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Date: May 14, 1987

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From: D&D Engineering

Project or Subject:

Decommissioning Work Procedure
DWP-183-H-1 REV 3

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DWP-183-H-1 REV 3, 183-H Solar Evaporation Basins Decommissioning



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DWP-183-H-1 REV 3

FACILITY

183 Solar Ponds

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DECOMMISSIONING WORK PROCEDURE

PROJECT

183-H Solar Evaporation Basins Decommissioning

PERSEDES ISSUE DATE

June 26, 1986

ACTIVITY

Assured Containment - Sludge Removal/Disposal

Prepared by Decommissioning Engineering

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1.0 PURPOSE

- 1.1 This procedure details the basic tasks required to assure containment of the liquid waste in the 183-H Solar Evaporation Basins and the removal/disposal of the solid waste. The complete decommissioning project - removal/disposal of the liquid and solid wastes from the 183-H basins and the eventual disposition of the 183-H facility will be accomplished by subsequent Decommissioning Work Procedures (DWP's).

This DWP delineates those steps that are required to assure containment - eliminate the potential for leakage - of the liquid remaining in the basins and the removal of the sludge and solid waste. This will be accomplished by pumping the liquid from basin #2 into basins #3 and #4. This will permit the sludge to be removed from basin #2 and a liner to be installed in the emptied basin. All the liquid will then be pumped into the lined basin #2 providing assured containment and permitting the sludge to be removed from basins #3 and #4.

The completion of this procedure will result in the assured containment of the remaining liquid and the removal of all the sludge.

NOTE: This procedure is not intended to give a step-by-step detailed description of the operations involved, but is meant to outline the work steps that must be accomplished to complete the described task. Changes or revisions to this procedure shall be routed through the author and original approvers, per UNI-1006 REV3, Section 7.3.

2.0 FACILITY DESCRIPTION

2.1 History

The 183-H Filter Plant operated from October 1949 to April 1965, concurrent with the startup and shutdown of the 105-H Reactor. The filter plant provided water treatment, filtering facilities, and reservoir capacity for the reactor process water system. The filter plant consisted of a head house and chemical building, flocculation and subsidence basins, filter building and clearwell

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2.0 FACILITY DESCRIPTION (Cont'd)2.1 History (Cont'd)

storage with a pump room. In April of 1974, demolition of this facility was initiated under the Hanford Site Housekeeping and Cleanup Program for the 100-H Area. The 183-H head house, twelve of the sixteen sedimentation basins, the clearwell pump room, and the filter building were demolished to ground level and the underground portions of these facilities were backfilled to ground level. A cyclone fence was installed around the four remaining sedimentation basins. These basins were held for use as a solar evaporation facility. The adjoining clearwells were also left intact for future use as a disposal site for clean debris resulting from additional buildings scheduled to be demolished at 100-H Area. Posts and signs were installed around the clearwells.

The solar ponds were first put into use in July 1973 when the 300 Area Fuels Department pumped liquid chemical wastes, resulting from fuel manufacturing, into basin #1. This was prior to the demolition of the filter building. Subsequently basins #2 and #3 were sealed and utilized in 1977-1978, and basin #4 was sealed and used in October 1982. The Fuels Department ceased using the solar ponds in November 1985.

2.2 Physical Description

The solar ponds (183-H filter plant sedimentation basins) are an above ground structure comprised of a deep subsidence basin and a shallow flocculator basin. The subsidence basin is 53 ft-6 in. wide and 96 ft in length with a depth varying from 16 ft-6 in. at the north end to 15 ft-6 in. at the south end. The flocculator portion of the basin is 45 ft-6 in. wide and 32 ft in length and 9 ft-6 in. deep. These basins are now referred to as basin #1, #2, #3, and #4.

Currently basins #2, #3, and #4 together contain approximately 750,000 gal of liquid wastes and 36,000 ft³ of solid wastes in stratified layers. Basin #1 was cleaned out in FY 1985 by 300 Area Fuels Operations. The liquid was pumped into basin #2 and the solid material was removed and disposed of in the 200 Area contaminated burial facility as low level radioactive waste.

3.0 SPECIAL EQUIPMENT

The following list is not meant to be all inclusive, but to indicate some of the special equipment not normally associated with decommissioning activities that may be necessary to perform the work.

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3.0 SPECIAL EQUIPMENT (Cont'd)

- Mini-Max
- High Pressure Water Jet
- Hydraulic Jackhammer
- Hydraulic Concrete Saws
- Oxyacetylene Cutting Torch
- Flatbed Truck
- Crane
- DOT SPEC 17C Steel Drum & 90 mil Polyethylene Liner
- Approved Absorbent Material
- Air Compressor
- Water Truck
- Garden Hose
- 10 and 4 mil Plastic Bags
- Grout (Mortar)
- Caulking Guns and Sealant
- Pallets and Banding Material
- Portable Eye/Face Washers

4.0 HEALTH AND SAFETY REQUIREMENTS4.1 Radiological Control

Compliance with the following documentation is mandatory.

- RHO-M-220 REV1, Quarterly Exposure Limits. These requirements will be adhered to by Rockwell personnel.
- UNI-M-30, Radiation Control Manual
- UNI-M-3, Radiation Practice Manual; includes the ALARA program and Radiation Exposure Reduction Guide.
- UNI-M-31, Environmental Control Manual
- UNI-M-29, Shipment of Radioactive and Other Hazardous Materials
- UNI-M-946, Radiological Characterization of Retired 100 Areas
- UNI-3547, Decommissioning Services Radioactive Waste/Material Shipment Procedure
- All work that is designated in this Decommissioning Work Procedure (DWP) is to be accomplished in accordance with a Radiation Work Procedure (RWP) specifically prepared for this project. Work shall not proceed unless an approved RWP is posted.
- Continuous air samples will be obtained to monitor for both radiological and chemical releases to the atmosphere.

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4.2 Industrial Safety

- All work shall be performed in compliance with applicable standards OSHA/WISHA and UNI-M-38, Industrial Safety Manual.
- Comply with UNI-M-38, Control No. 110, Hazardous Work Permits.
- When hoisting and rigging, comply with UNI-M-122, UNC Hoisting and Rigging Manual. Also reference Appendix VI for hoisting and rigging equipment consideration.
- Comply with UNI-M-38, Control No. 36, Personal Protection Equipment, when working on this project.
- Comply with UNI-M-38, Control No. 103, Heat Stress.
- Comply with UNI-M-38, Control No. 104, Noise, when working on this project.
- Safety litter and communication devices will be available at all times.
- Comply with UNI-M-38, Control No. 19, Compressed Air, when operating water pumps.
- Portable fire extinguishers shall be located at each location where oxyacetylene cutting is performed. Reference UNI-M-38, Control No. 7.
- Comply with UNI-M-38, Control Nos. 16 & 29 when using ladders, work platform, scaffolds, etc.
- A Job Safety Analysis (JSA) has been prepared in accordance with UNI-M-38, Industrial Safety Manual, Control No. 11 and attached to this procedure. The JSA "hazard control" section includes "D&D Safe Work Practices" lists items that shall be reviewed as part of the job preparation.

4.3 Other Requirements

- UNI-1006, Quality Assurance Implementation Plan Quality Assurance Impact Level III, applies to the work involved in the completion of this DWP.
- UNI-1006, Quality Assurance Implementation Plan Quality Assurance Impact Level I, applies to procurement and installation of the basin liner.

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5.0 PREPARATORY WORK

- 5.1 Stencil shipping information on each 55 gal drum. This information is to be provided by the assigned shipper.
- 5.2 Personnel shall be trained on the safety and radiological hazards associated with this project. Verify that all personnel are familiarized with the RMP and JSA for this procedure.
- 5.3 Personnel shall be trained in the set up and operation of the high pressure water jet and/or operation of the Mini-Max.
- 5.4 Decommissioning Operations shall assure that a hazardous work permit has been prepared and approved by Industrial Safety prior to start of work. See UNI-M-38 Control No. 110 updated weekly.
- 5.5 Radiation and Water Quality Control (R&WQC) shall establish a controlled radiation survey checkpoint access area and post it.
- 5.6 Decommissioning Operations shall provide benches, a drawing table/work bench, and two water container stands. These may be acquired from other job sites or fabricated by Surveillance and Maintenance.
- 5.7 Acquire the following list of equipment and materials and locate at the 183-H work site:
 - SWP's, laundry hampers, dissolvable plastic bags for laundry bags, ladders, caulking guns and sealant compound, barn scoop shovels, DOT-SPEC 17C drums and 90 mil liners, polyethylene bags (55 gal drum size), two 2 in. pumps and hoses, four 50 ft lengths of 2 in. hose, two 2 in. foot valves, grouting material (light mortar), and tools.
- 5.8 Install excess flow check on air compressor prior to use.

6.0 PROCEDURE

- 6.1 Assemble two pumps on deck between basin #2 and basin #3. Place both suction hoses into basin #2 liquid. Place one discharge hose into basin #4 and one discharge hose into basin #3. Position hose ends in a location to avoid splashing and secure ends.
- 6.2 Set up air compressor alongside basin in a convenient location, connect air lines to pumps. Use an air manifold with in-line air lubricators.

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6.0 PROCEDURE (Cont'd)

6.3 Start pumping liquid from basin #2 into basin #3 and basin #4.

CAUTION: Avoid splashing and do not overflow.

6.4 As soon as liquid level is below the flocculator basin bottom, install ladders for access, secure in place, then start shoveling sludge down into the subsidence basin or remove.

6.5 When all sludge has been cleaned out of the flocculator basin, wash down with water from the water truck or aqua jet washer.

IMPORTANT: Use a minimum amount of water under close supervision. Use a small garden hose with a nozzle.

Work can proceed in the flocculator basin consecutively while pumping out remaining liquid from the subsidence basin. Carpenters can construct a safety barricade at edge of flocculator basin.

6.6 Cut off all metal protrusions, piping, etc., flush with concrete surface, use oxyacetylene cutting torch. Seal remaining openings.

6.7 Use the mini-max, high pressure water jet or hydraulic jackhammer to remove all concrete supports except the three supporting the cat-walk deck. There are 15 free standing supports and three attached to the west wall. This rubble shall be placed into Basin #1.

6.8 When all supports and stubs have been removed, start cutting off wall supports in same manner. These can also be jackhammered off.

6.9 As soon as the subsidence basin is pumped dry, the sludge removal work may commence.

6.10 Barrel Preparation

6.10.1 Insert 90 mil liner into 55 gal drum.

6.10.2 Insert drum and liner into a heavy duty 10 mil polyethylene bag, tuck end over lip of both drum and liner and down inside the liner.

6.10.3 Insert a heavy duty 4 mil polyethylene bag down inside the 90 mil liner then drape over the drum lip outside the drum, tape around drum to hold in place.

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6.0 PROCEDURE (Cont'd)

- 6.10.4 Place approximately one half sack of approved absorbent material into bottom of bag inside the liner.
- 6.10.5 Prepare each drum and liner in this manner.
- 6.11 Place prepared drums into the bottom of the subsidence basin approximately 30 to start in two parallel rows about 10 ft apart at the flocculator end of the basin.
- 6.12 Commence filling the drums using 5 gal buckets. Add 9 or 10 full 5 gal buckets of sludge into the drum leaving space on top, sufficient to add another half sack of absorbent material.
- 6.13 When drums are full, remove tape and fold inner polyethylene bag into the 90 mil liner and tape.
- 6.14 Hoist loaded drum up approximately 4 ft, then using clean gloves peel off outer polyethylene bag, stuff bag into another open drum for disposal, then continue hoisting drum up to the staging level for a radiation survey, then install liner lid.
- 6.15 If drum is contaminated, decontaminate immediately.
- 6.16 Continue loading each drum and hoisting to staging area for installation of lid and clamp ring. Drums shall then be surveyed by R&WOC and have the proper radiation stickers applied. Caution personnel not to stand under hoisted drums.
- 6.17 Place clean drum onto a flatbed truck. Continue with other loaded drums in same manner until truck is loaded and ready for transport to the 200 burial facility. Loaded drums may be stacked in a properly marked storage area in preparation for shipment.
- 6.18 Continue shoveling sludge into piles for loading into the drums as required.
- 6.19 When all sludge has been removed in this manner, wash down the entire basin using as little water as possible.
- 6.20 Permit wash down water to evaporate off if time and schedule permits, or pump into basin #3 or #4.
- 6.21 Clean all cracks in concrete and caulk or grout as required to seal and obtain a flat surface.

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6.0 PROCEDURE (Cont'd)

- 6.22 Cut off the overflow pipe and apply grout for a smooth surface.
- 6.23 Remove all protrusions and grout remaining surfaces. Seal all cracks with caulking compound.
- 6.24 Basin condition will be inspected and approved by a representative of the liner installation contractor and may require some touch up work.
- 6.25 Basin is ready for the liner installation by the contractor. DSS only support will be to hoist the liner off the truck and into the basin.
- 6.26 After the basin line installation is completed and signed off (Para. 7.12), commence pumping the liquid from basins #3 and #4 into the lined basin #2. Monitor liquid level when filling to avoid overflow.
- 6.27 When all liquid has been pumped out of basins #3 and #4, "ASSURED CONTAINMENT" has been obtained.
- 6.28 Clean up facility and make preparations for continuing the sludge removal process from basins #3 and #4. Sludge removal/disposal from basins #3 and #4 will be accomplished in accordance with steps 6.10 through 6.19. However, due to budgeting and scheduling constraints, this work may not be performed until some later date.

7.0 WORK COMPLETION

	<u>Initial</u>	<u>Date</u>
7.1 Personnel trained on the safety and radiological hazards of project and are familiarized with the RMP and JSA (Para. 5.2).	_____	_____
7.2 Personnel trained in the operation of the Mini-Max or high pressure water jet (Para. 5.3).	_____	_____
7.3 Decommissioning Operations shall assure that a hazardous work permit has been prepared and approved by Industrial Safety prior to start of work (Step 5.4).	_____	_____
7.4 Radiation & Water Quality Control (R&WQC) shall establish a controlled radiation survey check-point access area and post it (Step 5.5).	_____	_____

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PROJECT

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7.0 WORK COMPLETION

Initial Date

- 7.5 Excess flow check valves installed on air compressor. _____
- 7.6 Liquid transferred into basins #3 and #4. _____
- 7.7 Sludge removed from flocculator basin. _____
- 7.8 Concrete supports and protrusions removed from flocculator basin. _____
- 7.9 All sludge removed from basin #2. _____
- 7.10 Overflow pipe cut off and basin surface prepared for liner. _____
- 7.11 Basin surface inspected and approval obtained from liner installation contractor. _____
- 7.12 Liner installation complete. _____
- 7.13 All liquid transferred into lined basin #2 and assured containment completed. _____

8.0 WORK COMPLETION - BASIN #3 SLUDGE REMOVAL

- 8.1 Personnel trained on the safety and radiological hazards of project and are familiarized with the RWP and JSA (Para. 5.2). _____
- 8.2 Decommissioning Operations shall assure that a hazardous work permit has been prepared and approved by Industrial Safety prior to start of work (Step 5.4). _____
- 8.3 Radiation & Water Quality Control (R&WQC) shall establish a controlled radiation survey check-point access area and post it (Step 5.5). _____
- 8.4 Sludge removed from flocculator basin. _____
- 8.5 Concrete supports and protrusions removed from flocculator basin. _____
- 8.6 All sludge removed from basin #3. _____
- 8.7 Overflow pipe cut off and basin surface prepared for liner. _____

DATE ISSUED

5/5/87

SUPERSEDES ISSUE DATE

6/26/86

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PROJECT

183-H Solar Evaporation Basins Decommissioning

7.0 WORK COMPLETION

Initial Date

8.8 Basin surface inspected and approval obtained from liner installation contractor.

8.9 Liner installation complete.

9.0 WORK COMPLETION - BASIN #4 SLUDGE REMOVAL

9.1 Personnel trained on the safety and radiological hazards of project and are familiarized with the RWP and JSA (Para. 5.2).

9.2 Decommissioning Operations shall assure that a hazardous work permit has been prepared and approved by Industrial Safety prior to start of work (Step 5.4).

9.3 Radiation & Water Quality Control (R&WQC) shall establish a controlled radiation survey check-point access area and post it (Step 5.5).

9.4 Sludge removed from flocculator basin.

9.5 Concrete supports and protrusions removed from flocculator basin.

9.6 All sludge removed from basin #4.

9.7 Overflow pipe cut off and basin surface prepared for liner.

9.8 Basin surface inspected and approval obtained from liner installation contractor.

9.9 Liner installation complete.

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DATE ISSUED

5/5/87

SUPERSEDES ISSUE DATE

6/26/86

JOB SAFETY ANALYSIS		Job Description Assured Containment - Sludge Removal/Disposal		JSA Number 183-H-1
		Component 183-H Solar Pond Decommissioning		Building 183-H
Reviewed By INDUSTRIAL SAFETY		Prepared By E. W. POWERS		Date 6/23/86
Date 6-26-86	Initials W.F.R.	Review Dates		
SAFETY EQUIPMENT REQUIRED		TOOLS & EQUIPMENT REQUIRED		JOB PREPARATION
1. Hard hats 2. Safety shoes 3. Protective clothing per RWP 4. Eye protection 5. Hearing protection 6. Gloves 7. Safety litter 8. Portable eye/face washers.		1. High pressure water 2. Oxyacetylene torch 3. Air compressor 4. Hydraulic jackhammer 5. Concrete saws (CONTINUED ON PAGE 2)		1. Review applicable UNI-M-38 and UNI-M-122 controls as outlined in procedure. 2. Review JSA & applicable RWP. 3. Hazardous work permit issued.
		HAZARDOUS MATERIALS		RELATED REQUIREMENTS
		1. High pressure water 2. Hazardous mixed wastes. 3. Acetylene 4. Oxygen 5. Compressed		Radiation Work Procedure Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Nuclear Safety Spec. Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
JOB STEP		HAZARD		HAZARD CONTROL OR PROTECTIVE EQUIPMENT
1a. High pressure water jet operation.		1a. High pressure water.		1a. Avoid leakage from unit, and shut down immediately.
1b. Filling abrasive hopper.		1b. Noise		1b. Wear ear protection while near power unit.
		1c. Lifting heavy object.		1c. Use proper lifting techniques.
2. Access and egress.		2a. Ladders		2a. Position ladders correctly and secure. Do not reach from ladder.
3. Hoisting items.		3a. Falling objects.		3a. Rope off area. Assure proper rigging. Do not move objects over people.
4. Packaging sludge.		4a. Lifting heavy objects.		4a. Use proper lifting techniques.
		4b. Chemicals		4b. Use protective gloves & clothing as prescribed in RWP.
		4c. Slippery surface.		4c. Exercise caution.
5. Pumping liquid		5. Compressed air.		5. Use trained operator.
6. Jackhammer operation.		6. Noise, flying debris.		6. Use ear & eye protection, and safety shoes.
7. Pumping liquid & removing sludge.		7. Splashing.		7. Use portable eye/face washers.
8. All job steps.		8. Airborne contamination.		8. Air samplers monitored by R&WOC.
9. Cutting off protrusion.		9. Open flame.		9. Fire extinguishers.

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JOB SAFETY ANALYSIS (Cont'd)

183-H Solar Pond Decommissioning

TOOLS & EQUIPMENT REQUIRED (Cont'd)

6. Crane & rigging equipment.
7. Forklift.
8. Mini-Max.

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