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Document number: 9504723/96-PCA-019

Title: Transmittal of the 4843 Alkali Metal Storage Facility Closure Plan, Rev. 1 (S-4-1), the 4843 Alkali Metal Storage Facility Notice of Deficiency Response Table (S-4-1), & the 4843 Alkali Metal Storage Facility State Environmental Policy Act Checklist (S-4-1)

Section: 3 of 3

Date: 10-27-95

Author: Rasmussen, Dixon **Co:** DOE-RL, WHC

Customer: Jaraysi, Witczak **Co:** DOEC

Reference: DOE/RL-90-49, 9554912D

Keywords:

CONTENTS

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5.0 GROUNDWATER MONITORING

There have been no historical discharges to the groundwater from the 4843 AMSF. Groundwater protection regulations established by WAC 173-303-645 only pertain to surface impoundments, waste piles, land treatment units, or landfills. Because the 4843 AMSF was operated as a container-storage unit, groundwater monitoring is not included as part of the 4843 AMSF Closure Plan.

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CONTENTS

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6.0 CLOSURE STRATEGY AND PERFORMANCE STANDARDS

This chapter describes the closure strategy and performance standards that will be met and closure activities that will be conducted to achieve clean closure. Generally, these standards will be achieved by removing dangerous waste from the 4843 AMSF and decontaminating to levels protective of human health and the environment, or removing all equipment, structures, or other materials containing or contaminated with dangerous waste or waste residue from the waste management unit.

6.1 GENERAL CLOSURE STRATEGY

The 4843 AMSF is a clean, well-maintained waste management unit. The 340 Facility and Tanker maintains detailed records of materials stored at the 4843 AMSF (Appendix C). Spills and other unusual occurrences were handled promptly and are well documented (Appendix D). Closure of the 4843 AMSF will be accomplished by verifying that dangerous waste constituents stored in the 4843 AMSF are not present above action levels. This will be assessed using information obtained from implementation of decontamination and sampling activities outlined in Chapter 7.0. The 4843 AMSF is expected to be clean closed; therefore, no postclosure activities are necessary.

The only waste stored in the 4843 AMSF was alkali metal (sodium and lithium [Section 4.2]). Most of the dangerous and mixed alkali metal waste received consisted of retired equipment from liquid sodium processes. Alkali metals have the property of being very reactive in an air environment. As a result, any spills or releases of alkali metals are not anticipated to be found in an unreacted state. The compounds anticipated after reaction with the air are oxides, hydroxides, and carbonates of lithium and sodium.

These carbonates are only dangerous in very large quantities and concentrations (Section 4.2). The concentration expected to be found within the 4843 AMSF is extremely small relative to the size of the building. Closure will be achieved by removing surface deposits of sodium and lithium carbonates from the building and floor. Effort will focus on the interior of the building where the waste was stored. The two reported spills (Appendix D) occurred inside the building.

6.2 GENERAL CLOSURE PROCEDURE

The 4843 AMSF will be closed in a manner consistent with Ecology guidelines and regulations (WAC 173-303-610). The general closure procedure is detailed as follows.

After removal of waste inventory, closure activities will indicate decontamination and visual verification, or removal and disposal of the structure and equipment. These activities will consist of the following steps (as necessary):

1. Perform visual and radiological survey of building interior.

2. Decontaminate associated building equipment to below action levels.

3. Decontaminate building floor and walls, as described in Section 7.4.

4. Perform visual verification of the building and associated equipment to determine the effectiveness of decontamination procedures.

5. Repeat remediation and visual verification until removal of all contaminants above action levels is verified or the component is properly disposed of.

6. Decontaminate equipment used in performing closure activities.

7. Designate and dispose of all contaminated materials and rinsates generated during the closure activities.

8. Certify that closure activities were completed in accordance with the approved plan.

Action levels refer to chemical concentrations that prompt an action. For sodium and lithium carbonates the action level is 10 percent weight per volume; therefore, a visual inspection would be sufficient to ensure dangerous waste concentrations are below the acceptable action levels. The naturally occurring background levels on the Hanford Site for sodium and lithium are as follows: sodium is 1390 parts per million and lithium is 37 parts per million (DOE-RL 1994).

6.3 MINIMIZE THE NEED FOR FURTHER MAINTENANCE

Closure of the 4843 AMSF by removing or decontaminating equipment and structure to the levels specified will eliminate the need for further maintenance specific to the 4843 AMSF.

6.4 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

As discussed previously, the 4843 AMSF will be closed by removing or decontaminating, to identified action levels, all dangerous waste and waste residues to protect human health and the environment.

6.5 RETURN LAND TO THE APPEARANCE AND USE OF SURROUNDINGS

Following closure, if possible, the 4843 AMSF location will be restored to allow for the continued use of the building as a storage unit.

CONTENTS

FIGURES

TABLE

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7.0 CLOSURE ACTIVITIES

7.1 INTRODUCTION

The strategy for closure of the 4843 AMSF is clean closure. Before closure activities begin, all containers will be removed from the 4843 AMSF. Contaminated equipment, floors, and walls will be decontaminated or contaminated sections will be removed. All decontamination rinsate will be contained, designated, and disposed of accordingly.

7.2 REMOVAL OF DANGEROUS WASTE INVENTORY

All stored dangerous waste has been removed from the 4843 AMSF as of May 10, 1995. The mixed waste was transferred to the Hanford Central Waste Complex. The nonradioactive waste was shipped offsite to an approved TSD facility.

7.3 UNIT DECONTAMINATION AND SAMPLING

Closure activities will entail decontaminating contaminated sections of the structure and equipment and properly disposing of any material generated during decontamination activities. These activities will consist of the following steps, as necessary, to determine what dangerous chemical waste, if any, has contaminated the building or the associated equipment:

1. Perform visual inspection and radiation survey of the interior of the building.

2. Decontaminate the floor using the options described in Section 7.4.

3. Verify by visual inspection that no carbonates remain on concrete surfaces.

4. If necessary, repeat remediation and visual inspection until contaminant concentrations are at or below action levels, if practical.

5. Decontaminate or dispose of equipment used in performing closure activities.

6. Designate and dispose of all contaminated materials and rinsates generated during closure activities.

7. Restore the area after closure activities are complete.

8. Certify that closure activities were completed in accordance with the approved plan.

Now that all stored waste has been removed from the AMSF, closure will be achieved by removing all visual surface deposits of sodium and lithium carbonates. The only waste stored in the 4843 AMSF was alkali metal (sodium

and lithium [Chapter 4.0]). Alkali metals have the property of being very reactive in an air environment. As a result, any spills or releases of alkali metals are not anticipated to be found in an unreacted state. The compounds anticipated after reaction with the air are carbonates of lithium and sodium (Chapter 4.0). These carbonates are only dangerous in very large quantities that are above 10 percent weight per volume. The concentration, if any, at the 4843 AMSF is expected to be extremely small relative to the size of the building.

Effort will focus on the interior of the building where the waste has been stored. The two reported spills both occurred inside the building (Appendix D).

After the removal of all dangerous waste containers from the 4843 AMSF, a radiation survey was conducted on May 15, 1995 (see Appendix C). The radiation survey was performed according to established WHC procedures (Environmental Investigations Instructions [EII] 2.3, "Administration of Radiation Surveys to Support Environmental Characterization Work on the Hanford Site," [WHC 1988]) for worker protection and unit characterization. The survey was to be used as a tool to select biased sampling locations. If there were areas where the survey showed measurable radioactivity, samples of those locations would be collected and analyzed. The results of the May 15, 1995, survey allowed the building to be released from a RCA; there were no areas with measurable radiation that could be used as biased sample locations. All that remains to finalize closure activities is to conduct a visual inspection for carbonates and, if found, properly remove carbonates as described in Section 7.4.

Any dangerous waste generated during the decontamination of the structure will be containerized, sampled, designated, and shipped to a permitted TSD facility. All materials packaged for shipment will be shipped in DOT-approved containers that are compatible with the waste contents. All containers will be marked, labeled, and shipped with an accompanying manifest in accordance with applicable regulations.

7.3.1 Decontamination of Building Equipment

All equipment that was associated with the storage of alkali metals at the 4843 AMSF (i.e., shielding concrete blocks and metal drum racks) was found to be free of measurable amounts of radiation. Equipment will be inspected first for carbonate deposits; if the associated equipment is found to be contaminated with carbonate deposits, it will be decontaminated as described is Section 7.4. If the equipment can be deemed free of all contamination associated with the AMSF, it will be excessed. Otherwise, all equipment will be disposed of appropriately. Any decontamination rinsate generated will be containerized, sampled, designated (in accordance with WAC 173-303-070), and, if regulated, shipped to a permitted TSD facility. All materials packaged for shipment to a TSD facility will be in DOT-approved containers that are compatible with waste contents. All containers will be labeled and shipped with an accompanying manifest. All dangerous waste rinsate generated from decontamination of the equipment will be handled in the previously stated manner.

7.3.2 Decontamination of the Walls

The walls of the 4843 AMSF were not used for the storage of waste. Also, because of the nature of the waste stored at the 4843 AMSF, spills that could result in airborne contamination are not expected. Thus, the type of waste and the way the waste was handled suggest that there is no basis to suspect that the walls or ceiling will be contaminated.

Verification of the absence of contamination on the walls will be accomplished using a radiation survey and visual inspection. The walls were part of the survey conducted on May 15, 1995; no measurable amounts of radiation were detected, therefore, the walls will be visual inspected for carbonate deposits. It is very unlikely that the walls will be contaminated with carbonate. If, however, the walls are found to be contaminated with carbonates, they will be decontaminated as described in Section 7.4.

7.3.3 Decontamination of the Concrete Floor

The floor of the 4843 AMSF consists of poured concrete with an area of approximately 150 square meters (1,613 square feet) as shown in Figure 2-3 in Chapter 2.0. There are visible seams where 3.18-millimeter (.125-inch)-wide and 6.35-millimeter (.25-inch)-deep saw-cut control joints were cut to allow the concrete to expand and contract to help prevent cracking of the slab. The floor does have some small fractures in it, but these are not seen as a likely pathway for the dangerous waste to enter the environment because of the nature of the waste stored at the 4843 AMSF, the number of spills documented, and the thickness of the concrete floor (up to 12 inches thick).
The 4843 AMSF was divided by a rope into two storage areas: the dangerous alkali metal storage area and the mixed alkali metal storage area. To date, two containers that were located within the mixed alkali metal storage area are known to have leaked (Appendix D). These spills released a small amount of sodium carbonate and sodium hydroxide on the concrete floor, which was visible by the eye. (Sodium hydroxide reacts with carbon dioxide in the air to form sodium carbonate.) The spills were cleaned according to existing procedures, and the floor was released for use. The two reported spills have left no etching or scaring of the concrete surface and cannot be distinguished by visual inspection of the floor and are considered to be below the action level of 10 percent weight per volume for lithium and sodium carbonates.

The floor was surveyed on May 15, 1995, and no measurable amounts of radiation were found. Afterwards, the floor was swept and visually inspected for carbonate deposits. No carbonates were seen. All material that was generated during sweeping of the floor was collected and analyzed with EPA Method 300.7, Ion Chromatography, to determine levels of sodium and lithium; the generated material then will be disposed accordingly. Results from the sample of the sweepings reported at less than 10 parts per million (detection limit) for lithium and a reading of 95 parts per million for sodium. Both the readings for lithium and sodium are well below the Hanford Site Background levels (DOE-RL 94); therefore it can be concluded that the sweepings are a nonregulated material and can be disposed of accordingly. No further action will be required to decontaminate the concrete floor and will be deemed free of contamination.

7.3.4 Field Logbook

All field activities will be recorded in a field logbook according to the protocols outlined in EII 1.5, "Field Logbooks" (WHC 1988). All entries will be made in ink, signed, and dated. Photographs should be taken of decontamination locations and of any unusual circumstances encountered during the investigation.

7.3.5 Reporting

After completion of the decontamination effort, verification documents will be produced by the Field Team Leader and the Hanford Technical Lead to provide for actual decontamination locations and specific methods used for decontamination.

7.3.6 Site Safety

Site safety during all closure activities will involve planning, training, and approved standard procedures.

7.3.6.1 Health and Safety Plan. A health and safety plan (HASP) is required for all dangerous waste sampling sites. The HASP is intended to specify information pertinent to field assignments and to be a guide in unusual situations or emergencies. A site-specific version of the general *Resource Conservation and Recovery Act of 1976* (RCRA)/*Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) investigation health and safety manual will be developed and used for sampling at the 4843 AMSF. This plan will be developed and completed before initiation of sampling activities in accordance with EII 2.1 "Preparation of Hazardous Waste Operations Permits" (WHC 1988).

7.3.6.2 Personnel Training. All personnel involved with the closure activities at the 4843 AMSF will receive a minimum level of dangerous waste training. Personnel generally are placed into the following job categories:

- Managers and supervisors, who are responsible for supervising, coordinating, and directing the closure activities and personnel
- Nuclear Process Operators and Decommissioning and Decontamination workers, who are responsible for sampling, packaging, and handling of both dangerous and mixed waste
- HPTs, who are responsible for surveying for radiological and dangerous waste contaminants
- Crafts personnel, who are responsible for specialized work. The various crafts include carpenters, electricians, ironworkers/riggers, heavy equipment operators, crane operators, millwrights, pipefitters, and painters.

In addition to the personnel mentioned, any person entering a TSD unit during closure must have completed the 40-hour hazardous waste worker safety training.

Table 7-2 contains a matrix that relates job categories to the individual training course (WHC-CM-7-5, *Environmental Compliance Manual*, Chapter 11). Appendix F contains brief descriptions of the training courses, including descriptions of the target audience, instructional technique, evaluation method, length of course, and frequency of retraining.

7.3.6.3 Standard Safety Procedures. The following safety procedures will apply each time personnel make a site entry for sampling purposes:

- No personnel will be at the site without a designated 'buddy'
- Of the personnel entering the site, one will be designated to be in charge
- Personal protective equipment will be worn as specified. Approved deviations will be entered in the field logbook and signed by the field team leader (cognizant engineer) and the site safety officer
- Field work will be planned before the site is entered
- Equipment needed for work will be inventoried and inspected before the site visit to ensure that all equipment is present and in operable condition.

7.4 SCHEDULE FOR CLOSURE

A schedule of the closure activities is presented in Figure 7-1. The activities representing the greatest portion of time will be decontamination activities.

7.5 AMENDMENT OF PLAN

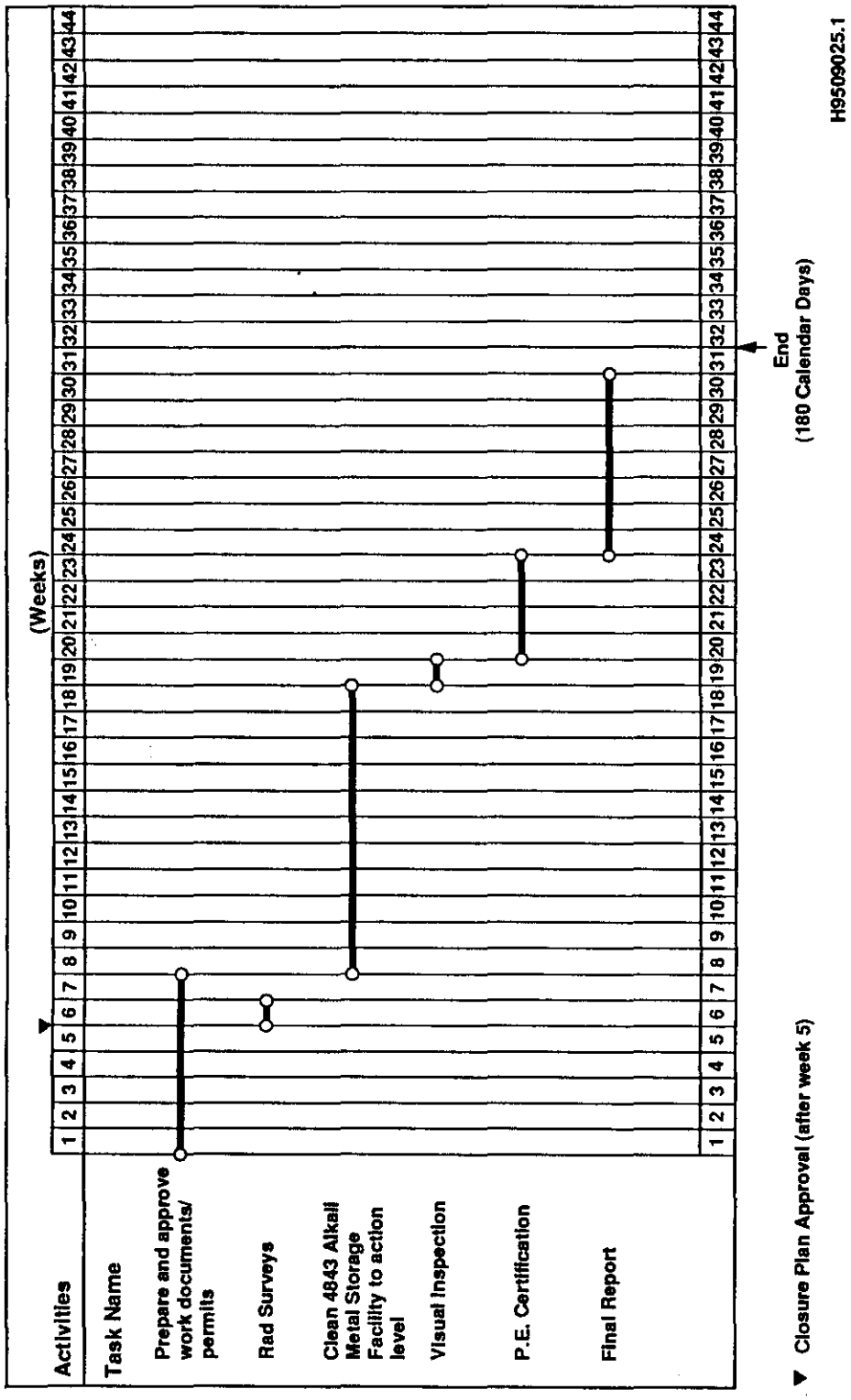
The closure plan for the 4843 AMSF will be amended whenever changes in operating plans or unit design affect the closure plan, whenever there is a change in the expected time of closure, or if, when conducting closure activities, unexpected events require a modification of the closure plan. The closure plan will be modified in accordance with WAC 173-303-610(3). This plan can be amended any time before certification of final closure of the 4843 AMSF.

If an amendment to the approved closure plan is required, DOE-RL will submit a written request to Ecology to authorize a change to the approved plan. The written request will include a copy of the closure plan amendment for approval.

7.6 CERTIFICATION OF CLOSURE

Within 60 days of final closure of the 4843 AMSF, DOE-RL will submit to Ecology a certification of closure. The certification will be signed by both DOE-RL and an independent professional engineer registered in the state of Washington, stating that the unit has been closed in accordance with the approved closure plan. The certification will be submitted by registered mail. Documentation supporting the independent professional engineer's certification will be retained and furnished to Ecology upon request.

The DOE-RL and the independent professional engineer registered in the state of Washington will certify with a document similar to Figure 7-2.



1 Figure 7-1. Schedule of Closure Activities.

CLOSURE CERTIFICATION FOR

_____

Hanford Site Facility
Department of Energy-Richland Operations Office

We, the undersigned, hereby certify that all _____ _____ closure activities were performed in accordance with the specifications in the approved closure plan.

_____

Owner/Operator Signature DOE-RL Representative Date
(Typed Name)

_____P.E.#_____

Signature Independent Registered Professional Engineer Date
(Typed name and Washington State Professional Engineer license number).

1 Figure 7-2. Closure Certification for the 4843 AMSF.

Table 7-1. Company-General Training Matrix.

Course number/title	Target/audience				
	Type	MS	NPO	HPT	CR
000001 Hanford General Employee Training	A	X	X	X	X
02006A Hanford Site Orientation	I	X	X	X	X
02006G Hazardous Communication and Waste Management Awareness	I	X	X	X	X
031220 40 Hour Hazardous Waste Operations Training	I	X	X	X	X
032020 8 Hour Hazardous Waste Refresher Training	A	X	X	X	X
03E023 Unit Building-specific contingency plan/hazard communication/emergency preparedness training FFTF Facility	A	X	X	X	X

A = annual course.
I = introductory course.
NPO = nuclear process operators and decontamination and decommissioning workers.
MS = manager and supervisors.
X = required course.
HPT = health physics technicians.
CR = crafts.

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CONTENTS

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8.0 POSTCLOSURE

This closure plan is proposing clean closure of the 4843 AMSF. However, if clean closure cannot be obtained, the following action will be taken in accordance with WAC 173-303-610(1)(b).

8.1 NOTICE IN DEED BOOK

Within 60 days of the certification of closure, DOE-RL will sign, notarize, and file for recording the notice indicated below. The notice will be sent to the Auditor of Benton County, P.O. Box 470, Prosser, Washington, with instructions to record this notice in the deed book.

TO WHOM IT MAY CONCERN

The United States Department of Energy, Richland Operations Office, an operations office of the United States Department of Energy, which is a department of the United States Government, the undersigned, whose local address is the Federal Building, 825 Jadwin Avenue, Richland, Washington, hereby gives the following notice as required by 40 CFR 265.120 and WAC 173-303-610(10) (whichever is applicable):

(a) The United States of America is, and since April 1943, has been in the possession in fee simple of the following describe lands: (legal description of the 4843 Alkali Metal Storage Facility).

(b) The United States Department of Energy, Richland Operations Office, by operation of the 4843 Alkali Metal Storage Facility, has disposed of hazardous and/or dangerous waste under the terms of regulations promulgated by the United States Environmental Protection Agency and Washington State Department of Ecology (whichever is applicable) at the above described land.

(c) The future use of the above described land is restricted under terms of 40 CFR 264.117(c) and WAC 173-303-610(7)(d) (whichever is applicable).

(d) Any and all future purchasers of this land should inform themselves of the requirements of the regulations and ascertain the amount and nature of wastes disposed on the above described property.

(e) The United States Department of Energy, Richland Operations Office has filed a survey plat with the Benton County Planning Department and with the United States Environmental Protection Agency, Region 10, and the

Washington State Department of Ecology (whichever are applicable) showing the location and dimensions of the 4843 Alkali Metal Storage Facility and a record of the type, location, and quantity of waste treated.

8.2 POSTCLOSURE CARE

Postclosure care generally is required when a waste management unit cannot attain a clean closure.

If it is determined that the 4843 AMSF cannot be remediated under these programs, a postclosure plan will be prepared for the 4843 AMSF at that time. The post closure plan will include the following:

- Inspection plan
- Monitoring plan
- Maintenance plan
- Personnel training
- Postclosure contact
- Provisions to amend the postclosure plan
- Provisions to certify the postclosure plan.

CONTENTS

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9.0 REFERENCES

9.1 DOCUMENTS

DOE, 1984, *Radioactive Waste Management-Guidance Document*, DOE Order 5820.2A, U.S. Department of Energy, Washington, D.C.

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WHC, 1989a, *Quality Assurance*, WHC-CM-4-2, Westinghouse Hanford Company, Richland, Washington.

WHC, 1989b, *Environmental Compliance Manual*, WHC-CM-7-5, Westinghouse Hanford Company, Richland, Washington.

9.2 CODE OF FEDERAL REGULATIONS AND FEDERAL REGISTER

40 CFR 261, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, as amended.

40 CFR 302, "Designation, Reportable Quantities, and Notification," *Code of Federal Regulations*, as amended.

49 CFR 178, "Shipping Container Specification," *Code of Federal Regulations*, as amended.

9.3 FEDERAL AND STATE ACTS

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 USC 9601 et seq.

NIOSH, 1986, *Registry of Toxic Effects of Chemical Substances*, 1985-86 ed., National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, Washington, D.C.

Resource Conservation and Recovery Act of 1976, as amended, 42 USC 6901 et seq.

9.4 REVISED CODE OF WASHINGTON AND WASHINGTON ADMINISTRATIVE CODE

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, Chapter 173-303, Washington State Department of Ecology, Olympia, Washington.

APPENDICES

A HANFORD SITE MAP

B DESIGN DRAWINGS

C HISTORICAL WASTE INVENTORY

D SPILL REPORTS

E PHOTOGRAPHS

F PERSONNEL TRAINING

G QUALITY ASSURANCE PROJECT PLAN FOR SAMPLING AT THE 4843 ALKALI METAL STORAGE FACILITY

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APPENDIX A

HANFORD SITE MAP

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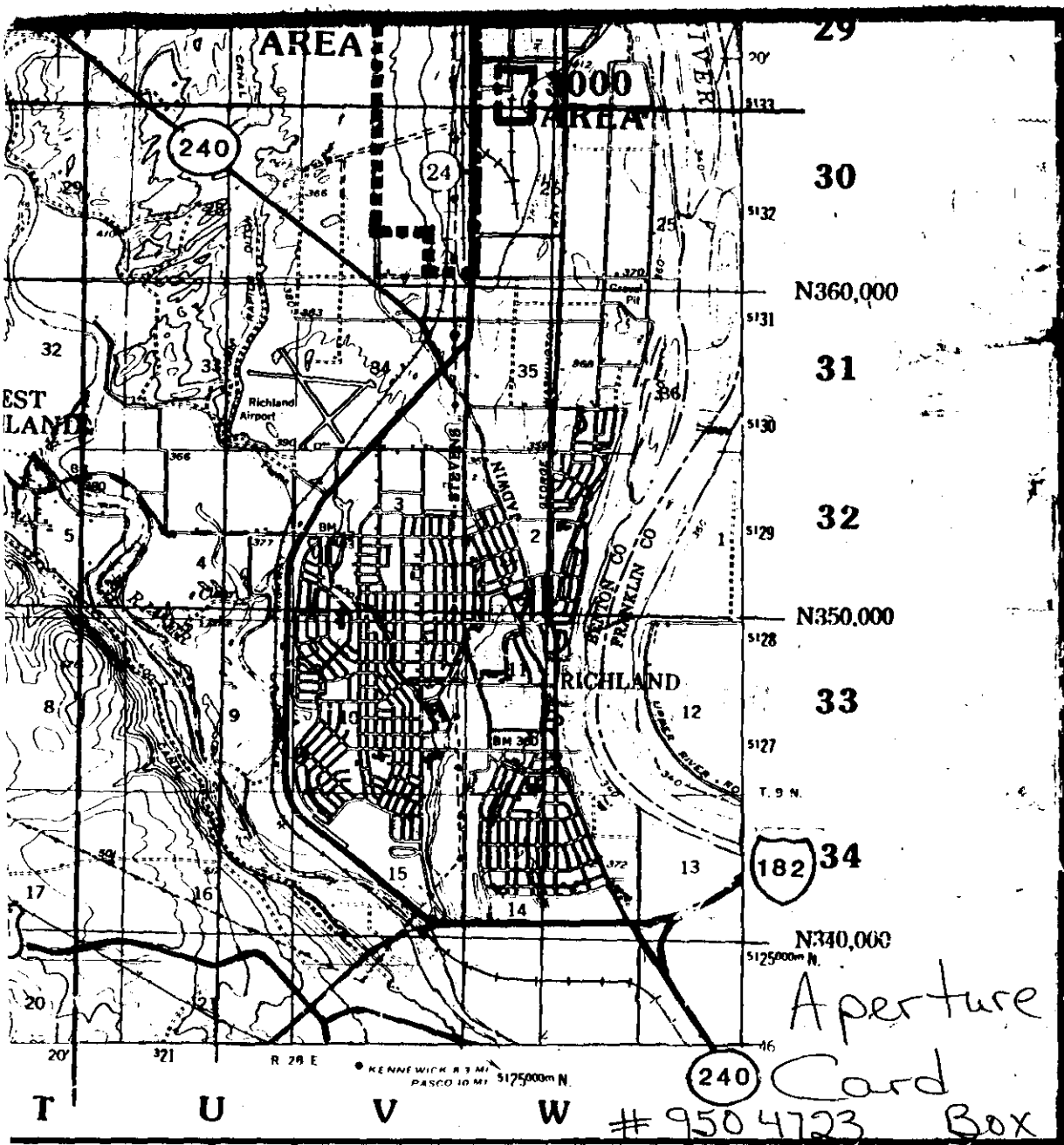

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U. S. Department of Energy
Richland Operations Office

Westinghouse Hanford Company

GENERAL OVERVIEW OF HANFORD SITE

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APPENDIX B

DESIGN DRAWINGS

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APPENDIX B

DESIGN DRAWINGS

This appendix contains the following design drawings:

FSK-70E-164:

40-foot-by-40-foot Structural and Rigging Loft Building #3 General Floor Plan (for historical reference only). Originally, the 4843 Alkali Metal Storage Facility (4843 AMSF) Building was called Building #3 and was used as a support building for the construction of the Fast Flux Test Facility (FFTF).

H-4-152000:

400 Area Layout Map, Rev. 9.

Building #3 subsequently was moved to the present location, renamed 4843 AMSF, and became a waste management unit for the storage of dangerous and mixed alkali metal waste generated at FFTF and from other waste generating units on the Hanford Site (H-4-152000).

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REVISIONS

COMMENT PRT ISSUE NO.	DATE	CHECK PRT ISSUE NO.	DATE	LAST REV

DRAWING STATUS

APPD James W. Webb 4/26/71 DATE	U. S. ATOMIC ENERGY COMMISSION RICHLAND OPERATIONS OFFICE
APPD DATE	WESTINGHOUSE ELECTRIC CORP.
ENGR 4/30/71 DATE	BECHTEL SAN FRANCISCO
OPTG APPD DATE	40' x 40' STRUCTURAL AND RIGGING LOFT BLDG # 3 GENERAL FLOOR PLAN
CHECKED R. Griffin 4/29/71 DATE	FAST FLUX TEST FACILITY
DRAWN PRUTZ 4-22-71 DATE	BLDG. NO. / INDEX NO.
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RB		1/5/90		WHC	12/4/89	PRC 12/19/89	REV PER ECN # 109248	8

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US Department of Energy

Hanford Engineering Development Laboratory
Westinghouse Hanford Company

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APPENDIX C

HISTORICAL WASTE INVENTORY

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APPENDIX C

HISTORICAL WASTE INVENTORY

This appendix contains a historical record of the waste inventory stored at the 4843 Alkali Metal Storage Facility (4843 AMSF) as well as the final Radiological Survey Plan and Radiological Survey Report conducted after all waste had been removed from the building. As waste drums (both radioactive mixed and nonradioactive dangerous waste) were received into the 4843 AMSF, they were numbered in a chronological order. As time passed, 39 drums of radioactive mixed waste were repackaged into 10 drums, 4 drums became 2, etc. The total amount of waste has remained constant, but the number of containers was reduced. The duplicate containers were not included on the all-time inventory because it would have artificially increased the amount of waste stored at the 4843 AMSF. Waste container No. 77 was generated at the 4843 AMSF during repackaging of lithium contaminated pipe into a new container. Specifically, a piece of piping was cut with the stub end containing about 57 grams (2 ounces) of lithium metal going into Container No. 77.

Terms:

FFTF = Fast Flux Test Facility
NOS = not otherwise specified
LSA = low specific activity
DM = drum metal
GW = gross weight.

#/PSN/LABELS/MARKINGS Radioactive Mixed Waste	SOURCE	DESCRIPTION	ACCUMULATION RECEIVED SHIPPED
44-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	FFTF Operations Waste	1-55 gal DM Pipe & Small can of sodium 5 gal of Na	A-5-30-86 R-4-15-87
47-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	437-FFTF P-39 related-5 gal buckets	1-55 gal DM contaminated sodium-drip cup meltout-refueling ops-120 mr/hr-120 mCi-GW	A-11-13-87 R-11-13-87
49-Radioactive Material, N.O.S. Flammable solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	437-FFTF P-39 related-small cans	1-30 gal DM contaminated sodium-drip cup meltout-refueling ops-70 mr/hr-70 mCi-GW	A-11-13-87 R-11-13-87
50-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	437-FFTF P-39 related-small cans	1-30 gal DM contaminated sodium-drip cup meltout-refueling ops-90 mr/hr-90 mCi-GW	A-5-13-87 R-11-13-87

51-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	437-FFTF P-39 related-small cans	1-30 gal DM contaminated sodium-drip cup meltout-refueling ops-01 mr/hr-1 m/Ci-GW	A-11-13-87 R-11-13-87
52-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	405-FFTF P-39 related-small cans	1-55 gal DM contaminated sodium-drip cup meltout-refueling ops-10 mr/hr-9.893 mCi-GW	A-4-10-86 R-11-13-87
53-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	405-FFTF P-39 related-small cans	1-55 gal DM contaminated sodium-drip cup meltout-refueling ops-10 mr/hr-11.03 mCi-GW	A-4-10-86 R-11-13-87
54-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	405-FFTF P-39 related	1-55 gal DM contaminated sodium-solid chunks & oil-FFTF-Spill-100 mr/hr-32.6 mCi-GW	A-4-10-86 R-11-13-87

55-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	405-FFTF P-39 related	1-55 gal DM contaminated sodium-solid chunks & oil-FFTF-Spill-100 mr/hr-35.75 mCi-GW	A-4-10-86 R-11-13-87
56-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	405-FFTF P-39 related	1-55 gal DM contaminated sodium-solid chunks & oil-FFTF-Spill-100 mr/hr-33.1 mCi-GW	A-4-10-86 R-11-13-87
57-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	405-FFTF P-39 related	1-55 gal DM contaminated sodium-solid chunks & oil-FFTF-Spill-100 mr/hr-21.0 mCi-GW	A-4-10-86 R-11-13-87
58-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	405-FFTF P-39 related	1-55 gal DM contaminated sodium-solid chunks & oil-FFTF-Spill-100 mr/hr-36.2 mCi-GW	A-4-10-86 R-11-13-87

59-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	405-FFTF P-39 related	1-55 gal DM contaminated sodium-Eqp. & structural - FFTF-Spill-50.0 mr/hr-01.9 mCi-GW	A-4-10-86 R-11-13-87
60-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	405-FFTF P-39 related	1-55 gal DM contaminated sodium-Eqp. & structural - FFTF-Spill-50.0 mr/hr-00.8 mCi-GW	A-4-10-86 R-11-13-87
61-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	405-FFTF P-39 related	1-55 gal DM contaminated sodium-Eqp. & structural - FFTF-Spill-10.0 mr/hr-00.8 mCi-GW	A-4-10-86 R-11-13-87
62-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-10.0 GW	A-7-14-86 R-11-13-87

63-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-<.01 mCi-GW	A-7-14-86 R-11-13-87
64-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-<.01 mCi-GW	A-7-14-86 R-11-13-87
65-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-<.01 mCi-GW	A-7-14-86 R-11-13-87
66-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-<.01 mCi-GW	A-7-14-86 R-11-13-87
67-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-<.01-GW	A-7-14-86 R-11-13-87

68-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-<.01 mCi-GW	A-7-14-86 R-11-13-87
69-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-<.01 mCi-GW	A-7-14-86 R-11-13-87
70-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-<.01 mCi-GW	A-7-14-86 R-11-13-87
71-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-<.01 mCi-GW	A-7-14-86 R-11-13-87
72-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-<.01 mCi-GW	A-7-14-86 R-11-13-87

73-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2912	324-300A	1-55 gal DM contaminated sodium-in steel pipes-<1 mr/hr-<.01 mCi-GW	A-7-14-86 R-11-13-87
74-1-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-55 gal DM 1/2 dump tank 7.5 lbs contam-imated sodium-<1 mr/hr-<.5 mCi-GW	A-7-14-86 R-11-13-87
74-2-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-55 gal DM 1/2 dump tank 7.5 lbs contam-omated sodium-<1 mr/hr-<.5 mCi-GW	A-7-14-86 R-11-13-87
75-1-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-55 gal DM 1/2 dump tank 7.5 lbs contam-omated sodium-<1 mr/hr-<.5 mCi-GW	A-7-14-86 R-11-13-87
75-2-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-55 gal DM 1/2 dump tank 7.5 lbs contam-omated sodium-<1 mr/hr-<.5 mCi-GW	A-7-14-86 R-11-13-87

76-Radioactive Material, N.O.S. Flammable Solid, Danagerous When Wet-D001,D002,D003,WT01 UN2982	324-300A	1-55 gal DM contaminated sodium samples & scrp-80 mCi -80 mr/hr	A-7-7-88 R-7-7-88
78-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2982	324-300A	1-5 gal can contaminated sodium trash from capping Tanks 74 & 75 GW	A-4-12-88 R-7-29-88
79-Radioactive Material, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN2982	324-300A	1-5 gal can contaminated sodium trash from capping Tanks 74 & 75 GW	A-4-12-88 R-7-29-88
80-Radioactive Material LSA, N.O.S. Flammable Solid Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-DOT 7A container-130 lbs contaminated sodium-overpacked .039mCi-GW	A-2-9-89 R-2-9-89 Into 5-9-89
81-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-Hot Trap with contam inated sodium .025 mCi-GW	A-2-9-89 R-2-9-89 Into 5-9-89
82-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-Fermi Heat Exchanger-contaminated Sodium-.025mCi-GW	A-2-9-89 R-2-9-89 Into 5-9-89

87-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D002,D003,WT02 UN2912	324-300A	1-55 gal DM pipe pieces-trace amounts of sodium-98 lbs net-<D-	A-8-10-89 R-8-21-89
88-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-55 gal DM pipe pieces-201 lbs net contaminated sodium-<1 mr/hr	A-8-10-89 R-8-21-89
89-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D002,D003,WT02 UN2912	324-300A	1-55 gal DM pipe pieces-<1 lbs sodium-228 lbs net-<0.5 mr/hr	A-8-10-89 R-8-21-89
90-Radioactive Material N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2982	324-300A	1-55 gal DM pipe pieces-tubing-141 lbs net-contaminated sodium-60 mr/hr	A-8-10-89 R-8-21-89
91-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-55 gal DM pipe pieces 189 lbs net contaminated sodium-<D mr/hr	A-8-10-89 R-8-21-89
92-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-55 gal DM surge tanks 130 lbs net contaminated sodium-<D mr/hr	A-8-10-89 R-8-21-89

93-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-55 gal DM bags-cans-jars-104 lbs net-contaminated sodium-15 mr/hr	A-8-10-89 R-8-21-89
94-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-55 gal DM pipe/trap-199 lbs net contaminated sodium-<D mr/hr	A-8-10-89 R-8-21-89
95-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-s. tank-sealed-contaminated sodium-60 Kg Net-GW	A-8-10-89 R-8-21-89
96-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN2912	324-300A	1-s. tank-sealed-contaminated sodium-45 Kg Net-GW-	A-8-10-89 R-8-21-89
97-Radioactive Material LSA, N.O.S. Flammable Solid, Dangerous When Wet-D001,D002,D003, WT02 UN2912	324-300A	1- 5 gal can Waste & Paper from clean up & overpacking DOT 7A #80	A-2-6-90 R-2-6-90

#/PSN/LABELS/MARKINGS Non-Radioactive Waste	GENERATOR	DESCRIPTION	ACCUMULATION RECEIVED SHIPPED
45-5 gal can - Training Material	4713D	5k Brick of Sodium GW	N/A
77-Lithium metal, Flammable Solid, Dangerous When Wet-D001,D002,D003,WT02 UN1415	4843	1-5 gal can 1/8 lbs of clean Lithium GW	A-7-29-86 R-7-29-86
01-Waste Sodium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1428	324-300A	1-55 Gal DM Haz waste not radioactive GW 200lbs	R-6-29-89 S-4-11-91
02-Waste Sodium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1428	324-300A	1-55 Gal DM Haz waste not radioactive GW 400lbs	R-6-29-89 S-4-11-91
03-Waste Sodium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1428	324-300A	1-55 Gal DM Haz waste not radioactive GW 175lbs	R-6-29-89 S-4-11-91
04-Waste Lithium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1415	324-300A	1-55 Gal DM Haz waste not radioactive GW 100lbs	R-6-29-89 S-4-11-91

05-Waste Lithium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1415	324-300A	1-55 Gal DM Haz waste not radioactive GW 200lbs	R-6-29-89 S-4-11-91
06-Waste Lithium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1415	324-300A	1-55 Gal DM Haz waste not radioactive GW 250lbs	R-6-29-89 S-4-11-91
07-Waste Lithium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1415	324-300A	1-55 Gal DM Haz waste not radioactive GW 225lbs	R-6-29-89 S-4-11-91
08-Waste Lithium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1415	324-300A	1-55 Gal DM Haz waste not radioactive GW 300lbs	R-6-29-89 S-4-11-91
09-Waste Lithium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1415	324-300A	1-55 Gal DM Haz waste not radioactive GW 250lbs	R-6-29-89 S-4-11-91
10-Waste Lithium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1415	324-300A	1-55 Gal DM Haz waste not radioactive GW 400lbs	R-6-29-89 S-4-11-91
11-Waste Lithium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1415	324-300A	1-55 Gal DM Haz waste not radioactive GW 250lbs	R-6-29-89 S-4-11-91

12-Waste Lithium, Metal Flammable Solid, Dangerous When Wet-D001,D002,D003,WT01 UN1415	324-300A	1-55 Gal DM Haz waste not radioactive GW 450lbs	R-6-29-89 S-4-11-91

Radiological Survey Plan No.: X-95-0001	Page 1 of 3	Date: 5/9/95
Title: Release of Building 4843 from Radiological Control	Expiration Date: 8/9/95	

1.0 Purpose

This plan describes the radiation survey methodology by which the 400 Area Radiological Control Organization will release the 4843 Building from radiological control.

2.0 Scope

The 4843 Building has been used solely for the purpose of storing radioactive contaminated Alkali metals prior to shipment to final disposition. No radioactive spills have occurred in the building. The building has been posted as a Radiation Area indicating that routine radiation surveys have never detected any radioactive contamination.

All the Alkali metal stored at 4843 Building came from FFTF. FFTF radioactive isotope characterization has shown that alpha contamination is not a concern. The radiation survey of this facility will, therefore, be performed with beta-gamma instrumentation only.

3.0 Required Material

- Currently Calibrated beta-gamma survey instrument
- Massolin cloth (smear material)
- Survey Plan
- Radiation Survey Report

4.0 Survey Plan

4.1 Facility Layout

The interior dimension of the 4843 Building is approximately 39' x 39' (1521 square feet). The floor is concrete (4 slabs, shown in Figure 1 as the small dotted line). The walls are corrugated metal. There are roll-up doors at the west and east sides; personnel entrance doors on the NW and SE sides of the building.

Inside the building, on the north wall, there is a cement block shield wall (4' high and 2' wide). On the south wall there is scaffolding. Otherwise the building is empty.

Figure 1 shows the layout of the 4843 Building. The Figure's scale is approximately 1/6 inch to 1 foot. The building has been divided into grids approximately 30 - 50 ft^2 areas. These grids will be used for the purpose of indicating the locations of the survey points.

Radiological Survey Plan No.: X-95-0001	Page 2 of 3	Date: 5/9/95
Title: Release of Building 4843 from Radiological Control	Expiration Date: 8/9/95	

4.2 Survey

4.2.1 Perform a smear survey of the concrete floor using massolin (or equivalent smear material) cloth. Use 6 - large area smears along each of the rows 1-6 (see Figure 1).

4.2.2 Perform a smear survey on the wall panels and roll-up doors (8 ft high). Use one smear per wall.

NOTE: If any contamination is found above the release criteria, the entire floor area will be surveyed at a scan speed of 2 inches/second.

4.2.3 Perform a 95% statistical direct survey on the concrete floor as follows:

- Scan the entire concrete floor at approximately 6 inches per second.
- Using the attached Figure and indicated grids (e.g. A1, B2), perform 22 static (at least 5 seconds each) measurements (at random) within each 50 ft^2 area. Indicate the approximate location of each direct scan on the Figure with a dot. If any measurement is above the minimum detectable activity, circle the dot to so indicate and document the level.

  For those grids along the east of south walls which are not 50 ft^2, combine the grids as follows: F1&2, F3&4, F5&6, 6A&B, 6CD&E.

4.2.4 Perform direct static measurements on the wall panels and roll-up doors (8' high). Make at least 22 measurement per wall area.

5.0 Release Criteria

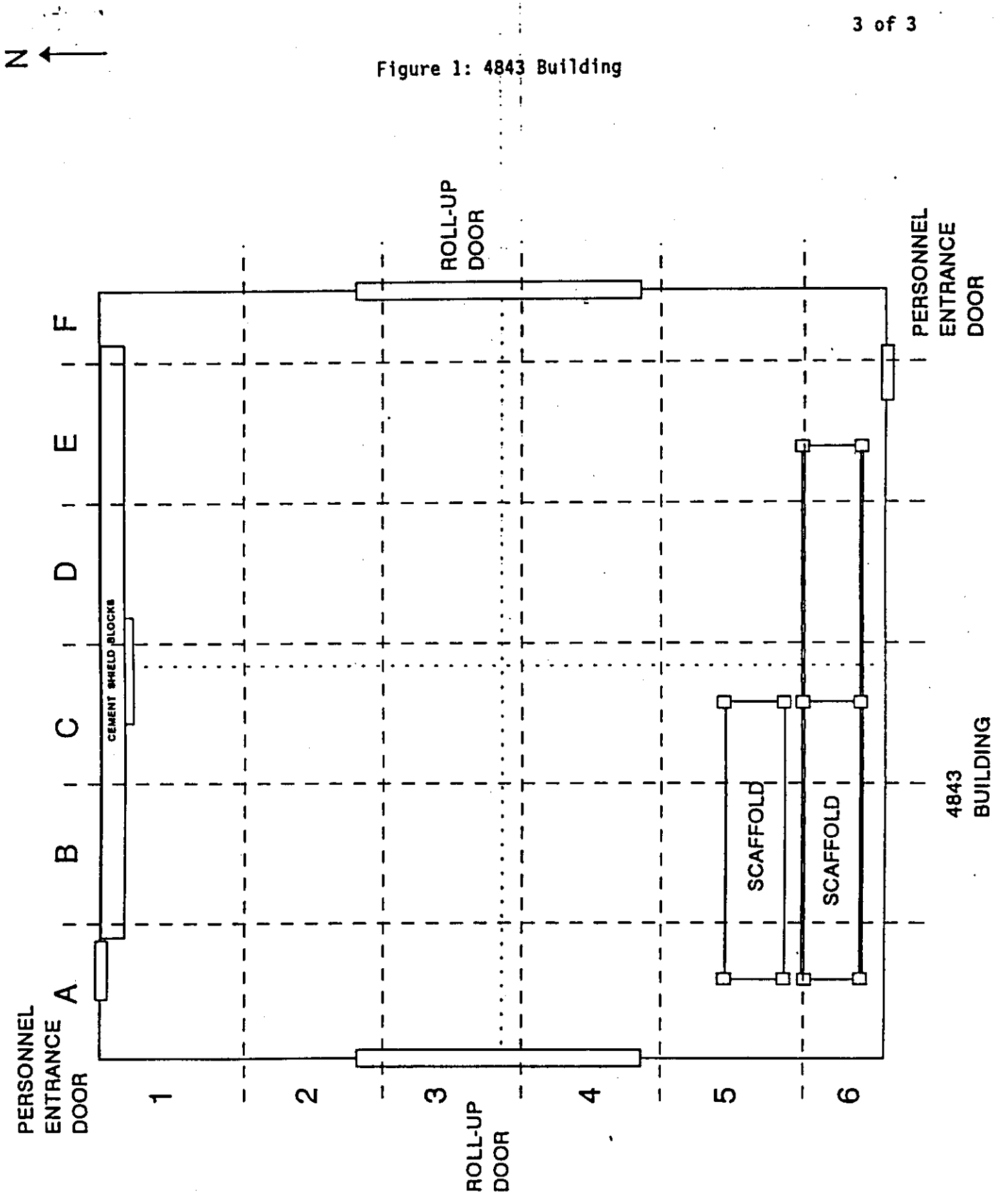
To release the the 4843 Building from radioligical control, the removable contamination shall be less than 1000 dpm/100 cm^2 and the direct scan measurements shall be less than 5000 dpm/100 cm^2. If any of these levels are exceeded, a Decontamination Plan will be developed and the area will be resurveyed.

6.0 Documentation

Document radiation survey results on a Radiation Survey Report form. Identify the floor locations by the grid number (e.g., A1, B2, etc.). Identity the wall survey by compass direction (e.g. east wall). Attach grid map to the survey report.

Author: D. R. Burstad D R. Burstad	RC Manager: L. A. Nelsen L A. Nelsen

Figure 1: 4843 Building



Westinghouse Hanford Company - Health Physics
RADIOLOGICAL SURVEY REPORT

Survey No. Nº 205838

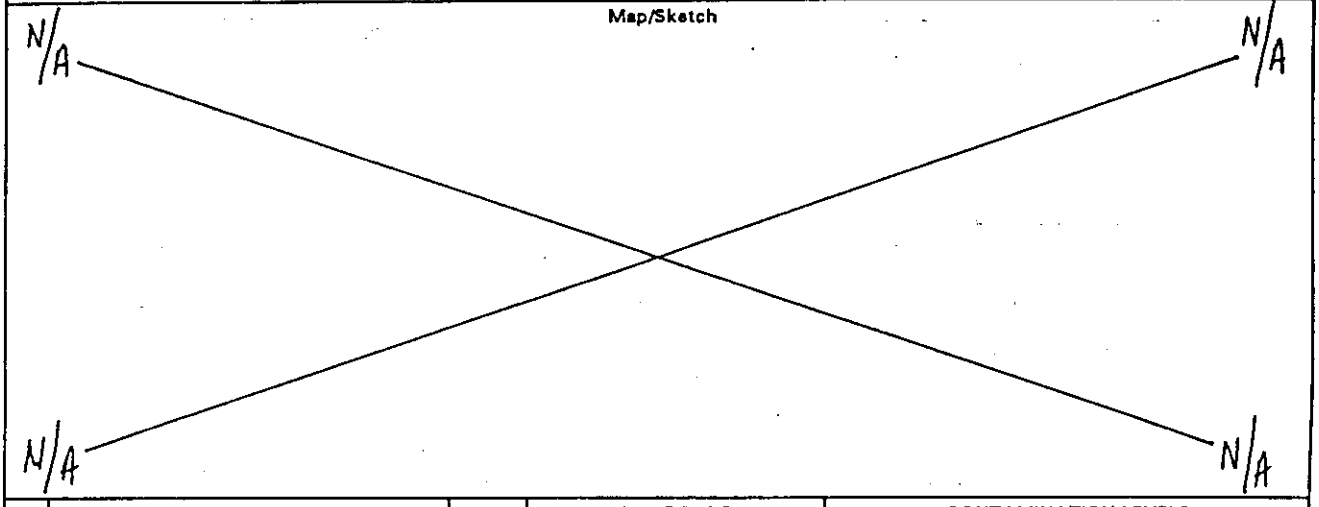
Date: 5-15-95 | Time: 0800/1000 | RWP No.: N/A | Page 1 of 3

Area/Bldg./Room/Location (Code): 400, FFTF, 4843 BLDG. | F.C.: X

Job Description: RELEASE THE 4843 BUILDING FROM RADIOLOGICAL CONTROL. PER SURVEY PLAN No: Y-95-0001

Purpose of Survey (check appropriate box(es)):
Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill
Alarm Response: ☐ CAM, ☐ ARM(RAM), ☐ PSD
☐ HRA/VHRA Work ☐ Job Coverage
☐ Exposure Incident ☒ Material Release
☐ RM Transfer/Shipment ☐ Required, Task No. ____

Map/Sketch



No.	Description	Dist.	DOSE RATE β (non-pen) mrad/h	DOSE RATE γ (pen) mR/h	DOSE RATE n mrem/h	CONTAMINATION LEVELS Direct (dpm/probe) β	Direct (dpm/probe) α	Smear (/100cm²) β (dpm)	Smear (/100cm²) α (dpm)	Smear (/100cm²) mrad/h
1	6 LARGE AREA FLOOR SMEARS	N/A	—	—	—		—	<1000	N/A	—
2	(4 WALLS) ONE SMEAR PER WALL	N/A	—	—	—		—	<1000	N/A	—
3	SCAN ENTIRE FLOOR SURFACE	N/A	—	—	—	<5000	N/A			
4	CEMENT SHIELD BLOCKS	N/A	—	—	—		—	<1000	N/A	—
5	(4 WALL PANELS) 22 5 SECS.	N/A	—	—	—	<5000	N/A	—		
	MEASUREMENTS PER WALL AREA	N/A	—							
6	22 STATIC MEASUREMENTS	N/A	—	—	—	<5000	N/A	—		
	IN EACH 50ft² OF FLOOR	N/A	—							
	AREA.	N/A	—							
N/A	—									

Continued on page 2

Air Sample Results (μCi/ml)

	BZ	GA	Initial	Decay
α 1	N/A			N/A
β 1				
α 2				
β 2	N/A			N/A

Legend
(#) - Smear Location ⚠# - Air Sample Location
[#] - Large Area Smear * - Contact Reading
Other ____

BD-8000-010 (01/94)

950919.0938

Westinghouse Hanford Company - Health Physics
RADIOLOGICAL SURVEY REPORT

F.C. X | Page 2 of 3 | Survey No. № 205838

No.	Description	Dist.	DOSE RATE β (non-pen) mrad/h	DOSE RATE γ (pen) mR/h	DOSE RATE n mrem/h	CONTAMINATION LEVELS Direct (dpm/probe) β	Direct (dpm/probe) α	Smear (/100cm²) β (dpm)	Smear (/100cm²) α (dpm)	mrad/h
N/A										N/A
N/A										N/A

Comments

ALL SMEARS WERE <1000 DPM/100 cm²
ALL SCAN & STATIC MEASUREMENTS <5000 DPM/100 cm²
BUILDING WAS NOT SURVEYED ABOVE THE EIGHT FOOT HIGH MARK.
BUILDING WAS RELEASED FROM RADIOLOGICAL STATUS.

11 Samples Counted with portable instruments for 0.25 minutes.

Instr./Probe Model	RO-3B (CP)	E-140/ P-11 (GM/Probe)
Serial No.	N	1212 / 0938 / 1554 / 1848
Efficiency	A	.10
Correction Factor		10

N/A N/A N/A N/A

ADDITIONAL REPORTS

FPR No. N/A | Sample Counter Log(s) N/A

RSR No. N/A | . . . Contamination - Skin N/A | Procedure: WHC IP-0718 HRS 3.1.1

. . . Contamination - Clothing N/A | Other(s) N/A

HPT:
Payroll No.: 66671/67302
Name (Print): DOUG EDWARDS / LOUIS HELLER
Signature: Doug Edwards / Louis Heller

First-Line HP Manager:
Date: 5/15/95 | Payroll No.: 6C448
Name (Print): LA NELSEN
Signature: L A Nelsen

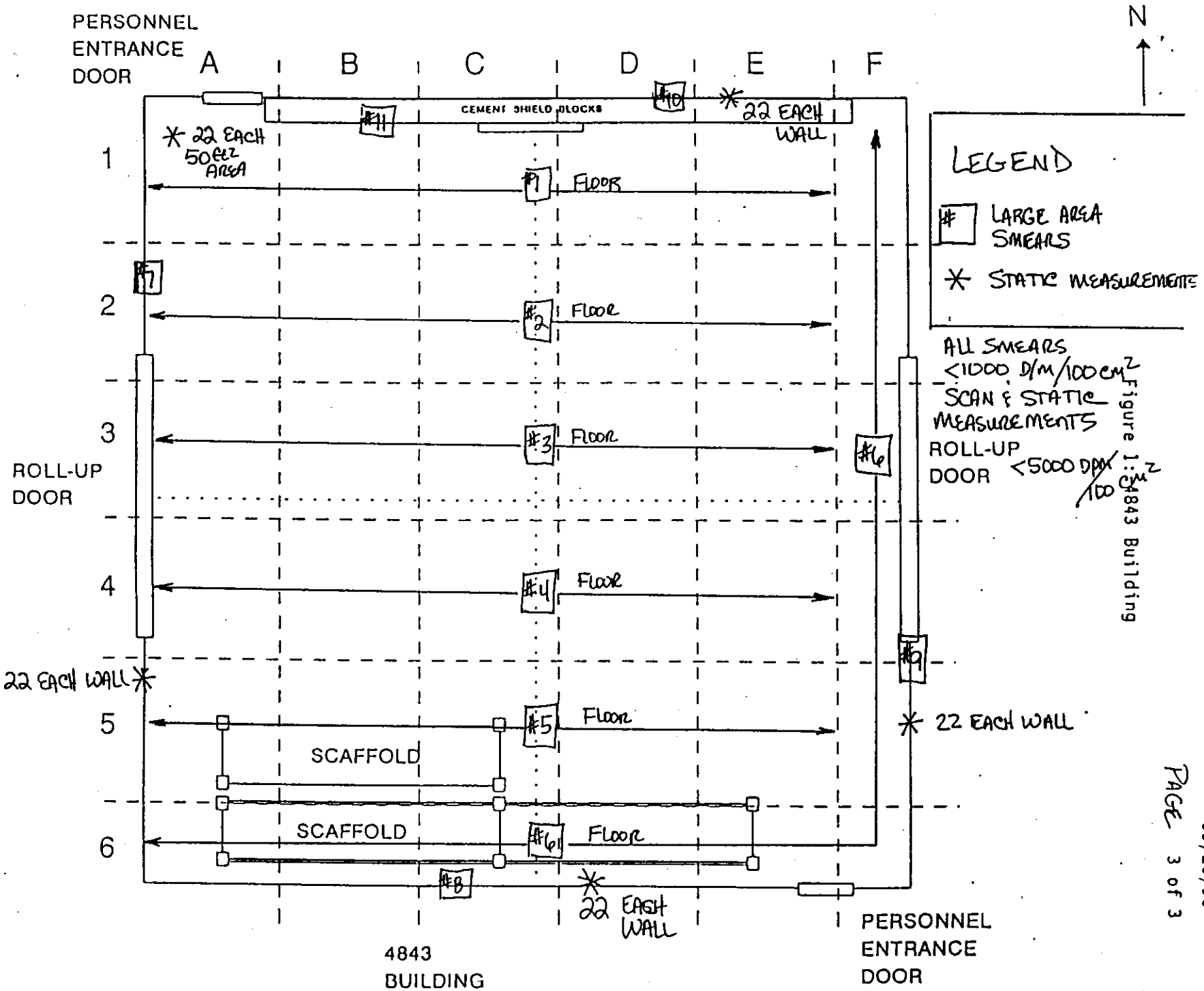


Figure 1: 4843 Building

Incoming 9503862

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

August 15, 1995

Ms. Ellen Mattlin
U.S. Department of Energy
Richland Operations Office
P.O. Box 550
Richland, WA 99352

Dear Ms. Mattlin:

Re: 4843 Alkali Metal Storage Facility Resource Conservation and Recovery Act Unit Radiological Survey

On August 11, 1995, I received the enclosed confirmation letter from the Washington State Department of Health's (DOH) Environmental Radiation Section. The letter documents DOH concurrence with the Westinghouse Hanford Company (WHC)-Radiological Survey Report #205838, and DOH's recommendation to terminate radiological controls.

If you have any questions, please contact me at (509) 736-3025.

Sincerely,

Greta P. Davis

Greta P. Davis, 4843 Unit Manager
Nuclear Waste Program

GD:mf

cc: Dan Duncan, EPA
Fred Ruck III, WHC
Zach Knaus, WHC
Phillip Miller, WHC
Administrative Record

ERS 95-804

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
DIVISION OF RADIATION PROTECTION
Airdustrial Center, Bldg. 5 • P.O. Box 47827 • Olympia, Washington 98504-7827

August 3, 1995

Ms. Greta Davis
State of Washington
Department of Ecology
1315 West 4th Ave.
Kennewick, WA 99336-6018

Dear Ms. Davis:

On May 15, 1995, a representative from the Department of Health's Environmental Radiation Section observed radiological surveys of the 4843 Alkali Metal Storage Facility. These surveys were initiated as part of the RCRA closure of the facility and conducted by 400 Area Westinghouse Health Physics staff.

Historically, this facility was posted as a "Radiation Area" and used as temporary storage for radioactively contaminated alkali metals resulting from FFTF operations. The "Radiation Area" designation for this facility would imply that removable radioactive contamination was not detected during routine facility surveys. This was independently confirmed by our representative. His measurements, which utilize similar instruments and methodologies, indicated that dose rates have returned to background levels and that, no fixed, or removable contamination was detected.

I concur with measurements documented in Westinghouse Hanford Company - Radiological Survey Report # 205838 and recommend termination of radiological controls.

If you have any questions, please contact me at (509) 377-3870.

Sincerely,

Allan Danielson
Radiation Health Physicist
Environmental Radiation Section
Division of Radiation Protection

RAD:KP
Enclosure: WHC - Radiological Survey Report #205838

cc: John Erickson, Department of Health

APPENDIX D

SPILL REPORTS

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APPENDIX D

SPILL REPORTS

This appendix contains the reports of two spills occurring within the 4843 Alkali Metal Storage Facility (4843 AMSF) and an eyewitness account of the spill clean ups. The associated Event Fact Sheets (EFS) are attached. Both spills were the result of leaks from waste containers and both spills were addressed and corrected promptly. An eyewitness account gives the following steps as being followed during clean up of the two spills. Upon discovery of the spills a team consisting of two workers was used to clean up the spills of alkali metal. The workers were instructed to completely remove any material and if possible to clean the area until no traces of the spill remained. The first step in the clean up of the two spills was to remove all spilled sodium carbonate by sweeping it up and disposing of it appropriately. Secondly, any residue that remained on the concrete was treated with Dowenal EB[1] and scrubbed with a wire bristle brush. Finally, the spill areas were scrubbed with extremely small amounts of water and a wire bristle brush. The eyewitness account stated that after completion of spill clean up, there were no marks left on the concrete and it could not be distinguished exactly where the spill had occurred.

The spill of February 5, 1990, involving Container No. 80 (the DOT-7A metal box) took place about 1.5 to 3 meters (5 to 10 feet) from the east roll-up door and about 1.5 to 3 meters (5 to 10 feet) north of the east-west building centerline. No stain was left on the floor once the spill had been cleaned. Information on the spill of April 11, 1988, is sketchy. The operations personnel state that the spill occurred in front of the cold traps. This was roughly the same general area as the February 5, 1990, spill, but either north 1.5 to 3 meters (5 to 10 feet) or west 1.5 to 3 meters (5 to 10 feet). Again, no stain was left on the floor after clean up of the spill.

Generally, both spills appear to have occurred in the northeast quadrant of the building, with the spills most likely being closer to the centerline of the building than to the wall.

The presence of oil spills on the floor of the 4843 AMSF is strongly disputed. During the Washington State Department of Ecology (Ecology) visit to the 4843 AMSF of July 9, 1993, no oil stains were observed. Oil stains would occur where the forklift was stored or parked for long periods. The forklifts used at Fast Flux Test Facility (FFTF) are not stored or parked at 4843 AMSF. The only observed marks on the floor were the faint black tire marks (similar to skid marks, but fainter) that are commonly left by rubber-tired forklifts operating on smooth concrete floors. The tire tracks are unrelated to closure of this or any other dangerous waste treatment, storage, or disposal facility.

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[1]Dowenal EB is a trademark of Dow Chemical Company.

STAR . WHC EVENT FACT SHEET

1. Title: Breached Radioactive Waste Sodium Container
2. Reporting Org: 300 Area Waste Services
3. Div/Dept/Proj: Solid Waste Management Defense Waste Management
4. No: SWM-90-004
5. Rev:
6. Event Date: 02/05/90 Event Time: 1430

7. Event Identification:

A) Location of Event: 4843 Building/400 Area

B) Plant/Facility Status: Normal Surveillance Routine.

1. Alarm: Facility Type (False, Fire, CAM, CAS, etc)
2. Regulatory Requirement (CERCLA, RCRA, WDOE, DOE-RL, DOE-HQ, etc)
3. Operating Requirements (OSR, CPS, Tech Spec, Procedure, Administrative, etc)
4. Release/Spread - Radioactive Contamination/Hazardous Material
5. Radiological - Personnel Contamination, Internal Deposition, Over Exposure, etc.
6. Industrial Safety, Personnel Injury, First Aid, etc.
7. Process Misrouting
8. Utility System - Electrical, Steam, Air, Water
9. Hoisting/Lifting
10. Other

C) Event Type: 4 - Contaminated Sodium Carbonate seed through weld seam of a DOT 7A container.

8. Apparent Cause(s) of Event:

[P]	Design	[ ]	Administrative Control
[ ]	Personnel Error	[ ]	Procedure
[S]	Material	[ ]	Other:

9. Description of Event: On February 5, 1990 at 1430 a small quantity of sodium carbonate was discovered along a welded seam and underneath a DOT 7A metal box containing radioactive waste sodium. A Plant Engineer, Nuclear Process Operator, and Health Physics Technician from the 340 Facility, cleaned up the material and covered the potential leak area. The material from the container reads 600 counts per minute.

10. Consequences of Event: The DOT 7A Metal container will need to be reevaluated with respect to the containers ability to provide containment. The release of radioactive contaminated material outside a surface contamination area.

11. Actions Taken (A) or Planned (B):

Actions Taken:

A-1. The area was cleaned up and the potentially breached areas were taped. Completed 2/5/90

A-2. Temporary radioactive surface contamination area was established. Completed 2/5/90

A-3. DOE-RL program monitor notified. Completed 2/5/90

A-4. Notified Solid Waste Management. Completed 2/5/90

A-5. Notified Environmental Protection. Completed 2/5/90

A-6. Notified Nuclear Safety. Completed 2/6/90

A-7. Implement daily inspection of the container by 300 Area Waste Services until the container is temporary repackaged and transfer by Advanced Reactor Division to a suitable location for further disposition. Completed 2/6/90

A-8. Decontaminate and release temporary zone. Completed 2/6/90

Action Planned:

B-1. Provide additional radiological containment for the 7A box. Chemical and Waste Applications by 2/9/90.

B-2. Develop and plan action for recovery. Chemical and Waste Applications by 2/28/90.

12. Tentative Disposition:

[ ] Event meets criteria for a UOR
[ ] Event meets criteria for a Critique
[ ] Undetermined: Revised EFS will be issued in 3 working days
[X] Above criteria not met: no further report

13. Signatures:

C. B. Dean — 02-06-90
Originator: C. B. Dean, Plant Engineer, 300 Area Waste Services — Date:

Michael E. Thurman — 2-6-90
Approved By: M. E. Thurman, Manager, 300 Area Waste Services — Date:

[signature] — 2/6/90
AOC/UCNI Review Official — Review Date:

491

FACT SHEET START

FACT SHEET NUMBER Revised TFS&O-EFS-88-036 Rev 1

PROGRAM/PROJECT: 300 Area Waste Systems Operations

DATE OF EVENT: April 11, 1988 TIME: 8:45PM

I. EVENT DESCRIPTION

A) NATURE OF PROBLEM: A solid substance, later determined to be sodium hydroxide, was noticed on the flanges and sides of two sodium metal containment vessels. A small amount of sodium hydroxide was also on the concrete floor below the vessels.

B) LOCATION OF EVENT OR OCCURENCE:

4843 Alkali Metal Storage Facility, 400 area.

C) PLANT FACILITY STATUS:

Normal Operation

D) TRENDS NOTED PRIOR TO THE EVENT:

None

2. APPARENT CAUSE(S) OF EVENT: ___ DESIGN ___ MATERIAL ___ PROCEDURE
X ADMINISTRATIVE CONTROL ___ OTHER
___ PERSONNEL

3. DESCRIPTION OF EVENT: During a routine monthly radiological inspection, a solid discharge was discovered on the flange of two vessels containing potentially radioactive sodium metal. The flanges were improperly sealed allowing moisture from the air to react with sodium in the container forming solid sodium hydroxide. Sodium hydroxide requires more volume than sodium. The increased substance volume and warmer weather may have caused the sodium hydroxide to expand out the flange opening onto the vessel and concrete floor.

4. ACTIONS TAKEN OR PLANNED:

1. Operations Management and the U. S. Department of Energy - Richland Operations Office (DOE-RL) were notified. Completed 4-11-88.
2. Emergency number (811) called and building safety status determined. Completed 4-11-88
3. Sodium hydroxide removed and vessels determined to be stable. Completed 4-11-88
4. Vessel flanges to be tapped and sealed. ECD 4-14-88

(See page 2 for continuation) UNCLASSIFIED

REVIEWED FOR CLASSIFICATION
R. A. Zinsli

NOTE: NUMBER THE ACTION ITEMS FOR TRACKING PURPOSE.

5. TENTATIVE DISPOSITION

___ EVENT MEETS CRITERIA FOR A UCR

___ CRITIQUE REQUIRED DUE TO FURTHER INVESTIGATION NEEDED TO ESTABLISH APPROPRIATE CORRECTIVE ACTION.

___ ABOVE CRITERIA NOT MET: NO FURTHER REPORT.

6. SIGNATURE
M. J. Skidmore — ORIGINATOR — DATE 4-15-88

H. L. Winters — APPROVED — DATE 4/15/88

4. Actions Taken or Planned:

5. Process Engineering investigation of vessels origin, shipping documentation, and storage and handling procedures. ECD 5/27/88

6. Westinghouse Hanford Company Defense Waste Safety notified. Completed 4-11-88

4. Revision of Actions Taken or Planned

Revised 4.4 Installed neoprene plug with a threaded stainless steel tube in each vessel flanges, after purging the vessels with argon, the tubing was capped off. Completed 4-12-88

7. Process Engineering investigating options for long term storage disposition. ECD 5-27-88.

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APPENDIX E

PHOTOGRAPHS

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APPENDIX E

PHOTOGRAPHS

Attached are six photographs of the 4843 Alkali Metal Storage Facility (4843 AMSF).

Figures E-1 and E-2 show the outside of the building and some surrounding gravel and roadway.

Figures E-3 and E-4 show the interior of the building and the present configuration.

Figures E-5 and E-6 show the past configuration of interior of the building. These photographs were taken in May 1987.

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Figure E-1. The East End of the 4843 AMSF.
Photograph taken December 1990.

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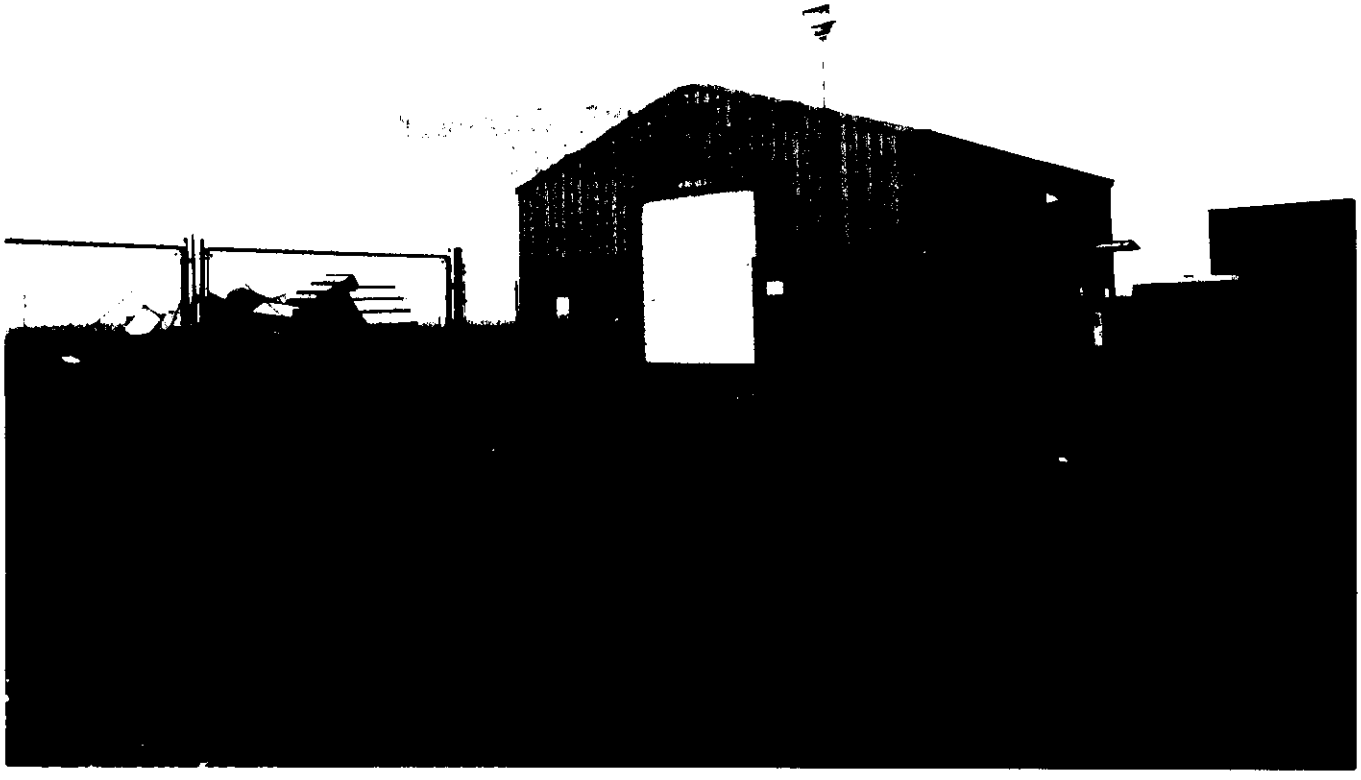

Figure E-2. The West End of the 4843 AMSF. The chain-link fence surrounds the 400 Area Laydown Area. Photograph taken December 1990.

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Figure E-3. Interior of the 4843 AMSF. Present configuration showing containers of dangerous waste. Photograph taken December 1990.

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Figure E-4. Interior of the 4843 AMSF. Present configuration showing containers of mixed alkali metal waste. Photograph taken December 1990.

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Figure E-5. Interior of the 4843 AMSF. Past configuration showing stacked nonwaste lithium metal containers and single container of mixed alkali metal waste. Photograph taken May 1987.

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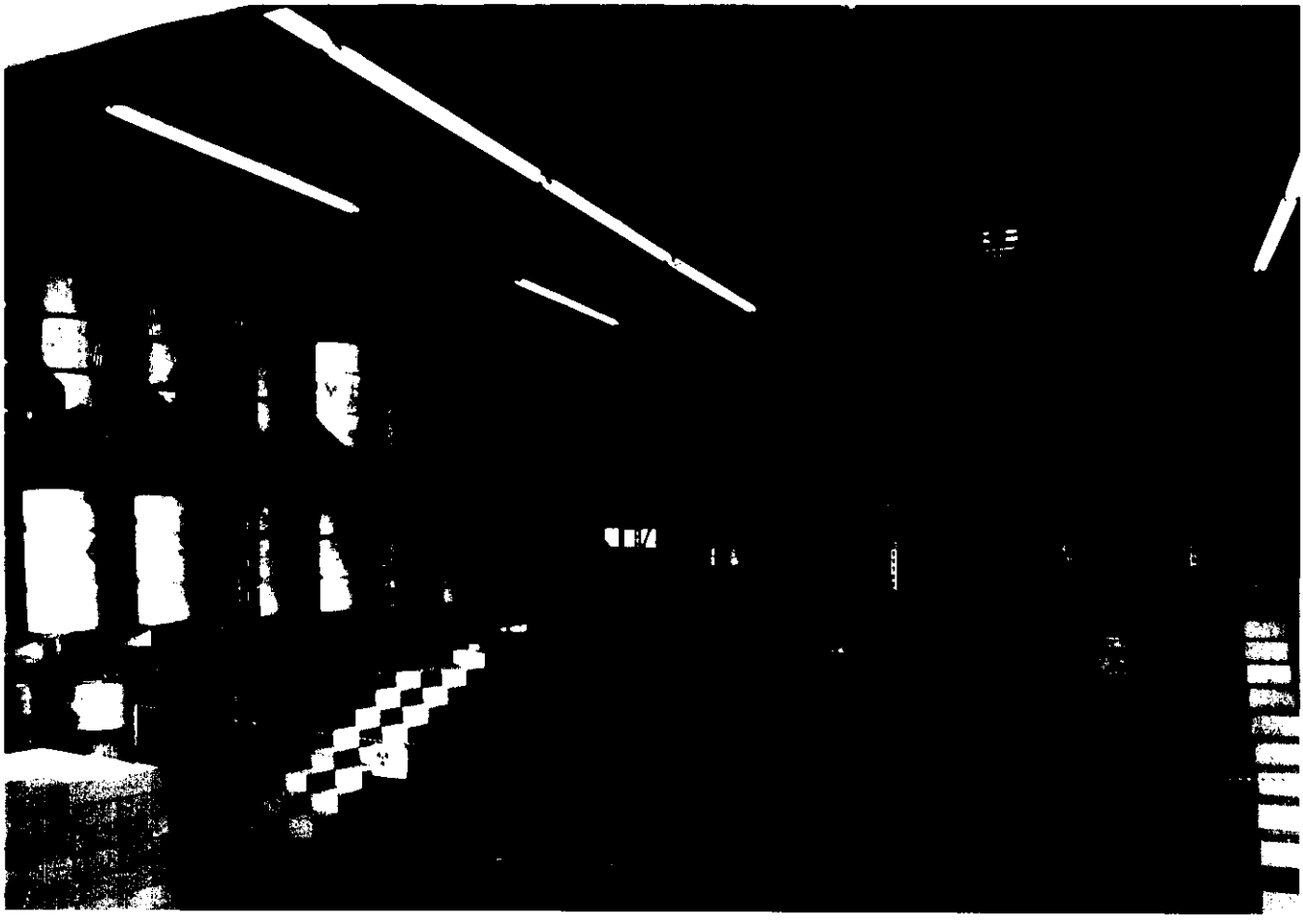

Figure E-6. Interior of the 4843 AMSF. Past configuration showing stacked nonwaste lithium metal containers and single container of mixed alkali metal waste. Photograph taken May 1987.

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APPENDIX F

PERSONNEL TRAINING

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1	C.1	**COMPANY-GENERAL RULES**
2	Number/Title:	000001/Hanford General Employee Training (HGET)
3	Description:	Course covers DOE Orders and applicable policies pertaining to employer and employee rights and responsibilities, general radiation training, hazard communications, dangerous waste, fire prevention, personal protective equipment, safety requirements, ceratin unit/building orientation refresher training, emergency preparedness, accident reporting, and avenues for addressing safety concerns. The RCRA training program identifies this course as a program element as an annual refresher to the Hanford Facility RCRA permit condition concerning training
4	Target Audience:	All Hanford Facility personnel
5	Technique:	Computer-based training with interactive video
6	Evaluation:	Computer generated questions
7	Length:	Average = 2-4 hours
8	Frequency:	Annual.
9	Number/Title:	02006A/Hanford Site Orientation
10	Description:	Course covers DOE Orders and applicable policies pertaining to employer and employee rights and responsibilities, general radiation training, hazardous waste, fire prevention, personal protective equipment, safety requirements, accident reporting, and avenues for addressing safety concerns. The RCRA training program identifies this course as a program element due to the Hanford Facility RCRA permit condition concerning training
11	Target Audience:	All Hanford Facility personnel
12	Technique:	Computer-based training with interactive video
13	Evaluation:	Computer generated questions
14	Length:	3 hours
15	Frequency:	Initial only (Retrained by 000001 HGET).

1	Number/Title:	02006G/Hazardous Communication and Waste Management Awareness
2	Description:	Course introduces workers to federal laws governing chemical safety in the work place. The course provides the hazardous material/waste worker with the basic fundamentals for safe use of hazardous material and accumulation of hazardous waste in containers. The concepts covered in this course instruct personnel on specific waste generation procedures and requirements which includes: (1) Pertinent waste management issues (e.g., waste categories, initial accumulation container management requirements, and waste segregation practices), (2) proper responses to incidents pertaining to the waste in the initial accumulation container, (3) proper responses to dealing with waste of unknown origins, and (4) proper responses to questions posed in the field concerning the above elements
3	Target Audience:	Hanford Facility personnel categorized as a General Worker, Advanced Worker, General Manager, and General Shipper
4	Technique:	Classroom
5	Evaluation:	Written test - 80% passing grade
6	Length:	4 hours
7	Frequency:	One-time-only.
8	Number/Title:	031220/40 Hour Hazardous Waste Operations Training
9	Description:	Provides the dangerous waste worker with the fundamentals of safety when working with dangerous waste
10		Note: This course fulfills training requirements of 29 CFR 1910.120 requiring dangerous waste training of workers at all treatment, storage and/or disposal (TSD) facilities regulated under *Resource Conservation and Recovery Act of 1976* (RCRA)
11	Target Audience:	Dangerous material and waste workers
12	Technique:	Classroom and on-the-job training
13	Evaluation:	Written test
14	Length:	40 hours
15	Frequency:	Initial.

1	Number/Title:	032020/8 Hour Hazardous Waste Refresher Training
2	Description:	Provides the dangerous waste worker with a refresher in the fundamentals of safety when working with dangerous waste. Note: This course fulfills training requirements of 29 CFR 1919.120 requiring dangerous waste training of workers at all TSD facilities regulated under RCRA
3	Target Audience:	Dangerous material and waste workers
4	Technique:	Classroom
5	Evaluation:	Written test
6	Length:	8 hours
7	Frequency:	Annually.
8	Number/Title:	03E023/ Unit Building-specific contingency plan/hazard communication/emergency preparedness training 4843 AMSF Facility
9	Description:	Course consists of a review of specific chemical hazards associated with each RCRA waste management unit and job assignment, as covered by a RCRA contingency plan. The training is completed by the supervisor, manager, or a designated individual using a checklist available on the Hanford Local Area Network under Jet Forms. The unit/building-specific information is reviewed concerning hazards in the work area and emergency response requirements, including where applicable, waste feed cut-off, communication and alarm systems, and response to fires. The training is completed by immediate manager, or designated individual using a checklist. The checklist acts as a guide to ensure consistent coverage of necessary topics.
10	Target Audience:	Dangerous material and waste workers
11	Technique:	One-to-one or as a group with a manager or designated individual
12	Evaluation:	Training checklist documentation
13	Length:	1 hour
14	Frequency:	Annual.
15		

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APPENDIX G

QUALITY ASSURANCE PROJECT PLAN FOR SAMPLING AND ANALYSIS FOR THE 4843 ALKALI METAL STORAGE FACILITY

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CONTENTS

QUALITY ASSURANCE PROJECT PLAN FOR SAMPLING AND ANALYSIS FOR THE 4843 ALKALI METAL STORAGE FACILITY

This quality assurance project plan (QAPjP) has been prepared for regulatory review as part of the *4843 Alkali Metal Storage Facility Closure Plan* (DOE 1995) and in support of the sampling and analysis activities described in Section 7.0 of that closure plan. The QAPjP provides the generic quality assurance and quality control (QA/QC) information for the closure activities defined by the closure plan.

1.0 PROJECT DESCRIPTION

The 4843 Alkali Metal Storage Facility (4843 AMSF) is a storage unit for dangerous waste regulated under the Washington Administrative Code (WAC) 173-303 *Dangerous Waste Regulations*. The unit is no longer required and will be closed per WAC 173-303.

1.1 PROJECT OBJECTIVES

The sampling and analysis activities at this unit will support the closure activities defined in the unit closure plan. The ultimate goal is the clean closure of the unit.

1.2 APPLICABILITY AND RELATIONSHIP TO THE ONSITE CONTRACTOR'S QUALITY ASSURANCE PROGRAM

This QAPjP applies specifically to field activities and laboratory analyses performed in support of closure of the unit. This QAPjP has been prepared in compliance with the *Environmental Engineering, Geotechnology, and Permitting Function Quality Assurance Program Plan* (WHC 1990a) and the *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans* (EPA 1980). This QAPjP describes the means selected to implement QA program requirements, defined in the *Quality Assurance Manual* (WHC 1988b), as the requirements apply to environmental investigations. The QAPjP will accommodate the specific requirements for project plan format and content agreed upon in the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al., 1994).

This QAPjP contains a matrix of procedural resources from *Environmental Engineering, Geotechnology, and Permitting Function Quality Assurance Program Plan* (WHC 1990a) and *Environmental Investigations and Site Characterization Manual* (WHC 1988a). Distribution and revision control of this plan will be carried out in compliance with Quality Requirement (QR) 6.0, "Document Control" of the *Quality Assurance Manual* (WHC 1988b). All plans and procedures referenced in this QAPjP are available for regulatory review.

2.0 DATA QUALITY OBJECTIVES FOR ANALYTICAL LABORATORY MEASUREMENTS

Data quality objectives for a given data collection activity describe the overall level of uncertainty that decision makers are prepared to accept in the analytical results deriving from the activity. Data QRs generally are defined in terms of specific objectives for precision, accuracy, representativeness, comparability, and completeness.

Precision typically is calculated either as a range (R), for duplicate measurements, or a standard deviation(s). Precision also can be expressed as a relative range (RR), for duplicates, or a relative standard deviation (RSD). When the precision for a method is not constant over the concentration range of interest, the reported range or standard deviation will describe the concentration dependence. The dependence alternatively could be described in terms of a slope and intercept for a linear relationship, an indicated function for a nonlinear relationship, or a tabulated set of precision values for specific indicated concentrations.

Accuracy usually is expressed as percent recovery (P) or as percent bias (P-100). When accuracy is observed to be significantly concentration dependent, it could be reported in terms of a linear relationship, an alternative functional relationship, or as a table of measured values.

The method detection limit (MDL) is the minimum concentration of a chemical constituent that can be measured reliably (i.e., it can be reported with 99 percent confidence that the analyte concentration is greater than zero). The method detection limit is determined from a minimum of seven analyses of samples of a given matrix type (e.g., water, soil, etc.) spiked with the analyte of interest at a concentration three to five times the estimated method detection limits. The method detection limit is the standard deviation of the replicate measurements (reported in concentration units) multiplied by the appropriate Student's t value for the number of replicates taken for a one-tailed test at the 99 percent level of confidence. The practical quantitation limit is defined in *Test Methods for Evaluating Solid Waste* SW-846 (EPA 1990) as the lowest concentration level that can be determined reliably within specified limits of precision and accuracy during routine laboratory operating conditions. Practical quantitation limit values are tabulated in SW-846 for various U.S. Environmental Protection Agency (EPA)-approved analytical methods for evaluating solid waste. The practical quantitation limit values are matrix dependent and method-dependent. Typically, practical quantitation limits are listed as multiples of the method detection limits for specified methods and matrix types.

The performance of the analytical laboratory will be subject to method- and analyte-specific quantitation limits and minimum requirements for precision, accuracy, and completeness as follows:

- Precision: The agreement among a set of replicate measurements without assumption of knowledge of the true value. Precision is estimated by means of duplicate/replicate analyses. These samples

should contain analyte concentrations above the MDL and may involve the use of matrix spikes. The most commonly used estimates of precision are the RSD or the coefficient of variation (CV),

$$RSD = 100CV = 100\ s/\bar{x},$$

where:

$\bar{x}$ = the arithmetic mean of the x_i measurements
s = standard deviation.

The relative percent difference (RPD) (EPA 1990) when only two samples are available is:

$$RPD = 100\ [(x_1 - x_2)/\{(x_1 + x_2)/2\}].$$

- Accuracy: The closeness of agreement between an observed value and an accepted reference value. When applied to a set of observed values, accuracy will be a combination of a random component and a common systematic error (or bias) component (EPA 1990).

- Completeness: Requirements for precision and accuracy will be met for at least 95 percent of the total number of determinations on routine and quality control samples.

More stringent requirements for precision and accuracy could be specified in procedures for individual laboratory methods. In that event, the more stringent requirements will apply as data quality objectives for this project.

Approved analytical procedures will adhere to reporting techniques and units that are consistent with EPA reference methods. This will facilitate the comparability of data sets in terms of precision and accuracy. Actual achieved and/or used detection limits, and values for precision, accuracy, and completeness will be provided in all summary analyses reports.

Goals for data representativeness for sampling are addressed qualitatively by the specification of sample locations and depth intervals (when applicable) in the unit closure plan and unit sampling and analysis plan. Sample data should be comparable with other measurement data for similar samples and sample conditions. Comparability will be achieved qualitatively by using standard techniques to collect and analyze representative samples and by reporting analytical results in appropriate units.

Failure to conform to these criteria will be documented in data summary reports (Section 7.1). Corrective actions will be initiated by the Technical Lead as appropriate (Section 12.0) in the event that the criteria initially are not achieved.

3.0 PROCEDURES

Section 3.0 discusses standardized sampling procedures that will be used and the approvals and control of these procedures.

3.1 PROCEDURE APPROVALS AND CONTROLS

The following sections describe the procedures referenced to support sampling and analysis activities.

3.1.1 Hanford Site Procedures

The Hanford Site procedures that have been referenced to support the unit sampling and analysis activities are listed in the QA program index (QAPI) in the *Environmental Engineering, Geotechnology, and Permitting Function Quality Assurance Program Plan* (WHC 1990a). Referenced procedures include Environmental Investigation Instructions (EII) (WHC 1988a) and QRs (WHC 1988b). Requirements relating to approval, revision, and distribution control of EIIs are addressed in EII 1.2, "Preparing and Revising of Procedures;" requirements applicable to Quality Instructions (QIs) and QRs are addressed in QR 5.0, "Instructions, Procedures, and Drawings," and QR 6.0, "Document Control." Other controlling documents that apply to preparation, review, and revision of Hanford Site analytical laboratory procedures and sample management procedures are identified under Criteria 5.00 and 6.00 in the *Environmental Engineering, Geotechnology, and Permitting Function Quality Assurance Program Plan* (WHC 1990a). All of the aforementioned procedures will be available on request for regulatory review.

3.1.2 Participating Contractor and/or Subcontractor Procedures

Participating contractor and/or subcontractor services may be procured for sampling or technical assistance. All such procurement will be subject to the applicable requirements of QR 4.0, "Procurement Document Control;" QI 4.1, "Procurement Document Control;" QI 4.2, "External Services Control;" QR 7.0, "Control of Purchased Items and Services;" QI 7.1, "Preprocurement Planning and Proposal Evaluation;" and/or QI 7.2, "Supplier Evaluation" (WHC 1988b). Whenever such services require procedural controls, conformance to onsite procedures, or submittal of contractor procedures for onsite review and approval before implementation, the requirement(s) will be identified in the procurement document or work order. Contracting or subcontracting analytical laboratories will be required to submit their analytical procedures as well as the current version of their internal QA program plans for review and approval. The subject plans and procedures will be reviewed and approved by the Management and Operations (M&O) Contractor's QA, sample management, and analytical laboratories organization personnel, and/or other qualified personnel as determined by the Technical Lead. If required, all reviewers will be qualified per the requirements of EII 1.7, "Qualification and Training" (WHC 1988a). All approved participating contractor or subcontractor procedures, plans, and/or manuals will be retained as project quality records

in compliance with the *Document Control and Record Management Manual*, Section 9.0 (WHC 1989); QR 17.0, "Quality Assurance Records;" and QI 17.1, "Quality Assurance Records Control" (WHC 1988b). All such documents will be available upon request for regulatory review.

3.2 SAMPLING PROCEDURES

As a minimum, sampling procedures will follow the guidelines and requirements of SW-846 (EPA 1990). Soil samples will be collected in compliance with EII 5.2, "Soil and Sediment Sampling" (WHC 1988a).

Where no standardized procedures for sampling or analysis exist (e.g., the sampling and analysis of asphalt or concrete), the best practice will be followed in collection and analysis of these samples. Specific sampling and analytical methodologies will be determined in concert with the appropriate regulatory agencies and documented in the unit closure plan, unit sampling and analysis plan, or other appropriate document.

Sample numbers will be assigned as indicated in EII 5.10, "Obtaining Sample Identification Numbers and Accessing HEIS Data" (WHC 1988a). Sampling activities will conform with the sample identification, container type, preparation, and preservation requirements of EII 5.11, "Sample Packaging and Shipping" (WHC 1988a).

3.3 PROCEDURE ADDITIONS AND CHANGES

Additional EIIs or modifications to existing EIIs that might be required as a consequence of sampling plan requirements will be developed in compliance with EII 1.2, "Preparing and Revising Procedures" (WHC 1988a). Should deviations from established EIIs be required to accommodate unforeseen situations, the Field Team Leader can authorize such deviations consistent with provisions and requirements in EII 1.4, "Instruction Change Authorizations" (WHC 1988a). As required by EII 1.4, deviations will be documented, reviewed, and dispositioned by means of instruction change authorization forms. Other types of document change requests will be completed as required by the procedures governing their preparation and revision.

4.0 SAMPLE CUSTODY

All samples obtained during the course of this investigation will be controlled from the point of origin to the analytical laboratory as stipulated in EII 5.1, "Chain of Custody" (WHC 1988a). Chain-of-custody documentation also will be maintained for the return of residual sample materials from the laboratory. Requirements and procedures will be defined in procurement documentation to subcontractor or participant contractor laboratories for the return of residual sample materials after completion of analysis. Laboratory chain-of-custody procedures will ensure that sample integrity and identification are maintained throughout the analytical process and will be

reviewed and approved in advance as required by onsite procurement control procedures (see Section 3.1.2).

Analytical results will be traceable to the original samples through a unique code or identifier (see Section 3.0). All analytical results will be controlled as permanent project quality records as required by QR 17.0 "Quality Assurance Records" (WHC 1988b), and EII 1.6 "Records Processing" (WHC 1988a).

Sample and/or data flow will be coordinated by the sample management organization. The sample management organization will be responsible for tracking, controlling, and verification of in-process samples and data per the *Sample Management And Administrative Manual*, WHC-CM-5-3, Section 1.0, "Sample Tracking;" Section 1.3, "Data Package Control;" and Section 1.1, "Data Package Verification" (WHC 1990b).

All samples will be screened in the field for beta/gamma and gross alpha radioactivity in compliance with approved Hanford Site health physics procedures (WHC 1990c). Health physics technicians (HPTs) must release samples before the samples can be transported to offsite laboratories for analysis of dangerous constituents.

5.0 CALIBRATION PROCEDURES

Calibration of the contracting laboratory analytical equipment will be performed per applicable standard methods. The standard methods will be subject to review and approval.

6.0 ANALYTICAL PROCEDURES

Specific analytical methods or procedures will be reviewed and approved before use in compliance with the procedures and procurement control requirements noted in Section 4.1.

7.0 DATA REDUCTION, VALIDATION, AND REPORTING

Data reduction, validation of completed laboratory data packages, reporting requirements are discussed in the following sections. This includes the review and records management for the data packages.

7.1 DATA REDUCTION AND DATA PACKAGE PREPARATION

When each group of analyses is completed, the analytical laboratory will prepare a report summarizing the analytical results. The analytical laboratory also will prepare a detailed data package. The data package will include all information necessary to perform data validation to the extent indicated by the minimum applicable requirements (Section 7.2). Data summary report format and data package content will be defined in procurement documentation subject to review and approval (see Section 3.1). As a minimum, laboratory data packages will include the following:

- Sample receipt and tracking documentation. This will include identification of the organization and individuals performing the analysis, the names and signatures of the responsible analysts, sample holding time requirements, references to applicable chain-of-custody procedures, and the dates of sample receipt, extraction, and analysis.

- Instrument calibration documentation. This will include equipment type and model, with continuing calibration data for the time period in which the analyses were performed.

- Quality control data. This will include quality control data appropriate for the methods used. This can including matrix-spike/matrix-spike duplicate data, recovery percentages, precision data, laboratory blank data, and identification of any nonconformances that might have affected the laboratory's measurement system during the time in which the analyses were performed.

- Analytical results or data deliverables. This will include reduced data, reduction formulas or algorithms, and identification of data outliers and/or deficiencies.

Other supporting information (e.g., initial calibration data, reconstructed ion chromatographs, spectrograms, traffic reports, and raw data) are included in the individual data packages. All sample data, will be retained by the analytical laboratory and made available for systems or program audit purposes at the request of the M&O contractor, U.S. Department of Energy (DOE), or regulatory agency representatives (Section 9.0). Such data will be retained by the analytical laboratory through the duration of the contractual statement of work, at which time the data will be transmitted for archiving.

A completed data package will be reviewed and approved by the analytical laboratory QA manager before the package is submitted to the sample management organization for validation.

The requirements of Section 7.1 will be included in procurement documents and/or work orders, as appropriate, in compliance with the procurement control procedures (Section 3.1).

7.2 VALIDATION

Completed laboratory data packages will be validated by the M&O Contractor's sample management organization. Data validation and reporting will be performed in conformance with requirements and procedures identified in *Sample Management and Administrative* (WHC 1990b) and the *Data Validation Procedures for Chemical Analyses* (WHC 1993).

Data validators will perform a number of tasks on each sample delivery group in response to general and specific requirements identified in the data validation procedures (WHC 1993). A sample delivery group is defined as a group of samples (usually 20 or fewer) reported within a single laboratory data package. These tasks are summarized as follows:

- Take delivery of the data package, stamp the receipt date on the package, and make duplicate copies of the sample concentration reports or report forms
- Organize and review the data package for completeness as described in the data validation procedures (WHC 1993) and document the completeness review on the applicable data validation checklist
- Validate the data package and qualify sample results according to the procedures and criteria described in the data validation procedures (WHC 1993). Data that are rejected at any point during validation will be eliminated from further review or consideration.
- Check for calculation and transcription errors, applying the frequency guidelines (Section 7.2.1)
- Resolve any discrepancies identified during the review of the data package, including any missing data, with the laboratory
- Prepare a narrative summary of the acceptability of the data, and prepare a summary of the validated results in tabular and electronic formats after the data have been validated
- Submit the data validation report. The report will include the narrative summary, an electronic media copy of the data, checklists, summary forms, and the qualified laboratory concentration reports to the Technical Lead within 21 days after receipt of the data package from the laboratory.

7.2.1 Frequencies for Checking Calculation and Transcription Errors

For this sampling and analysis project, the following frequencies will be used to check for calculation and transcription errors:

- Investigative samples and verification samples. All reported laboratory results for at least 20 percent of the samples contained in the sample delivery group and 100 percent of the reported quality control samples (duplicates, matrix spikes, field blanks, and any

performance audit samples) will be recalculated and verified against the instrument printouts and bench sheet records (raw data). If possible, at least 50 percent of the samples selected for recalculation should contain positive results for the compounds analyzed.

- Confirmatory samples. All reported laboratory results for 100 percent of the samples contained in the sample delivery group and 100 percent of the reported quality control samples (duplicates, matrix spikes, field blanks, and any performance audit samples) will be calculated and verified against the raw data.

Reporting requirements for validation of data produced by routine and special analytical methods other than EPA reference methods (EPA 1990) will be established within applicable procedures for the individual methods, subject to review and approval (see Section 3.1). The reporting requirements will be in general compliance with the guidelines provided previously in Section 7.2.

7.3 FINAL REVIEW AND RECORDS MANAGEMENT CONSIDERATIONS

All validation reports and supporting analytical data packages will be subjected to a final technical review by a qualified reviewer at the direction of the Technical Lead before submittal to regulatory agencies or inclusion in reports or technical memoranda. All validation reports, data packages, and review comments will be retained as permanent project quality records in compliance with *Document Control and Records Management Manual*, Section 9.0 (WHC 1989), and QR 17.0, "Quality Assurance Records" (WHC 1988b).

8.0 INTERNAL QUALITY CONTROL

All analytical samples will be subject to in-process quality control measures both in the field and in the laboratory. The following types of control samples are specified in the unit sampling and analysis plan to maintain internal quality control.

- Duplicate Samples. Field duplicate samples are samples retrieved from a single sampling location using the same equipment and sampling technique but analyzed independently. Duplicate samples generally are used to assess sampling precision.

- Trip Blanks. A trip blank consists of a sample container of an appropriate media (e.g., pure silica sand or deionized water) that is prepared in the laboratory, transported to the sampling site, and returned unopened for analysis with the actual samples. Analysis of the trip blank will eliminate false positive results for the actual samples arising from contamination during shipment.

- Equipment Blanks. An equipment blank consists of an appropriate media (e.g., pure silica sand or deionized water) that is drawn through decontaminated sampling equipment and placed in a container identical to those used for the actual field samples. Equipment blanks are used to verify the adequacy of the decontamination procedures for sampling equipment.

Additional quality control checks will be performed by the analytical laboratories as follows:

- Duplicates or Matrix-Spiked Duplicates. Estimate analytical precision.

- Matrix-Spiked Samples. A known quantity of a representative analyte of interest is added to an aliquot (or a replicate) of an actual sample and analyzed to measure the recovery percentage. Spike compound selection, quantities, and concentrations will be described in the laboratory's analytical procedures.

- Laboratory Quality Control Samples. A quality control sample is prepared from an independent standard at a concentration within the calibration range. Reference samples provide an independent check on analytical instrument calibration.

The numbers and/or frequencies of quality control samples to be submitted and analyzed with each group of samples are specified in the analytical contract. The numbers of quality control samples proposed in the sampling plan have been determined based on guidance presented in SW-846 (EPA 1990) and the discussion during the meetings between the M&O Contractor, DOE, and regulatory agencies during the Data Quality Objectives process.

Detailed descriptions of internal quality control requirements for participating contractor or subcontractor laboratories will be provided in procurement documents or work orders in compliance with standard procedures (see Section 3.1).

9.0 PERFORMANCE AND SYSTEM AUDITS

Performance, system, and program audits will begin early in the execution of this sampling plan and continue through completion of activities. Collectively, the audits will address quality-affecting activities that include, but are not limited to, measurement accuracy; intramural and extramural analytical laboratory services; field activities; and data collection, processing, validation, and management.

Regarding offsite contractor laboratory analyses of confirmatory samples, performance audits of analytical accuracy will be implemented through the use of QA/QC control samples.

System audit requirements will be implemented in accordance with QI 10.4, "Surveillance" (WHC 1988b). Surveillances will be performed regularly throughout the course of sampling activities. Additional performance and system 'surveillances' might be scheduled as a consequence of corrective action requirements or might be performed on request. All quality-affecting activities will be subject to surveillance.

Sampling plan activities could be evaluated as part of environmental restoration program-wide QA audits under procedural requirements. Program audits will be conducted in accordance with QR 18.0, "Audits," and QI 18.1, "Audit Programming and Scheduling," (WHC 1988b).

10.0 PREVENTIVE MAINTENANCE

All measurement and testing equipment used in the field and the laboratory that directly affect the quality of analytical data will be subject to preventive maintenance measures that ensure minimization of measurement system downtime. Preventive maintenance instructions for field equipment will be as stipulated in approved operating procedures for the equipment. Laboratories will be responsible for performing or managing the maintenance of assigned analytical equipment. Maintenance requirements, spare parts lists, and preventive maintenance instructions will be included in individual laboratory procedures or in laboratory QA plans, subject to review and approval. When samples are to be analyzed by a contractor or subcontractor laboratory, preventive maintenance requirements for laboratory analytical equipment will be as defined in the contractor laboratory's QA plan(s).

11.0 DATA ASSESSMENT

Analytical data will be compiled and summarized by the laboratory and forwarded to the sample management organization for validation (see Section 7.2) before the data can be used in any assessment activities. Assessments could include various statistical and probabilistic techniques to compare and/or analyze data. The statistical methodologies and assumptions that are to be used to evaluate data will be identified in written instructions that are to be signed, dated, and retained as project quality records in compliance with EII 1.6, "Records Processing" (WHC 1988a), and QR 17.0, "Quality Assurance Records" (WHC 1988b). These instructions will be documented in the final report for each sampling and analysis project.

12.0 CORRECTIVE ACTION

Corrective actions required as a result of surveillance reports, nonconformance reports, or audit activities will be documented and dispositioned as required by QR 16.0, "Corrective Action"; QI 16.1, "Trend Analysis"; and QI 16.2, "Corrective Action Requests" (WHC 1988b). Primary responsibilities for corrective action resolution will be assigned to the Technical Lead and the QA coordinator. Other needs for corrections to measurement systems, procedures, or plans that are identified as a result of routine review processes will be resolved as stipulated in applicable procedures or referred to the Technical Lead for resolution. Copies of all surveillance, nonconformance, audit, and corrective action documentation will be retained as project QA records.

13.0 QUALITY ASSURANCE REPORTS

Project activities will be assessed regularly by audit and surveillance processes (see Sections 9.0 and 12.0). At the conclusion of a given sampling and analysis project, all related field and laboratory data, raw data, reports, surveillance reports, nonconformance reports, audit reports, and corrective action documentation will be transferred for archival to the Hanford Site Records Holding Area (if documentation has not been transmitted previously). In the event that original quality-affecting documents are to be retained and/or controlled by others, legible copies will be transmitted to the Records Holding Area for inclusion in the project record file.

14.0 REFERENCES

14.1 DOCUMENTS

Ecology, EPA, and DOE, 1994, *Hanford Federal Facility Agreement and Consent Order*, 2 vols, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

EPA, 1980, *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*, EPA-QAMS-005/80, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1990, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW-846, Supplement 1990, U.S. Environmental Protection Agency, Washington, D.C.

DOE-RL, 1995, *4843 Alkali Metal Storage Facility Closure Plan*, DOE/RL-90-49, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

WHC, 1988a, *Environmental Investigation and Site Characterization Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.

WHC, 1988b, *Quality Assurance Manual*, WHC-CM-4-2, Westinghouse Hanford Company, Richland, Washington.

WHC, 1989, *Document Control and Records Management Manual*, WHC-CM-3-5, Westinghouse Hanford Company, Richland, Washington.

WHC, 1990a, *Environmental Engineering, Geotechnology, and Permitting Function Quality Assurance Program Plan*, WHC-EP-0330, Westinghouse Hanford Company, Richland, Washington.

WHC, 1990b, *Sample Management and Administrative Manual*, WHC-CM-5-3, Westinghouse Hanford Company, Richland, Washington.

WHC, 1990c, *Health Physics Procedures Manual*, WHC-IP-0692, Westinghouse Hanford Company, Richland, Washington.

WHC, 1993, *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

14.2 CODE OF FEDERAL REGULATIONS AND FEDERAL REGISTER

None.

14.3 WASHINGTON ADMINISTRATIVE CODE AND REVISED CODE OF WASHINGTON

WAC 173-303, 1990, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

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