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Symbol: EPC-DO: 19-007
LA-UR: 19-20039
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GROUND WATER
JAN 28 2019
BUREAU

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2261
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

Subject: **DP-1132, Condition No. 41, Stabilization Plans for RLWTF Clarifier #2, Gravity Filter, WM2-North/South Tank, and 75K Tank**

Dear Ms. Hunter:

On August 29, 2018, the New Mexico Environment Department (NMED) issued Discharge Permit DP-1132 to the U.S. Department of Energy (DOE) and Los Alamos National Security, LLC for discharges of treated effluent from the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF). Subsequently, DP-1132 was transferred to Triad National Security, LLC (DOE/Triad) on November 1, 2018. Pursuant to Discharge Permit Condition No. 41, *Stabilization of Individual Units and Systems,* DOE/Triad is required to submit a stabilization plan for a unit or system that has ceased operations. Stabilization plans are attached for the following four units that have been removed from service pursuant to Discharge Permit Condition No. 40, *Cessation of Operation of Specific Units*:

- Attachment 1: Clarifier #2
- Attachment 2: Gravity Filter
- Attachment 3: WM2-North/South Tank
- Attachment 4: 75K Tank

Upon NMED approval of the attached stabilization plans, DOE/Triad will implement the plans in accordance with the approved scope and schedule.

Please contact Karen E. Armijo by telephone at (505) 665-7314 or by email at Karen.Armijo@nnsa.doe.gov, or Robert S. Beers by telephone at (505) 667-7969 or by email at bbeers@lanl.gov if you have questions regarding the attached stabilization plans.

Very truly yours,

Enrique "Kiki" Torres
Division Leader
Environmental Protection & Compliance
Triad National Security, LLC

Very truly yours,

Karen E. Armijo
Permitting and Compliance Program Manager
National Nuclear Security Administration
U.S. Department of Energy

ET/KEA/MTS/RSB:jdm

Attachment(s): Attachment 1 DP-1132 Stabilization Plan for Low-Level Clarifier #2
Attachment 2 DP-1132 Stabilization Plan for Gravity Filter
Attachment 3 DP-1132 Stabilization Plan for WM2-North/South Tank
Attachment 4 DP-1132 Stabilization Plan for 75K Tank

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ATTACHMENT 1

DP-1132 Stabilization Plan for Low-Level Clarifier #2

EPC-DO: 19-007

LA-UR-19-20039

Date: JAN 2 5 2019

Attachment 1

Radioactive Liquid Waste Treatment Facility Stabilization Plan for Low-Level Clarifier #2

Discharge Permit DP-1132

Condition No. 41

LA-UR-19-20039

Los Alamos NATIONAL LABORATORY EST. 1943

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1.0 STABILIZATION OBJECTIVE AND CRITERIA

This Stabilization Plan describes activities that will be undertaken to stabilize Clarifier #2, a treatment unit for low-level radioactive liquid wastes (RLW). This Plan has been prepared in accordance with the provisions specified in Condition 41 of Discharge Permit DP-1132, issued by the New Mexico Environment Department (NMED). Information is presented in the same sequence as requirements are listed in Condition 41.

The primary objective of stabilizing the clarifier is to empty and isolate the unit so that it will pose no threat to the environment (groundwater and air) until closure.

2.0 DESCRIPTION OF CLARIFIER #2

Clarifier #2 is a concrete cylindrical tank with conical bottom. It has a working volume of about 28,000 gallons, and is designed to handle feed flow rates up to 120 gpm. Clarifier #2 can be viewed as having five major components: (1) the concrete clarifier vessel (2) a system for feeding treatment chemicals in a solid or powder form (3) a liquid chemical feed system (4) internal components, and (5) superstructure.

1. ***Concrete vessel:*** The cylindrical portion is 11 feet 4 inches high and 20 feet in diameter; the cone has a depth of 18 inches. The cement structural support for Clarifier #2 extends sixteen inches below the slab floor of the building.

2. ***System for feeding treatment chemicals:*** Solid treatment chemicals were delivered from a room one floor above the clarifier using cone-bottomed hoppers. Five hoppers were available to feed chemicals to the two clarifiers (#1 and #2). Two of the hoppers are three feet in diameter and ten feet high; three are two feet in diameter. Hoppers extend into the room above the clarifiers. The hoppers are equipped with a motor-driven vibrator, and had an air-operated gate valve at the bottom of each hopper.

3. ***Liquid chemical feed system:*** Liquid treatment chemicals were delivered from a system of two tanks, approximately 200 gallons each, located between the two clarifiers.

2.0 DESCRIPTION OF CLARIFIER #2 (continued)

4. ***Internal components:*** Internal components consist of a feed well and solids rake. The feed well (or flocculator tank) is a 10-foot-diameter steel cylinder suspended in the middle of the clarifier. The well is open at the bottom, allowing solids to fall through the bottom of the well onto the floor of the clarifier. A solids rake moves solids to the conical central sump of the clarifier, from where they can be pumped to a collection tank, turning at the rate of approximately two RPM.

5. ***Superstructure:*** A beam spans the top of the clarifier. The beam supports the suspended feed well, and the rake motor and drive mechanism.

Clarifier #2 went into operation in July 1963, and has been used ever since. Because it is located within Building 1 of Technical Area 50, Clarifier #2 is within SWMU 50-001(a). However, there are no reports of past leaks, and there is no evidence of current leaks.

2.1 Function

The clarifier system comprised the first portion of the existing Main Treatment Process in the RLWTF. It provided partial removal of metals, radioactive constituents, and other impurities from RLW influent.

The clarifier had two entry streams (RLW influent, treatment chemicals) and two exit streams (treated water, precipitated solids). Feed and chemicals entered from above through a flash mixer into the center feed well. Treated waters exited at the bottom of the feed well, rose in the outer portion of the clarifier, and then overflowed the clarifier to the next treatment unit.

Precipitated solids settled beneath the feed well; rakes slowly rotated across the bottom of the unit to move the settled solids to the middle of the cone. Clarifier solids were then periodically pumped from the bottom of the clarifier for storage and treatment in the Secondary Treatment Plant.

2.2 Historic Waste Streams

Chemicals and low-level RLW influent were the historic feed streams to Clarifier #2. Influent came from multiple generators at LANL, and was collected and stored in the 75K tank at Building 50-002. Influent was then pumped from the 75K Tank to the clarifier, where chemicals such as lime (calcium hydroxide), caustic soda (sodium hydroxide), and iron sulfate were added to assist in precipitating impurities, including radionuclides.

Treatment chemicals:

- Lime - Bags of powdered lime were dissolved in water and then fed to the flash mixer where the lime and RLW influent were mixed.
- Iron sulfate - Bags of powdered iron sulfate were dissolved in water and then fed to the flash mixer where the iron sulfate and RLW influent were mixed.
- Caustic soda - Solutions of sodium hydroxide (25% or 50% strength) were fed directly into the flash mixer.

Low-level RLW influent: Radioactivity levels averaged 50-100 nanocuries per liter (nCi/L) alpha activity. Three alpha-emitting radionuclides (Americium-241, Plutonium-238, and Plutonium-239) accounted for more than 99% of the alpha radioactivity in the influent. Beta-emitting radionuclides averaged less than 1 nCi/L. Tritium concentrations have historically averaged 25 nCi/L, but have averaged less than 10 nCi/L in recent years.

Low-level RLW influent: Non-radioactive constituents included common metals (iron, sodium, silicon) and anions (nitrate, chloride, sulfate, phosphate) at parts-per-million (ppm) concentrations. Regulated metals were also present, but always at parts-per-billion concentrations, far below levels that would make the influent a RCRA hazardous waste. Total dissolved solids concentration of influent averaged less than 1000 ppm.

3.0 STABILIZATION ACTIVITIES FOR CLARIFIER #2

3.1 Remove Unused Chemicals

NOTE Unused chemicals for both Clarifier #1 and Clarifier #2 will be removed when Clarifier #1 is stabilized. The reporting and documentation for this activity will, however, be reported in both Stabilization Reports.

Treatment chemicals in solid form were stored one floor above the clarifier, in Room 216, and fed to the clarifier via feed chute. A physical inventory of remaining solid treatment chemicals will be taken and documented. Chemicals either will then be used in other processes at the RLWTF, or will be disposed in compliance with state and federal regulations.

Treatment chemicals in liquid form were stored in Room 116, before being fed to Clarifier #2. A physical inventory of remaining solid treatment chemicals will be taken and documented. Chemicals either will then be used in other processes at the RLWTF, or will be disposed in compliance with state and federal regulations.

Criterion: No solid or liquid clarifier treatment chemicals will remain.

Verification: Removal will be visually verified.

Documentation: Before and after inventory data and photographs will be taken in Rooms 116 and 216. Photographs and activity records (e.g., disposition of unused chemicals) will provide input for the Stabilization Report.

3.2 Dismantle Chemical Feed Systems

NOTE Chemical feed systems for both Clarifier #1 and Clarifier #2 will be removed when Clarifier #1 is stabilized. The reporting and documentation for this activity will, however, be reported in both Stabilization Reports.

Two systems were installed to feed treatment chemicals to the clarifiers. The original (1963) system fed chemicals in solid or powder form; a system installed in 2006 fed chemicals in a liquid form.

3.2 Dismantle Chemical Feed Systems (continued)

Solid chemicals were fed from a room above Clarifier #2 via gravity feed chute. The feed system consisted of feed chutes (five total) and dissolution tanks (two). Dismantled components (chute segments, dissolution tanks, and piping) will be characterized and disposed as solid low-level radioactive waste. Details:

- Three overhead cylindrical feed hoppers from Room 216: The bins neck down from approximately 24" diameter to 6" diameter, pass through a slide valve, and then are taped shut. Vibrators above the slide valve were used to assist the flow of solid chemical. The 6" diameter pipe beneath the slide-valve has been truncated, the dissolution tanks have been removed, and the opening has been taped over. Stabilization will consist of confirming that the bins are empty, then removing the hoppers.

- From Room 216, two overhead feed chutes 36" in diameter delivered solid chemicals (lime and ferric sulfate) into separate 100-gallon feed tanks. Stabilization will consist of confirming that the feed chutes are empty, them removing the hoppers. The opening into Room 216 will be sealed.

- Chemical dissolution tanks: Two feed tanks received solid chemicals (lime and ferric sulfate) from Room 216 via two feed chutes (see above). Industrial water (1963-2000) or gravity filter effluent (post-2000) was added to the tanks to dissolve the chemicals. Each tank will be rinsed with water, and the rinsate will be emptied into Flash Mixer #2, and then into Clarifier #2. Both tanks, and the 3-inch-diameter drainpipes from the tanks into the flash mixers, will be disposed as solid low-level radioactive waste. Openings into Flash Mixer #1 will be capped.

Two liquid chemical feed skids were erected in 2006 so that chemicals could be purchased in liquid form, and fed to the Flash Mixers without using the dissolution tanks. Each skid included a pump, piping, valves, and a small liquid chemical feed and storage tank (~200 gallons).

One skid fed liquid chemicals to Flash Mixer #1 (for Clarifier #1), and the other fed liquid chemicals to Flash Mixer #2 (for Clarifier #2). Both skids will be dismantled, removed, and discarded as solid low-level radioactive waste. Openings into the top of Flash Mixer #1 will be capped.

3.2 Dismantle Chemical Feed Systems (continued)

Criterion: Feed systems for solid and liquid treatment chemicals will be removed.

Verification: Removal will be visually verified.

Documentation: Before and after photographs will be taken in Room 116. Dismantling, characterization, and disposal activities will be documented. Photographs and activity records will be used as input for the Stabilization Report.

3.3 Remove Process Liquids and Solids

Liquids and solids will be transferred from Clarifier #2 to other treatment units for low-level radioactive liquid wastes, where the solids and liquids will be treated, in accordance with existing operating procedures. Specifically, solids will be pumped to TK-8 in Room 61, and then processed through the rotary vacuum filter. Clarifier liquids will be processed through the Main Treatment Plant (microfilter, perchlorate ion exchange, and reverse osmosis) prior to discharge to the environment. Vacuum filter solids will be characterized, and then disposed. It is anticipated that vacuum filter solids will be disposed as solid low-level radioactive waste.

Criterion: Clarifier #2 will be empty.

Verification: Removal will be visually verified.

Documentation: The condition of the interior of the Clarifier #2 following removal of liquids and solids will be documented through photographs and through radiological surveys of the interior walls of the clarifier. Operating records and photographs will be used as input for the Stabilization Report.

3.4 Flush Clarifier #2 and Process Piping

Industrial water will be used to flush clarifier inlet waste lines and the interior walls of the clarifier, in order to reduce residual internal contamination. Flush water will collect in the clarifier, then be transferred the Main Treatment Plant (microfilter and reverse osmosis) prior to discharge pursuant to DP-1132. The act of transferring flush water out of Clarifier #2 will also flush outlet piping. Repeated flushing may be required until the stabilization criterion is met.

Criterion: Flushing will be adequate when flush water concentration decreases to <20 nCi/L.

Verification: Analytical results for flush water samples will be used to verify that the flush criterion has been met.

Documentation: Operating records and analytical data will be used as input for the Stabilization Report.

3.5 Remove Superstructure and Internal Components

Superstructure: The beam that spans the top of the clarifier, and the rake motor and drive mechanism, will be removed. The 10-foot-diameter feed well, the solids rake, and their support mechanisms will then be removed from inside the clarifier. Components will be discarded as low-level radioactive waste.

Criterion: The superstructure and internal components of Clarifier #1 will be gone, leaving only the walls and floor of the concrete vessel.

Verification: Removal will be visually verified.

Documentation: Before and after photographs will be taken of the inside of Clarifier #1. Photographs and activity records will provide input for the Stabilization Report.

3.6 Clean and Seal Interior Clarifier Surfaces

Interior surfaces will then be cleaned using measures such as low-pressure spraying or a high-pressure spray wand. Cleaning materials such as water will collect in the clarifier, then be transferred the Main Treatment Plant for processing through the microfilter. Cleaning measures may need to be repeated until the stabilization criterion is met. Residual contamination will then be fixed by applying a brush/roll-on fixative (e.g., paint) to the interior clarifier surfaces.

Criterion: Flushing will be adequate when flush water concentration decreases to <20 nCi/L.

Verification: Cleaning will be visually verified. Radioactive survey results will be used to verify that the sealing criterion has been met.

Documentation: Photographs of the interior walls of the clarifier will be taken prior to cleaning, after cleaning, and after sealing. Radiological surveys will be taken after surfaces have been sealed. Operating records, photographs, and radioactive survey data will be used as input for the Stabilization Report.

3.7 Isolate Inlet and Outlet Lines

Piping that carried chemicals, process materials, and industrial water into or from the clarifier will be isolated by removal, by capping, or by applying blind flanges, thereby assuring that materials can no longer enter Clarifier #2, and that Clarifier #2 will be in a stable condition until closure in accordance with the RLWTF Closure Plan (*LANL 2016*). Section 4.1 of this Stabilization Plan has a detailed list of the lines and how each will be isolated.

Criterion: All inlet and outlet lines will be isolated either by removing the line, by capping, or by applying a blind flange.

Verification: Isolation will be visually verified.

Documentation: Before and after photographs will be taken of process pipe connections. Photographs and activity records will be used as input for the Stabilization Report.

3.8 Isolate Support Systems

Industrial Water: Enters Clarifier #2 via recirculation line. This will be isolated as part of the Flash Mixer #2 recirculation line isolation.

Compressed Air: Not applicable. Compressed air was not used to operate Clarifier #2 components (e.g., clarifier rakes, sludge pumps).

Ventilation: Not applicable. Rooms 16 and 116 receive general room ventilation. There are no clarifier-specific systems to stabilize.

4.0 OTHER STABILIZATION INFORMATION

4.1 Clarifier #2 Conveyance Lines

All process and chemical streams enter Clarifier #2 indirectly, via Flash Mixer #2. No streams are fed directly into the top of Clarifier #2.

A. Lines into Flash Mixer #2:

Seven pipes enter Flash Mixer #2. Two are process lines, and five are chemical feed lines. All seven lines enter at the top of Flash Mixer #2.

1. RLW influent (a 3-inch steel pipe into the side of Flash Mixer #2): Remove the pipe back to the tee where influent divides to either Clarifier# or Clarifier #2. This tee is upstream of the Clarifier #2 flow meter, and upstream of valve 116-INF-V18, both of which will be removed. The tee itself will be removed, and blind flanges placed on the three openings. Cap the opening into the top of Flash Mixer #2.
2. Clarifier recirculation (a 2-inch steel pipe into the top of Flash Mixer #2): The pipe will be removed back to valve 116-SRC-V06 against the wall. The open end of the valve will be capped, and the opening into Flash Mixer #2 will be capped.
3. Dissolved lime (a 3-inch-diameter pipe into the top of Flash Mixer #2): The tank that fed Flash Mixer #2, and the dissolved lime pipe, will be removed. The opening into Flash Mixer #2 will be capped.
4. Dissolved ferric sulfate (a 3-inch-diameter pipe into the top of Flash Mixer #2): The tank that fed Flash Mixer #2, and the dissolved ferric sulfate pipe, will be removed. The opening into Flash Mixer #2 will be capped.
5. Liquid sodium hydroxide (a 3/8-inch line into the top of Flash Mixer #2): This line will be removed back to its transition to plastic tubing. The tubing will then be removed back to the point of its entry into its source tank (CST-2) in Room 16. The opening into the top of Flash Mixer #2 will be capped.
6. Liquid chemicals from Skid #1 (a 3/8-inch line into the top of Flash Mixer #2): This line will be removed back to Skid #1, and Skid #1 will then be removed. The opening into the top of Flash Mixer #2 will be capped.

4.1 Clarifier #2 Conveyance Lines

7. Liquid chemicals from Skid #2 (a 3/8-inch line into the top of Flash Mixer #2): This line will be removed back to Skid #2, and Skid #2 will then be removed. The opening into the top of Flash Mixer #1 will be capped.

B. Process Lines Out of Clarifier #2:

NOTE Sludge drains from Clarifier #2 in two locations. One drain line is at floor level; the other exits Clarifier #2 about 10 feet above the floor.

1. Floor-level sludge drain: Remove the tee located ~six inches from the exterior wall of Clarifier #2. Apply blind flanges to all three openings.

2. Drain at the ten-foot level: Sludge to the WM2 sludge tank: Remove the spool piece located ~ten inches from the exterior wall of Clarifier #2. Apply blind flanges to both openings.

3. Feed to the gravity filter: This 10-inch steel pipe drops into Room 16. The 10-inch pipe runs directly from Clarifier #2 to Clarifier #1, about 10 feet above the floor of Room 16. Either feed to the gravity filter drops vertically into a 10-inch feed line to the gravity filter, or into a six-inch line, that bypasses the gravity filter. Stabilization will be achieved by removing valves 016-GFB-V04 (10-inch diameter), 016-GFB-V02 (four-inch diameter), and 016-ISOL-V08 (10-inch diameter), and by applying blind flanges to the two openings that result when each valve is removed (total of six openings). Stabilization will occur when the gravity filter is stabilized and is, therefore, not considered part of the Stabilization of Clarifier #2.

4. Drain for Flash Mixer #2: This 4-inch steel pipe drops into Room 16, then makes a 60-degree turn to travel horizontally. This will be stabilized by removing the spool piece (~six feet in length) that is located immediately after the 90-degree turn. Apply blind flanges to the two openings.

5. CL#2 overflow: This line descends from the top of Clarifier #2 to a point about ten feet above floor level, then makes a 90-degree turn. Remove the elbow spool piece, and apply blind flanges to both openings.

4.2 Implementation: Portions of the Closure Plan

Stabilization of Clarifier #2 pursuant to this Stabilization Plan will execute the following portions of Closure Plan-related activities at the RLWTF:

DP-1132, Condition 42.d, Methods to be used for decontamination of the site and equipment:

- Sludge and liquids will be removed within Clarifier #2 and processed (treated) in the existing RLWTF;
- The interior surfaces of the clarifier will be cleaned (e.g., low-pressure and/or high-pressure wash; and
- Residual contamination will be fixed by applying a brush/roll-on fixative such as paint to the interior clarifier surfaces.

DP-1132, Condition 42.h, Methods to be used to characterize waste generated during closure:

- Samples of sludge removed from the clarifiers will be sampled and analyzed for radioactivity (alpha radionuclides, beta radionuclides, and tritium) and RCRA toxicity-characteristic metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).

DP-1132, Condition 42.j, Methods to be used to remove, transport, treat, recycle, and dispose of waste generated during closure:

- Liquids and sludge from within the clarifiers will be removed and treated in accordance with existing operating procedures for Clarifier #2, for the Main Treatment Plant, and for the vacuum filter in the Secondary Treatment Plant.

4.3 Interim Measures and Controls for Clarifier #2

The activities described in Section 3 of this Stabilization Plan will prevent all future releases of (a) water contaminants to the environment, (b) water contaminants from moving into the ground water, and (c) water contaminants from posing a threat to human health.

Succinctly, process solids and liquids will be removed from the clarifier, so that it is empty. Inlet and outlet lines will be removed or capped, or will have blind flanges applied so that new water and process wastes cannot be introduced to the unit. And chemical feed systems will be removed and discarded so that chemicals cannot be re-introduced to Clarifier #2.

4.4 Soil and Groundwater Investigation

There are no reports of past leaks for Clarifier #2, and no evidence of current leaks. Clarifier #2 is a part of SWMU 50-001(a), defined as all of Building 50-001.

In addition, Clarifier #2 itself is located within Rooms 16 and 116 of Building 50-001. Walls of the unit are visible to operators and other personnel. Had the clarifier developed a leak, then water would have been discovered on the floor of Room 16, and the origin of the leak would have been obvious.

However, the structural support for Clarifier #2, the process line that brought low-level RLW influent to Clarifier #2, and the process line that removed sludge from Clarifier #2 extend beneath the floor of Room 16.[1]

The investigation, characterization, cleanup and corrective action requirements for potential releases of contaminants into soil, groundwater and other environmental media from solid waste management units (SWMUs) and areas of concern (AOCs) associated with the RLWTF are contained within the Compliance Order of June 2016 entered into between the NMED and the DOE pursuant to the New Mexico Hazardous Waste Act, NMSA 1978, §74-4-10 and the New Mexico Solid Waste Act, NMSA 1978, §74-9-36(D). Accordingly, sampling will be conducted per an investigation work plan approved by the Hazardous Waste Bureau under the Consent Order during final closure.

[1] The floor of Room 16 is part of the slab for Building 50-001.

4.5 Stabilization Report

Within 30 days of completion of stabilization activities, a Stabilization Report will be submitted to the NMED for approval. The report will describe stabilization activities, and will contain photographs, radioactive survey data, and other documentation specified in Section 3 of this Plan as evidence that stabilization has been completed.

4.6 Stabilization Schedule

Funding for the stabilization of Clarifier #2 has been requested for fiscal year 2021 and stabilization is anticipated to require 24 months. Milestone dates would be as follows:

- As part of the Stabilization of Clarifier #1, removal of excess chemicals, and treatment of process liquids and solids, and removal of feed systems would occur during 2019.
- Stabilization of Clarifier #2 itself would be initiated October 2021 (planning and start of the procurement process).
- Removal of the superstructure and internal components would occur in 2022, and the Stabilization Report would be submitted to NMED in October 2022.

5.0 REFERENCES

New Mexico Environment Department, June 2016. *Compliance Order on Consent U.S. Department of Energy Los Alamos National Laboratory.*

New Mexico Environment Department, 08-29-2018. *Ground Water Discharge Permit DP-1132, Radioactive Liquid Waste Treatment Facility, Los Alamos National Laboratory.*

LANL, April 2010. *Investigation Report for Upper Mortandad Canyon Aggregate Area, Revision 1*, EP-2010-0149, page 98.

LANL, September 2016. *Radioactive Liquid Waste Treatment Facility Closure Plan*, LA-UR-16-27050.

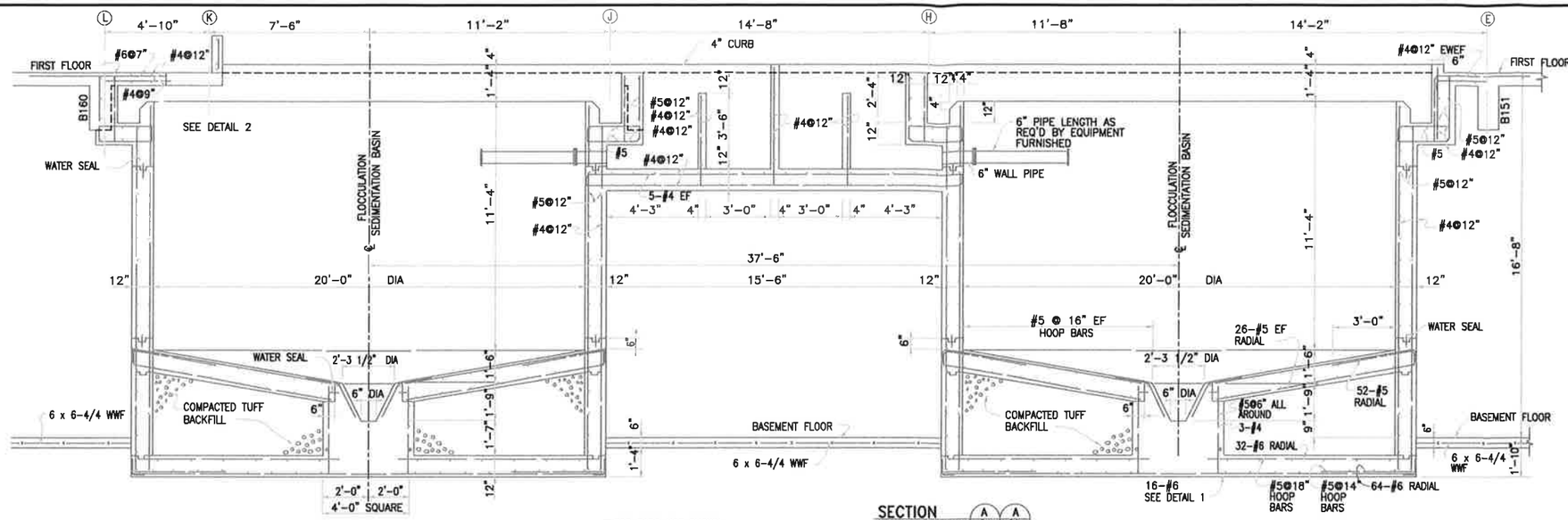
6.0 ATTACHMENTS

Attachment	Title
A	*Stabilization Criteria and Documentation for Clarifier #2*
B	*Drawing AB57, As-Built Critical Facility Rad Liquid Waste Treatment Plant, Plant Equipment Sections, Sheet S11. Revision 1, Sep 2001*
C	*Drawing AB57, As-Built Critical Facility Rad Liquid Waste Treatment Plant, Plant Piping Basement Area D, Sheet M115. Revision 1, Sep 2001*
D	*Drawing AB57, As-Built Critical Facility Rad Liquid Waste Treatment Plant, Plant Piping and Details, Sheet M136. Revision 1, Sep 2001*

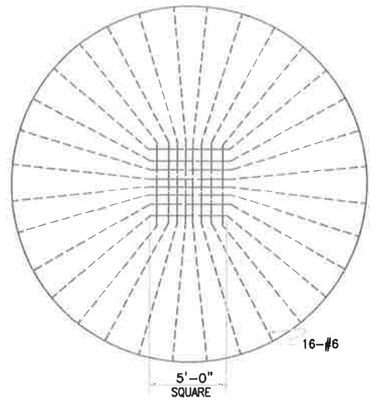
Attachment A, Stabilization Criteria and Documentation for Clarifier #2

Activity	Criteria	Documentation
1. Remove unused chemicals	No solid or liquid chemicals remain.	Before and after inventory data and photographs
2. Dismantle chemical feed systems	Remove solid and liquid systems.	Before and after photographs
3. Remove process liquids and solids	Clarifier #2 will be empty.	Before and after photographs
4. Flush Clarifier #2 and process piping	Flush water <20 nCi/L	Flush water analytical results
5. Remove superstructure and internal components	Remove feed well, solids rake and motor, and support beam.	
6. Clean and seal interior clarifier surfaces	• Cleaning: No residual solids • Sealing: Contamination < 20 dpm/100 cm^2	• Cleaning: Before and after photographs • Sealing: Radiation survey results
7. Isolate inlet and outlet lines	Remove or cap the line, or apply a blind flange	Before and after photographs

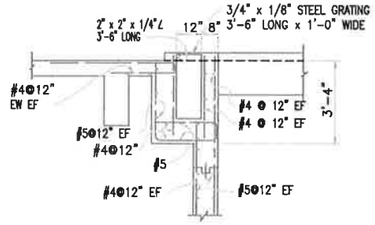
In addition to above-listed documentation, activity logs and records will be used as documentation for all activities.



SECTION (A S1 / A S2)
SCALE: 3/8"=1'-0"

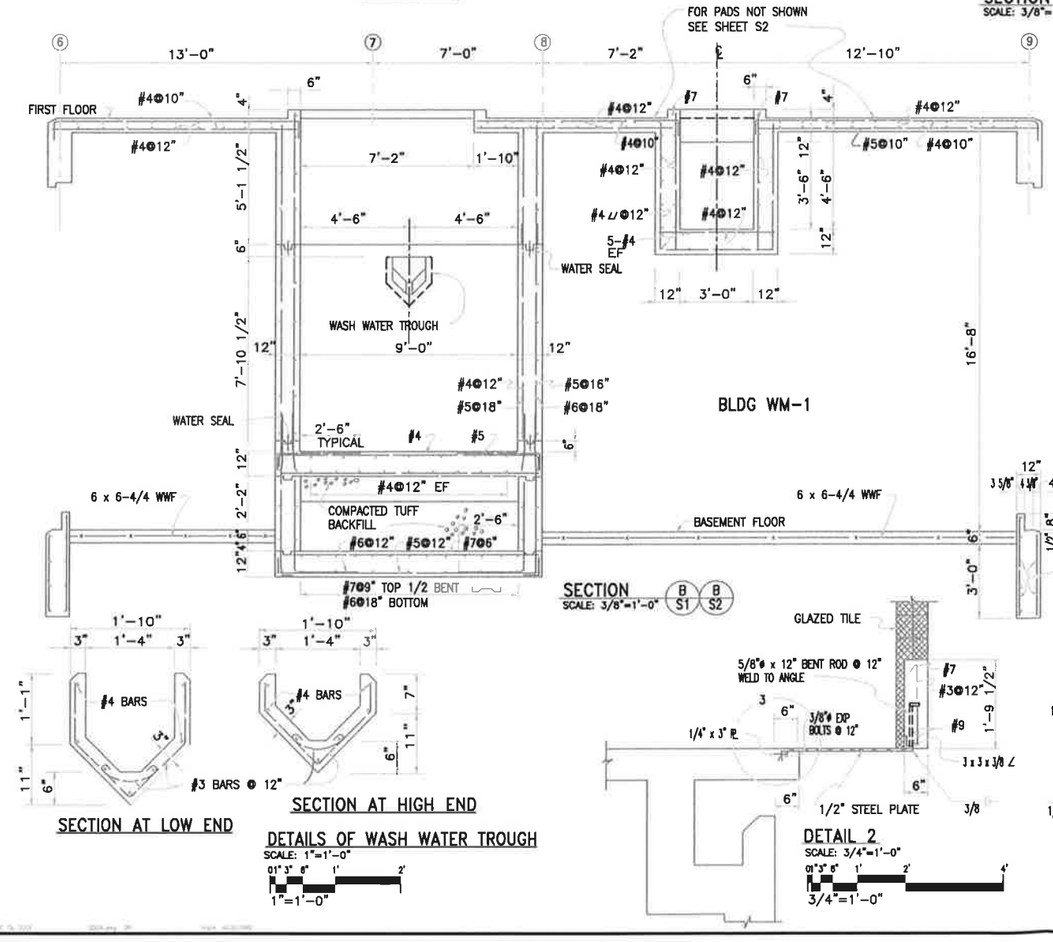


CLARIFER DETAIL
SCALE: NONE

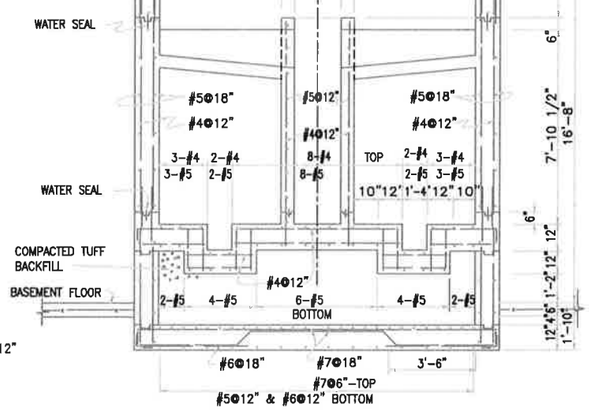


SECTION (D S2)
SCALE: 3/8"=1'-0"





SECTION (B S1 / B S2)
SCALE: 3/8"=1'-0"



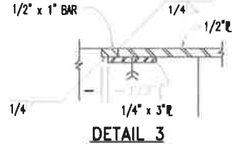
SECTION (C S1 / C S2)
SCALE: 3/8"=1'-0"

SECTION AT LOW END

SECTION AT HIGH END

DETAILS OF WASH WATER TROUGH
SCALE: 1"=1'-0"
0 1' 2' 4' 8'
1"=1'-0"

DETAIL 2
SCALE: 3/4"=1'-0"
0 1' 2' 4'
3/4"=1'-0"



DETAIL 3

GENERAL NOTES:

1. TUFF BACKFILL TO BE COMPACTED TO 95 TO 100 PERCENT MAXIMUM DENSITY. SEE SPECIFICATIONS.
2. NOT AS-BUILT VERIFIED.

REFERENCE DRAWINGS
011955, AB57, 09/17/93

NO.	DATE	CLASS REV.	REVISIONS	DRWN	VER	CHKD	SUB	APP
1	09/04/01		GENERAL REVISIONS	CB		JG	DM	JN

RADIOACTIVE LIQUID WASTE TREATMENT FACILITY
FM-84 RLWTF

AS-BUILT CRITICAL FACILITY
RAD LIQUID WASTE TREATMENT PLANT
PLANT EQUIPMENT SECTIONS

DRAWN	C. BINKLEY
VERIFIED	
CHECKED	J. GRIFFIN
DATE	09/04/01

BLDG. 1 TA-50
SUBMITTED D. MEADOWS
APPROVED FOR RELEASE J. NARUM

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET S11 122 OF 600

CLASSIFICATION REVIEWER DATE
PROJECT ID
DRAWING NO. AB57
REV. 1

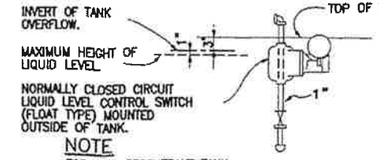
LA-UR-19-20039
ATTACHMENT 1
EPC-DO-19-007

MISCELLANEOUS TANK SCHEDULE

TANK	DIA	HEIGHT	MIN CAP GALLONS	SHELL THICK	TYPE OF SUPPORT	TYPE OF BOTTOM	BOTTOM PL THICKNESS	TYPE OF TOP	THICKNESS OF TOP PL	STIFFENER ANGLE @TOP	LINING	REMARKS
SODIUM HYDROXIDE SOLUTION	9'-0"	10'-0"	4,000	3/16"	CONC.PAD	FLAT	1/4"	CONE	3/16"	———		4" VENT —
SODIUM HYDROXIDE DILUTION	3'-0"	5'-0"	200	3/16"	LEGS	DISHED	1/4"	OPEN	———	3"X3"X3/16"		SEE SHEET M126 FOR LEGS & BASE PL CALLOUT. *
ACID REGENERANT	5'-4"	6'-4"	1,000	3/16"	CONC.PAD	FLAT	1/4"	CONE	3/16"	———	GLASS	2" VENT TO OUTSIDE *
SODIUM HYDROXIDE DILUTION	5'-4"	6'-4"	750	3/16"	CONC.PAD	FLAT	1/4"	OPEN	———	3"X3"X3/16"		*
SPENT REGENERANT	FOR INFORMATION ON SPENT REGENERANT TANK SEE DETAILS DWG. 6013										GLASS	—

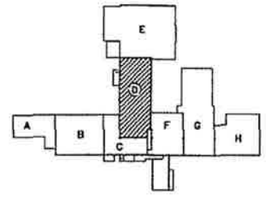
NOTE

PIPE CONNECTIONS, TANK JOINTS, CONSTRUCTION ETC, SHALL CONFORM TO APPLICABLE RULES AS SET FORTH IN THE UNDERWRITERS LABORATORIES, INC. STANDARD FOR ABOVE GROUND STORAGE TANKS FOR HAZARDOUS LIQUIDS.
ANCHOR TANKS THAT ARE ON CONCRETE PAD SUPPORTS WITH 6-1/2" ϕ ANCHOR BOLTS EQUALLY SPACED AROUND PERIPHERY OF TANK BOTTOM.
* - SEE DETAIL 1 M115

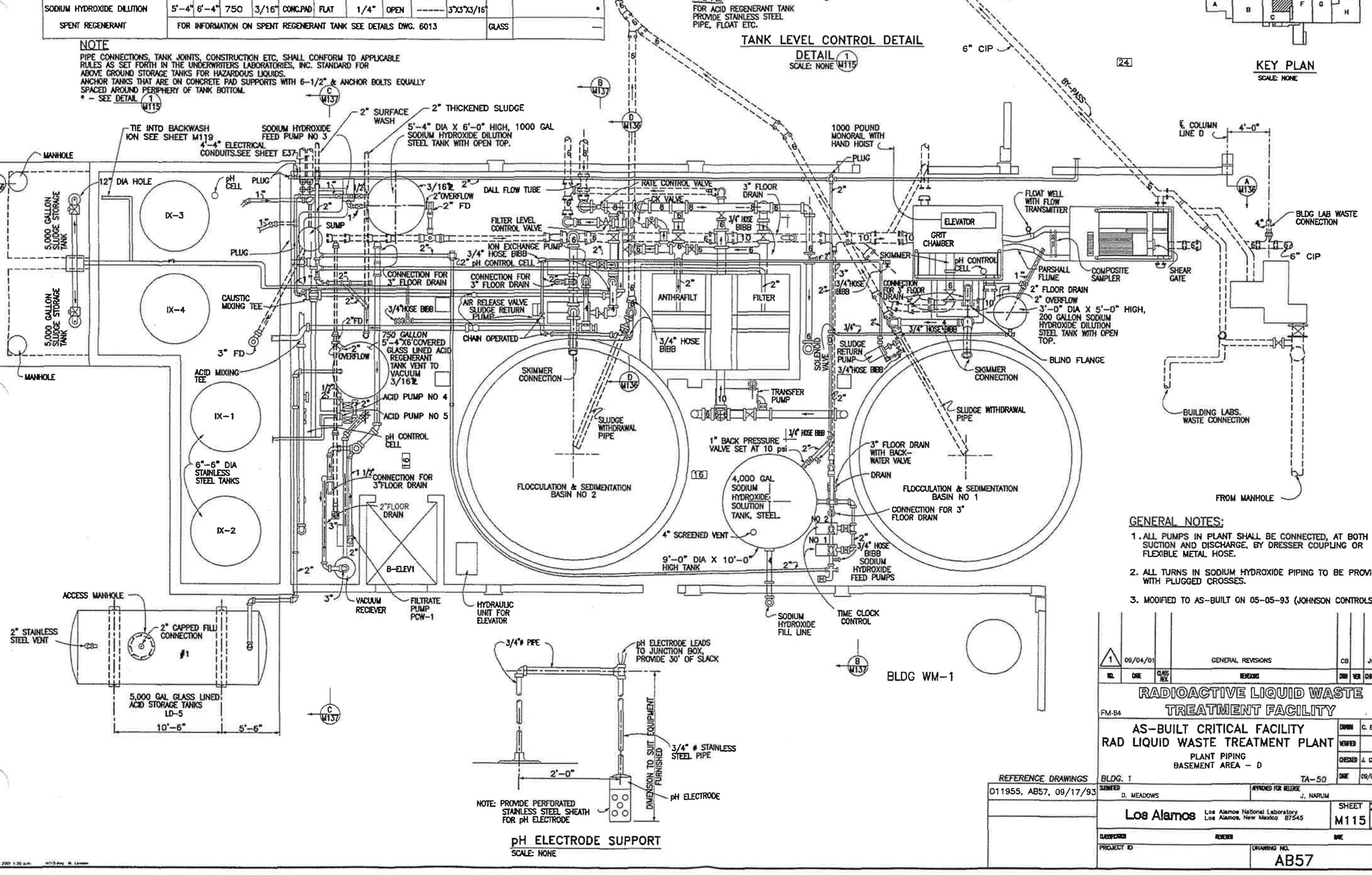


NOTE
FOR ACID REGENERANT TANK PROVIDE STAINLESS STEEL PIPE, FLOAT ETC.

TANK LEVEL CONTROL DETAIL
DETAIL 1 M115
SCALE: NONE



KEY PLAN
SCALE: NONE



pH ELECTRODE SUPPORT
SCALE: NONE

GENERAL NOTES:

1. ALL PUMPS IN PLANT SHALL BE CONNECTED, AT BOTH SUCTION AND DISCHARGE, BY DRESSER COUPLING OR FLEXIBLE METAL HOSE.
2. ALL TURNS IN SODIUM HYDROXIDE PIPING TO BE PROVIDED WITH PLUGGED CROSSES.
3. MODIFIED TO AS-BUILT ON 05-05-93 (JOHNSON CONTROLS INC.)

REFERENCE DRAWINGS
011955, AB57, 09/17/93

NO.	DATE	CLASS REV.	REVISIONS	DRN	VER	CHKD	SUB	APP
1	09/04/01		GENERAL REVISIONS	CB		JG	DWJ	JN

RADIOACTIVE LIQUID WASTE TREATMENT FACILITY
FM-84 RLWTF

AS-BUILT CRITICAL FACILITY
RAD LIQUID WASTE TREATMENT PLANT
PLANT PIPING
BASEMENT AREA - D

DRAWN C. BINKLEY
VERIFIED
CHECKED J. GRIFFIN
DATE 09/04/01

BLDG. 1 TA-50

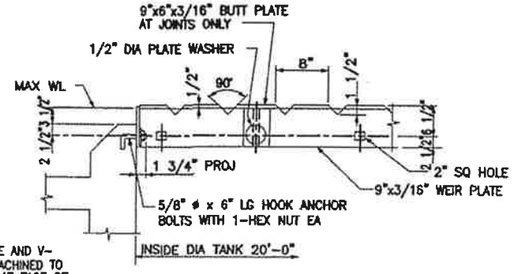
SUBMITTED D. MEADOWS
APPROVED FOR RELEASE J. NARUM

Los Alamos Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET M115 290 OF 600

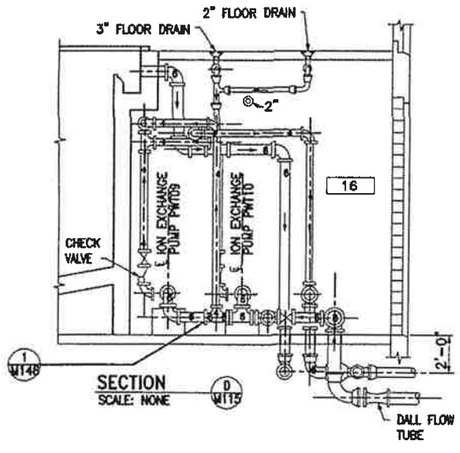
CLASSIFICATION REVIEWER DATE

PROJECT ID DRAWING NO. AB57 REV. 1



TOP EDGE OF PLATE AND V-NOTCHES TO BE MACHINED TO A TRUE EDGE. COAT FACE OF CONCRETE AND ADJACENT SIDE OF WEIR PLATE WITH A HEAVY LAYER OF HOT ROOFING ASPHALT, BEFORE PLACING PLATE, TO INSURE A TIGHT SEAL.

FLOCCULATION SEDIMENTATION BASIN
WEIR PLATE DETAIL
SCALE: NONE



GENERAL NOTES:

1. MODIFIED TO AS-BUILT ON 5-12-93, BY JOHNSON CONTROLS.
2. THE GRIT CHAMBER HAS BEEN DISCONNECTED AND DECOMMISSIONED IN PLACE.
3. REFER TO M115 FOR CURRENT PROCESS PIPING CONFIGURATION.

NO.	DATE	CLASS REV	REVISIONS	DRN	VER	CHD	SUB	APP
1	09/04/01		GENERAL REVISIONS	CB		JG	DM	JN

RADIOACTIVE LIQUID WASTE TREATMENT FACILITY

FM-84 RLWTF

AS-BUILT CRITICAL FACILITY
RAD LIQUID WASTE TREATMENT PLANT
PLANT PIPING AND DETAILS

BLDG. 1 TA-50

DRAWN C. BINKLEY
VERIFIED
CHECKED J. GRIFFIN
DATE 08/04/01

REFERENCE DRAWINGS
011955, AB57, 09/17/93

SUBMITTED D. MEADOWS
APPROVED FOR RELEASE J. NARUM

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET M136 311 OF 600

CLASSIFICATION MARKER DATE

PROJECT ID DRAWING NO. AB57 REV. 1

ATTACHMENT 2

DP-1132 Stabilization Plan for Gravity Filter

EPC-DO: 19-007

LA-UR-19-20039

Date: JAN 2 5 2019

Attachment 2

Radioactive Liquid Waste Treatment Facility Stabilization Plan for the Gravity Filter

Discharge Permit DP-1132

Condition No. 41

LA-UR-19-20039

Los Alamos
NATIONAL LABORATORY
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1.0 STABILIZATION OBJECTIVE AND CRITERIA

This Stabilization Plan describes activities that will be undertaken to stabilize the Gravity Filter, a treatment unit for low-level radioactive liquid wastes (RLW). This Plan has been prepared in accordance with the provisions specified in Condition 41 of Discharge Permit DP-1132, issued by the New Mexico Environment Department (NMED). Information is presented in the same sequence as requirements are listed in Condition 41.

The primary objective of stabilizing the Gravity Filter is to empty and isolate the unit so that it will pose no threat to the environment (groundwater and air) until closure.

2.0 DESCRIPTION OF THE GRAVITY FILTER

The Gravity Filter is a concrete rectangular tank with 2 cells containing media (sand, anthracite), and a middle chamber in the center of the tank separating the cells (see attachments 6.2 & 6.4). The Gravity Filter has a working volume of about 7,000 gallons, and is designed to handle feed flow rates ranging from 135-225 gpm. The tank is 13 feet long, 9 feet wide, and has a height of ~13 feet. Both cells are 5 feet wide and share a ~9 foot vertical wall with the 2 foot wide middle chamber; the cells contain 1 foot of anthracite resting on top of 3 foot of sand. At the bottom of the cells there is a 1 foot high underdrain (Wheeler Bottoms), which the media rest on, with a trench in the bottom center of each cell running the width of the tank. Each cell has a trough that slopes up from the middle chamber wall to the inner tank wall and are centered at half the width of the tank. The cement structural support for the Gravity Filter extends 16 inches below the slab floor of the building.

The Gravity Filter was backwashed in order to clean the effluent piping and media so solids/sludge would not hinder its productivity. The solids/sludge backwash was sent back to TK-75 for retreatment through the plant.

The Gravity Filter went into operation in July 1963, and has been used ever since. Since it is located within Building 1 of Technical Area 50, the Gravity Filter is within SWMU 50-001(a). However, there are no reports of past leaks, and no evidence of current leaks.

2.1 Gravity Filter Function

The Gravity Filter system comprised the second treatment step of the Main Treatment Process in the RLWTF; directly downstream of Clarifier #1 and Clarifier #2. It provided removal of suspended solids >50 micron from the clarifiers.

The Gravity Filter had one entry stream (treated water from clarifiers) and three exit streams (filtered water both cells, and middle chamber drain water). Feed enters from a 10 inch pipe from either Clarifier #1 or Clarifier #2 into the middle chamber of the Gravity Filter. Treated waters filter through the media to an underdrain; exiting from a 10 inch pipe at the bottom of each cell to the next treatment unit.

NOTE The exit streams of both cells are the same lines used to introduce Gravity Filter backwash water.

2.2 Historic Waste Streams

Treated water from the Clarifier #1 and Clarifier #2 were the historic feed streams to the Gravity Filter. Influent came from multiple generators at LANL, and was collected and stored in the 75K tank at Building 50-002. Influent was then pumped from the 75K Tank to the clarifier, where chemicals such as lime (calcium hydroxide), caustic soda (sodium hydroxide), and iron sulfate were added to assist in precipitating impurities, including radionuclides. Effluent from the Clarifiers then entered the Gravity Filter removing suspended solids.

Clarifier effluent/overflow: Radioactivity levels averaged less than 10 nanocuries per liter (nCi/L) alpha activity. Three alpha-emitting radionuclides (Americium-241, Plutonium-238, and Plutonium-239) accounted for more than 99% of the alpha radioactivity in the effluent. Beta-emitting radionuclides averaged less than 1 nCi/L. Tritium concentrations have historically averaged 25 nCi/L, but have averaged less than 10 nCi/L in recent years.

Clarifier effluent/overflow: Non-radioactive constituents included common metals (iron, sodium, silicon) and anions (nitrate, chloride, sulfate, phosphate) at parts-per-million (ppm) concentrations. Regulated metals were also present, but always at parts-per-billion concentrations, far below levels that would make the influent a RCRA hazardous waste. Total dissolved solids concentration of influent averaged less than 1000 ppm.

3.0 GRAVITY FILTER STABILIZATION ACTIVITIES

3.1 Remove Unused Chemicals

Carbon dioxide was used to adjust the Gravity Filter pH from 10-11 to 6-8. Carbon dioxide was stored in a holding tank outside of 50-0001 (north of room 16); transferred via a compressor. The tank was emptied in June of 2015. Additionally, a sodium hydroxide line that was used for the Reverse Osmosis skid CIP tank runs atop the Gravity Filter, although it was not used for treating Gravity Filter water, this line will be removed in order to mitigate potential release into the Gravity Filter.

Criterion: Carbon dioxide tank and sodium hydroxide line are empty.

Verification: Carbon dioxide - maintenance work package.

Sodium hydroxide - visually verified (before and after photographs).

Documentation: Maintenance work order #477255-01 completion which will be used for the carbon dioxide tank. Photographs will be taken of the sodium hydroxide line. The maintenance work order, photographs, and activity records (e.g., disposition of unused chemicals) will be used as input for the Stabilization Report.

3.2 Dismantle Chemical Feed Systems

Carbon dioxide (~1-inch-diameter copper lines feed at the top of the Gravity Filter): Stabilization will be achieved when valves 116-CO2-VO2, 116-CO2-VO9, and the copper elbow on the compressed air side upstream of 116-CO2-V08 are removed and openings capped. All the copper lines in-between the two valves and elbow will be removed and disposed as solid low-level radioactive waste.

The ~1-inch steel sodium hydroxide line that runs adjacent to the compressed air line has been previously severed and capped. However, this line will need to be removed back to the elbow and capped in order to allow safe entry into the Gravity Filter, and disposed as solid low-level radioactive waste.

Criterion: Feed system for chemicals will be removed.

Verification: Removal will be visually verified (before and after photographs).

Documentation: Before and after photographs will be taken in Room 116. Dismantling, characterization, and disposal activities will be documented. Photographs and activity records will be used as input for the Stabilization Report.

3.3 Flush Gravity Filter and Process Piping

Industrial water or effluent water will be used to backwash the Gravity Filter to TK-75; solids (e.g. sludge) collect in the troughs which outlet to the middle chamber (inlet waste lines will be flushed during the stabilization of the clarifiers). Flush water is transferred from the middle chamber to the Main Treatment Plant (microfilter and reverse osmosis). The act of transferring flush water out of Gravity Filter will flush outlet piping. Flushing may need to be repeated until the stabilization criterion is met.

Criterion: Flushing will be adequate when flush water concentration decreases to <10 nCi/L.

Verification: Analytical results for flush water samples will be used to verify that the flush criterion has been met.

Documentation: Operating records and analytical data will be used as input for the Stabilization Report.

3.4 Remove Process Liquids and Solids

Liquids and solids will be transferred from Gravity Filter to other treatment units for low-level radioactive liquid wastes, where the solids and liquids were treated, in accordance with existing operating procedures. Specifically, solids will be pumped to TK-8 in Room 61, then processed through the rotary vacuum filter. Gravity Filter liquids will be processed through the Main Treatment Plant (microfilter, perchlorate ion exchange, and reverse osmosis) prior to discharge to the environment. Vacuum filter solids will be characterized, then disposed. It is anticipated that vacuum filter solids will be disposed as solid low-level radioactive waste.

Criterion: Gravity Filter will no longer contain process liquids and solids.

Verification: Process records for backflush and drawings of the Gravity Filter.

Documentation: The condition of the interior of the Gravity Filter following removal of liquids and solids will be documented through process records and will be used as input for the Stabilization Report.

3.5 Remove Filter Media (Sand and Anthracite)

A structure will be constructed to allow safe entry and exit into and from the gravity filter. The filter media will then be placed in approved waste containers (e.g., 55 gallon drums) and disposed as solid low-level radioactive waste.

Criterion: Gravity Filter will be a shell.

Verification: Removal will be visually verified (before and after photographs).

Documentation: The condition of the interior of the Gravity Filter following removal of filter media will be documented through photographs and through radiological surveys of the interior walls of the Gravity Filter. Operating records and photographs will be used as input for the Stabilization Report.

3.6 Clean and Seal Interior Gravity Filter Surfaces

Interior surfaces will then be cleaned using measures such as low-pressure spraying, a high-pressure spray wand and/or stiff brushes. Cleaning materials such as water will collect in the Gravity Filter, then be transferred the Main Treatment Plant for processing through the microfilter, perchlorate ion exchange, and reverse osmosis. Cleaning measures may need to be repeated until the stabilization criterion is met. Residual contamination will then be fixed by applying a brush/roll-on fixative (e.g., paint) to the interior Gravity Filter surfaces.

Criteria: Cleaning will be complete when interior surfaces have no residual solids. Sealing of residual contamination will be complete when contamination levels of painted surfaces have been reduced to <20 dpm per 100 cm2.

Verification: Cleaning will be visually verified. Radioactive survey results will be used to verify that the sealing criterion has been met.

Documentation: Photographs of the interior walls of the clarifier will be taken prior to cleaning, after cleaning, and after sealing. Radiological surveys will be taken after surfaces have been sealed. Operating records, photographs, and radioactive survey data will be used as input for the Stabilization Report.

3.7 Isolate Inlet and Outlet Lines

Piping that carried process materials, carbon dioxide, and industrial/effluent tank water into or from the Gravity Filter will be isolated by removal, by capping, or by applying blind flanges, thereby assuring that materials can no longer enter the Gravity Filter, and that the Gravity Filter will be in a stable condition until closure in accordance with the RLWTF Closure Plan (LANL 2016). Section 4.1 of this Stabilization Plan has a detailed list of the lines and how each will be isolated.

Criterion: All inlet and outlet lines will be isolated either by removing the line, by capping, or by applying a blind flange.

Verification: Isolation will be visually verified.

Documentation: Before and after photographs will be taken of process pipe connections. Photographs and activity records will be used as input for the Stabilization Report.

3.8 Isolate Support Systems

Industrial water: Used to backwash the Gravity Filter. This will be isolated as part of the drain line isolation in section 4.1 of this Stabilization Plan.

Compressed air: Compressed air was used to operate Gravity Filter components (e.g. air actuated valves) and was also used to purge the carbon dioxide lines. Compressed air will be stabilized when the compressed air line for carbon dioxide described in section 3.2 of this stabilization plan is stabilized and air actuated valves are removed (the compressed air lines will be capped).

Ventilation: Not applicable. Rooms 16 and 116 receive general room ventilation. There are no gravity filter-specific systems to stabilize.

Control panel: The Gravity Filter Control Panel located in room 116 (south of the Gravity Filter) was used to electronically operate equipment (e.g. valves, mixers) will be removed and disposed as solid low-level radioactive waste.

Standing line: A 4-inch diameter pipe that descends down into the Gravity Filter. This pipe has been severed and no longer poses a threat to allowing the entering/exiting of water from the Gravity Filter. The only purpose of this pipe is to support the current FAS (Fixed Air Sampler) in room 116 that collects air samples and monitors airborne contaminates. This pipe will be removed to allow cleaning activities, and disposed as solid low-level radioactive waste.

4.0 OTHER STABILIZATION INFORMATION

4.1 Gravity Filter Conveyance Lines

Four pipes enter the Gravity Filter. One is a process line, one recirculation line, and two surface wash lines. The process line enters from the north side of the Gravity Filter, the recirculation line from the top, and the surface wash lines from the south side of the Gravity Filter. A rubber purge line also enters the top of the Gravity Filter.

A. Lines into the Gravity Filter:

1. Feed to the Gravity Filter: This 10-inch steel pipe drops into Room 16. The 10-inch pipe runs directly from Clarifier #2 to Clarifier #1, about 10 feet above the floor of Room 16. Either feed to the gravity filter drops vertically into a 10-inch feed line to the gravity filter, or into a six-inch line, that bypasses the gravity filter. Stabilization will be achieved by removing valves 016-GFB-V04 (10-inch diameter), 016-GFB-V02 (four-inch diameter), and 016-ISOL-V08 (10-inch diameter), and by applying blind flanges to the two openings that result when each valve is removed (total of six openings).

2. Gravity Filter recirculation (~1-inch steel pipe into the top of the gravity filter from the top of the two chemical dissolution tanks): The pipe will be removed during the stabilization of both Clarifier #1 and Clarifier #2 and is, therefore, not considered part of the stabilization of the Gravity Filter. In addition, valve 016-GFE-VO5 will be removed; upstream end will be capped and downstream piping removed and disposed as solid low-level radioactive waste.

3. Filter surface wash lines (~4-inch-diameter pipes into the top of each cell of the Gravity Filter): Stabilization will be achieved by removing valves 016-BKW-V09 and 016-EFF-V08, and by applying blind flanges to the two openings that result when each valve is removed (total of 4 openings).

4. Purge line (~1/4 inch rubber tubing): Stabilization will be complete when the tee, located in-between valves 116-INF-V18 and 116-INF-V20, is removed, and lines capped (3 lines). This will be part of the stabilization plan for the Clarifiers in section 4.1 and is, therefore, not considered part of the stabilization of the Gravity Filter.

4.1 Gravity Filter Conveyance Lines (continued)

B. Potable Water Lines into the Gravity Filter:

1. Remove the eyewash/safety shower SHS005 located atop the Gravity Filter and cap or relocate line to new eyewash/safety shower location.

2. Remove the eyewash/safety shower SHS004 located atop the Gravity Filter and cap or relocate line to new eyewash/safety shower location.

C. Process Lines Out of the Gravity Filter:

NOTE The Gravity Filter could either be backwashed with industrial water, or north and south effluent tank water from building 50-002. The backwash lines are one in the same as the drain lines from Cell #1 and Cell #2, therefore, when the drain lines for both cells are stabilized so will be the backwash lines.

1. Middle chamber drain line (10-inch diameter): Stabilization will be achieved when the tee that is located ~15 inches from the exterior wall of the Gravity Filter is removed and blind flanges are applied to all three openings.

2. Drain line from Cell #1 (10-inch diameter): Stabilization will be achieved when the tee located ~4 inches from the exterior wall of the Gravity Filter is removed and blind flanges are applied to all 2 openings. The third opening consisting of a 6 foot long spool piece running from the tee of Cell #1 to the four-way spool piece of Cell #2; this pipe will be removed and disposed as solid low-level radioactive waste.

3. Drain line from Cell #2 (10-inch diameter): Stabilization will be achieved when the four-way spool piece that is located ~4 inches from the exterior wall of the Gravity Filter is removed and blind flanges are applied to all 3 openings. The fourth opening consisting of the same 6 foot long pipe from the tee of Cell #1; will be removed when both Cell #1 and Cell #2 are stabilized.

4. Gravity Filter recirculation (~1-inch diameter steel pipe): This line recirculated water from the bottom of the Gravity Filter to the solid chemical dissolution tanks (used for the Clarifiers) to minimize the use of industrial water for mixing of the dry chemicals; this is part of the same line in section 4.1 part A of this stabilization plan that allowed excess water from the recirculation to enter the top of the Gravity Filter. Stabilization will be achieved when the recirculation pump in-between valves 016-GFE-V-11 and 016-GFE-V-12 is removed and inlet/outlet ends from the pump are capped.

4.2 Implementation: Portions of the Closure Plan

Stabilization of the Gravity Filter pursuant to this Stabilization Plan will execute the following portions of Closure Plan-related activities at the RLW:

DP-1132, Condition 42.d, Methods to be used for decontamination of the site and equipment:

- Sludge and liquids will be removed from the Gravity Filter and treated in the existing RLW;
- The Gravity Filter media will be removed and disposed as solid low-level radioactive waste.
- The interior surfaces of the Gravity Filter will be cleaned (e.g., low-pressure and/or high-pressure wash; and
- Residual contamination will be fixed by applying a brush/roll-on fixative such as paint to the interior Gravity Filter surfaces.

DP-1132, Condition 42.h, Methods to be used to characterize waste generated during closure:

- Samples of sludge removed from the Gravity Filter will be sampled and analyzed for radioactivity (alpha radionuclides, beta radionuclides, and tritium) and RCRA toxicity-characteristic metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).

DP-1132, Condition 42.j, Methods to be used to remove, transport, treat, recycle, and dispose of waste generated during closure:

- Liquids and sludge from within the Gravity Filter will be removed and treated in accordance with existing operating procedures for the Gravity Filter, for the Main Treatment Plant, and for the vacuum filter in the Secondary Treatment Plant.

4.3 Interim Measures and Controls for the Gravity Filter

The activities described in Section 3 of this Stabilization Plan will prevent all future releases of (a) water contaminants to the environment, (b) water contaminants from moving into the ground water, and (c) water contaminants from posing a threat to human health.

Succinctly, process solids and liquids will be removed from the Gravity Filter, so that it is empty. Inlet and outlet lines will be removed or capped, or will have blind flanges applied so that new water and process wastes cannot be introduced to the unit.

4.4 Soil and Groundwater Investigation

There are no reports of past leaks for the Gravity Filter, and no evidence of current leaks. The Gravity Filter is a part of SWMU 50-001(a), defined as all of Building 50-001.

In addition, the Gravity Filter itself is located within Rooms 16 and 116 of Building 50-001. Walls of the unit are visible to operators and other personnel. Had the Gravity Filter developed a leak, then water would have been discovered on the floor of Room 16.

The structural support for the Gravity Filter and the effluent process lines to TK-71 and backwash to TK-75 from the Gravity Filter extend beneath the floor of Room 16. A below-grade leak would have been evident as a decrease in water level in the Gravity Filter.

The investigation, characterization, cleanup and corrective action requirements for potential releases of contaminants into soil, groundwater and other environmental media from solid waste management units (SWMUs) and areas of concern (AOCs) associated with the RLWTF are contained within the Compliance Order of June 2016 entered into between the NMED and the DOE pursuant to the New Mexico Hazardous Waste Act, NMSA 1978, §74-4-10 and the New Mexico Solid Waste Act, NMSA 1978, §74-9-36(D). Accordingly, sampling will be conducted per an investigation work plan approved by the Hazardous Waste Bureau under the Consent Order during final closure.

4.5 Stabilization Report

Within 30 days of completion of stabilization activities, a Stabilization Report will be submitted to the NMED for approval. The report will describe stabilization activities, and will contain photographs, radioactive survey data, and other documentation specified in Section 3 of this Plan as evidence that stabilization has been completed.

4.6 Stabilization Schedule

Funding for the stabilization of the Gravity Filter has been requested for fiscal year 2021. Stabilization would be initiated October 2020 and completed September 2021. The Stabilization Report would be submitted to the NMED in October 2021.

Should funding not be received, a revision to this schedule will be required, and a revision to this Stabilization Plan would result.

5.0 REFERENCES

New Mexico Environment Department, June 2016. *Compliance Order on Consent U.S. Department of Energy Los Alamos National Laboratory.*

New Mexico Environment Department, date TBD. *Ground Water Discharge Permit DP-1132, Radioactive Liquid Waste Treatment Facility, Los Alamos National Laboratory.*

LANL, April 2010. *Investigation Report for Upper Mortandad Canyon Aggregate Area, Revision 1, EP-2010-0149*, page 98.

LANL, September 2016. *Radioactive Liquid Waste Treatment Facility Closure Plan, LA-UR-16-27050.*

6.0 ATTACHMENTS

Attachment	Title
A	*Stabilization Criteria and Documentation for the Gravity Filter*
B	*Drawing AB57, As-Built Critical Facility Rad Liquid Waste Treatment Plant, Plant Equipment Sections, Sheet S11. Revision 1, Sep 2001*
C	*Drawing AB57, As-Built Critical Facility Rad Liquid Waste Treatment Plant, Plant Piping Basement Area D, Sheet M115. Revision 1, Sep 2001*
D	*Drawing AB57, As-Built Critical Facility Rad Liquid Waste Treatment Plant, Plant Piping and Details, Sheet M136. Revision 1, Sep 2001*

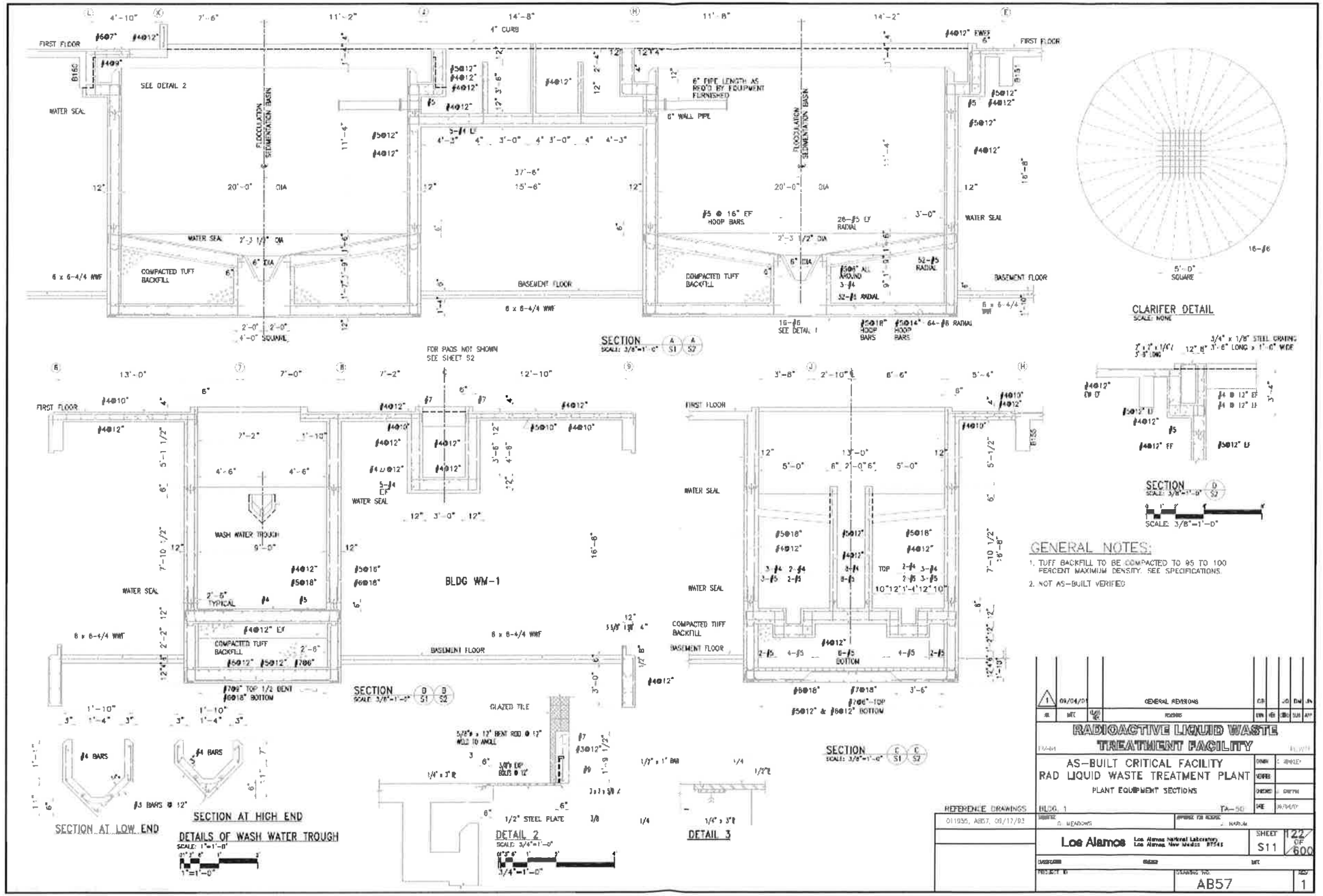
Attachment A, Stabilization Criteria and Documentation for Gravity Filter

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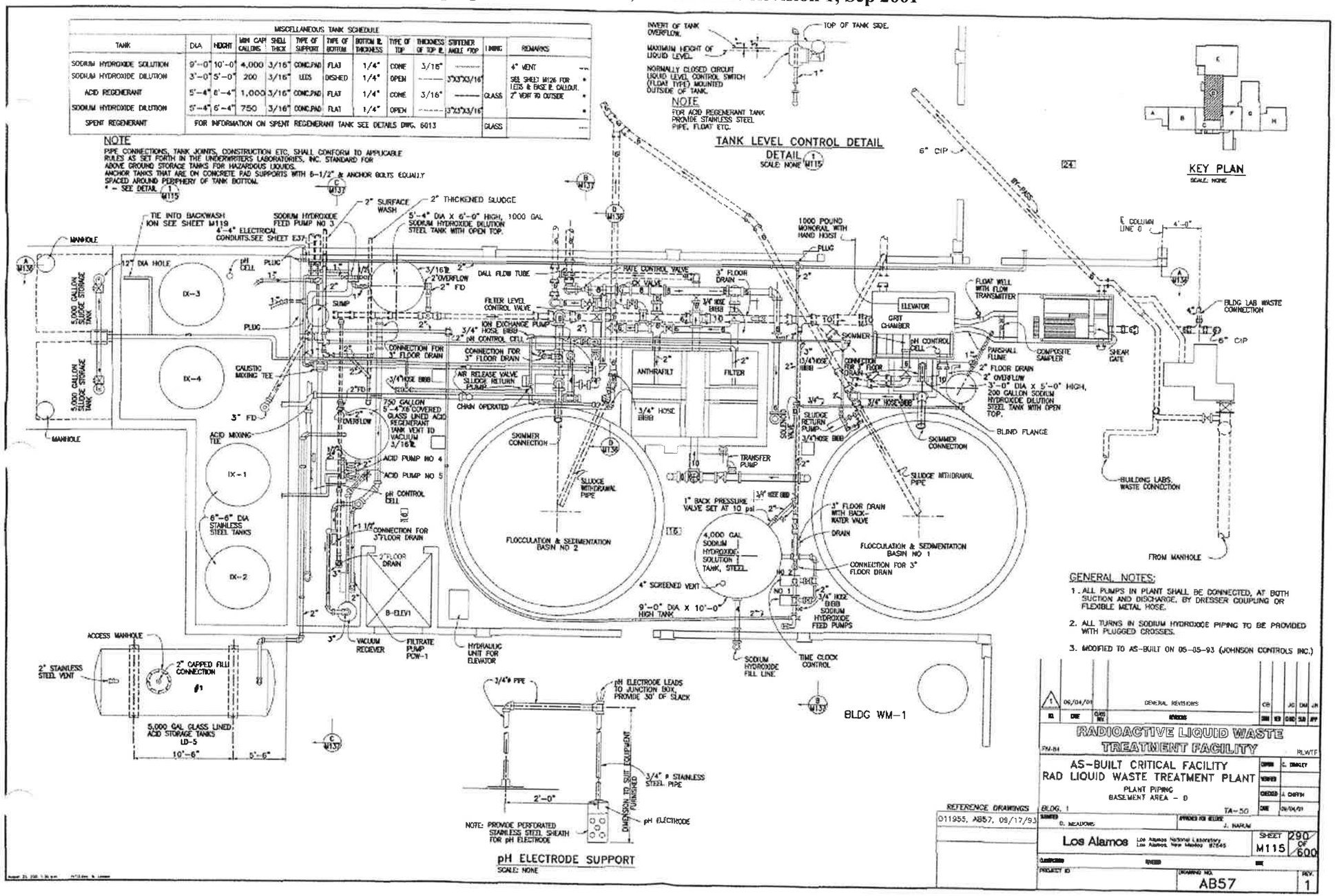
Activity	Criteria	Documentation
1. Remove unused chemicals	Carbon dioxide tank and sodium hydroxide line are empty	• Maintenance work order #477255-01 completion • Before and after photographs
2. Dismantle chemical feed system	Feed system for chemicals will be removed	Before and after photographs
3. Flush Gravity Filter and process lines	Flush water < 10 nCi/L	Flush water analytical results
4. Remove process liquids and solids	Gravity Filter will no longer contain process liquids or solids	Process records for backflush and drawings of the Gravity Filter
5. Remove filter media (sand and gravel)	Gravity Filter will be a shell	Before and after photographs
6. Clean and seal interior Gravity Filter surfaces	• Cleaning: No residual solids • Sealing: Contamination < 20 dpm/100 cm^2	• Cleaning: Before and after photographs • Sealing: Radiation survey results
7. Isolate inlet and outlet lines	Remove or cap the line, or apply a blind flange	Before and after photographs

In addition to above-listed documentation, activity logs and records will be used as documentation for all activities.

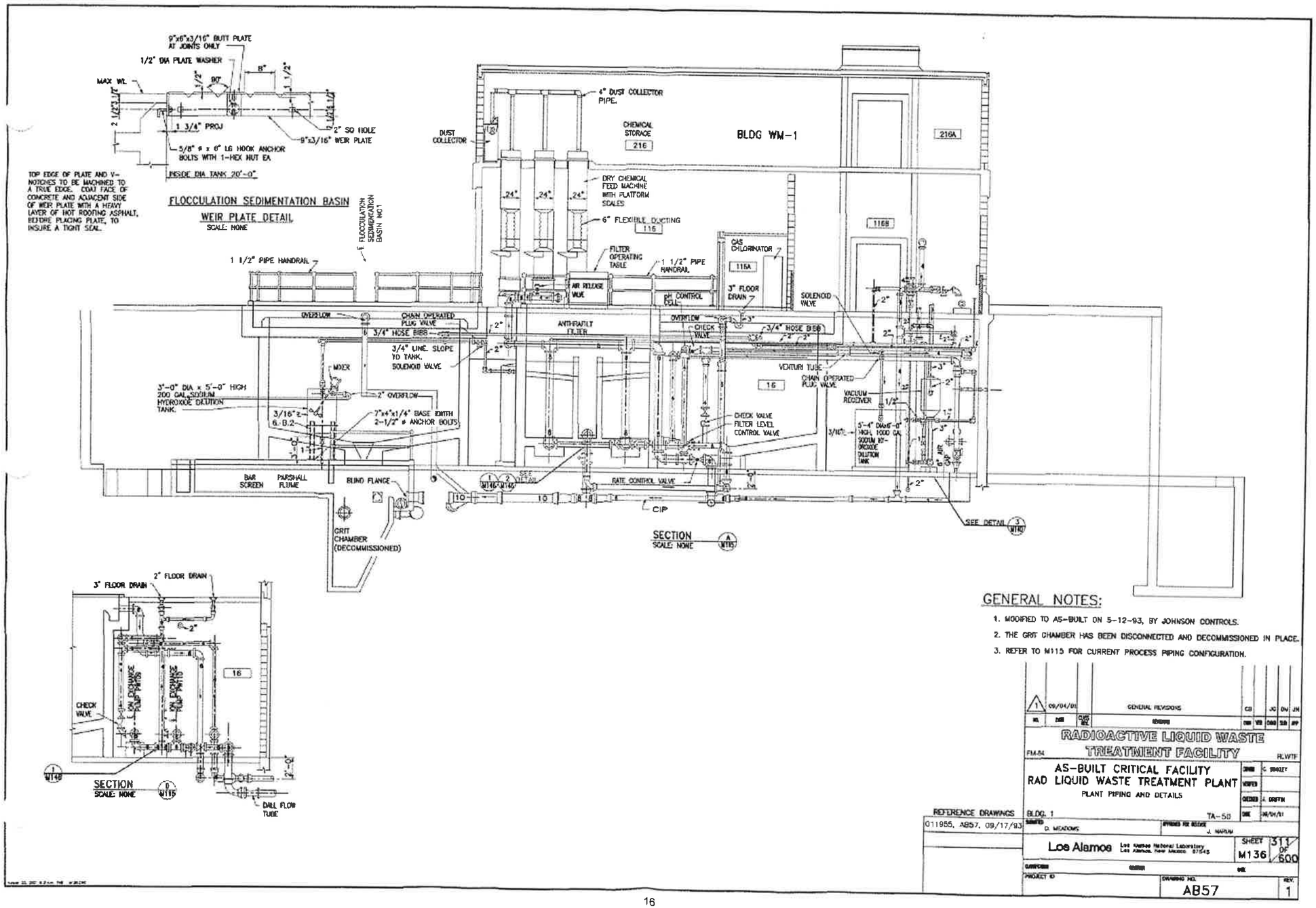
Attachment B, Drawing AB57, As-Built Critical Facility Rad Liquid Waste Treatment Plant, Plant Equipment Sections, Sheet S11. Revision 1, Sep 2001



Attachment C, Drawing AB57, As-Built Critical Facility Rad Liquid Waste Treatment Plant, Plant Piping Basement Area D, Sheet M115. Revision 1, Sep 2001



Attachment D, Drawing AB57, As-Built Critical Facility Rad Liquid Waste Treatment Plant, Plant Piping and Details, Sheet M136. Revision 1, Sep 2001



GENERAL NOTES:

1. MODIFIED TO AS-BUILT ON 5-12-93, BY JOHNSON CONTROLS.
2. THE GRIT CHAMBER HAS BEEN DISCONNECTED AND DECOMMISSIONED IN PLACE.
3. REFER TO M115 FOR CURRENT PROCESS PIPING CONFIGURATION.

NO.	DATE	CHKD BY	REVISIONS	DRN	VID	DES	SUB	APP
1	09/04/01		GENERAL REVISIONS	CD		JC	DN	JN

RADIOACTIVE LIQUID WASTE TREATMENT FACILITY

FM-84 RLWTF

AS-BUILT CRITICAL FACILITY
RAD LIQUID WASTE TREATMENT PLANT
PLANT PIPING AND DETAILS

DRAWN C. BRADLEY
VERIFIED
CHECKED J. GRIFFIN
DATE 08/01/01

REFERENCE DRAWINGS
011955, AB57, 09/17/93

BLDG. 1 TA-50

SUBMITTED D. MEADOWS
APPROVED FOR RELEASE J. MARUM

Los Alamos Los Alamos National Laboratory Los Alamos, New Mexico 87545

SHEET M136 311 OF 500

PROJECT ID

DRAWING NO. AB57

REV. 1

ATTACHMENT 3

DP-1132 Stabilization Plan for WM2-North/South Tank

EPC-DO: 19-007

LA-UR-19-20039

Date: JAN 2 5 2019

Attachment 3

Radioactive Liquid Waste Treatment Facility Stabilization Plan for the Low-Level WM2-North/South Tanks

Discharge Permit DP-1132

Condition No. 41

LA-UR-19-20039

Los Alamos
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1.0 STABILIZATION OBJECTIVE AND CRITERIA

This Stabilization Plan describes activities that will be undertaken to stabilize the WM2-North/South tanks which store evaporator drain water. This plan has been prepared in accordance with the provisions specified in Condition 41 of Discharge Permit DP-1132, issued by the New Mexico Environment Department (NMED). Information is presented in the same sequence as requirements are listed in Condition 41.

The primary objective of stabilizing the WM2-North/South tanks is to empty and isolate the units so that they will pose no threat to the environment (groundwater and air) until closure.

2.0 DESCRIPTION OF THE WM2-NORTH/SOUTH TANKS

The WM2-North/South tanks are square concrete tanks. The tanks are 15' x 15' x 15' with a total storage volume for each tank of 25,000 gallons. Both tanks have a 10-inch outlet line and a 6-inch inlet line. (See Attachment B).

The WM2-North/South tanks went into operation in 1963. The WM2-North/South tanks are within SWMU 50-002(a). There are no reports of past leaks, and there is no evidence of current leaks.

2.1 Function

The WM2-North/South tanks were used for storage of effluent from 1963 through 1999. From 1999 to 2010, they were used for waste evaporator overhead. From 2011 to the present, they have been used for effluent evaporator drain water. No treatment occurred within the tanks.

2.2 Historic Waste Streams

Effluent, waste evaporator overhead, and effluent evaporator drain water were the historic streams stored in the WM2-North/South effluent tanks.

Effluent (1963-1999):

Radioactivity levels averaged less than 1 nanocuries per liter (nCi/L) alpha activity. Three alpha-emitting radionuclides (Americium-241, Plutonium-238, and Plutonium-239) accounted for more than 99% of the alpha radioactivity. Beta-emitting radionuclides averaged less than 2.57 nCi/L. Tritium concentrations have historically averaged 211 nCi/L.

2.2 Historic Waste Streams (continued)

Non-radioactive constituents included common metals (iron, sodium, silicon) and anions (nitrate, chloride, sulfate, phosphate) at parts-per-million (ppm) concentrations. Regulated metals were also present, but always at parts-per-billion concentrations, far below levels that would make the influent a RCRA hazardous waste. The total dissolved solids concentration of effluent averaged 1387 ppm.

Waste Evaporator Overhead (1999-2010):

Radioactivity levels averaged less than 1 nanocuries per liter (nCi/L) alpha activity. Three alpha-emitting radionuclides (Americium-241, Plutonium-238, and Plutonium-239) accounted for more than 99% of the alpha radioactivity in the influent. Beta-emitting radionuclides averaged less than 1 nCi/L. Tritium concentrations have historically averaged 22 nCi/L.

Non-radioactive constituents included common metals (iron, sodium, silicon) and anions (nitrate, chloride, sulfate, phosphate), with sodium being the most prevalent metal. Regulated metals were also present, but always at parts-per-billion concentrations, below levels that would make the influent a RCRA hazardous waste. Total dissolved solids concentration of waste evaporator overhead were as high as 470 ppm.

Effluent Evaporator Drain Water (2011-present):

Radioactivity levels averaged less than 2 nanocuries per liter (nCi/L) alpha activity. Three alpha-emitting radionuclides (Americium-241, Plutonium-238, and Plutonium-239) accounted for more than 99% of the alpha radioactivity in the influent. Beta-emitting radionuclides averaged less than 2 nCi/L. Tritium concentrations have historically averaged 11 nCi/L.

Non-radioactive constituents included common metals (iron, sodium, silicon) and anions (nitrate, chloride, sulfate, phosphate), with sodium being the most prevalent metal. Regulated metals were also present, but always at parts-per-billion concentrations, below levels that would make the influent a RCRA hazardous waste. Total dissolved solids concentration of effluent evaporator drain water were as high as 7,800 ppm.

All three streams were from the main treatment plant, and had little to no solids, low concentrations of radiological constituents, and low concentrations of non-radiological constituents overall.

3.0 STABILIZATION ACTIVITIES FOR THE WM2-NORTH/SOUTH EFFLUENT TANKS

3.1 Remove Process Liquids from the WM2-North/South Tanks

Liquids will be transferred from the WM2-North/South tanks to TK-71 and/or TK-72. TK-71 and TK-72 are the feed tanks for the main treatment plant, which includes microfilter, perchlorate ion exchange, and reverse osmosis. Treatment will be in accordance with existing operating procedures.

Criterion: The WM2-North/South tanks will no longer contain process liquids.

Verification: Removal will be visually verified using photographs.

Documentation: The condition of the interior of the WM2-North/South tanks following removal of liquids will be documented through process records and will be used as input for the Stabilization Report.

3.2 Remove Process Solids from the WM2-North/South Tanks

Solids are not expected. However, if solids are found, the process solids will be removed with a high-pressure spray wand, placed in approved waste containers, or sent through the main treatment plant to be processed via the vacuum filter.

Criterion: The WM2-North/South tanks will be a shell.

Verification: Removal will be visually verified (before and after photographs).

Documentation: The condition of the interior of the WM2-North/South tanks after the solids are removed will be documented through photographs and through radiological surveys of the interior walls. Operating records and photographs will be used as input for the Stabilization Report.

3.3 Flush the WM2-North/South Tanks and Process Piping

Industrial water will be used to flush the WM2-North/South tanks. Flush water will be transferred to the main treatment plant, where it will be treated through the microfilter and reverse osmosis. Transferring flush water in and out of the WM2-North/South tanks will flush process piping. Flushing may need to be repeated until the stabilization criterion is met.

Criterion: Flushing will be adequate when flush water concentration decreases to <10 nCi/L.

Verification: Analytical results for flush water samples will be used to verify that the flush criterion has been met.

Documentation: Operating records and analytical data will be used in the Stabilization Report.

3.4 Clean and Seal Interior Surfaces

Interior surfaces are expected to be clean due to quality of historic process streams. However, if cleaning is deemed necessary, then the interior surfaces will be cleaned using measures such as low-pressure spraying or a high-pressure spray wand. Cleaning materials will be collected in the WM2-North/South tanks, then transferred the main treatment plant for processing through the microfilter. Cleaning measures may need to be repeated until the stabilization criterion is met. Residual contamination will be fixed or sealed with a roll-on fixative (e.g., paint) to the interior surfaces of the WM2-North/South tanks.

Criteria: Cleaning will be complete when interior surfaces have no residual solids and liquids. Sealing of residual contamination will be complete when contamination levels of painted surfaces are reduced to <20 dpm per 100 cm^2.

Verification: Cleaning will be visually verified. Radioactive survey results will be used to verify that the sealing criterion has been met.

Documentation: Photographs of the interior walls of the WM2-North/South tanks will be taken prior to cleaning, after cleaning, and after sealing. Radiological surveys will be taken after surfaces have been sealed. Operating records, photographs, and radioactive survey data will be used as input for the Stabilization Report.

3.5 Isolate Inlet and Outlet lines

The WM2-North/South tanks have a total of four process pipes. Each of the two tanks has one influent process pipe of 10-inch diameter carbon steel and one effluent line of 6-inch diameter carbon steel.

Piping that carried process materials into or from the WM2-North/South tanks will be isolated by removal, by capping, or by applying blind flanges, thereby assuring that materials can no longer enter the tanks, and that the tanks will be in a stable condition until closure in accordance with the RLW Closure Plan (*LANL 2016*).

Section 4.1 of this Stabilization Plan has a detailed list of the lines and how each will be isolated.

Criterion: All inlet and outlet lines will be isolated either by removing the line, by capping, or by applying a blind flange.

Verification: Isolation will be visually verified.

Documentation: Before and after photographs will be taken of process pipe connections. Photographs and activity records will be used as input for the Stabilization Report.

3.6 Isolate Support Systems

Compressed Air: Not applicable

Electrical: Electric power was used to operate the two inlet and outlet valves and will be disconnected when the valves are removed. (See Section 4.1.)

Industrial Water: Not applicable

Ventilation: Not applicable

4.0 OTHER STABILIZATION INFORMATION

4.1 The WM2-North/South Tanks Conveyance Lines

The WM2-North/South tanks each have one 10-inch outlet pipe and one 6-inch inlet pipe for a total of 4 pipes. The influent comes from either the North FRAC or South FRAC tank (evaporator drain) or TK-9.

Outlet flows primarily go to the following tanks:

- TK-71, RLW low-level influent
- TK-72, RLW low-level influent/sump water
- TK-9

However, water can be sent to tanks in addition to TK-71, TK-72, and TK-9.

The two influent valves (WM2-EFF-V10 and WM2-EFF-V09) and the two steel outlet valves (WM2-EFF-V20 and WM2-EFF-V21) will be removed and blind flanged. This will ensure no water enters or exits the WM2 North/South Effluent tanks prior to closure.

4.2 Implementation of Portions of the Closure Plan

Stabilization of the WM2-North/South tanks includes executing the following portions of Closure Plan-related activities at RLW:

DP-1132, Condition 42.d - methods to be used for decontamination of the site and equipment:

- Liquids will be removed within WM2-North/South tanks and processed (treated) in the existing RLW plant
- Solids will be removed from the WM2-North/South tanks, packaged in 55-gallon drums, and then shipped to a commercial facility for disposal as solid low-level radioactive waste.
- The interior surfaces of the WM2-North/South tanks may be cleaned with low-pressure and/or high-pressure wash.
- Residual contamination will be fixed by applying a spray-on fixative such as paint to the interior surfaces of the WM2-North/South tanks.

4.2 Implementation of Portions of the Closure Plan (continued)

DP-1132, Condition 42.h - methods to be used to characterize waste generated during closure:

- If solids are discovered, then samples from the WM2-North/South tanks will be analyzed for radioactivity (alpha radionuclides, beta radionuclides, and tritium) and RCRA toxicity-characteristic metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).

DP-1132, Condition 42.j - methods to be used to remove, transport, treat, recycle, and dispose of waste generated during closure:

- Liquids and solids from within the WM2-North/South tanks will be removed and treated in accordance with existing operating procedures.

4.3 Interim Measures and Controls for the WM2-North/South Tanks

The activities described in Section 3 of this Stabilization Plan will prevent all future releases of (a) water contaminants to the environment, (b) water contaminants from moving into the ground water, and (c) water contaminants from posing a threat to human health.

Process solids and liquids will be removed from the WM2-North/South tanks so that they will be empty. Inlet and outlet pipes will be removed or capped, or will have blind flanges applied so that new water and process wastes cannot be introduced to the units.

4.4 Soil and Groundwater Investigation

There are no reports of past leaks for the WM2-North/South tanks, and there is no evidence of current leaks. The WM2-North/South tanks are a part of SWMU 50-002(a), defined as all of building 50-0002.

In addition, the WM2-North/South tanks are located south west of building 50-0001 and are part of 50-0248. Exterior walls of the tanks are visible to operators and other personnel. Had the WM2-North/South tanks leaked, water would have been discovered inside or outside of 50-0002, and the origin of the leak would have been obvious.

The investigation, characterization, cleanup, and corrective action requirements for potential releases of contaminants into soil, groundwater, and other environmental media from solid waste management units (SWMUs) and areas of concern (AOCs) associated with RLW are contained within the Compliance Order of June 2016.

4.4 Soil and Groundwater Investigation (continued)

The Compliance Order was entered into between the NMED and the DOE pursuant to the New Mexico Hazardous Waste Act, NMSA 1978, §74-4-10 and the New Mexico Solid Waste Act, NMSA 1978, §74-9-36(D). Accordingly, during final closure, sampling will be conducted as stated in the investigation work plan approved by the Hazardous Waste Bureau under the Consent Order.

4.5 Stabilization Report

Within 30 days of completion of stabilization activities, a Stabilization Report will be submitted to the NMED for approval. The report will describe stabilization activities, and will contain photographs, radioactive survey data, and other documentation specified in Section 3 of this plan as evidence that stabilization has been completed.

4.6 Stabilization Schedule

Funding for the stabilization of the WM2-North/South tanks has been requested for fiscal year 2021. Stabilization would be initiated October 2020 and completed September 2021. The Stabilization Report would be submitted to the NMED in October 2021. If funding is not received, a revision to this schedule will be required, and a revision to this Stabilization Plan would result.

5.0 REFERENCES

New Mexico Environment Department, June 2016. *Compliance Order on Consent U.S. Department of Energy Los Alamos National Laboratory.*

New Mexico Environment Department. *Ground Water Discharge Permit DP-1132, Radioactive Liquid Waste Treatment Facility, Los Alamos National Laboratory.*

LANL, April 2010. *Investigation Report for Upper Mortandad Canyon Aggregate Area, Revision 1*, EP-2010-0149, page 98.

6.0 ATTACHMENTS

Attachment	Title
A	*Stabilization Activities, Criterion, and Documentation for The WM2 North/South Tanks*
B	*Drawing AB57, RLWTF support drawings AS-BUILT, Influent, Effluent and Sludge Holding Tanks Pumping Station Plan, Sheet S53. Revision 1, September 2001.*
C	*Drawing AB57, RLWTF support drawing AS-BUILT, Influent & Effluent Piping Plans – WM2, Sheet M148. Revision 1, November 1999*

Attachment A, Stabilization Criteria and Documentation for the WM2 North/South Tanks

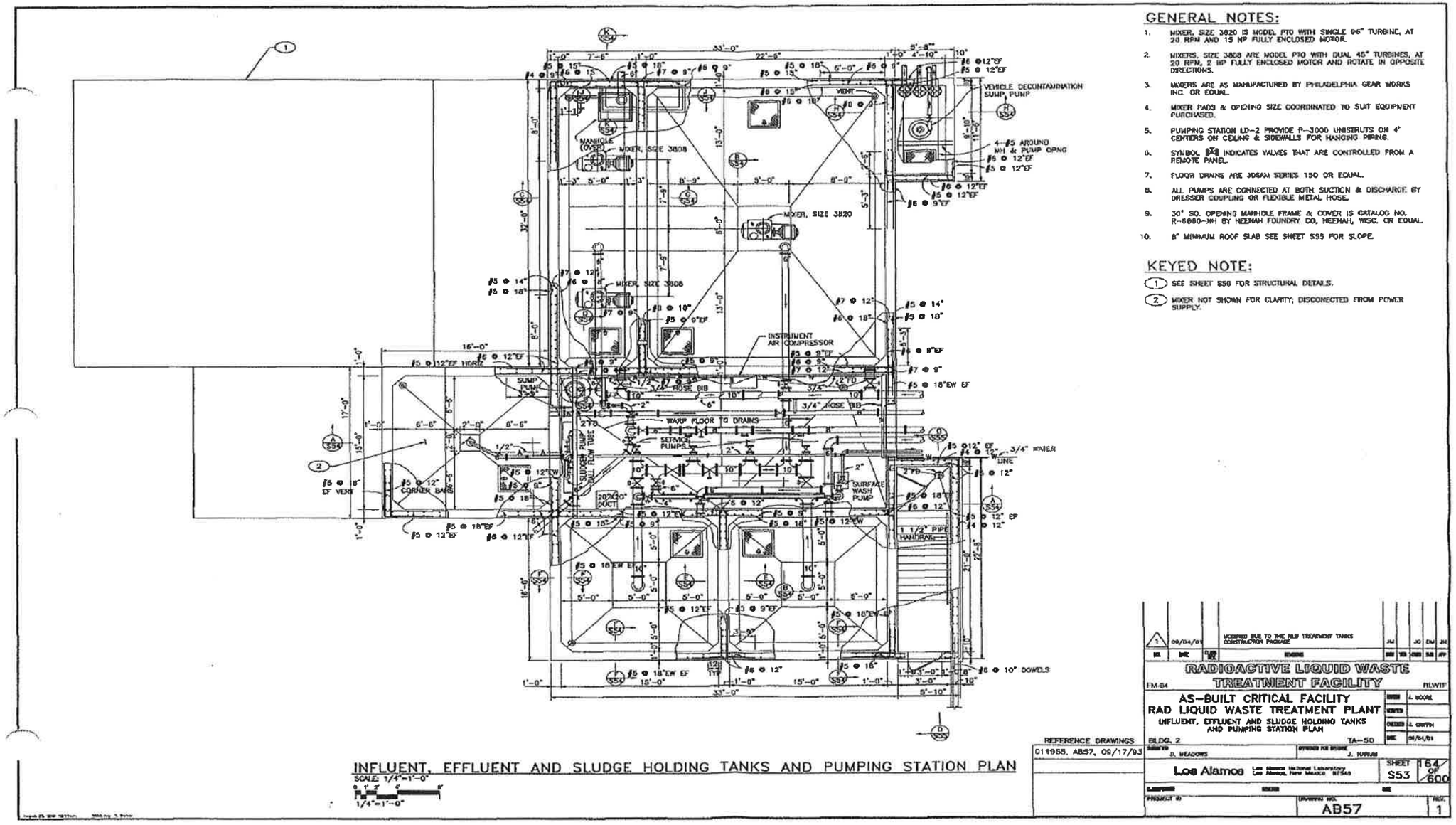
(Page 1 of 1)

Activity	Criteria	Documentation
1. Remove Process Liquids	The North/South Tanks no longer contain process liquids	Process records, including graph of tank levels over time
2. Remove Process Solids	The North/South Tanks will be empty	Before and after photographs
3. Flush The North/South Tanks and Process Piping	Flush water < 10 nCi/L	Flush water analytical results
4. Clean and Seal Interior Surfaces	• Cleaning: No residual solids • Sealing: Contamination < 20 dpm/100 cm^2	• Cleaning: Before and after photographs • Sealing: Radiation survey results
5. Isolate Inlet and Outlet Lines	Remove or cap the line, or apply blind flange	Before and after photographs

In addition to above-listed documentation, activity logs and records will be used as documentation for all activities.

Attachment B, Drawing AB57, RLW Support Drawing AS-BUILT, Influent, Effluent and Sludge Holding Tanks Pumping Station Plan, Sheet S53. Revision 1, September 2001

(Page 1 of 1)



GENERAL NOTES:

1. MIXER, SIZE 3820 IS MODEL PTO WITH SINGLE 26" TURBINE, AT 20 RPM AND 15 HP FULLY ENCLOSED MOTOR.
2. MIXERS, SIZE 3808 ARE MODEL PTO WITH DUAL 45" TURBINES, AT 20 RPM, 2 HP FULLY ENCLOSED MOTOR AND ROTATE IN OPPOSITE DIRECTIONS.
3. MIXERS ARE AS MANUFACTURED BY PHILADELPHIA GEAR WORKS INC. OR EQUAL.
4. MIXER PADS & OPENING SIZE COORDINATED TO SUIT EQUIPMENT PURCHASED.
5. PUMPING STATION LD-2 PROVIDE P-3000 UNISTRUTS ON 4' CENTERS ON CEILING & SIDEWALLS FOR HANGING PIPING.
6. SYMBOL [X] INDICATES VALVES THAT ARE CONTROLLED FROM A REMOTE PANEL.
7. FLOOR DRAINS ARE JOSAM SERIES 150 OR EQUAL.
8. ALL PUMPS ARE CONNECTED AT BOTH SUCTION & DISCHARGE BY DRESSER COUPLING OR FLEXIBLE METAL HOSE.
9. 30" SQ. OPENING MANHOLE FRAME & COVER IS CATALOG NO. R-6650-MH BY NEENAH FOUNDRY CO, NEENAH, WISC. OR EQUAL.
10. 8" MINIMUM ROOF SLAB SEE SHEET S55 FOR SLOPE.

KEYED NOTE:

(1) SEE SHEET S56 FOR STRUCTURAL DETAILS.

(2) MIXER NOT SHOWN FOR CLARITY; DISCONNECTED FROM POWER SUPPLY.

INFLUENT, EFFLUENT AND SLUDGE HOLDING TANKS AND PUMPING STATION PLAN

SCALE: 1/4"=1'-0"

1/4"=1'-0"

REFERENCE DRAWINGS

D11955, AB57, 09/17/93

1	09/04/01		MODIFIED DUE TO THE RLW TREATMENT TANKS CONSTRUCTION PACKAGE.	JM		JG	DM JM
NO.	DATE	CLASS MOD	REMARKS	DES	DRN	CHKD	TLG APP

RADIOACTIVE LIQUID WASTE TREATMENT FACILITY

FM-64 RLWTF

AS-BUILT CRITICAL FACILITY
RAD LIQUID WASTE TREATMENT PLANT
INFLUENT, EFFLUENT AND SLUDGE HOLDING TANKS AND PUMPING STATION PLAN

BLDG. 2 TA-50

DESIGNED L. MOORE
VERIFIED
CHECKED L. GRIFFIN
DATE 09/04/01

SUBMITTED D. MEADOWS
APPROVED FOR ISSUE J. KARAM

Los Alamos Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET S53 164 OF 600

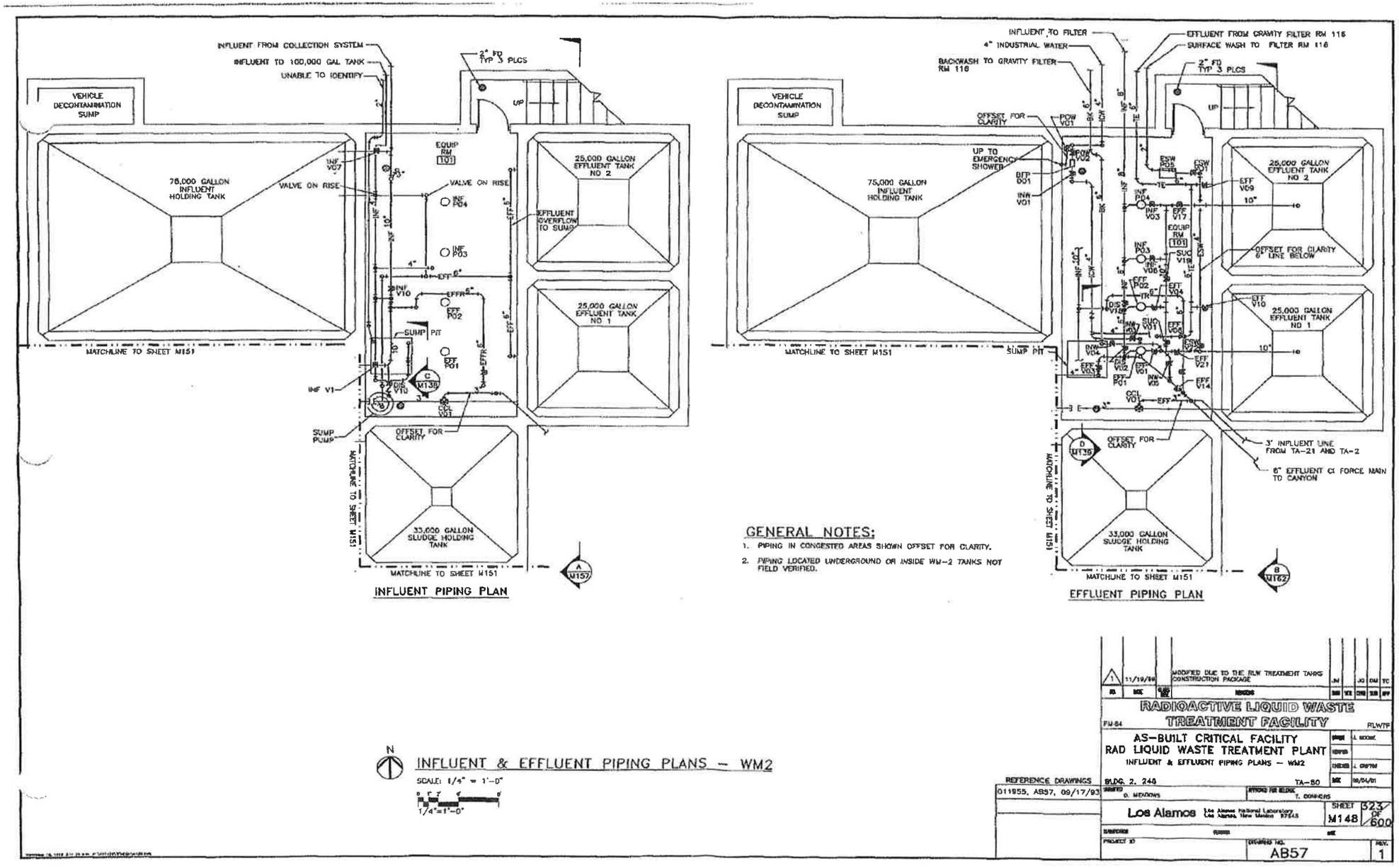
PROJECT ID

DRAWING NO. AB57

REV. 1

Attachment C, Drawing AB57, RLW Support Drawing AS-BUILT, Influent and Effluent Piping Plans – WM2, Sheet M148. Revision 1, November 1999

(Page 1 of 1)



ATTACHMENT 4

DP-1132 Stabilization Plan for 75K Tank

EPC-DO: 19-007

LA-UR-19-20039

Date: JAN 2 5 2019

Attachment 4

Radioactive Liquid Waste Treatment Facility Stabilization Plan for the 75K Tank

Discharge Permit DP-1132
Condition No. 41

LA-UR-19-20039

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Attachment C, Drawing AB57, RLWTF AS-BUILT, COMPOSITE PIPING ISOMETRIC-WM2, Sheet M162. Revision 1, March 2001 12

1.0 STABILIZATION OBJECTIVE AND CRITERIA

This Stabilization Plan describes activities that will be undertaken to stabilize the 75K tank, an influent storage unit for low-level radioactive liquid wastes (RLW). This Plan has been prepared in accordance with the provisions specified in Condition 41 of Discharge Permit DP-1132, issued by the New Mexico Environment Department (NMED). Information is presented in the same sequence as requirements are listed in Condition 41.

The primary objective of stabilizing the 75K tank is to empty and isolate the unit so that it will pose no threat to the environment (groundwater and air) until closure.

2.0 DESCRIPTION OF 75K TANK

The 75K tank is a concrete rectangular tank that is 32 feet long, 22 feet wide, and ~ 15 feet tall with a capacity of 75,000 gallons. The tank is beneath the ground with the top visible from outside and the east wall visible from within WM2.

The 75K tank went into operation in July 1963, and has been used ever since. Since it is located within WM2 of Technical Area 50, the 75K tank is within SWMU 50-002(a). There are no reports of past leaks, and no evidence of current leaks.

2.1 Function

The 75K tank is the influent storage tank from the RLW collection system and is the main tank that feeds the existing Main Treatment Process at the RLWTF. No treatment occurred within the 75K tank.

The RLW collection system line consist of all primary and secondary containment lines that transfer Low-level radioactive waste water from other Technical Areas and converge in the WM-72 vault before entering the 75K tank.

2.2 Historic Waste Streams

Low-level RLW influent was the historic feed stream to the 75K tank. Influent came from multiple generators at LANL, and was collected and stored in the 75K tank at Building 50-002.

Low-level RLW influent: Radioactivity levels averaged 50-100 nanocuries per liter (nCi/L) alpha activity. Three alpha-emitting radionuclides (Americium-241, Plutonium-238, and Plutonium-239) accounted for more than 99% of the alpha radioactivity in the influent. Beta-emitting radionuclides averaged less than 1 nCi/L. Tritium concentrations have historically averaged 25 nCi/L, but have averaged less than 10 nCi/L in recent years.

2.2 Historic Waste Streams (continued)

Low-level RLW influent: Non-radioactive constituents included common metals (iron, sodium, silicon) and anions (nitrate, chloride, sulfate, phosphate) at parts-per-million (ppm) concentrations. Regulated metals were also present, but always at parts-per-billion concentrations, far below levels that would make the influent a RCRA hazardous waste. Total dissolved solids concentration of influent averaged less than 1000 ppm

3.0 STABILIZATION ACTIVITIES FOR 75K TANK

3.1 Remove Process Liquids and Solids

Liquids will be removed from the 75K tank, then either shipped to a commercial facility for treatment and disposal, or transferred to a WMRM influent storage tank for treatment through the new radioactive liquid waste facility, Building 50-230. Solids will be removed from the 75K tank, then shipped to a commercial facility for treatment and disposal.

Criterion: 75K tank will be empty.

Verification: Removal will be visually verified.

Documentation: The condition of the interior of the 75K tank following removal of liquids and solids will be documented through photographs and Operating records; both will be used as input for the Stabilization Report.

3.2 Flush 75K Tank

Industrial water will be used to flush the 75K tank waste lines and the interior walls of the tank, in order to reduce residual internal contamination. Flush water will collect in the 75K tank, then either shipped to a commercial facility for treatment and disposal, or transferred to a WMRM influent storage tank for treatment through the new radioactive liquid waste facility, Building 50-230. Flushing may need to be repeated until the stabilization criterion is met.

Criterion: Flushing will be adequate when flush water concentration decreases to <20 nCi/L.

Verification: Analytical results for flush water samples will be used to verify that the flush criterion has been met.

Documentation: Operating records and analytical data will be used as input for the Stabilization Report.

3.3 Clean and Seal Interior 75K Surfaces

Interior surfaces will then be cleaned using measures such as a high-pressure water wand, sand-blasting, or carbon dioxide pressure spray. Cleaning materials such as water will collect in the 75K then either shipped to a commercial facility for treatment and disposal. (If water sprays are used, the water may instead be transferred to a WMRM influent storage tank for treatment through the new radioactive liquid waste facility, Building 50-230.) Cleaning measures may need to be repeated until the stabilization criterion is met. Residual contamination will then be fixed by applying a brush/roll-on fixative (e.g., paint) to the interior 75K tank surfaces.

Criteria: Cleaning will be complete when interior surfaces have no residual solids and liquids. Sealing of residual contamination will be complete when contamination levels of painted surfaces have been reduced to <20 dpm per 100 cm2.

Verification: Cleaning will be visually verified. Radioactive survey results will be used to verify that the sealing criterion has been met.

Documentation: Photographs of the interior walls of the 75K will be taken prior to cleaning, after cleaning, and after sealing. Radiological surveys will be taken after surfaces have been sealed. Operating records, photographs, and radioactive survey data will be used as input for the Stabilization Report.

3.4 Isolate Inlet and Outlet Lines

All inlet and outlet piping to and from the 75K will be isolated by removal, by capping, or by applying blind flanges, thereby assuring that RLW influent can no longer enter or exit. These lines will be in a stable condition until closure in accordance with the RLWTF Closure Plan (LANL 2016). Section 4.1 of this Stabilization Plan has a detailed list of the lines and how each will be isolated.

Criterion: Inlet and outlet RLW Influent lines will be isolated either by removing the line, by capping, or by applying a blind flange.

Verification: Isolation will be visually verified.

Documentation: Before and after photographs will be taken of process pipe connections. Photographs and activity records will be used as input for the Stabilization Report.

3.5 Isolate Support Systems

Electrical: Electric power was used to operate valves and the mixer in the 75K. Stabilization will be achieved when valves INF-VM07 and INF-V11 are removed.

Industrial Water: Used as seal water for the service pumps that pumped water out of the 75K.

Compressed Air: Not applicable

Ventilation: Not applicable

4.0 OTHER STABILIZATION INFORMATION

4.1 The 75K Tank Conveyance Lines

The 75K tank has one carbon steel 10-inch inlet pipe and one carbon steel 6-inch outlet pipe for the receipt and discharge of RLW influent. There is also a 4-inch overflow line to the sump within WM2, a conveyance line to the 17K within 50-248, and a drain line from RM 34B into the 75K tank. Furthermore, a vehicle decontamination sump, currently out of service, with an overflow core drill and an outlet line from the sump pump to the 75K. Stabilization will be achieved:

- When Valve INF-VM-07 (inlet), valve INF-V11 (outlet), and valve WM2-75K-V58 (line to 17K tank) are removed and blind flanged (see Attachment B).
- When the overflow line flange is removed and blind flanged before it ties into the 6-inch overflow line going to the sump in WM2.
- When the vehicle decontamination sump is emptied and the 8-inch core drill overflow hole to the 75K tank is plugged and the pump discharge line to the 75 tank is severed and capped right before it enters the tank (see Attachment C).
- When RM 34B drain is severed and capped.
- When valves RLWECS-VH-181, RLWECS-VH-191 and RLWECS-VH-201 inside vault WM-72 are removed and blind flanged to prevent receipt of water from WMRM or the RLW Collection System into the 75K tank.

4.2 Portions of the Closure Plan to be Implemented

Stabilization of the 75K tank pursuant to this Stabilization Plan will execute the following portions of Closure Plan-related activities at the RLWTF:

DP-1132, Condition 42.d, Methods to be used for decontamination of the site and equipment:

- Liquids, if any, will be removed within the 75K tank by a subcontractor and shipped off-site;
- Solids will be removed from the 75K tank, packaged (e.g., 55-gallon drums), then shipped to a commercial facility for disposal as solid low-level radioactive waste.
- The interior surfaces of the 75K tank may be cleaned (e.g., low-pressure and/or high-pressure wash; and
- Residual contamination will be fixed by applying a spray-on fixative such as paint to the interior of the 75K tank surfaces.

DP-1132, Condition 42.h, Methods to be used to characterize waste generated during closure:

- If solids are discovered then samples from the 75K tank will be sampled and analyzed for radioactivity (alpha radionuclides, beta radionuclides, and tritium) and RCRA toxicity-characteristic metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).

DP-1132, Condition 42.j, Methods to be used to remove, transport, treat, recycle, and dispose of waste generated during closure:

- Liquids and solids from within the 75K tank will be removed by subcontractors and shipped to a commercial facility for disposal.

4.3 Interim Measures and Controls for the 75K Tank

The activities described in Section 3 of this Stabilization Plan will prevent all future releases of (a) water contaminants to the environment, (b) water contaminants from moving into the ground water, and (c) water contaminants from posing a threat to human health.

Succinctly, process solids and liquids will be removed from the 75K tank, so that it will be empty. Inlet and outlet pipes will be removed or capped, or will have blind flanges applied so that new water and process wastes cannot be introduced to the unit.

4.4 Soil and Groundwater Investigation

There are no reports of past leaks for the 75K tank, and no evidence of current leaks. The 75K tank is a part of SWMU 50-002(a), defined as all of building 50-002. A water tightness test was also performed in Oct 2014 with 27,000 gallons and no leaks were experienced.

In addition, the 75K tank itself is located south west of building 50-001 and a part of 50-248. Exterior walls of the tank are visible to operators and other personnel. Had the 75K developed a leak, then water would have been discovered in 50-002 or outside of 50-002, and the origin of the leak would have been obvious.

The investigation, characterization, cleanup and corrective action requirements for potential releases of contaminants into soil, groundwater and other environmental media from solid waste management units (SWMUs) and areas of concern (AOCs) associated with the RLWTF are contained within the Compliance Order of June 2016 entered into between the NMED and the DOE pursuant to the New Mexico Hazardous Waste Act, NMSA 1978, §74-4-10 and the New Mexico Solid Waste Act, NMSA 1978, §74-9-36(D). Accordingly, sampling will be conducted per an investigation work plan approved by the Hazardous Waste Bureau under the Consent Order during final closure.

4.5 Stabilization Report

Within 30 days of completion of stabilization activities, a Stabilization Report will be submitted to the NMED for approval. The report will describe stabilization activities, and will contain photographs, radioactive survey data, and other documentation specified in Section 3 of this Plan as evidence that stabilization has been completed.

4.6 Stabilization Schedule

Prior to stabilization the 75K tank will be operationally emptied in fiscal year 2019, floor drains will be unplugged and the 75K will remain available for use as emergency storage until all other units in Condition 40 of DP-1132 are stabilized.

Funding for the stabilization of the 75K tank has been requested for fiscal year 2025. Stabilization would be initiated October 2024 and completed September 2026. The Stabilization Report would be submitted to the NMED in October 2026.

Should funding not be received, a revision to this schedule will be required, and a revision to this Stabilization Plan would result.

5.0 REFERENCES

New Mexico Environment Department, June 2016. Compliance Order on Consent U.S. Department of Energy Los Alamos National Laboratory.

New Mexico Environment Department, 08-29-2018. Ground Water Discharge Permit DP-1132, Radioactive Liquid Waste Treatment Facility, Los Alamos National Laboratory.

LANL, April 2010. Investigation Report for Upper Mortandad Canyon Aggregate Area, Revision 1, EP-2010-0149, page 98.

6.0 ATTACHMENTS

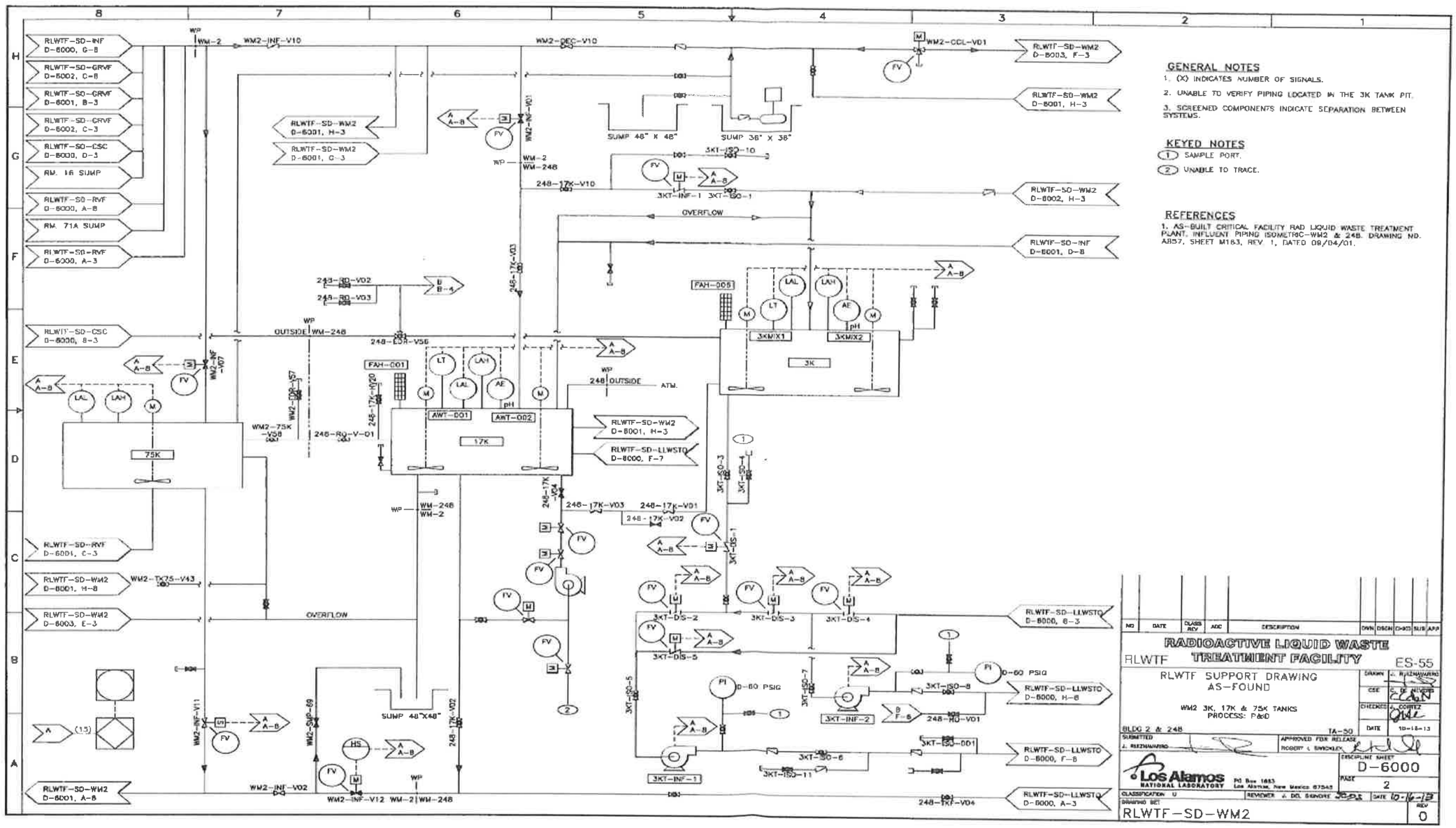
Attachment	Title
A	*Stabilization Activities, Criterion, and Documentation for the 75K Tank*
B	*Drawing RLWTF-SD-WM2, RLWTF support drawing As-Found, WM2 3K, 17K & 75K TANKS PROCESS: P&ID, Sheet D-6000. Revision 0, October 2013*
C	*Drawing AB57, RLWTF AS-BUILT, COMPOSITE PIPING ISOMETRIC-WM2, Sheet M162. Revision 1, March 2001.*

Attachment A, Stabilization Criteria and Documentation for the 75K Tank

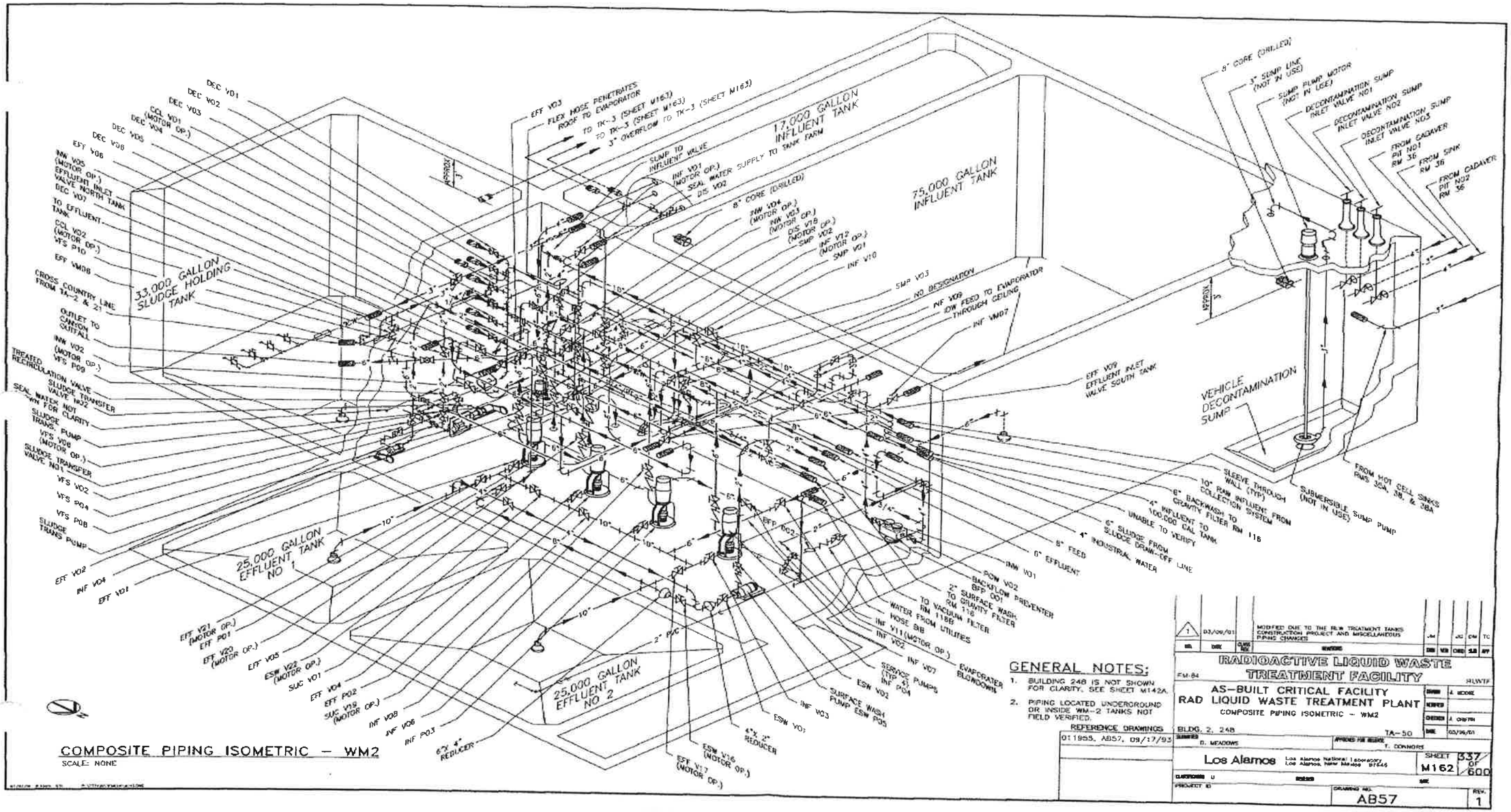
Activity	Criteria	Documentation
1. Remove Process Liquids	The 75K tank will no longer contain process liquids	Process records, including graph of tank levels over time
2. Remove Process Solids	The 75K tank will be empty	Before and after photographs
3. Flush 75K Tank	Flush water <20 nCi/L	Flush water analytical results
4. Clean and Seal Interior Surfaces	• Cleaning: No residual solids • Sealing: Contamination < 20 dpm/100 cm^2	• Cleaning: Before and after photographs • Sealing: Radiation survey results
5. Isolate Inlet and Outlet Lines	Remove or cap the line, or apply blind flange	Before and after photographs

In addition to above listed documentation, activity logs and records will be used as documentation for all activities.

Attachment B, Drawing RLWTF-SD-WM2, RLWTF support drawing As-Found, WM2 3K, 17K & 75K TANKS PROCESS: P&ID, Sheet D-6000. Revision 0, October 2013



Attachment C, Drawing AB57, RLWTF AS-BUILT, COMPOSITE PIPING ISOMETRIC-WM2, Sheet M162. Revision 1, March 2001



COMPOSITE PIPING ISOMETRIC – WM2
SCALE: NONE

GENERAL NOTES:

1. BUILDING 248 IS NOT SHOWN FOR CLARITY, SEE SHEET M142A.
2. PIPING LOCATED UNDERGROUND OR INSIDE WM-2 TANKS NOT FIELD VERIFIED.

REFERENCE DRAWINGS
011955, AB57, 09/17/93

1	03/06/01		MODIFIED DUE TO THE RLWW TREATMENT TANKS CONSTRUCTION PROJECT AND MISCELLANEOUS PIPING CHANGES	JM		JC	CM	TC
NO.	DATE	CLASS NO.	REVISIONS	DES	VER	CHK	SUB	APP

RADIOACTIVE LIQUID WASTE TREATMENT FACILITY
FM-84 RLWTF

AS-BUILT CRITICAL FACILITY
RAD LIQUID WASTE TREATMENT PLANT
COMPOSITE PIPING ISOMETRIC – WM2

BLDG. 2, 248 TA-50

SUBMITTED: D. MEADOWS
APPROVED FOR DESIGN: T. CONNORS

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

DESIGNED: J. MOORE
VERIFIED:
CHECKED: A. CHAVEZ
DATE: 03/06/01

SHEET M162 337 OF 600

PROJECT ID:
DRAWING NO. AB57
REV. 1