTIME -- Prints time when required

MESSG -- Prints error messages

EVTSN -- Arms event sense (priority interrupt) inputs

AUTOR -- Brings up computer and turns off outputs after power failure

AAXXX -- Shuts down system if blast is detected in ECC

ABXXX -- Shuts down system if emergency stop switch is pushed

EMGOF -- Clears AAXXX and ABXXX shutdowns

BBXXX -- Stops RDM operation at end of step if stop button is pushed

BCXXX -- Stops input conveyor if UPA stop switch is pushed

CKXXX -- Checks M55/M61 rocket correctly loaded on input conveyor

CLXXX -- Pushing step switch initiates new step if operating in step mode if operating in step mode

LSTMN -- Turns on last munition light in UPA

OFFMN -- Turn off last munition light in UPA

LSTRT -- Clears production line when last MGG/M61 rocket is processed

SAWST -- Stops RDM saws

SAWIT -- Starts RDM saws

2. Computer programs required for M55/M61 system operation:

All programs for RDM subsystem operation, plus the following:

PERDR -- Controls operation of ECC personnel door

CONVC -- Controls segregator and DFS input conveyors and interfaces between the ECC and DFS

START -- Initializes CAMDS Site and allows RDM subsystem to be started

STDBY -- Puts site in standby mode of operation

AGDET -- Monitors on condition and alarms of Site Agent Detectors

UTILI -- Monitors and controls site utilities

MONIT -- Monitors site functions

INTER -- Monitors and controls building block interfaces

RESET -- Resets shutdown signals to ECC from the rest of the site

TESTO -- Write output signals from control module to various RDM electrical switches

TEST1 -- Read input signals from switches in RDM processing

LCOMM -- Print and change information contained

STIME -- Signal STEP programs to print start and ending time

ZERO -- Turn off all output channels

APPENDIX G

PRODUCTION CONTROL
DATA SHEETS

Notes:

1) This appendix is a partial list of all of the proposed production monitoring data sheets. A complete list may be found in the "Production Control Plan, CAMDS." Certain sheets were eliminated because they are designed for internal production control record keeping and do not have a direct bearing on this test plan.

2) The sheets included in this section have been optically reduced in size for this document to serve as examples. Actual full size working sheets will be supplied by the Laboratory Division prior to testing.

INCL. NO. 2

AMMUNITION TRANSFER RECORD

(AMCR 710-1)

DATE PREPARED | CONTROL NUMBER

FROM	STOCK NUMBER	NOMENCLATURE

TO	STOCK NUMBER	NOMENCLATURE

SERIAL/LOT NUMBER (FROM)		COND	SITE LOCATION	GRID LOCATION	RESTRICTED	T/S	L/C	ITEM	MGR	QUANTITY	NO PKG	UP QTY	SERIAL/LOT NUMBER (TO)		COND	SITE LOCATION	GRID LOCATION	RESTRICTED	T/S	L/C	ITEM	MGR	QUANTITY	NO PKG	UP QTY
SERIAL	LOT												SERIAL	LOT											

REMARKS	TYPE OF ACTION	SIGNATURE OF FOREMAN/CHECKER INSPECTOR	DATE OF ACTION
	☐ LOCATION CHANGE ☐ RECLASSIFICATION ☐ SERIAL/LOT NUMBER CHANGE ☐ OTHER ☐ STOCK NUMBER CHANGE ☐ ITEM DATA CHANGE	APPROVED/DATE APPROVED/DATE	

AMC FORM 1 MAR 72 1493

REPLACES EDITION OF 1 MAY 68 WHICH IS OBSOLETE

G-2

HAZARD AREA WORK LOG

CAMDS

DAILY PERSONNEL ENTRY AND CONTROL RECORD

DATE	TYPE AGENT

NAME	AREA ENTERED	TYPE SUIT	SUIT NO.	TIME IN	TIME OUT	TOTAL TIME	SBLR RDNG	MYOSIS TEST

INCL. NO. 3

PLANNING AND ACCOMPLISHMENT REPORT		PLAN NO.
FSN	NOMENCLATURE	DATE
COST CODE	AUTHORITY	SOP NO.

LOT NUMBER	QTY	COND CODE	LOCATION	REMARKS

COMPONENTS REQUIRED

FSN	NOMENCLATURE	LOT NUMBER	QTY	LOCATION

WORK REQUIRED

AMXTE FORM 1983 - REV 7 OCT 68 (Replaces AMXTE Form 1983, 25 July 67.)

INCL NO 4

PREPARED BY	REVIEWED BY
SUBMITTED BY	APPROVED BY

DISPOSITION OF COMPONENTS

ACCOMPLISHMENT REPORT		PREPARED BY					DATE
LOT NUMBER	ACCEPTED			REJECTED			REMARKS
	QTY	LOC	DATE	QTY	LOC	DATE	

ADDITIONAL COMMENTS

CAMDS
DAILY ITEM ACCOUNTABILITY

STOCK NUMBER:	NOMENCLATURE:	DATE:

LOT NUMBER	ORDERED IN	RECEIVED	CONDITION CODE				FOREMANS SIGNATURE
			A	G	F	H	

LEAKERS

LOT NUMBER	QTY	DISPOSITION OF LEAKER

DRXTE Form

INCL. NO. 5

CAIDS
DAILY DEMILITARIZATION ACCOUNTABILITY REPORT

ITEM PROCESSED	AGENT	DATE

ACTION	UNITS (NUMBER)	AGENT (POUNDS)	BRINE (GALLONS)	SALT (DRUM)	SALT (POUNDS)
CARRYOVER (MHA)					
CARRYOVER (UPA)					
CARRYOVER (ADS)					
RECEIVED TODAY (MHA)					
RECEIVED TODAY (UPA)					
RECEIVED TODAY (ADS)					
PROCESSED TODAY (MHA)					
PROCESSED TODAY (UPA)					
NEUTRALIZED TODAY (ADS)					
CARRYOVER (MHA)					
CARRYOVER (UPA)					
CARRYOVER (ADS)					
TOTAL PRODUCTION					
SCHEDULED PRODUCTION					
ACTUAL PRODUCTION					
LOSS/GAIN ±%					

DRXTE FORM

INCL. NO. 6

CAMDS
DAILY PROCESSING & PRODUCTION RECORD

ITEM _____
DATE _____
SHIFT _____
SHIFT FOREMAN _____
OPERATION _____
LOCATION (UPA, BIF, CONTROL MODULE) _____

ITEM NO.	LOT NUMBER	TIME STARTED	TIME FINISHED	DOWNTIME (IN MINUTES)	*REASON/CORRECTIVE ACTION
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					

*IF MORE SPACE IS REQUIRED, USE REVERSE SIDE TO EXPLAIN REASONS FOR DOWNTIME AND CORRECTIVE ACTION

DRXTE FORM

INCL. No. 7

ITEM NO.	REASON FOR DOWNTIME	CORRECTIVE ACTION

MATERIEL RECONDITIONING MOVEMENT REQUEST/RETURN

(AMCR 740-12)

1. TO:	2. FROM:	3. MATERIEL REQUEST / RETURN

4. DOCUMENT NUMBER	5. PCN	6. PRIORITY	7. FEDERAL STOCK NUMBER

8. ITEM (NOUN)	9. UNIT OF ISSUE	10. QUANTITY	11. FSN CHANGED TO

12. COND. CODE	13. FINAL TECH. INSP. SIGNATURE	14. DELIVER TO / PICK-UP AT	15. SHOP LOCATION

16. PARTIAL NO.	17. PARTIAL QTY.	18. APPROVED BY SIGNATURE	19. DATE

20. STORAGE LOCATION	21. SELECTED QTY.	22. USA OR SERIAL NUMBERS

23. REMARKS

24. QUANTITY ISSUED	25. SIGNATURE AND DATE	26. QUANTITY RECEIVED	27. SIGNATURE AND DATE

AMC FORM 1549 (18 AUG. 67)

1

INCL. NO. 8

STOCK NUMBER	GRADE	UNIT PK. WT.	UNIT PK. CU.	UNIT PK. QTY.	DATE OF MFG.	LOT NUMBER

DATE	COND.	REMARKS	ACTION QUANTITY	TOTAL QTY/LOT	QUANTITY BY LOCATION				

INCL. NO 9

CAMDS
NEUTRALIZATION PRODUCTION REPORT

DATE:	SHIFT:	TIME:

BATCH NUMBER	1	2	3	4	5	6	TOTALS
REACTOR NUMBER							
AGENT SOURCE							
GALLONS/LBS AGENT							
CAUSTIC STRENGTH							
GALLONS CAUSTIC							
GALLONS BRINE							
BRINE % CAUSTIC							
BRINE HOLD TANK #							
TIME OF AGENT TRANSFER							

DOWNTIME & CAUSES

DRXTE FORM

INCL. NO. 22

CAMDS
DAILY ITEM ACCOUNTABILITY

STOCK NUMBER:	NOMENCLATURE:	DATE:

LOT NUMBER	ORDERED IN	RECEIVED	CONDITION CODE				FOREMANS SIGNATURE
			A	G	F	H	

LEAKERS

LOT NUMBER	QTY	DISPOSITION OF LEAKER

DRXTF Form

INCL. NO. 12

CAMDS
SUMMARY REPORT

WEEKLY	QUARTERLY	DATE
MONTHLY	OTHER (SPECIFY)	

ITEM PROCESSED

PERIOD REPORTED

PRODUCTION	AGENT(LB)	MUNITIONS(EA)
STOCKPILE START OF PROGRAM		
PROCESSED PRIOR PERIODS		
STOCKPILE END LAST PERIOD		
PROCESSED THIS PERIOD		
STOCKPILE END THIS PERIOD		
CUMULATIVE PROCESSED TO DATE		
SALTS STORED CUM TO DATE		

SCHEDULE

SCHEDULED PRODUCTION PRIOR PERIODS		
PROGRAM PERFORMANCE PRIOR PERIODS (%)		
SCHEDULED PRODUCTION THIS PERIOD		
PROGRAM PERFORMANCE THIS PERIOD (%)		
TOTAL OPERATING MANHOURS PRIOR PERIODS		
PRODUCTION		
DOWNTIME		
OPERATING EFFICIENCY PRIOR PERIODS (%)		
TOTAL OPERATING MANHOURS THIS PERIOD		
PRODUCTION		
DOWNTIME		
OPERATING EFFICIENTY THIS PERIOD (%)		

MANPOWER/ASSETS UTILIZATION

ITEM	PLANNED	ACTUAL	% DEVIATION
MANHOURS, (DIRECT)			
MANHOURS, (INDIRECT)			
GASOLINE (GAL)			
FUEL OIL (GAL)			
ELECTRICITY (KILOWATT)			
WATER (GAL)			
CHLORINE (GAL)			
SODIUM CARBONATE (LB)			
CHARCOAL FILTRASORB (LB)			
DIAMONIUM PHOSPHATE (LB)			
SODIUM HYDROXIDE (GAL)			
SULPHURIC ACID (GAL)			
OXALIC ACID (GAL)			
HYDROCHLORIC ACID (GAL)			
PROTECTIVE SUITS			
M-3 (EA)			
DPE (EA)			

DRXTE Form

INCL. NO. 24

CAMDS

DAILY SUMMARY REPORT

ITEM PROCESSED	AGENT	DATE

NUMBER OF ITEMS PROCESSED _____

POUNDS OF AGENT NEUTRALIZED _____

POUNDS OF SCRAP METAL GENERATED _____

POUNDS OF SALT GENERATED _____

TOTAL OPERATING MANHOURS _____

PRODUCTIVE _____

NONPRODUCTIVE _____

DOWNTIME _____

OTHER _____

REMARKS

DRXTE Form

INCL. NO. 19

QC - DATA SHEET

Area Temperature Monitoring
(Personnel operating areas)

TEST PHASE_____

SHEET ____ OF ____

Date:

Observer: 1

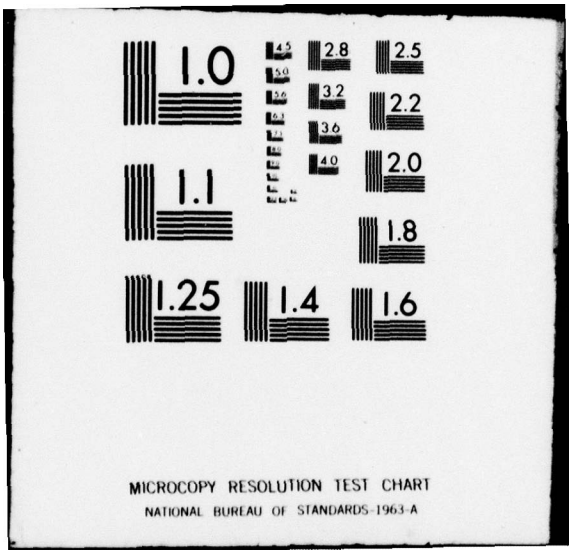
Temperature in °F.

Time	ECC	ECC Housing	ADS Toxic Cubicle	ADS Dryer Area	DUN	DFS	Outside Temperature

AD-A062 701 AAI CORP COCKEYSVILLE MD F/G 19/7
TEST PLAN FOR M55 ROCKET SYSTEM INTEGRATION. BB-39-OPERATIONAL --ETC(U)
SEP 76 DAAA15-75-C-0154
UNCLASSIFIED DRCPM-DR-D-CR-76012 NL

2 OF 2
AD
A062701

END
DATE FILMED
3-79
DDC


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

QC - DATA SHEET

MPF - Certification

TEST PHASE_____

SHEET ___ OF ___

Date:

Observer:

Temperature in °F.

Time	Volatization Temp	PF B Temp	Afterburner Temp	Burnout Temp	Vol. Dwell	AFB Dwell

QC - DATA SHEET

DFS - CERTIFICATION

TEST PHASE_____

SHEET ____ OF ____

Date:

Observer:

*Temperature in °F.

TIME	RETORT TEMP	RETORT SPEED	AFTER-BURNER TEMP	DISCHARGE CONVEYOR TEMP	DISCHARGE CONVEYOR SPEED

DATA SHEET; AGENT CONCENTRATION
IN BUBBLER SAMPLES (THROUGHOUT SITE)

Sample Date _____

Lab Date _____

Bubbler #	Time		Lab Book ID#	Flow Rate liters/min	Time of Sample minutes	Bubbler Volume ml.	Anti - CHE ng/ml		Conc mg/m^3
	Start	Stop					Single	Double	

REQUEST FOR AND RESULTS OF TESTS

PAGE NO	NO OF PAGES

SECTION A - REQUEST FOR TEST

1 TO: *(Include ZIP Code)*	2 FROM: *(Include ZIP Code)*

3. PRIME CONTRACTOR AND ADDRESS *(Include ZIP Code)*	4. MANUFACTURING PLANT NAME AND ADDRESS *(Include ZIP Code)*
CONTRACT NUMBER	P. O. NUMBER

5. END ITEM AND/OR PROJECT	6. SAMPLE NUMBER	7. LOT NO.	8. REASON FOR SUBMITTAL	9. DATE SUBMITTED

10. MATERIAL TO BE TESTED	10a. QUANTITY SUBMITTED	11. QUANTITY REPRESENTED	12. SPEC. & AMEND AND/OR DRAWING NO. & REV. FOR SAMPLE & DATE

13. PURCHASED FROM OR SOURCE	14. SHIPMENT METHOD	15. DATE SAMPLED AND SUBMITTED BY

16. REMARKS AND/OR SPECIAL INSTRUCTIONS AND/OR WAIVERS.

17. SEND REPORT OF TEST TO

SECTION B - RESULTS OF TEST *(Continue on plain white paper if more space is required)*

1. DATE SAMPLE RECEIVED	2. DATE RESULTS REPORTED	3. LAB REPORT NUMBER

4 TEST PERFORMED	RESULTS OF TEST	SAMPLE RESULT	REQUIREMENTS

DATE	TYPED NAME AND TITLE OF PERSON CONDUCTING TEST	SIGNATURE

DD FORM 1 FEB 62 1222 REPLACES DD FORM 1222, 1 JUL 58, WHICH IS OBSOLETE

APPENDIX H

PRE START-UP CHECK LIST

I. DOCUMENTATION

Status

1. SOP availability at work stations
2. Maintenance Manuals at site (1 set)
3. Operating Manuals at site (1 set)
4. Engineering drawings and specifications (1 set)
5. Test plan (10 copies)
6. Demil plan availability (1 copy)
7. Emergency procedures (2 copies)
8. M55 rocket drawings/specs (1 copy)
9. Production control plan
10. Quality Control plan
11. Data sheets for operations
12. Log books established at key sites (e.g. CMO, ADS, DFS, etc.)

add EIS

II. TEST MUNITIONS

Status

1. Phase I - 600 each, M55 rockets
   explosive-loaded, GB filled

2. Phase II - 2500 each, M55 rockets
   explosive-loaded, GB filled

III. CLOTHING AND PROTECTIVE GEAR

Status

1. Level A protective suit (M3 and/or DPE) (10)
2. Level B protective suit (5)
3. Level E protective suit (20)
4. Safety glasses (10 pairs)
5. Leather gloves (10 pairs)
6. Rubber gloves (10 pairs)
7. Chemical Safety Goggles (10 pairs)
8. Rubber boots

IV. CHEMICALS AND OTHER EXPENDABLES

Status

1. Sodium Carbonate
2. Diammonium Phosphate
3. Filtrasorb 300 Activated Charcoal
4. GAF Polypropylene Filter Bags
   a. 800 Micron size
   b. 100 Micron size
   c. 25 Micron size
5. Sodium Hydroxide
6. Sulfuric Acid
7. Slimicide
8. Dichromate Solution
9. Helium (DPE Leak Test)
10. Liquid Nitrogen (Helium Detector)
11. Fuel oil
12. Drums for salt
13. Containers for used bag filters
14. Bags for filter element disposal
15. Hydraulic fluid
16. Tempil sticks
17. Tempil paints

V. INSTRUMENTS, EQUIPMENT AND SPECIAL TOOLS

Status

1. Stopwatches (10)
2. Scales - 100 lb. capacity, 1-lb. sensitivity (1)
   - 25 lb. capacity, 1-oz. sensitivity (1)
3. Hand Tools (mechanics tool set)
   a. at ADS
   b. at DFS
   c. at UPA
4. Spark Proof Tools at ECC
5. Cameras and Film
   a. Polaroid (1)
   b. 35mm (1)
6. Video Tape Recorder and Tape
7. Liquid Sample Bottles W/Caps
8. Tachometer
9. Anemometer
10. Velometer
11. Manometers
12. Sound Level Meter

VI. PERSONNEL

The following personnel are needed for the test and must be notified prior to starting the test. Specific assignments should be made at pre test meeting.

Status

1. Operators
2. Maintenance Personnel
3. Sample Runners
4. Extra Data Collectors
5. Laboratory Division Personnel
6. Production Control Personnel
7. Test Engineers/Technicians
   a. AEO
   b. EWA
   c. CD
8. CMO Operators and Computer Specialist
9. Munitions Division - Toxic Handlers
10. Safety Office Engineers
11. AEHA Representatives
12. Pre-Op Survey Team
13. DPE Committee
14. Boiler Operators
15. Medical Personnel
16. Security Escort
17. Surety Representative
18. Fire Department
19. Ammo Surveillance Division

VII. CHEMICAL LABORATORY COORDINATION

Status

1. QC Procedures Defined/Available

2. Sample Analysis Request Format

3. Sample Identification Standardized

4. Analytical Equipment Capability

   a. pH
   b. Carbonate Concentration
   c. Filter Particulates
   d. Dissolved and Suspended Explosive Content
   e. Liquid Conductivity (Boilers and Cooling Tower)
   f. Chromate Concentration (Cooling Tower)
   g. Excess Caustic in Brine
   h. Caustic Concentration (CONC & DIL)
   i. Trace GB Agent
   j. Stack Gas Analysis
   k. Stack Gas Particulates

5. Sample Runners Designated

VIII. SAFETY REQUIREMENTS

Status

1. Safety reviews conducted

   a. Test Plan
   b. SOP's and ESOP's
   c. Life support system
   d. DPE and other protective gear
   e. Noise hazards

2. Intraline distances marked off

3. Appropriate safety limits posted at work areas

4. Barricades installed and warning placards posted (i.e. OFF LIMITS, GAS MASK AREA, NO SMOKING, RF HAZARD, etc.)

5. SOP's posted at operating areas

6. Fire protection reviewed with Fire Department

7. Area surrounding site surveyed for RF Transmitters (RF hazard)

8. Safety equipment available (See III)

9. Eyewash and safety showers inspected

10. Equipment grounding certified

11. Site medical facility and ambulances ready

12. Filter/Ventilation Systems inspected

13. Emergency Power System operational

14. Alarms and Control Systems operational

15. CAMDS site emergency siren inspected

IX. PRE-TEST CERTIFICATION AND ASSIGNMENTS

Status

1. Test Plan approval

2. Agent Operation approval

3. Operator training complete

4. Maintenance training complete

5. Storage procedures defined for in-process rocket segments (in case of shutdown or test interruption)

6. Observers and data collectors assigned and briefed

7. Test personnel identified

   a. Test Director
   b. Test Officer
   c. Test Engineer

8. SOP and ESOP approval

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REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: DRCPM-DRD-CR-76012
2. GOVT ACCESSION NO.:
3. RECIPIENT'S CATALOG NUMBER:
4. TITLE *(and Subtitle)*: M55 Rocket System Integration Test Plan
5. TYPE OF REPORT & PERIOD COVERED: Final - 1976
6. PERFORMING ORG. REPORT NUMBER: DAAA 15-75-C-0154
7. AUTHOR(s):
8. CONTRACT OR GRANT NUMBER(s):
9. PERFORMING ORGANIZATION NAME AND ADDRESS: AAI Corporation, Cockeysville, MD
10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS:
11. CONTROLLING OFFICE NAME AND ADDRESS: OFFICE OF THE PROJECT MANAGER FOR CHEMICAL DEMILITARIZATION AND INSTALLATION RESTORATION, ABERDEEN PROVING GROUND, MARYLAND 21010
12. REPORT DATE: September 1976
13. NUMBER OF PAGES: 102
14. MONITORING AGENCY NAME & ADDRESS *(if different from Controlling Office)*:
15. SECURITY CLASS. *(of this report)*: UNCLASSIFIED
15a. DECLASSIFICATION/DOWNGRADING SCHEDULE:
16. DISTRIBUTION STATEMENT *(of this Report)*: Approved for Public Release: Distribution Unlimited
17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*:
18. SUPPLEMENTARY NOTES:
19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*:

Test Plan	Detectors	Explosive Containment Cubicle
M55 Rocket		Explosive Treatment System
Demilitarization		Deativation Furnace System
Chemical Agent Munitions Disposal System		Agent Destruct System
Rocket Demilitarization Machine		Filters

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*:

The Chemical Agent Munitions Disposal System is a prototype facility for the large scale destruction of lethal chemical agents and munitions. This test plan outlines the procedures and requirements for the initial phase of toxic operations.

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