SRMC-CWDA-2025-00053
Revision 0

SRMC SAVANNAH RIVER MISSION COMPLETION®

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Proposal to Cease Waste Removal Activities in Tank 11 and Enter Sampling and Analysis Phase

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Waste Disposal Authority

May 19, 2025

Presentation Outline

- Meeting Objective
- Summary / Recommendations
- Waste Removal History and Results
- Additional Cleaning Considerations
- Path Forward
- Request for Department of Energy (DOE), South Carolina Department of Environmental Services (SCDES), and Environmental Protection Agency (EPA) Concurrence
- Background

Acronyms

ALT	Alternate
BWRE	Bulk Waste Removal Efforts
CGCP	Consolidated General Closure Plan
CM	Closure Module
DOE	Department of Energy
DSS	Decontaminated Salt Solution
DWPF	Defense Waste Processing Facility
EPA	Environmental Protection Agency
FFA	Federal Facility Agreement
FTF	F-Area Tank Farm
HTF	H-Area Tank Farm
LL	Liquid Level
LTAD	Low Temperature Aluminum Dissolution
LWTRSAPP	Liquid Waste Tank Residuals Sampling and Analysis Program Plan
MCL	Maximum Contaminant Level
PCWR	Preliminary Cease Waste Removal
SCDES	South Carolina Department of Health and Environmental Services*
SLP	Slurry Pump
SPF	Saltstone Production Facility
STD	Standard
STP	Submersible Transfer Pump
SWPF	Salt Waste Processing Facility
TCCR	Tank Closure Cesium Removal

*South Carolina Department of Environmental Services (SCDES) was known as South Carolina Department of Health and Environmental Control (SCDHEC) prior to July 1, 2024. Throughout this presentation figures and text reproduced from existing documents may still reflect SCDHEC nomenclature.

Meeting Objective

Obtain mutual agreement among DOE, SCDES, and EPA to:

1. Suspend waste removal activities in Tank 11; and
2. Enter the Sampling and Analysis phase in Tank 11 consistent with the *Consolidated General Closure Plan for F-Area and H-Area Waste Tank Systems* (CGCP) and *Liquid Waste Tank Residuals Sampling and Analysis Program Plan* (LWTRSAPP)

Tank 11 Primary

Summary

- Over 99% of the waste volume in Tank 11 has been removed
- A qualitative assessment indicates that the CGCP performance objectives will not be challenged
- Additional waste removal in Tank 11 would have minimal impact on estimated doses/performance objectives in the H-Area Tank Farm (HTF) Performance Assessment
- Additional waste removal activities in Tank 11 would have a negative impact on other Liquid Waste System risk reduction activities
- A quantitative assessment utilizing final residual waste volumes and results of sampling and analysis will be included in the Closure Module covering Tank 11
- A formal discussion on the “practicability” of additional waste removal will be included in the Closure Module covering Tank 11

Performance Objectives

Based on the characteristics and estimated volume of the waste remaining in Tank 11, performance objectives are expected to be met.

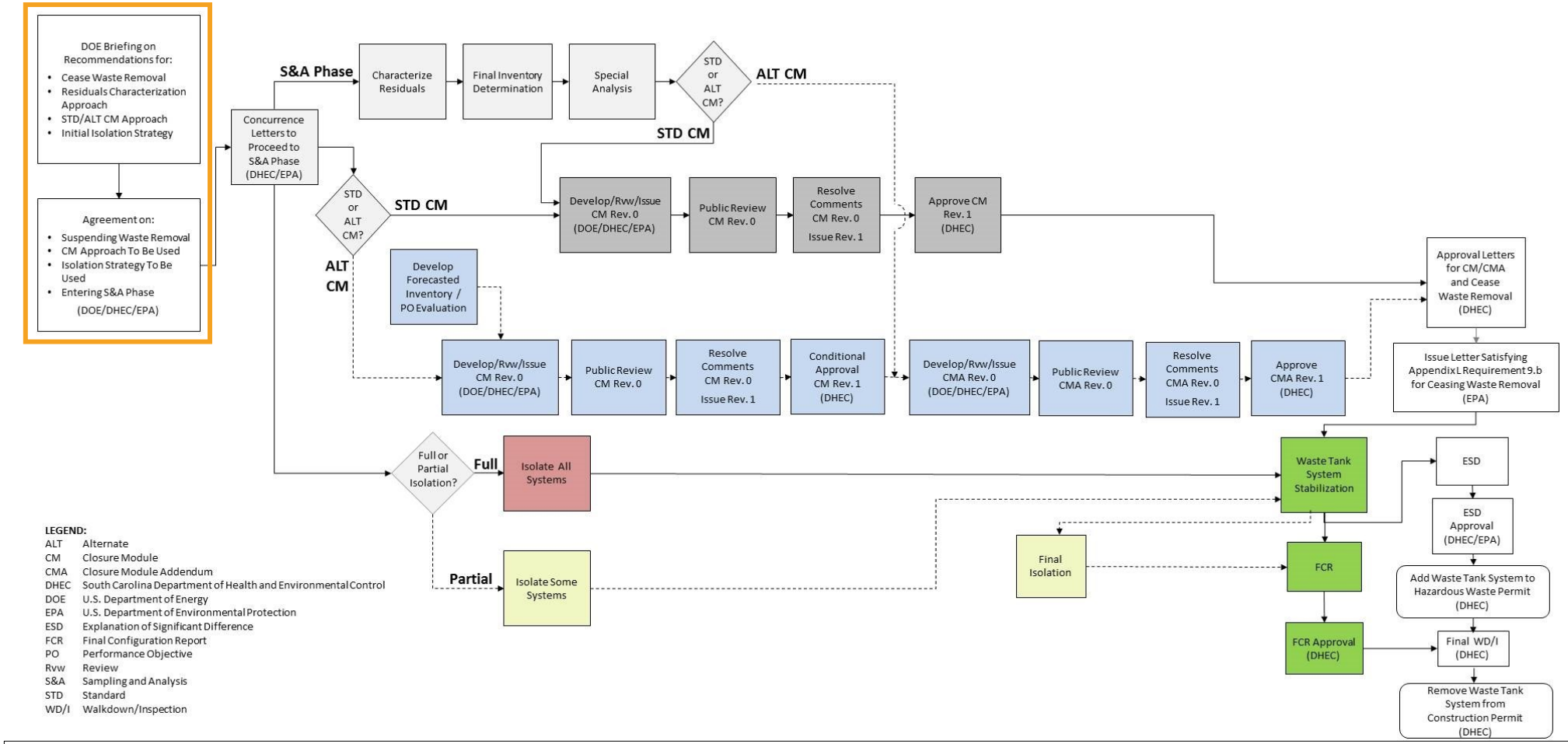
- **Anticipate that concentration values in the groundwater for HTF will be below the Maximum Contaminant Level (MCL) values for all the non-radiological inorganic constituents listed in Table 9.2-1 of the CGCP**
- **Anticipate that concentration values in the groundwater for HTF will be below the MCL values for radionuclides consistent with the State Primary Drinking Water Regulations including:**
  - *4 mrem/yr dose for beta and gamma-emitting nuclides*
  - *15 picocuries per liter (pCi/L) for alpha-emitting nuclides (including Ra-226 but excluding radon and uranium)*
  - *5 pCi/L for radium (Ra-226 plus Ra-228)*
  - *30 micrograms per liter (µg/L) of uranium*

Radiation Dose Perspective

- **Anticipate that the peak dose from Tank 11 alone will be <4 mrem/year during both the 1,000-year and 10,000-year periods after HTF closure***
- **To put this radiological dose into perspective**
  - *Per NCRP-160, the average annual dose to a person in the United States is approximately 620 mrem primarily from:*
    - Approximately 310 mrem from naturally occurring background
    - Approximately 300 mrem from medical procedures

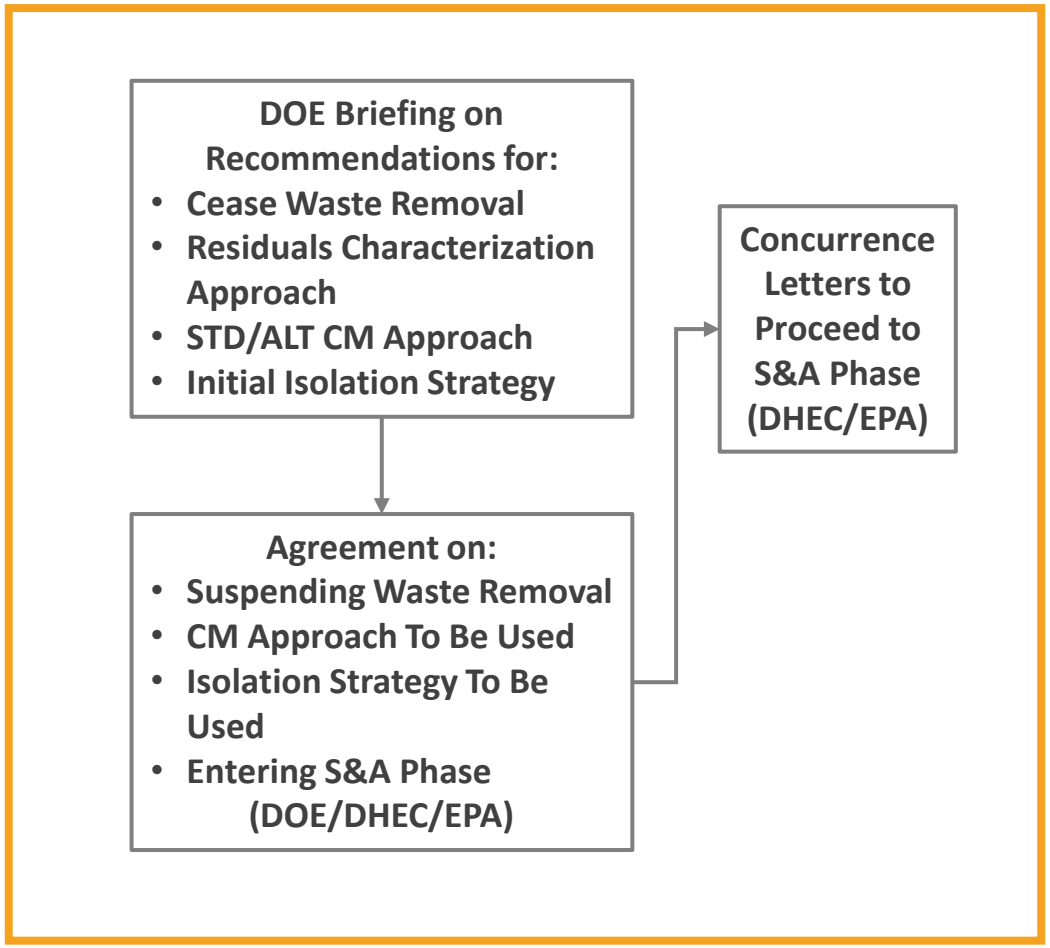
*Based on a preliminary estimate of the volume. Final inventories will be included in the Closure Module.

Pathway to Closure



Closure Module Approval and Waste Tank System Removal from Service Process (GGCP Figure 11.4-1) [SRR-CWDA-2017-00015]

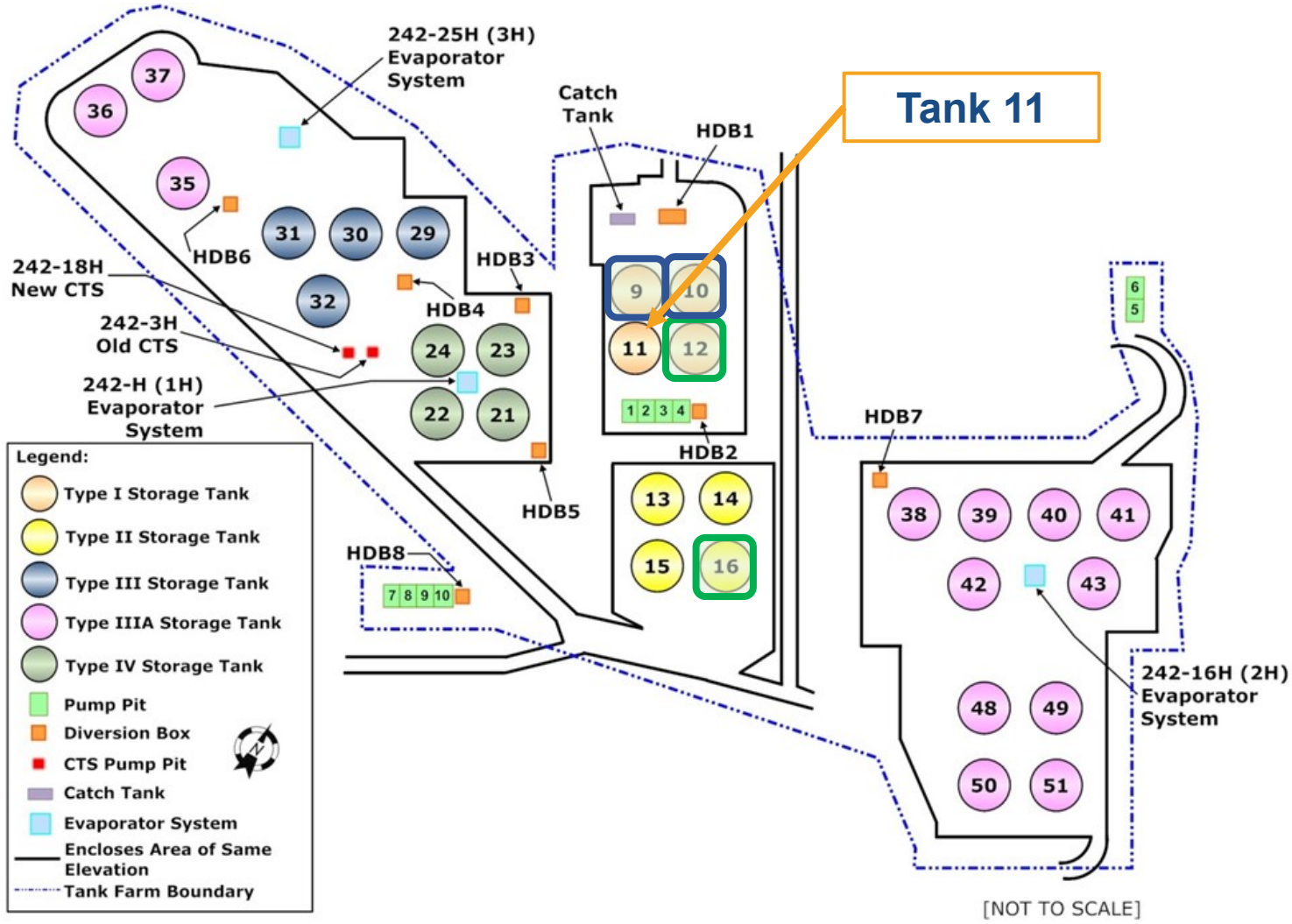
Recommendations



[SRR-CWDA-2017-00015]

1. **Suspending waste removal activities in Tank 11 and enter the Sampling and Analysis phase**
   - *Sampling and analysis to be performed per the LWTRSAPP*
2. **DOE will draft a Closure Module using the *Standard Closure Module* approach**
3. **The Closure Module will include appropriate isolation and stabilization provisions using the *Partial Isolation* approach**

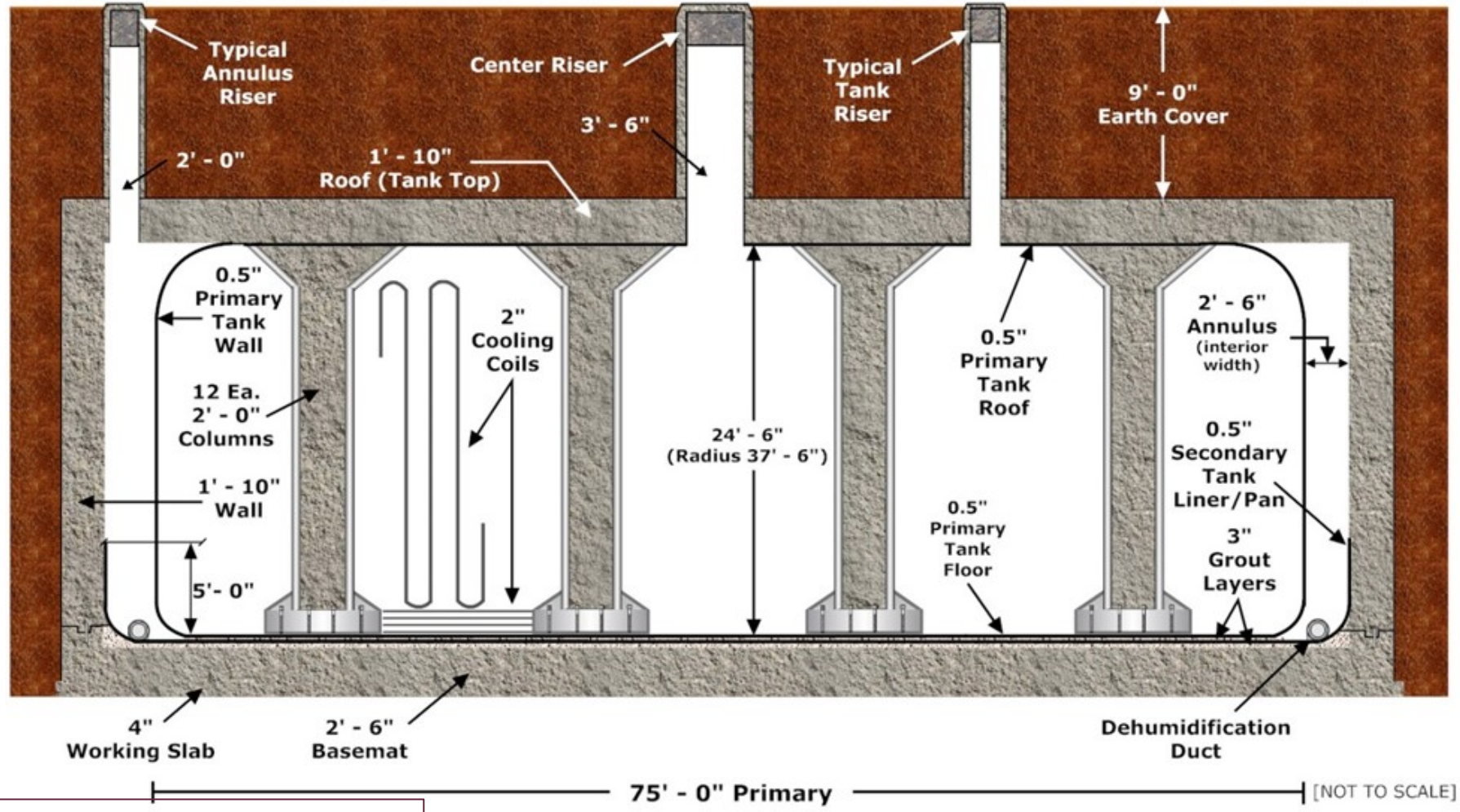
H-Tank Farm (HTF) Layout



Closed Tank(s)

PCWR Complete Tanks(s)

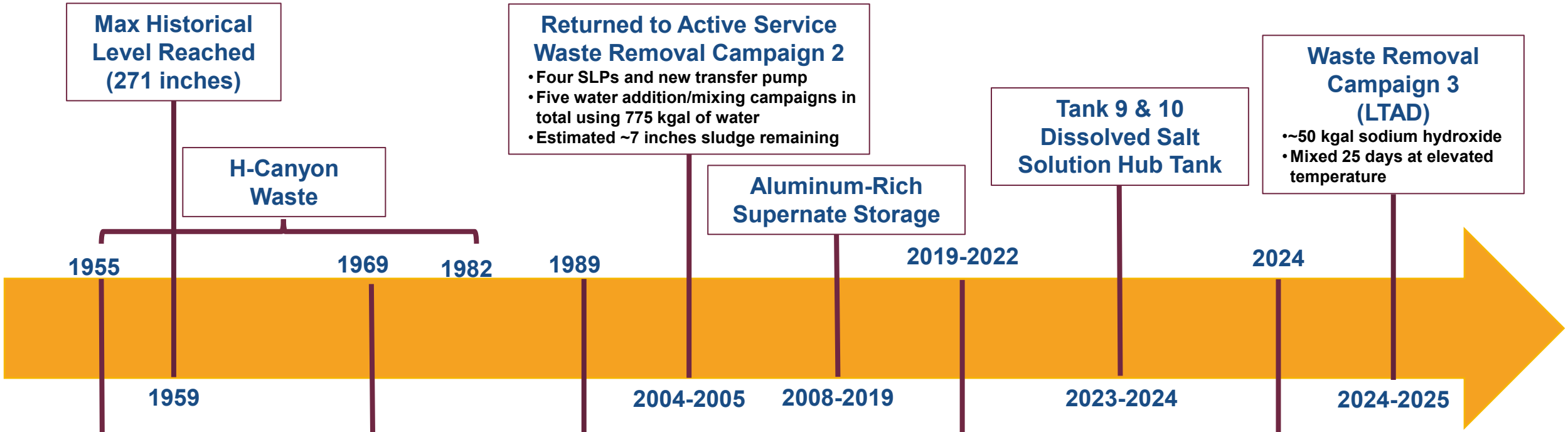
Tank 11 – Type I Tank Design



Nominal working capacity: 750,000 gallons
For a Type I Tank, 1" of waste equals 2,710 gallons

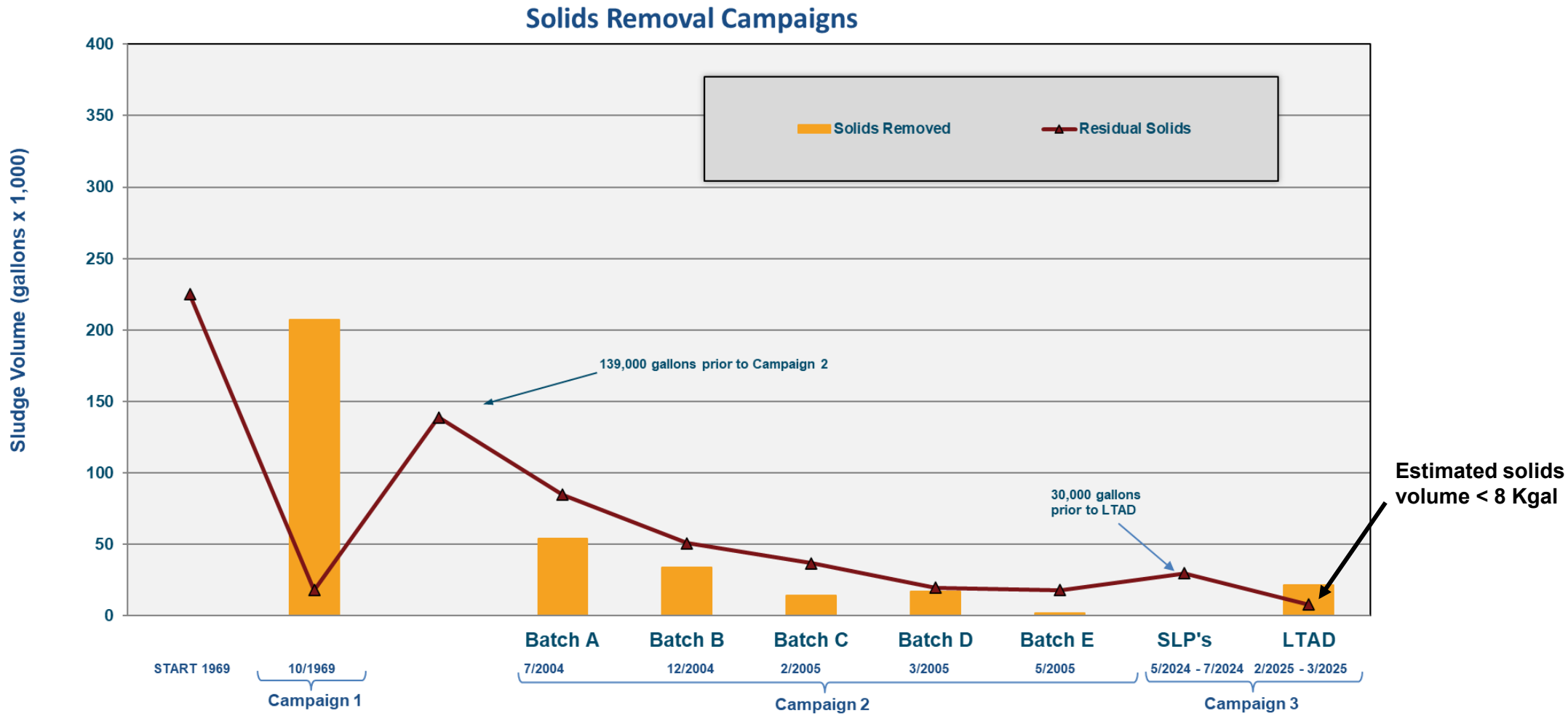
[SRR-CWDA-2017-00015]

Tank 11 Historical Timeline

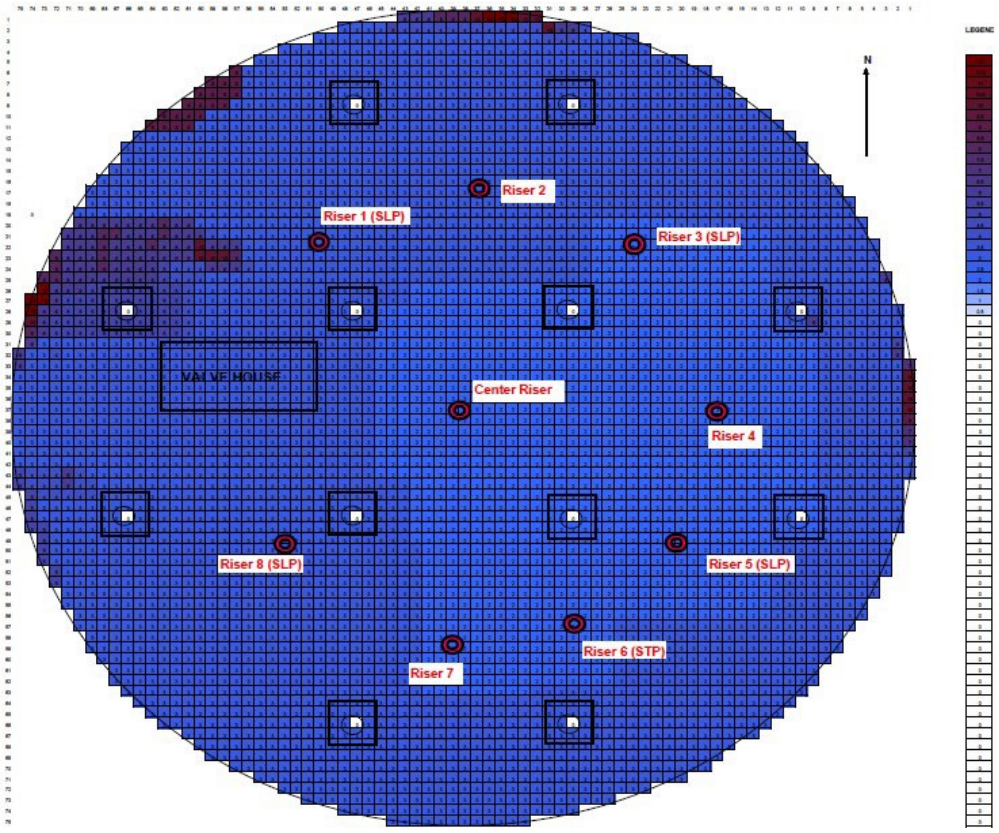


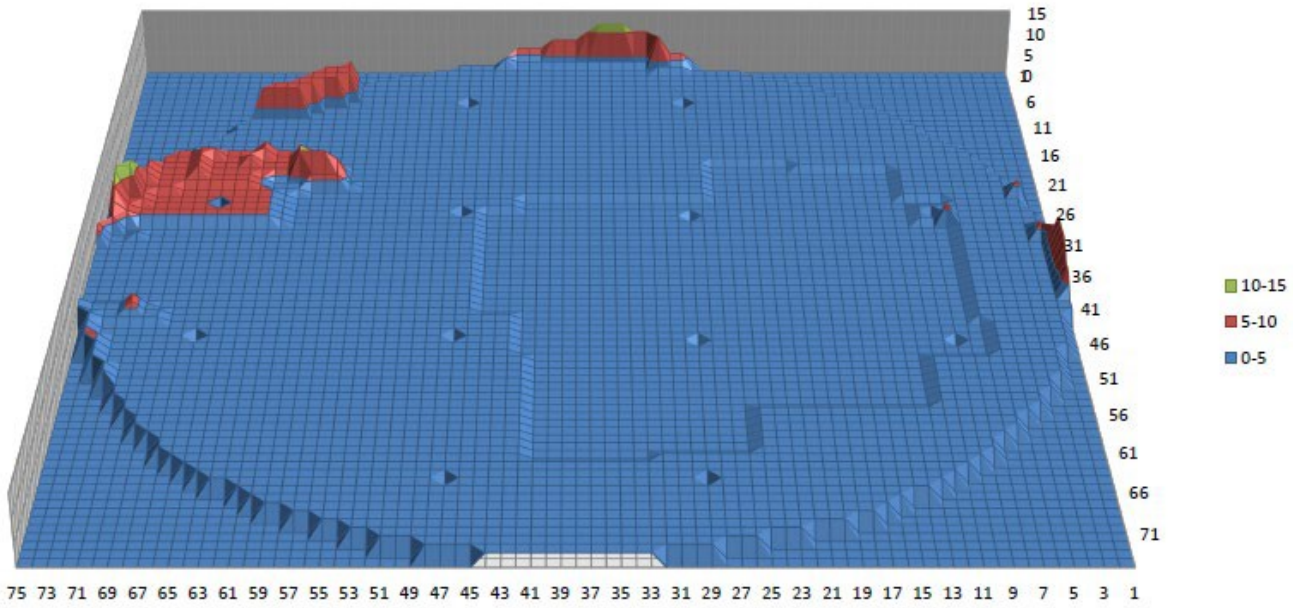
BWRE – Bulk Waste Removal Efforts
TCCR – Tank Closure Cesium Removal
SLPs – Slurry Pumps
LTAD – Low Temperature Aluminum Dissolution

Tank 11 Waste Removal Summary



Tank 11 Primary Tank Current Status





Remaining Solids < 8 Kgal

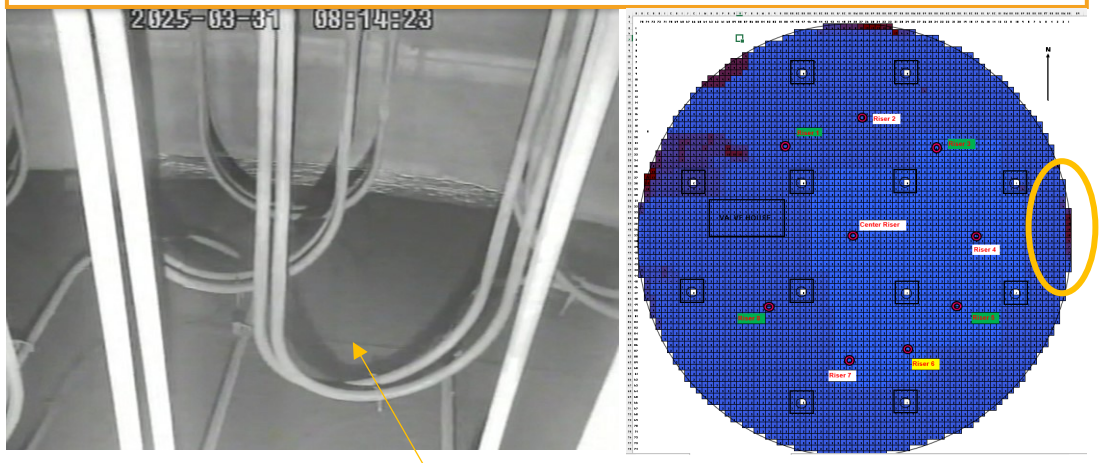
[U-ESR-H-00254]

Tank 11 – Current Status

Examples of General Tank Area

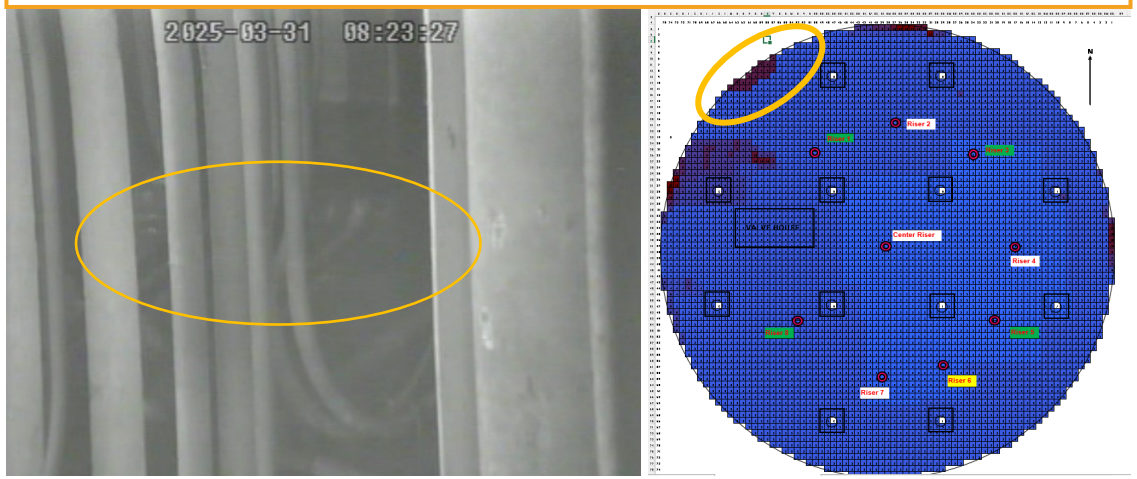
Tank 11 – Current Status

Mound East of Riser 4



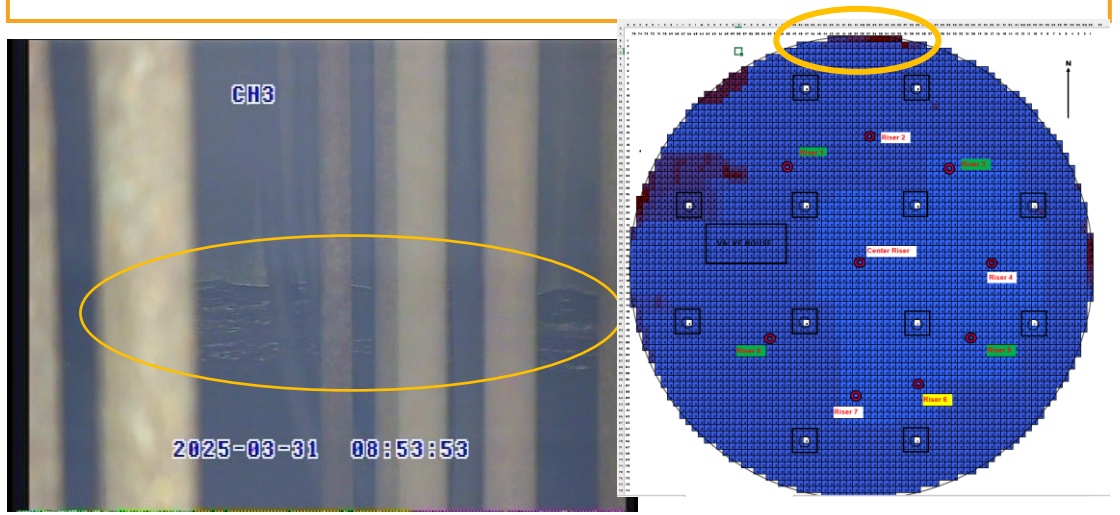
Lower horizontal cooling coil visible

Mound Northwest of Riser 1

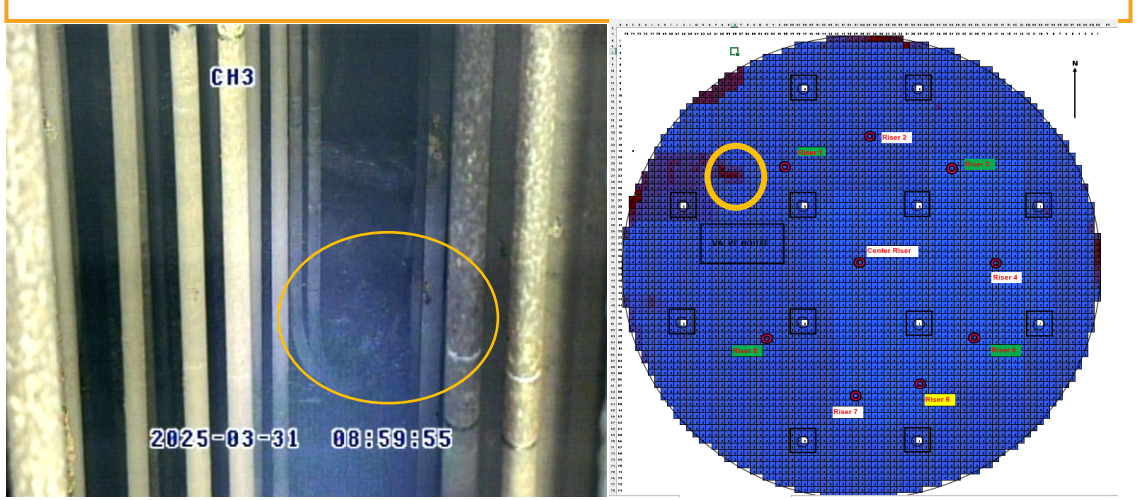


Tank 11 – Current Status

Mound North of Riser 2

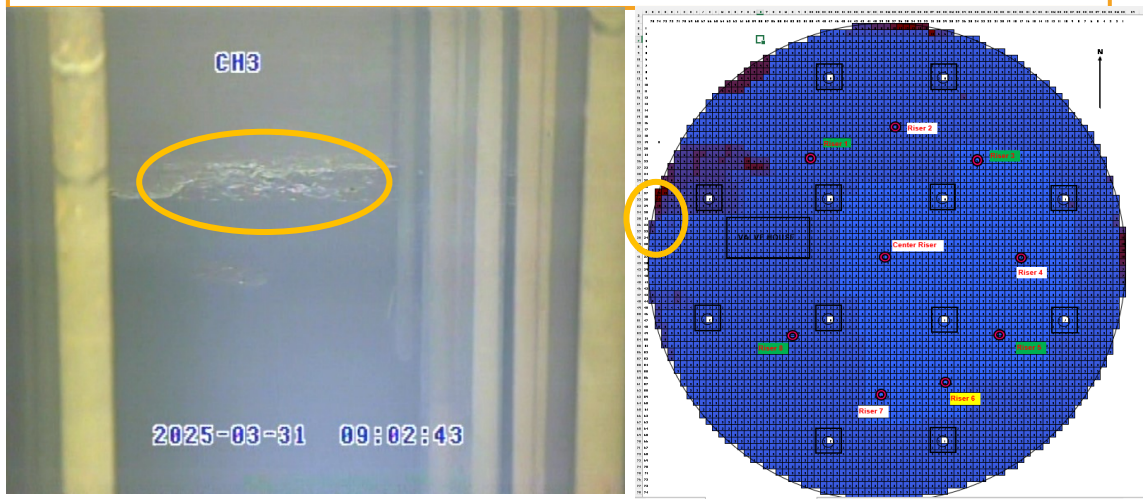


Mound Under Valve House

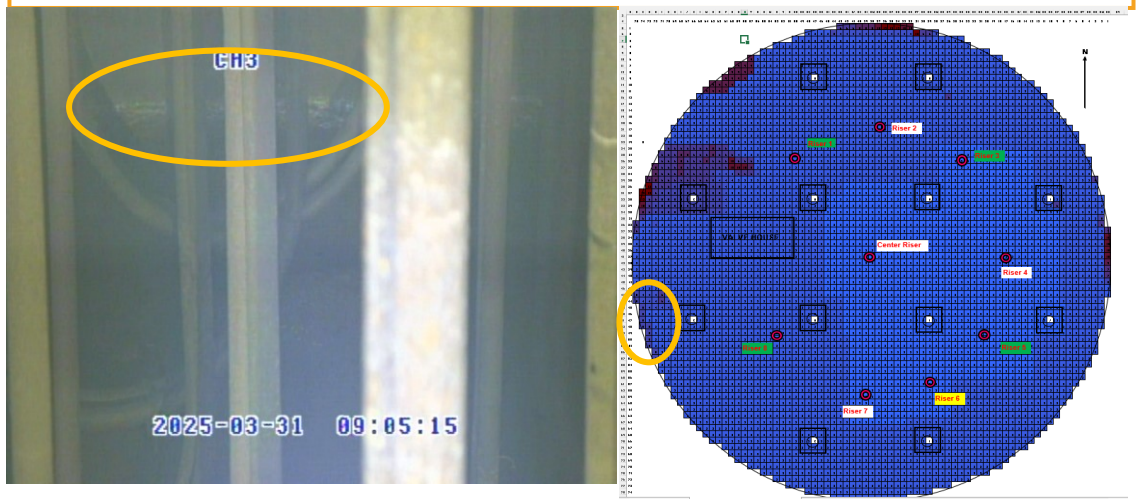


Tank 11 – Current Status

Mound by West Wall



Mound by Southwest Wall



Tank 11 Annulus Inspection/Leak History

- **Through November 2023**
  - *A total of two leak-sites documented*
  - *Four annulus risers available for inspection: North, South, East, and West*
  - *25% inspection capability*
  - *Leak-sites identified are located at 235” (West) and 189” (South) from the tank bottom.*
  - *Trace amount of waste on annulus floor*

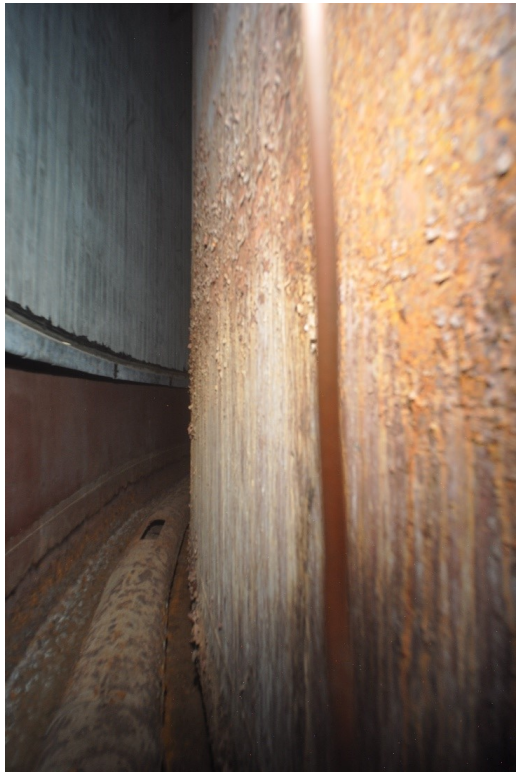
[SRMC-STI-2024-00076]

West Leak-site

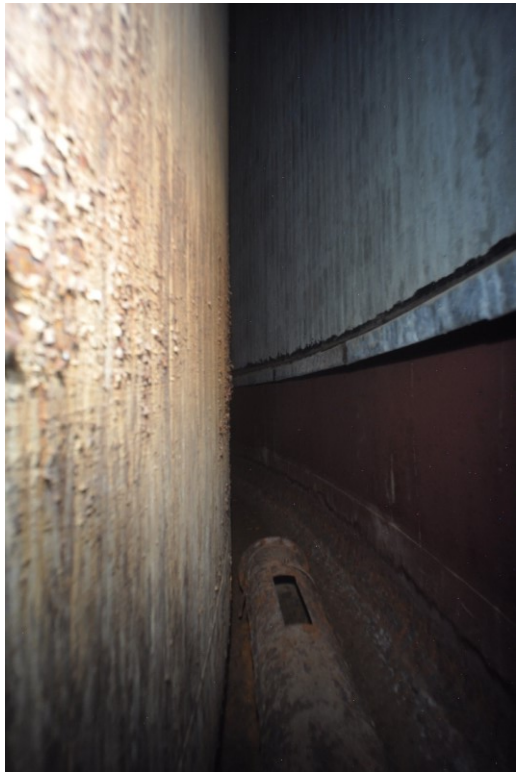
Tank 11 – Annulus*

***Pictures of Tank 11 annulus taken in September 2024**

East Riser Facing South

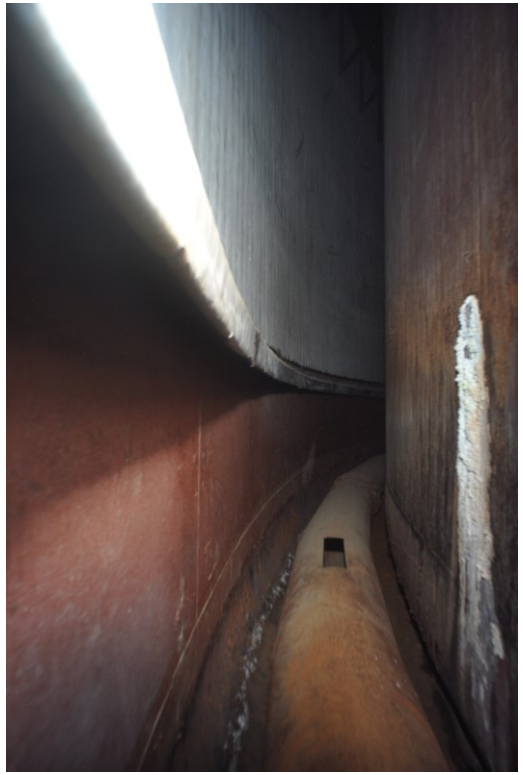


East Riser Facing North



West Riser Facing South

West Riser Facing North



Tank 11 – Annulus

North Riser Facing East

North Riser Facing West

South Riser Facing East

South Riser Facing West

Overall Cleaning Results

Maximum Waste Volume (gal)	734,000
Maximum Solids Volume (gal)	225,000
Maximum Salt Volume (gal)	0
Total Salt Remaining (gal)	0
Total Solids Remaining (gal)	<8,000[1]
Total Waste Remaining (gal)	<8,000[2]

[1] Based on a preliminary estimate of the solids remaining in the primary. Final volume determination will be included in the Closure Module.

[2] Based on a preliminary estimate of the primary. No waste in annulus floor. Final volume determination will be included in the Closure Module.

Total Percent Waste Removed >99%

Additional Removal Options

- **Mechanical Cleaning**
  - *Traditional mixing campaigns showed diminished effectiveness at the end of Waste Removal Campaign 2 and start of Waste Removal Campaign 3*
  - *Additional waste removal would divert resources (i.e., funding and personnel) from other Liquid Waste System risk reduction activities*
    - Funding and resources could be used to accelerate waste removal on other waste tanks
  - *Each waste removal campaign requires approximately 150K gallons of water to be added to allow for mixing pump operation, creating additional new waste*
    - Additional new waste must be handled within the Liquid Waste System which is already challenged by available tank space to support Salt Batch compilation/qualification and Sludge Batch compilation/qualification necessary to feed the Salt Waste Processing Facility (SWPF) and the Defense Waste Processing Facility (DWPF), respectively
    - Additional new waste must be processed through SWPF then subsequently DWPF or the Saltstone Production Facility (SPF), resulting in additional cost and impacts (i.e., extension) to the Liquid Waste System life-cycle
  - *Level of additional waste removal uncertain, but even removing the majority of the remaining material, if possible, would have a minimal impact on final performance objective concentrations and doses*

Additional Removal Options

- **Chemical Cleaning**
  - *Additional chemical cleaning would divert resources (i.e., funding and personnel) from other Liquid Waste System risk reduction activities*
    - Funding and resources could be used to accelerate waste removal on other waste tanks
  - *Additional chemical cleaning campaign would require approximately 150k gallons of water/chemicals be added to allow for mixing pump operation, creating additional new waste*
    - Additional new waste must be handled within the Liquid Waste System which is already challenged by available tank space to support Salt Batch compilation/qualification and Sludge Batch compilation/qualification necessary to feed the SWPF and the DWPF, respectively
    - Additional new waste must be processed through SWPF then subsequently DWPF or the SPF, resulting in additional cost and impacts (i.e., extension) to the Liquid Waste System life-cycle
  - *Level of additional waste removal uncertain, but even removing the majority of the remaining material, if possible, would have a minimal impact on final performance objective concentrations and doses*
    - Effectiveness of additional LTAD campaign(s) uncertain
    - Bulk Oxalic Acid cleaning would have additional adverse impact of introduction of additional oxalates into the system

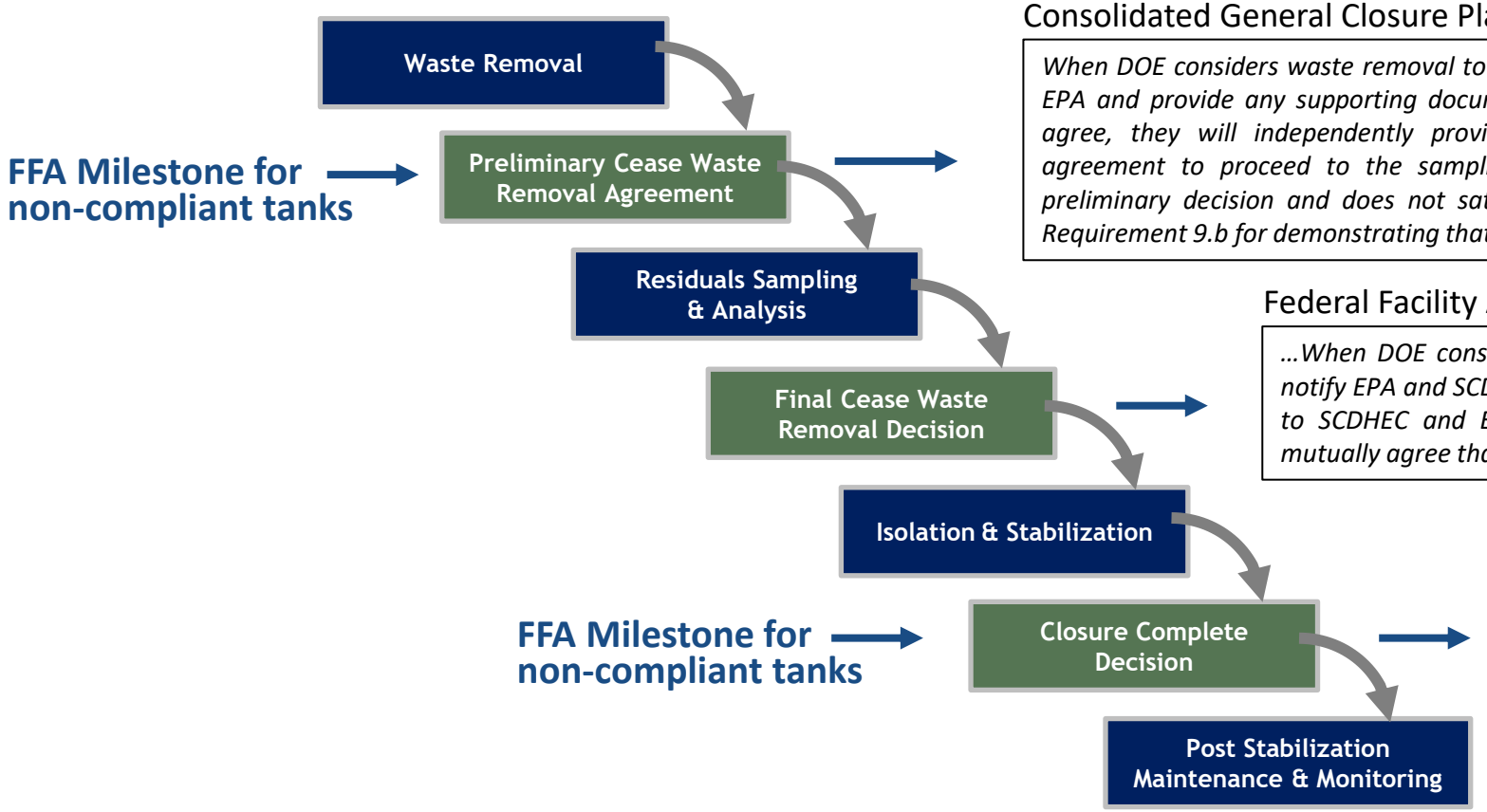
Additional Removal Options

- **Vacuum Technology**
  - *Proven Mantis technology that was utilized in Tanks 18 and 19 cannot be deployed due to in-tank obstructions*
  - *Alternate technology utilizing a smaller robotic platform with vacuum capability would require considerable development*
    - Very limited applicability at the time due to mobility around and over in-tank obstacles and associated tether management
    - Any water added to support removal, if required, would result in new waste and have same impact as previously described for additional mixing campaigns and chemical cleaning
    - Development/deployment of a new vacuum technology would divert resources (i.e., funding and personnel) from other Liquid Waste System risk reduction activities
  - *Level of additional waste removal uncertain, but even removing the majority of the remaining material, if possible, would have a minimal impact on final performance objective concentrations and doses*

Additional Removal Options

- **Annulus Waste Removal**
  - *Based on results from annulus inspections, Tank 11 has only trace amounts of accumulated waste on the annulus floor. Water addition/removal campaigns would have no impact on overall doses associated with Tank 11 while adding additional new waste into the Liquid Waste System*

Tank Closure Process



Consolidated General Closure Plan (CGCP)

When DOE considers waste removal to be complete, DOE shall notify SCDHEC and EPA and provide any supporting documentation for review. If EPA and SCDHEC agree, they will independently provide letters of agreement to DOE. This agreement to proceed to the sampling and analysis phase is a non-binding preliminary decision and does not satisfy the requirements of FFA Appendix L, Requirement 9.b for demonstrating that waste removal activities may cease.

Federal Facility Agreement (FFA) Appendix L, Requirement 9.b.

…When DOE considers waste removal to be complete, DOE shall notify EPA and SCDHEC and provide any supporting documentation to SCDHEC and EPA for review. DOE, SCDHEC and EPA shall mutually agree that waste removal activities may cease.

Consolidated General Closure Plan (CGCP)

When the waste tank system has been stabilized with grout, as authorized by the approved Closure Module and cease waste approval letters from SCDHEC and EPA, DOE will have met the FFA commitment for removal from service

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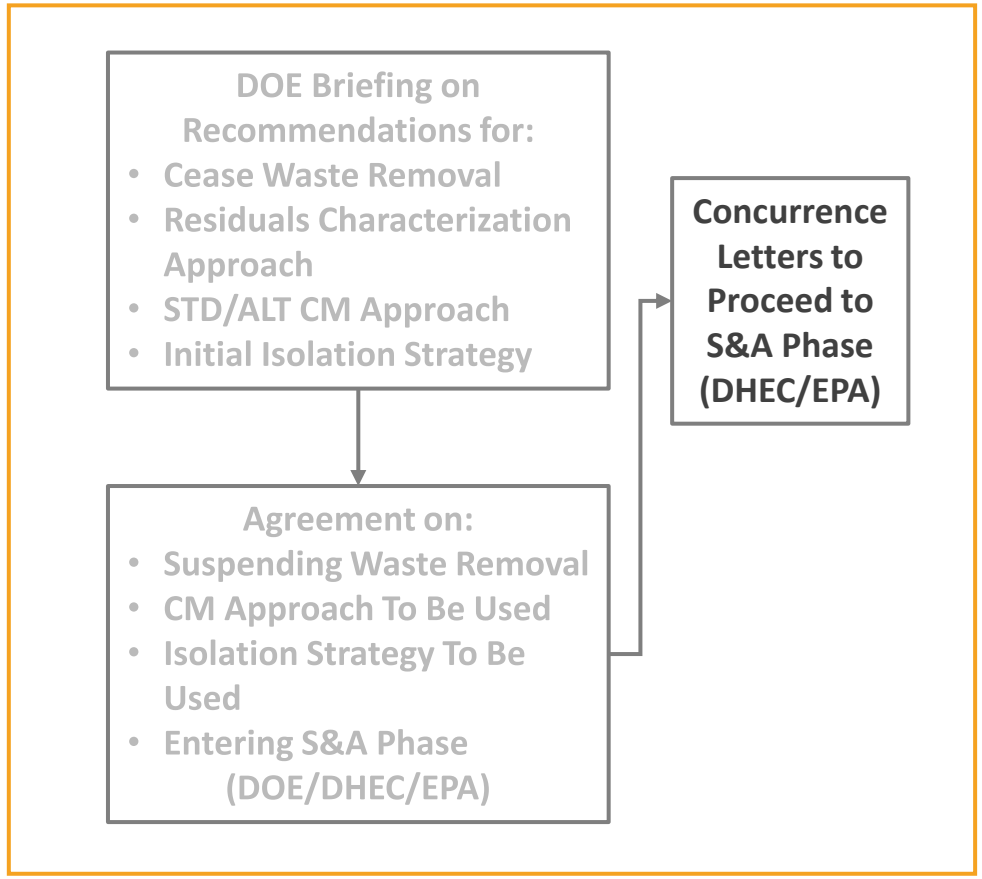
Following waste tank stabilization, the FFA commitment for removal from service (i.e., operational closure) will have been met.

Requested Action



[SRR-CWDA-2017-00015]

The three agencies agree that, based upon the described qualitative assessment, there is reasonable assurance that it is appropriate to suspend waste removal activities and enter the Sampling and Analysis phase of the operational closure process for Tank 11.

Next Steps

- **DOE will forward a letter to SCDES and EPA formally requesting concurrence to proceed to the Sampling and Analysis phase in Tank 11**
  - *This presentation will be attached as a primary reference*
  - *The requested action is a non-binding preliminary decision based on the qualitative information available at this time and presented today*
- **DOE and the Liquid Waste Contractor will proceed in developing the regulatory documentation necessary to operationally close Tank 11**
  - *DOE will coordinate with SCDES and EPA to establish a schedule for the development, review and approval of the Closure Module consistent with the approach described in the CGCP*

Common Values and Goals*

Values

1. Maintain transparency with open communication between regulators, DOE, and the contractor on program progress, and significant emerging issues.
2. Ensure DOE's strategy and plans are subject to stakeholder engagement and input, including SCDES permitting processes, and CERCLA, as appropriate.
3. Maximize the amount of curies (especially long-lived radionuclides) vitrified and ready for ultimate disposal out of state.
4. Limit disposal of curies onsite at SRS so that residual radioactivity is as low as reasonably achievable.

Goals

1. Reduce risk to the environment by removing waste and closing tanks with a goal of completion of the liquid waste program by 2037.
2. Reduce operational and environmental risk by aggressively removing curies form the waste tanks.
3. Reduce operational and environmental risk by optimizing operations to minimize liquid waste program total life cycle.
4. Complete waste removal and subsequent grouting of all waste tanks and ancillary structures with a risk-based priority order: first to tanks in the water table, followed by F-Area Tank Farm (FTF) tanks, followed by remainder of waste tanks, followed by ancillary structures, recognizing the potential for future emergent conditions or opportunities.

*From *Federal Facility Agreement (FFA) 2022 High Level Waste Tank Milestones Agreement* [WSRC-OS-94-42]

Summary for Closed/PCWR Complete Tanks

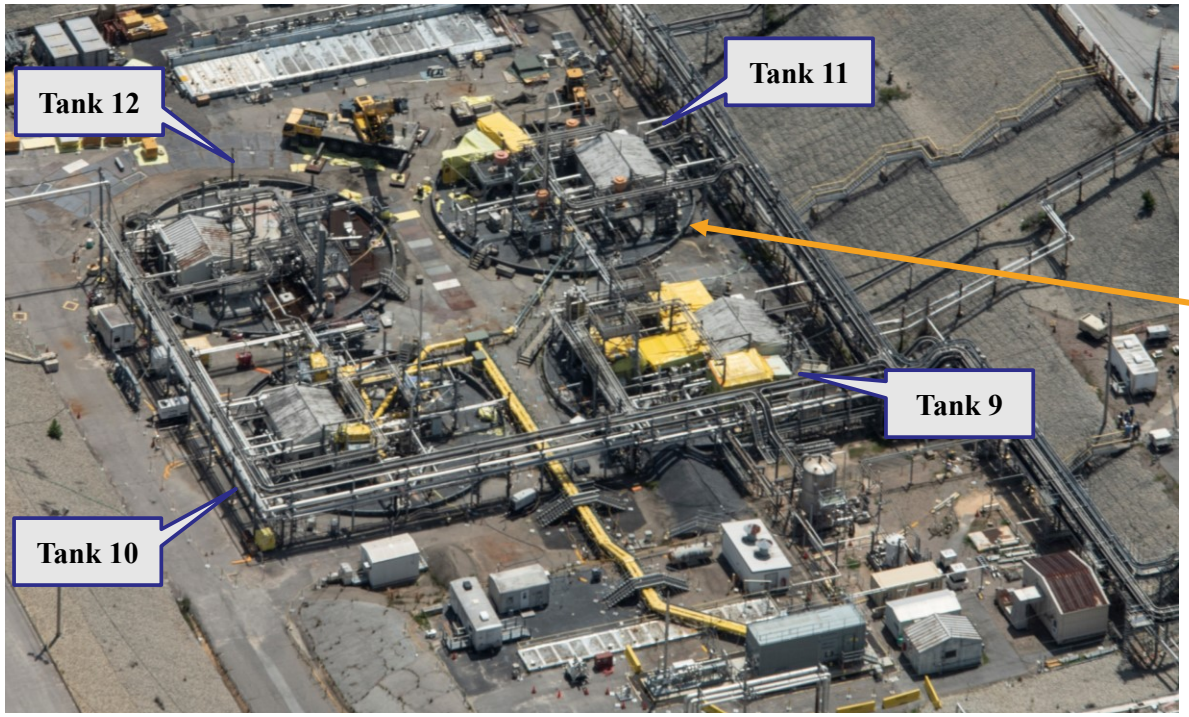
Waste Tank	PCWR Date	Operational Closure Date	Max. Dose within 10,000 years[1] (mrem/yr)	Primary Tank Residual Solids Volume[2] (%)	Primary Tank Residual Solids Volume (Gallons)	Annulus Residual Volume (Gallons)	Annulus Cleaning
4[3]	12/2024	-	<5	<1	<6,000	Negligible	No - negligible
5	11/2010	12/2013	3	0.26	1,900	<15	No – negligible
6	11/2010	12/2013	3	0.41	3,000	<50	Yes ~ 100 gal
9[3]	10/2024	-	<3	<1	<7,500	Negligible	Yes
10[3]	5/2024	-	<2	<0.40	<3,000	<400	Yes
12	1/2014	4/2016	6	0.20	1,500	30	No – negligible
16	4/2013	9/2015	2	0.21	356	1,910	No – not practical
17	N/A	12/1997	3	0.18	2,400	N/A	N/A
18	10/2009	9/2012	3	0.30	3,900	N/A	N/A
19	10/2009	9/2012	3	0.15	2,000	N/A	N/A
20	N/A	7/1997	3	0.08	1,000	N/A	N/A

[1] Dose for closed FTF tanks represents maximum all sources dose utilizing actual inventories for Tanks 5, 6, and 17 – 20. Dose for other tanks represents maximum contribution from individual tanks. [SRR-CWDA-2012-00106, SRR-CWDA-2015-00073, SRR-CWDA-2014-00106]
[2] Based on historic maximum waste volume for each tank. [DOE/SRS-WD-2012-001, DOE/SRS-WD-2014-001]
[3] Values based on preliminary information, sampling and analysis has not been performed

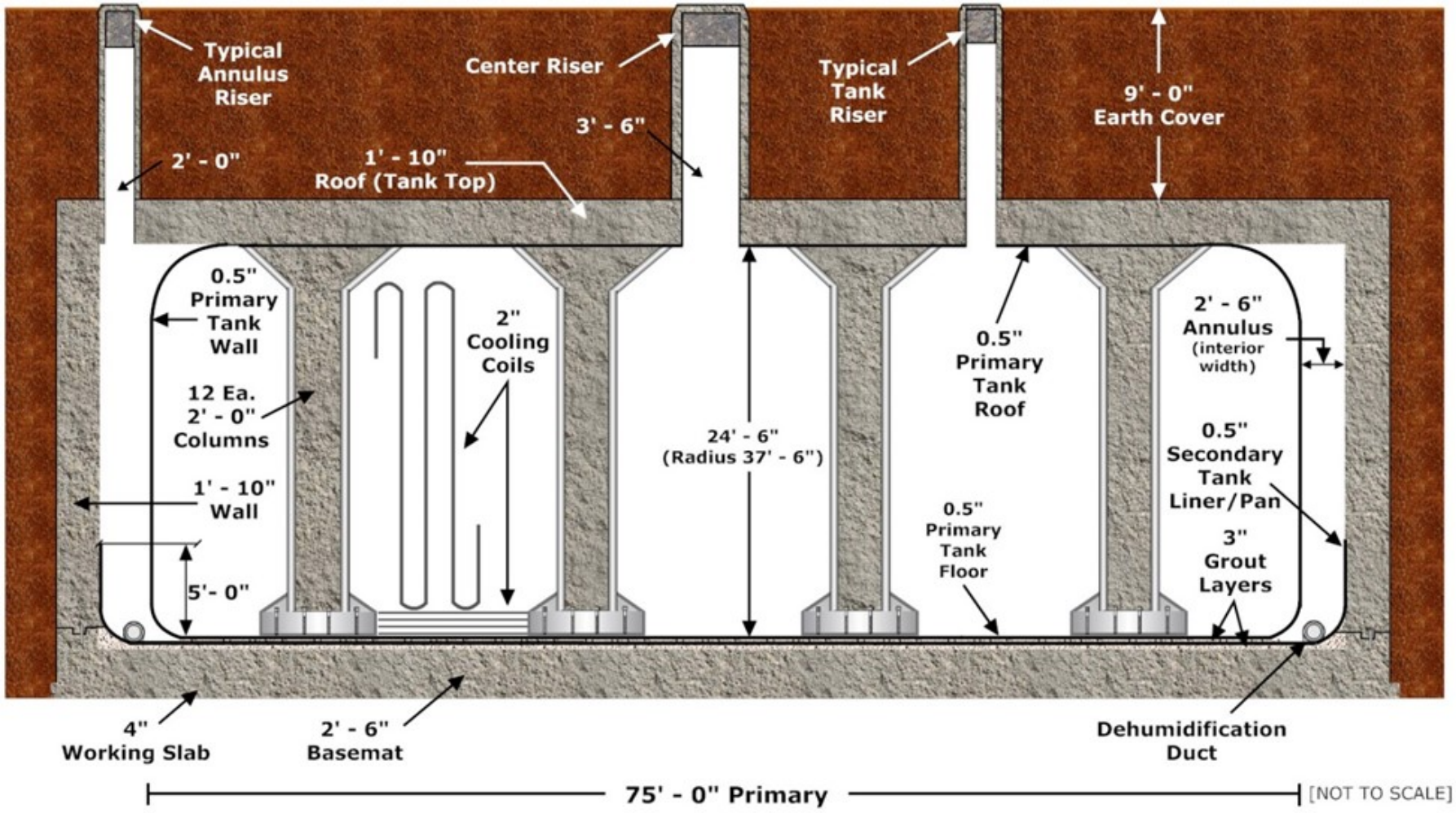
Tank 11

Background Information

Tank 11 Within HTF



Typical Type I Tank Design



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Typical Type I Design

- Carbon steel primary tank and secondary liner (annular pan) all contained in a concrete vault
- Nominal working capacity: 750,000 gallons
- For a Type I Tank, 1” of waste equals 2,710 gallons
- Primary tank diameter: 75 feet
- Primary tank height: 24.5 feet
- Annular pan diameter: 80 feet
  - *2.5-foot annular space surrounding primary*
- 12 interior support columns
  - *2-foot diameter*
- 34 vertical cooling coil runs suspended from the ceiling
- 2 horizontal cooling coil runs supported above the floor

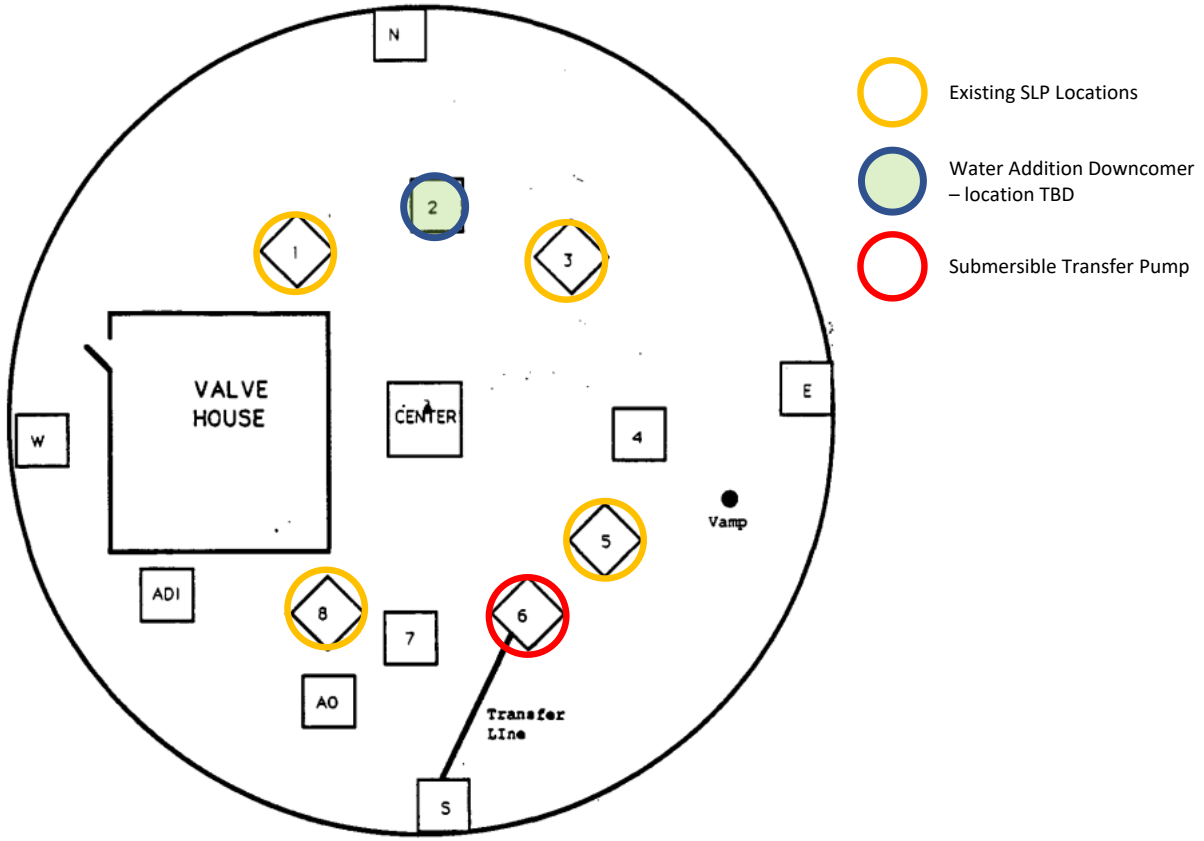
Typical Type I Tank Challenges

- **Challenges include:**
  - *Limited access ports (risers)*
  - *Presence of roof support columns*
  - *Approximately 22,800 linear feet (over four miles) of 2-inch diameter vertical and horizontal cooling coils*
  - *“Field-to-fit” horizontal cooling coil “fences”*
- **Tanks were not designed with waste removal in mind**

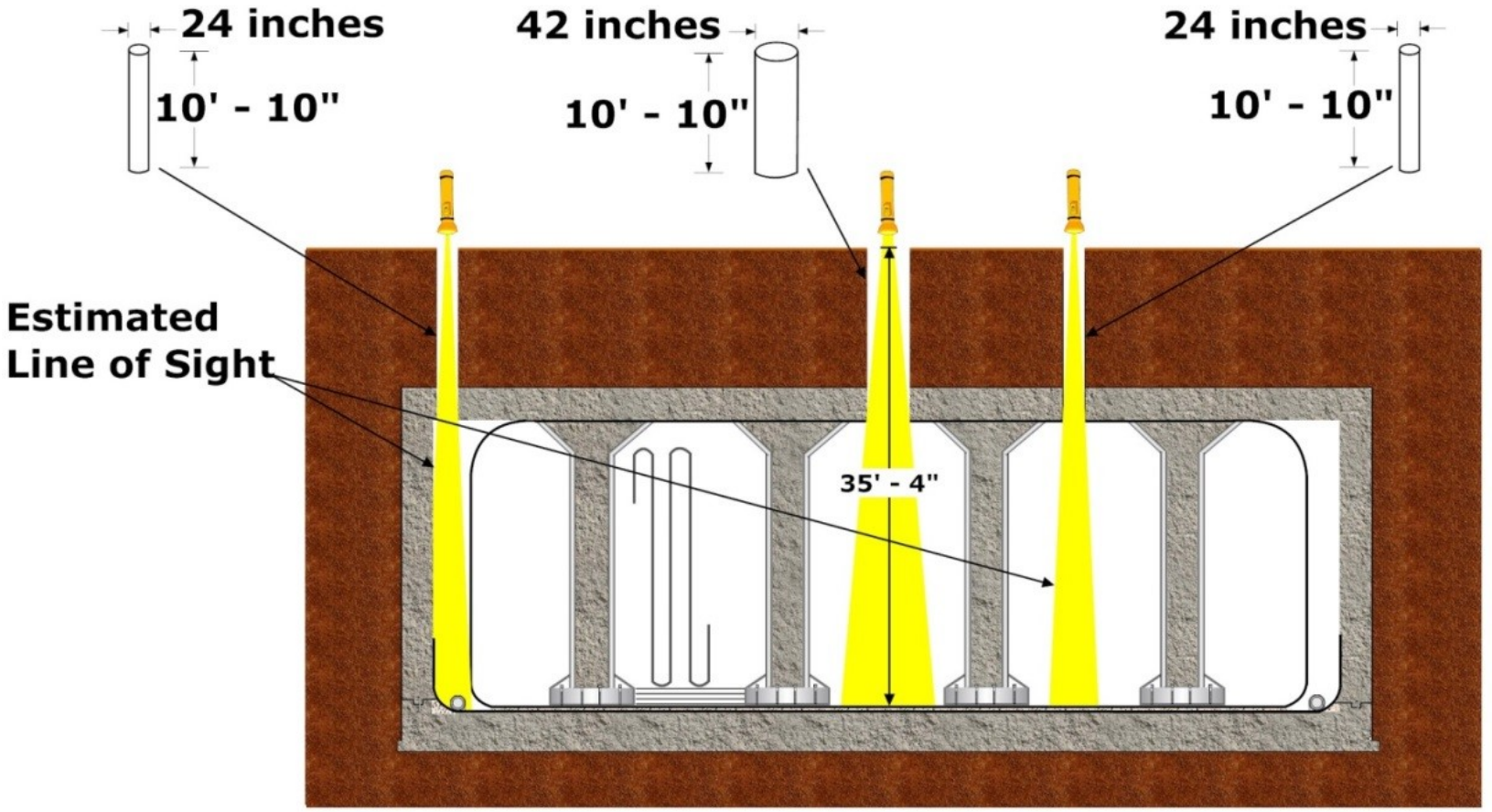
Type I Tank Riser Limitations

- **Primary access**
  - *Eight 24-inch risers*
  - *One 42-inch central riser*
- **Annulus access**
  - *Four 24-inch risers*
- **Limited riser entrances hinder:**
  - *Pump placement*
  - *Cleaning operations*
  - *Camera viewing*
  - *Sampling options*

Tank 11 Current



Type I Tank Riser Limitations



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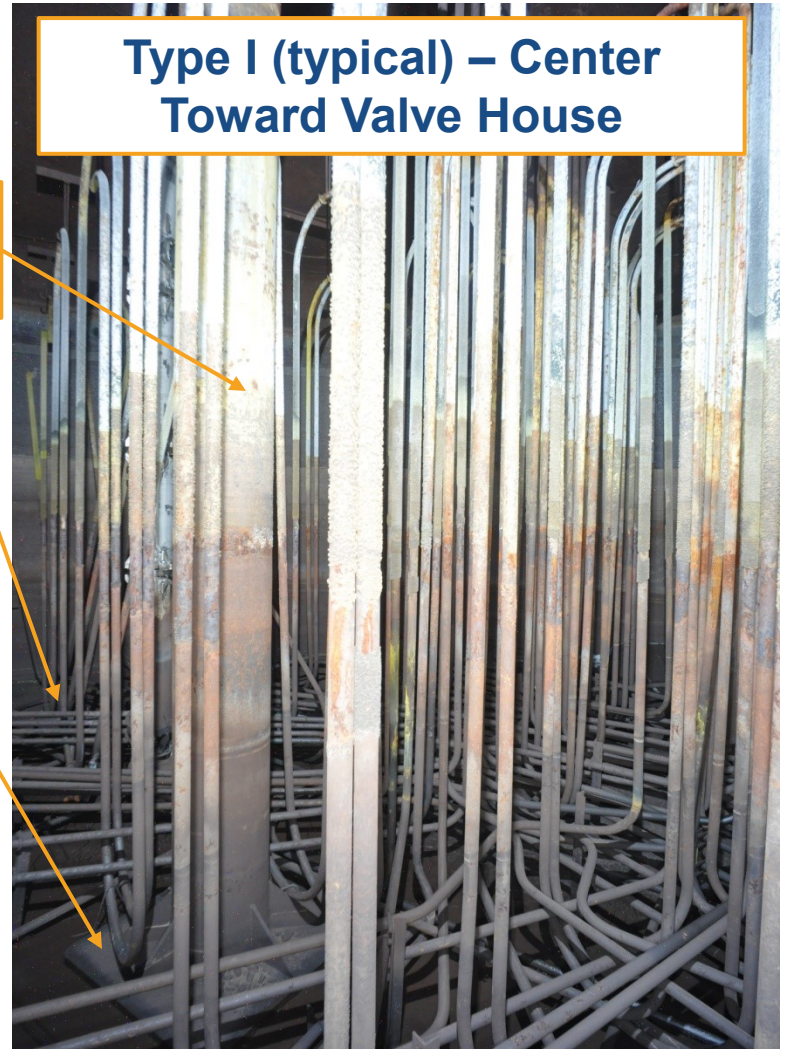
Type I Tank Columns and Cooling Coils

- **A total of 12 support columns in each Type I tank**
  - *Carbon steel filled with concrete*
  - *2-foot diameter*
  - *4.5-foot x 4.5-foot x 4.5-inch base plate*
- **Type I tanks contain approximately 22,800 linear feet of 2-inch diameter cooling coils**
- **Horizontal coils were installed "field-to-fit"**
- **Columns and cooling coils together impact installation and/or operation of waste removal related equipment**
  - *Effective cleaning radius of pumps*
  - *Full installation of pumps*
  - *Sampling device deployment*



Type I Tank Cooling Coil Valve House

Valve House Interior

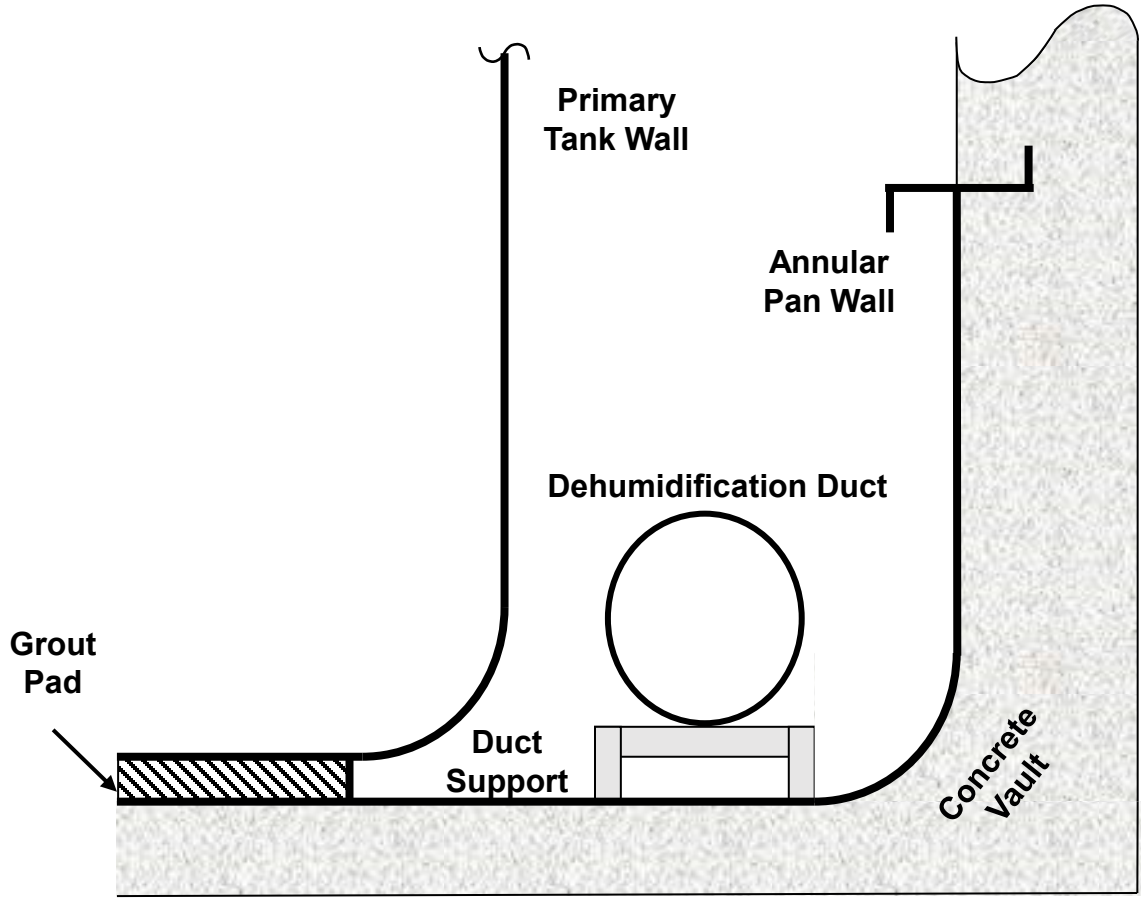
Tank 11 Valve House

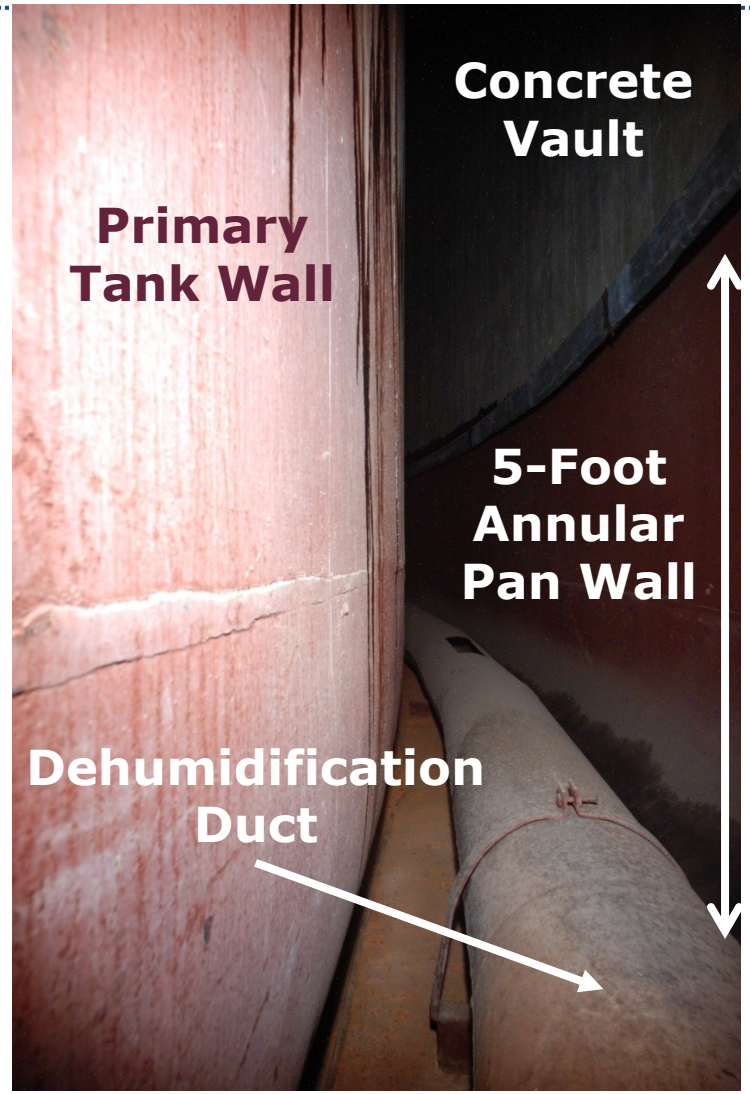
View From Inside Tank (Under the Valve House)

Cooling coil lines entering and exiting waste tank

Type I Tank Annular Region

5-foot high, 80-foot diameter annular pan provides secondary containment

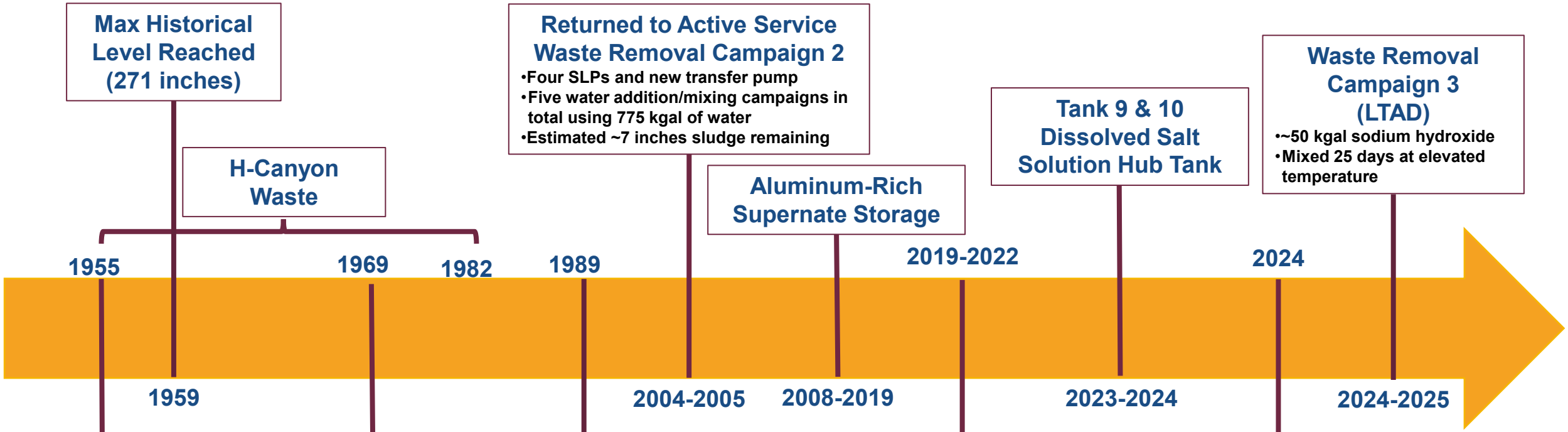




Tank 11 Operational History

- **Commissioned in 1955**
- **Received H-Canyon waste starting July 1955**
- **Maximum waste level – 271” vs. fill limit of 271” or 734,000 gallons**
- **Frequent supernate decants and fresh waste refills**
- **Performed high pressure sluicing in October 1969**
  - *Transferred 65” (176,000 gallons) of sludge to Tank 13*
- **Continued receiving H-Canyon waste through January 1982**
  - *Additional sludge accumulation*
- **Removed from active service in 2004 for resumption of waste removal**
  - *BWRE complete declared in 2005*
- **Supported TCCR process as Tank 9 and Tank 10 Decontaminated Salt Solution (DSS) receipt tank from 2019 to 2022**
  - *DSS transferred to Tank 50 for SPF feed.*
- **The tank Risers 1, 3, 5, and 8 SLPs were operationally restored and a new Submersible Transfer Pump (STP) installed to support Tank 9 and Tank 10 salt dissolution activities**
  - *Received dissolved salt solution from Tank 9 and Tank 10 from 2023 – 2024.*
  - *Dissolved salt solution transferred from Tank 11 to Tank 35 for SWPF feed.*
- **Waste heel removal in 2024 - 2025**
  - *Slurry pumps in Risers 1, 3, 5, 8 operationally restored. Mixing/transfer for waste removal performed in May – July 2024*
    - Mixing Campaign 1 was ineffective for sludge mobilization.
    - LTAD elected due to mixing ineffectiveness for sludge heel removal. LTAD was performed from November 2024 (caustic addition) through March 2025.

Tank 11 Historical Timeline



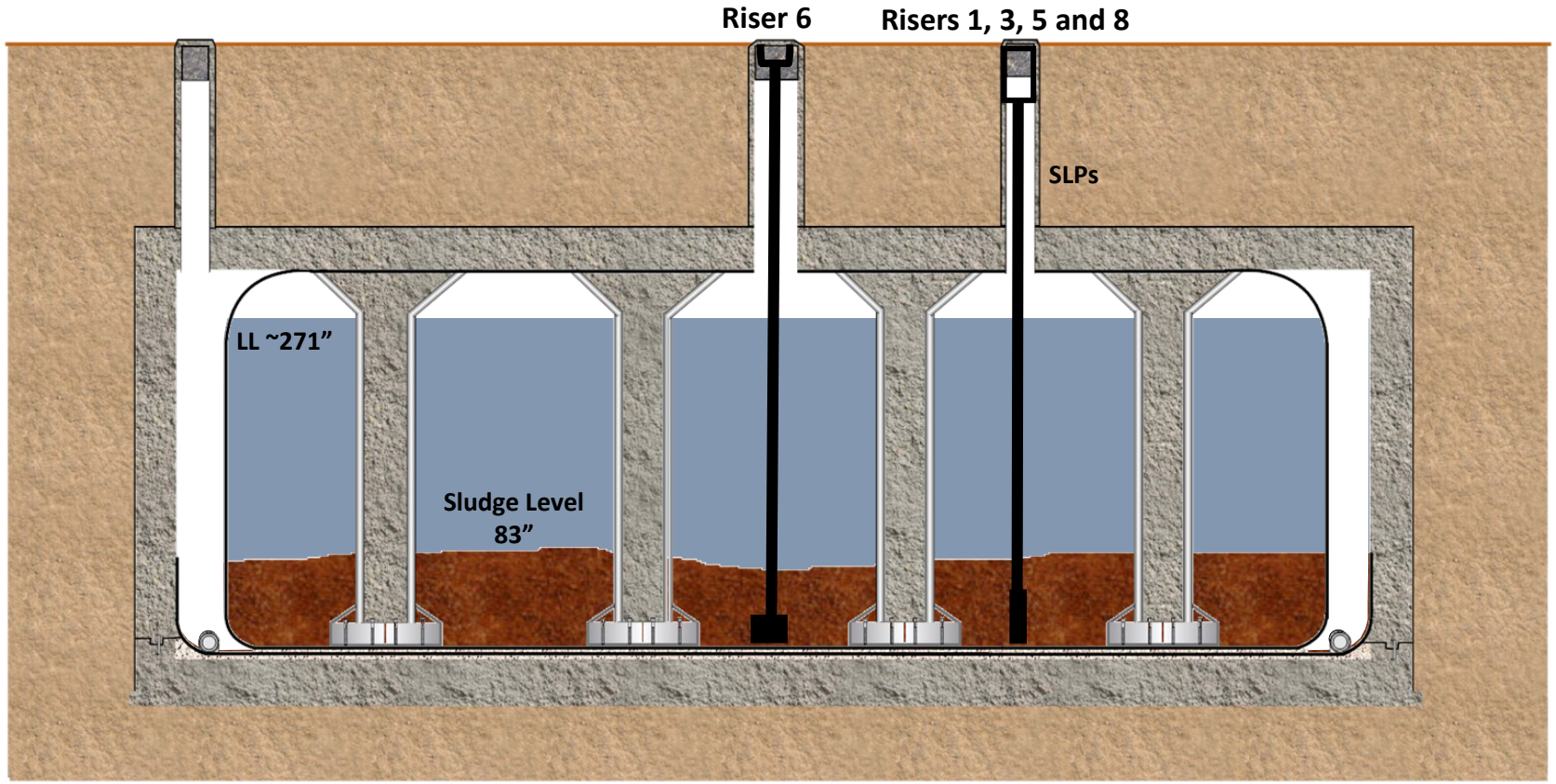
BWRE – Bulk Waste Removal Efforts
TCCR – Tank Closure Cesium Removal
SLPs – Slurry Pumps
LTAD – Low Temperature Aluminum Dissolution

Tank 11 Waste Removal

- **Waste removal started in October 1969 (Campaign 1)**
  - *Supernate level 205” (557k gallons), sludge level 83” (225k gallons)*
  - *Goal – remove sludge and convert the tank to salt receipt service*
  - *Supernate and sludge removal via high pressure sluicing*
    - Five sluicers and four transfer pumps utilized
  - *Sludge volume reduced from 225k to 49k gallons using 854k gallons of water*
  - *Presence of mounds prevented conversion of the tank to salt receipt service*

Tank 11 Waste Removal Campaign 1

At the beginning of Waste Removal Campaign 1 (October 1969)

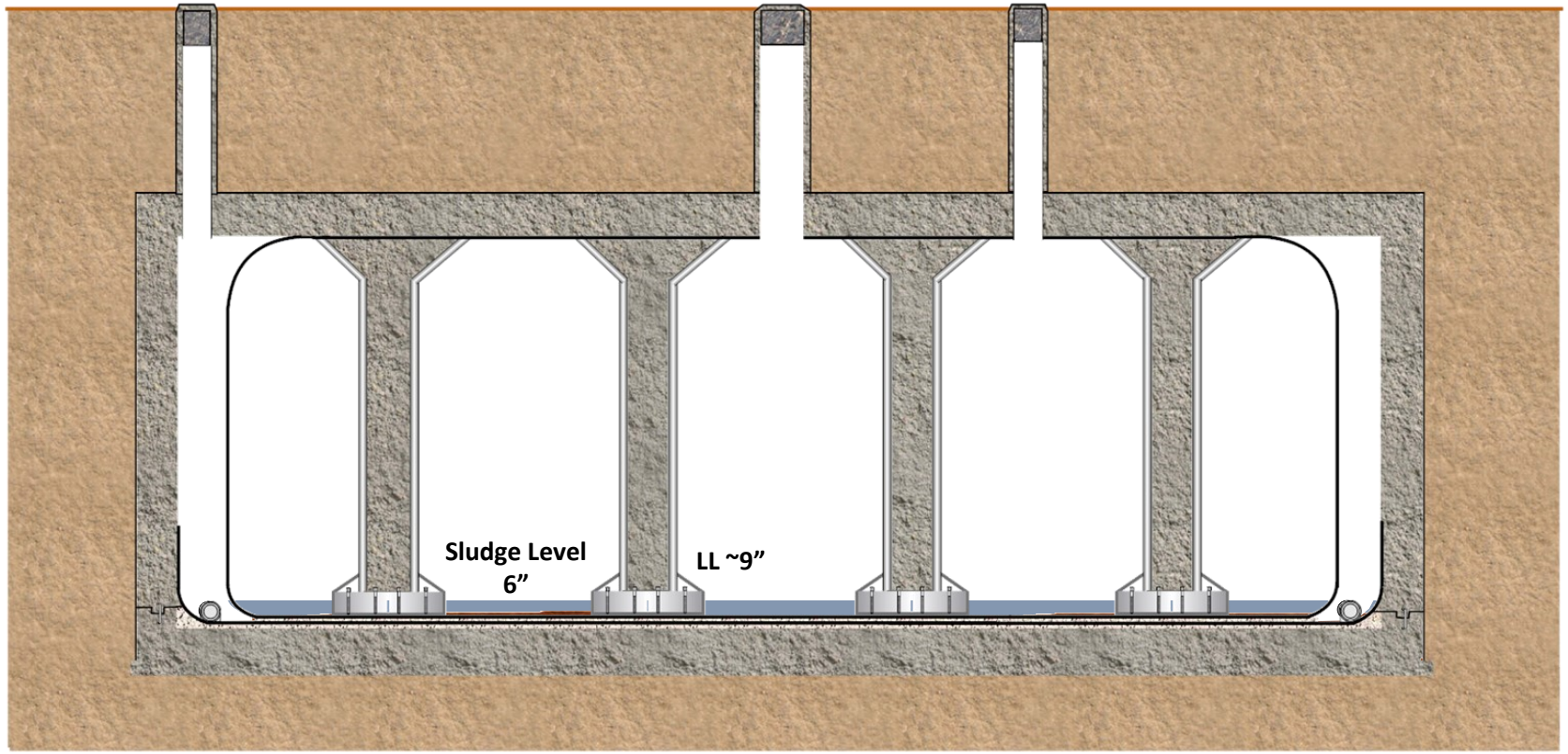


LL Liquid Level

[DPSPU 78-11-12, SRR-WRC-2011-0003]

Tank 11 Waste Removal Campaign 1

Post Waste Removal Campaign 1 (October 1969)*

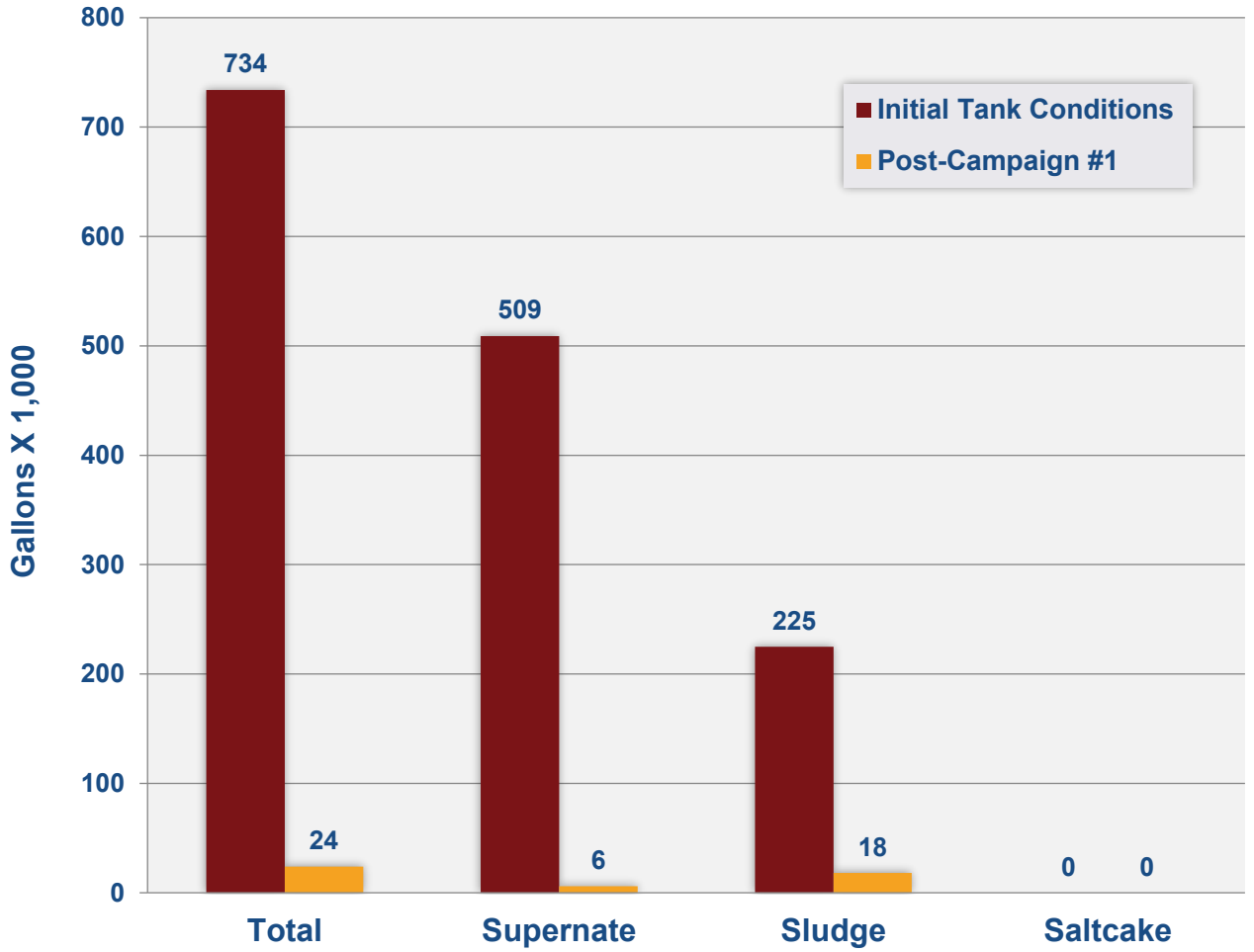


*Supernate and sludge removal via high pressure sluicing.

[DPSPU 78-11-12, SRR-WRC-2011-0003]

Tank 11 – Waste Removal Campaign 1 Results

Waste Volumes before and after Campaign 1

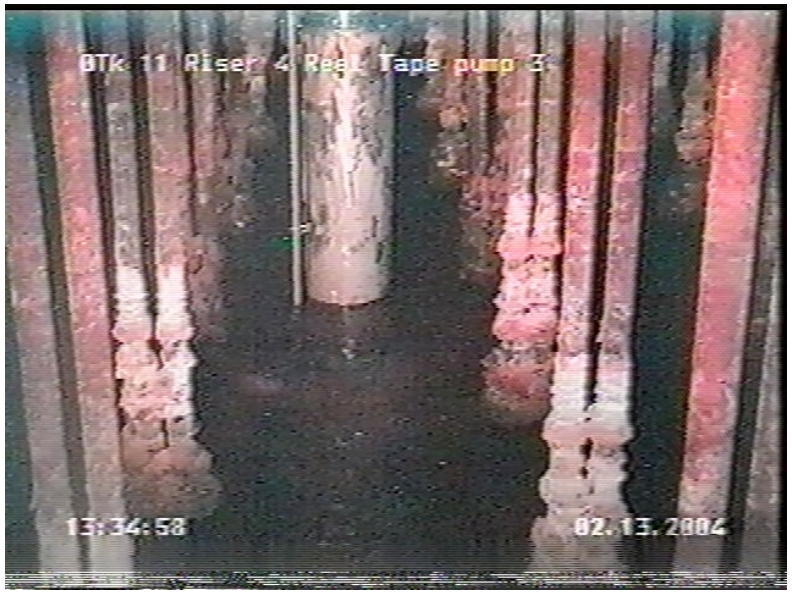


Tank 11 Waste Removal Campaign 2

- **Operations service between 1970-1981**
  - *Continued adding H-Canyon waste, additional sludge accumulated*
- **Began preparations for resumption of waste removal in 2000**
  - *Designed and installed 4 new 1,2000 gpm SLPs and 1 new transfer pump*
  - *Cost was $17M and duration was 4 years*
- **Performed February 2004 through May 2005 (Campaign 2, Batches A -E)**
  - *Consisted of 5 sludge removal campaigns*
  - *4,400 hours of slurrying with SLPs*
  - *Sludge volume reduced from 138k gallons to 18k gallons using 775k gallons of water*
  - *H-Area sludge more difficult to remove than F-Area sludge*
  - *Water washing of the tank interior was performed by deploying a water wash tool in both the Center Riser and Riser 2. The water washed material was transferred to Tank 51. [CBU-LTS-2005-00142]*
- **Mixer pumps moved to Tank 12 and used to complete waste removal in Tank 12**
- **Received Tank 51 aluminum-rich supernate from Tank 51 in February 2008 (Sludge Batch 5)**

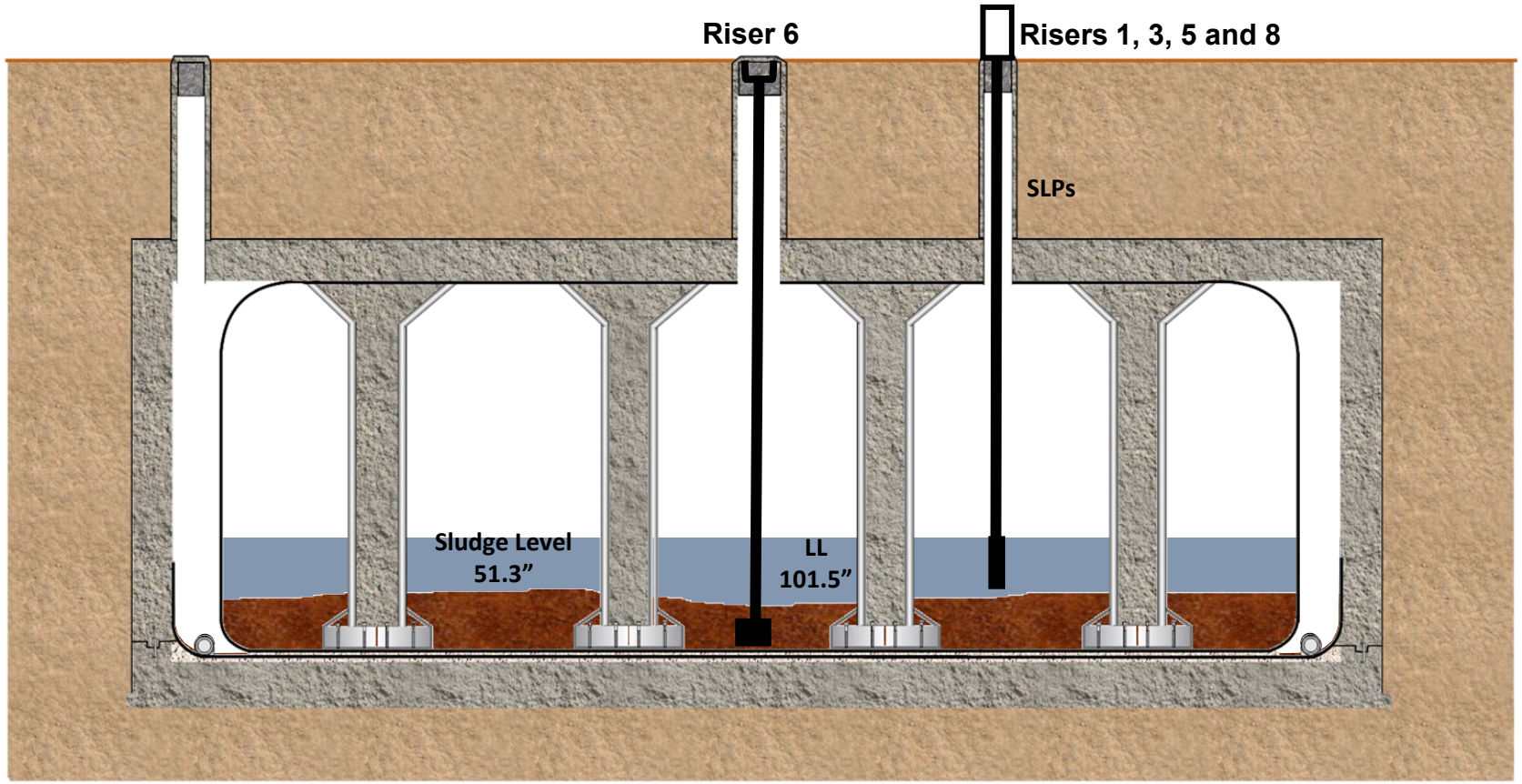
Tank 11 Waste Removal Campaign 2

Tank Conditions Before Waste Removal Campaign 2



Tank 11 Waste Removal Campaign 2

At the beginning of Waste Removal Campaign 2 (February 2004)

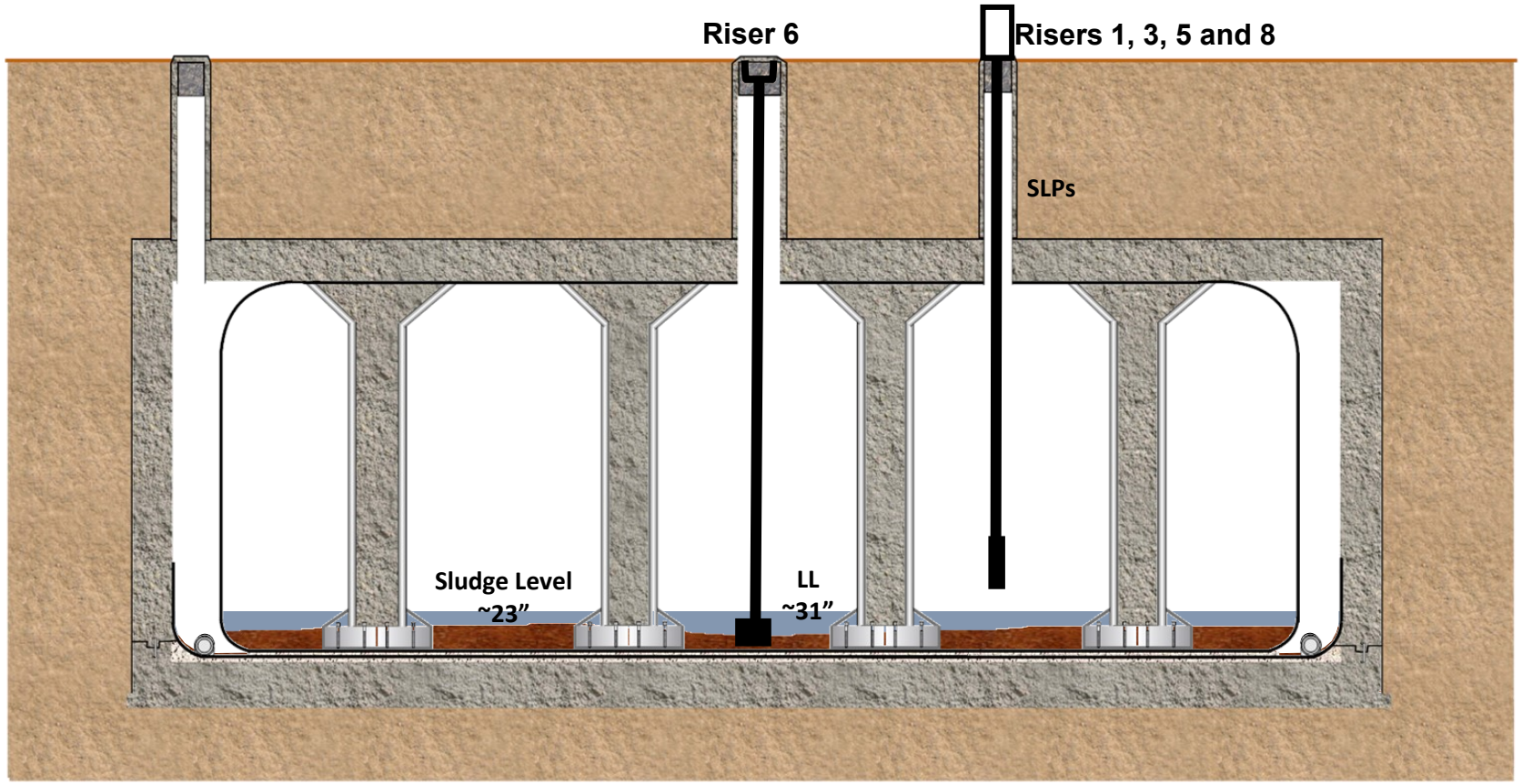


LL Liquid Level
SLP Slurry Pumps

[CBU-LTS-2005-00169]

Tank 11 Waste Removal Campaign 2

Post-Waste Removal Campaign 2 – Batch A (June 2004)



LL Liquid Level
SLP Slurry Pumps

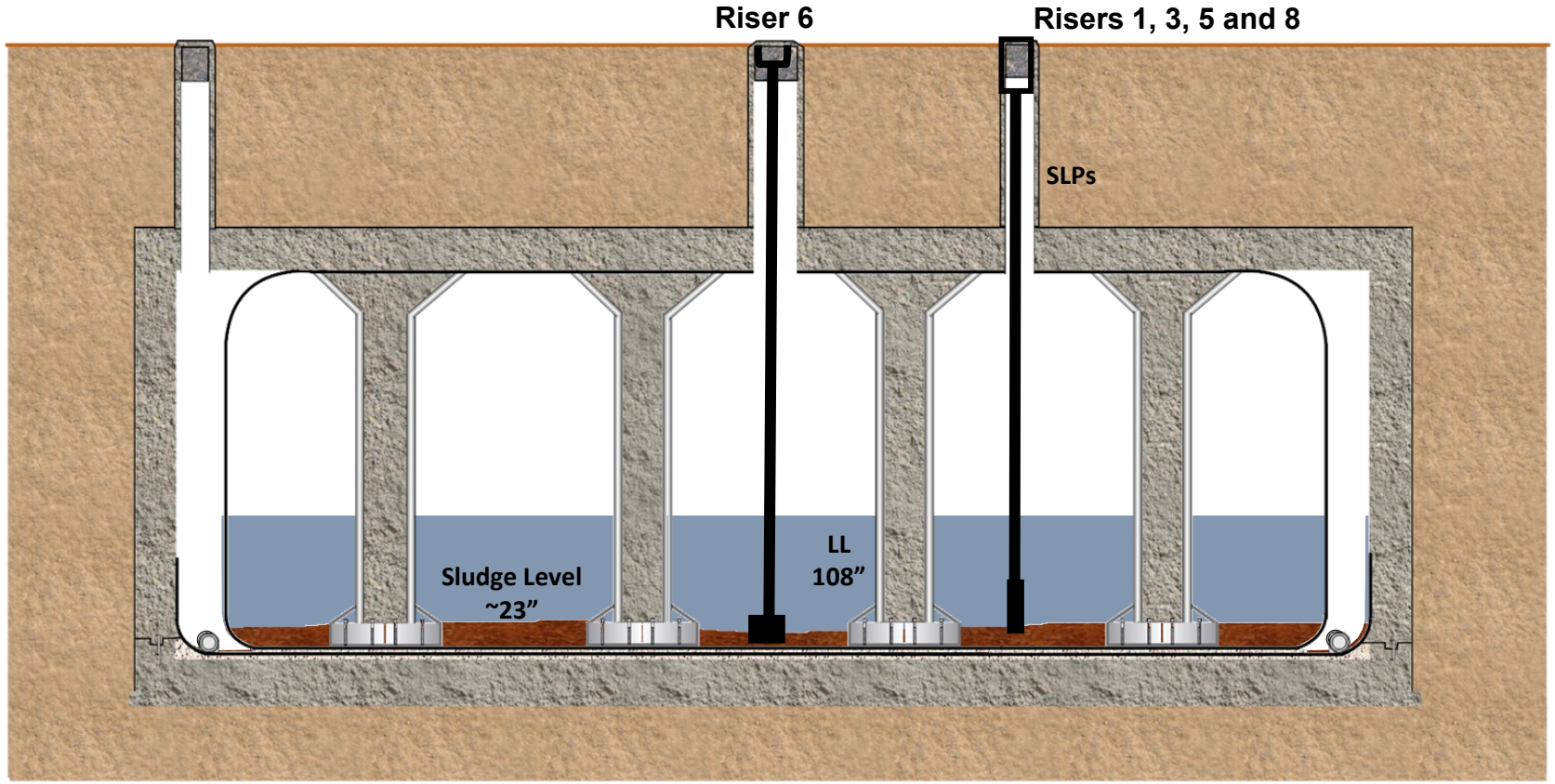
[CBU-LTS-2005-00169, M-ESR-H-00240]

Tank 11 Waste Removal Campaign 2

Tank Conditions After Waste Removal Campaign 2 Batch A

Tank 11 Waste Removal Campaign 2

Pre-Waste Removal Campaign 2 – Batch B (December 2004)

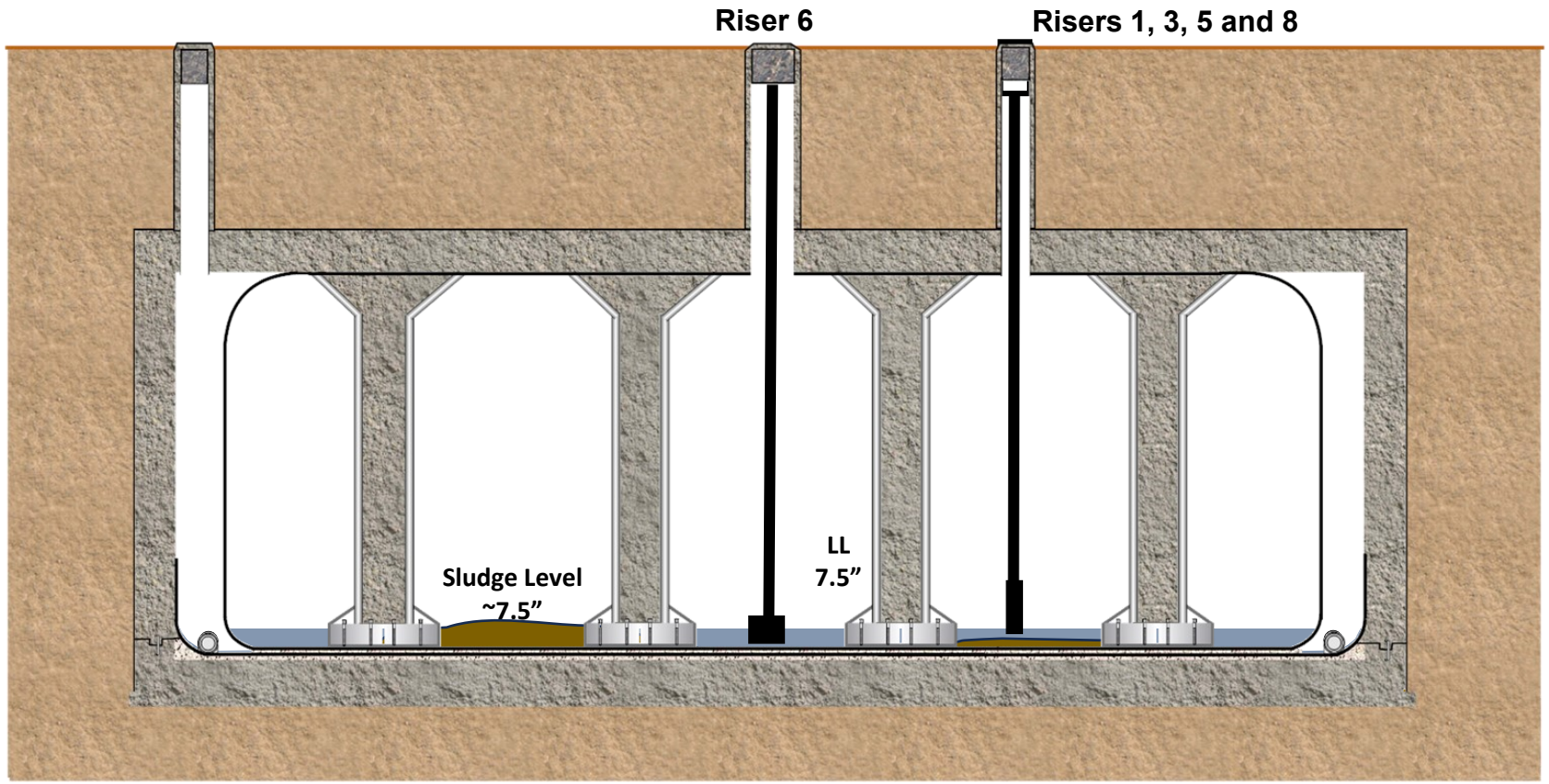


LL Liquid Level
SLP Slurry Pumps

[CBU-LTS-2005-00169, M-ESR-H-00240]

Tank 11 Waste Removal Campaign 2

Post-Waste Removal Campaign 2 – Batch B (December 2004)

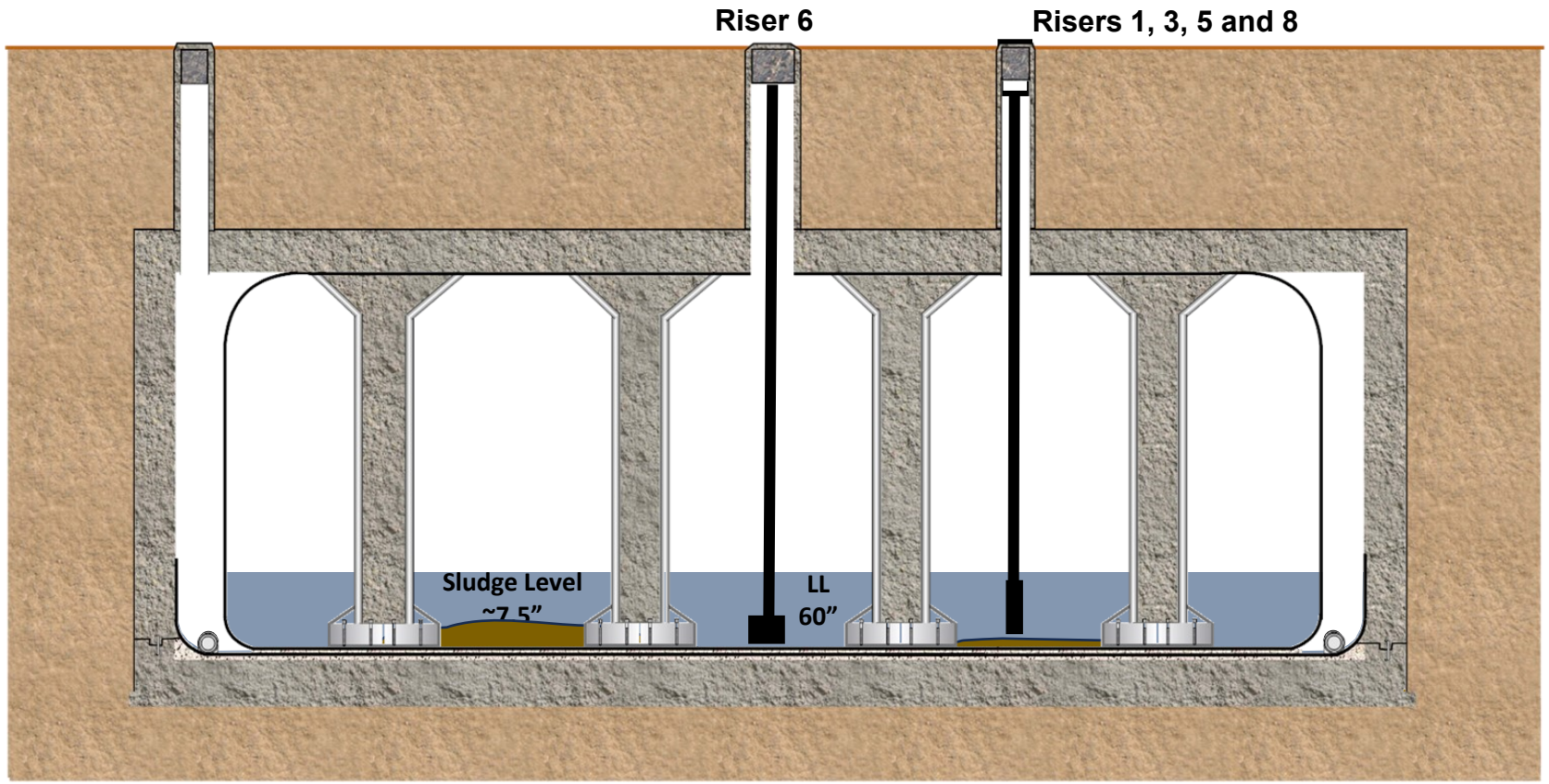


LL Liquid Level
SLP Slurry Pumps

[CBU-LTS-2005-00169, M-ESR-H-00240]

Tank 11 Waste Removal Campaign 2

Pre-Waste Removal Campaign 2 – Batch C (February 2005)

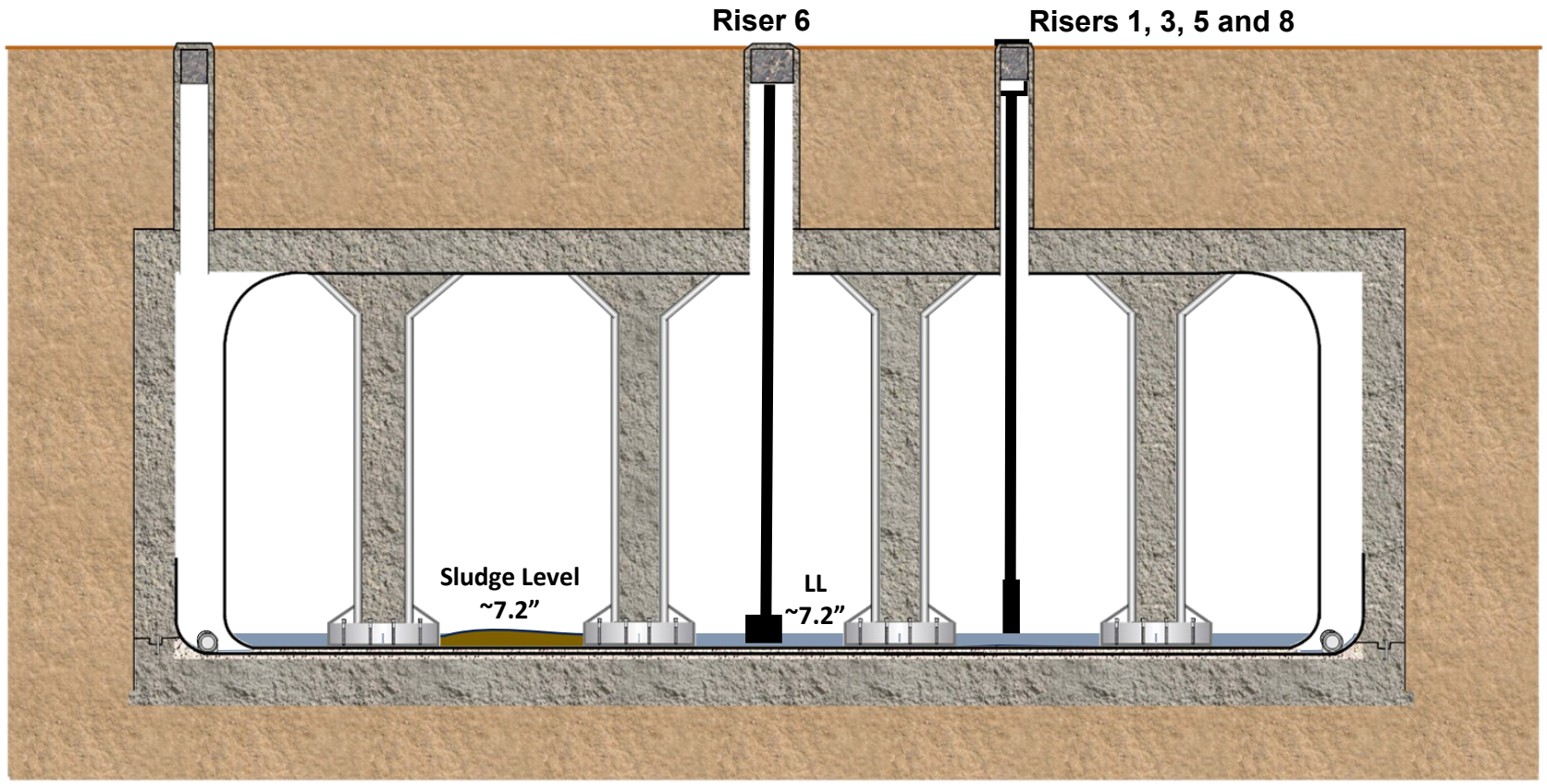


LL Liquid Level
SLP Slurry Pumps

[CBU-LTS-2005-00169, M-ESR-H-00240]

Tank 11 Waste Removal Campaign 2

Post-Waste Removal Campaign 2 – Batch C (February 2005)

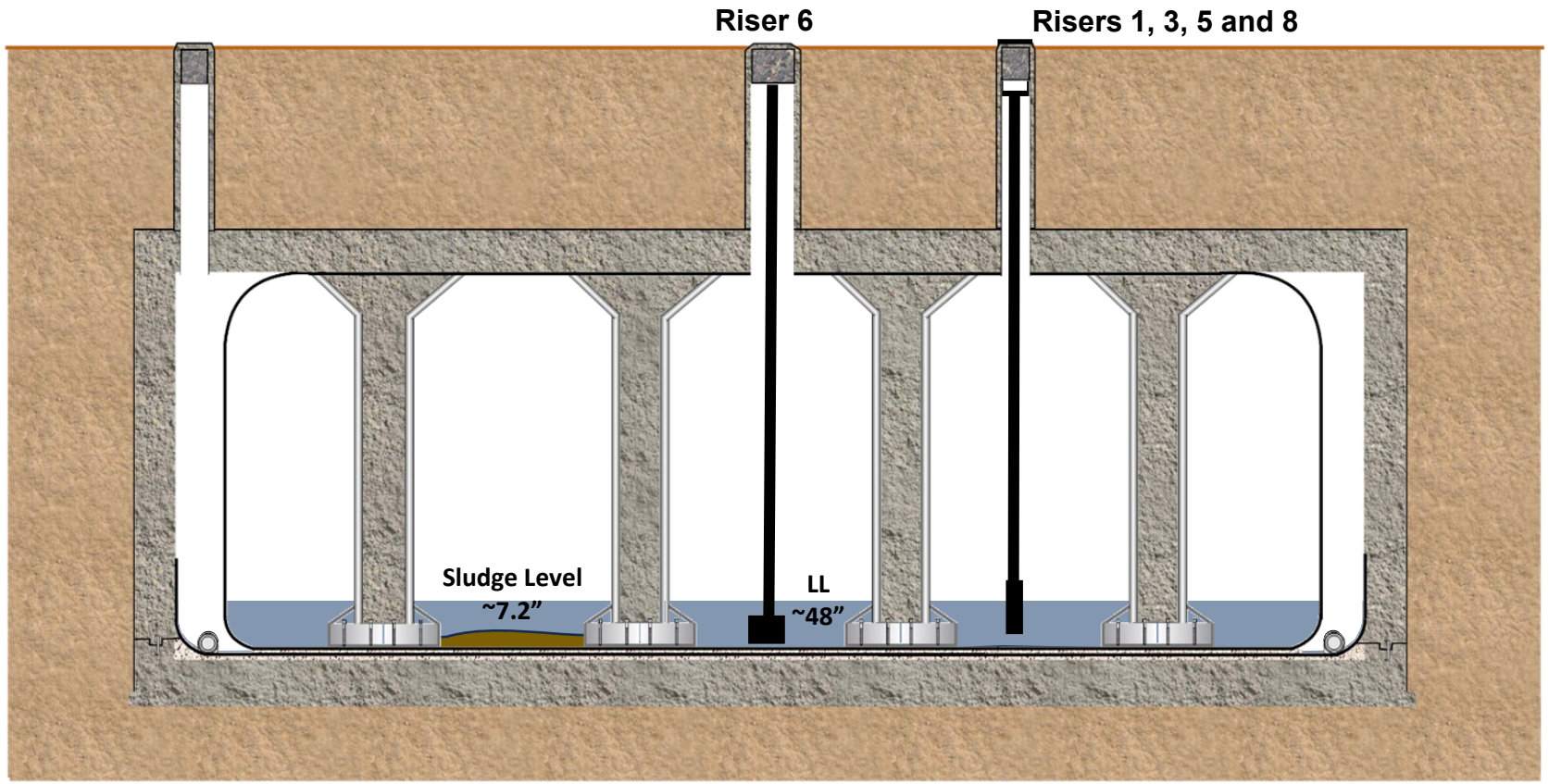


LL Liquid Level
SLP Slurry Pumps

[CBU-LTS-2005-00169, M-ESR-H-00240]

Tank 11 Waste Removal Campaign 2

Pre-Waste Removal Campaign 2 – Batch D (March 2005)

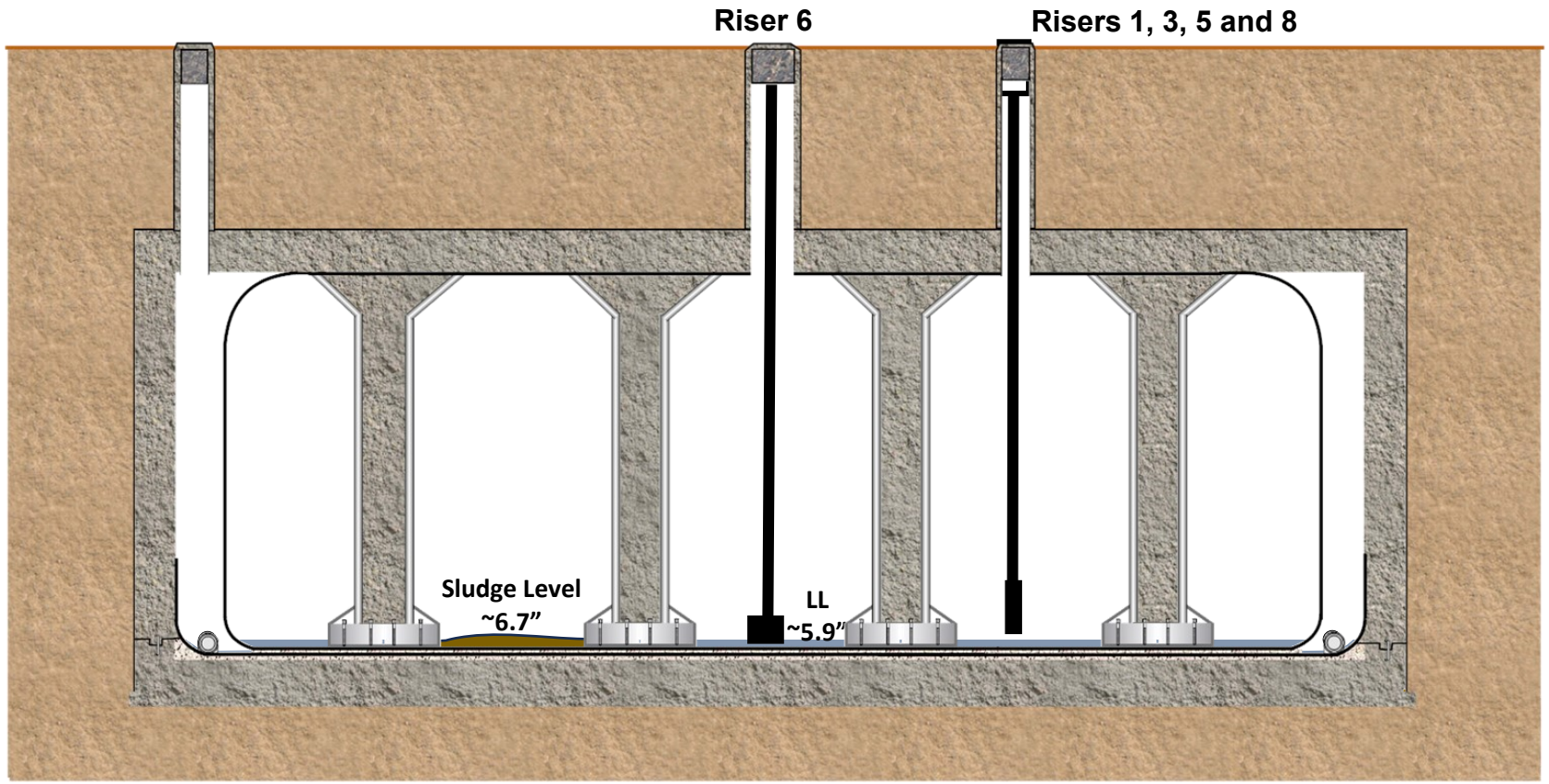


LL Liquid Level
SLP Slurry Pumps

[CBU-LTS-2005-00169, M-ESR-H-00240, M-ESR-H-246]

Tank 11 Waste Removal Campaign 2

Post-Waste Removal Campaign 2 – Batch D (March 2005)



LL Liquid Level
SLP Slurry Pumps

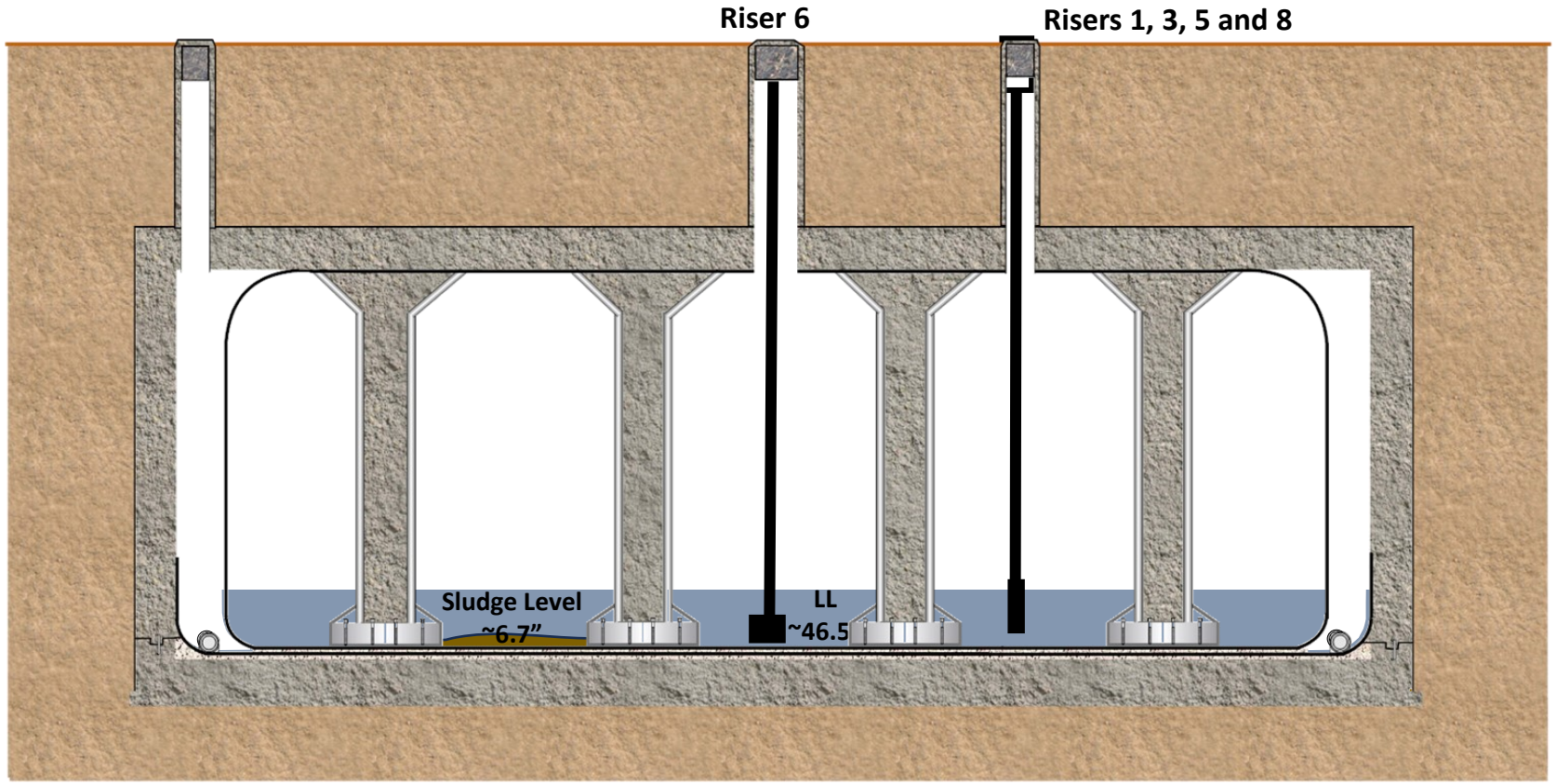
[CBU-LTS-2005-00169, M-ESR-H-00240, M-ESR-H-246]

Tank 11 Waste Removal Campaign 2

Tank Conditions After Waste Removal Campaign 2 Batch D

Tank 11 Waste Removal Campaign 2

Pre-Waste Removal Campaign 2 – Batch E (May 2005)

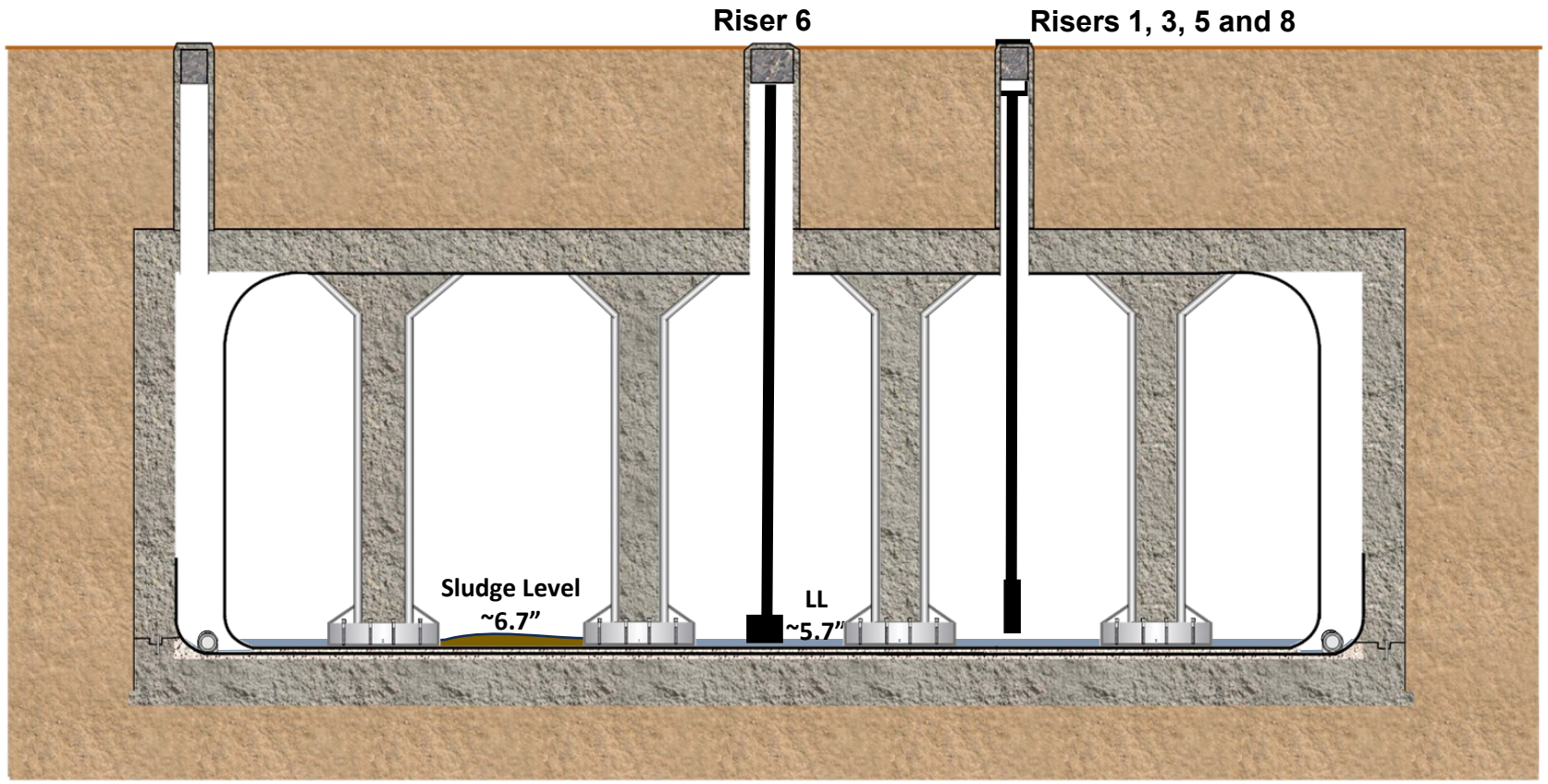


LL Liquid Level
SLP Slurry Pumps

[CBU-LTS-2005-00169, M-ESR-H-00240, M-ESR-H-246, M-ESR-H-00256]

Tank 11 Waste Removal Campaign 2

Post-Waste Removal Campaign 2 – Batch E (May 2005)

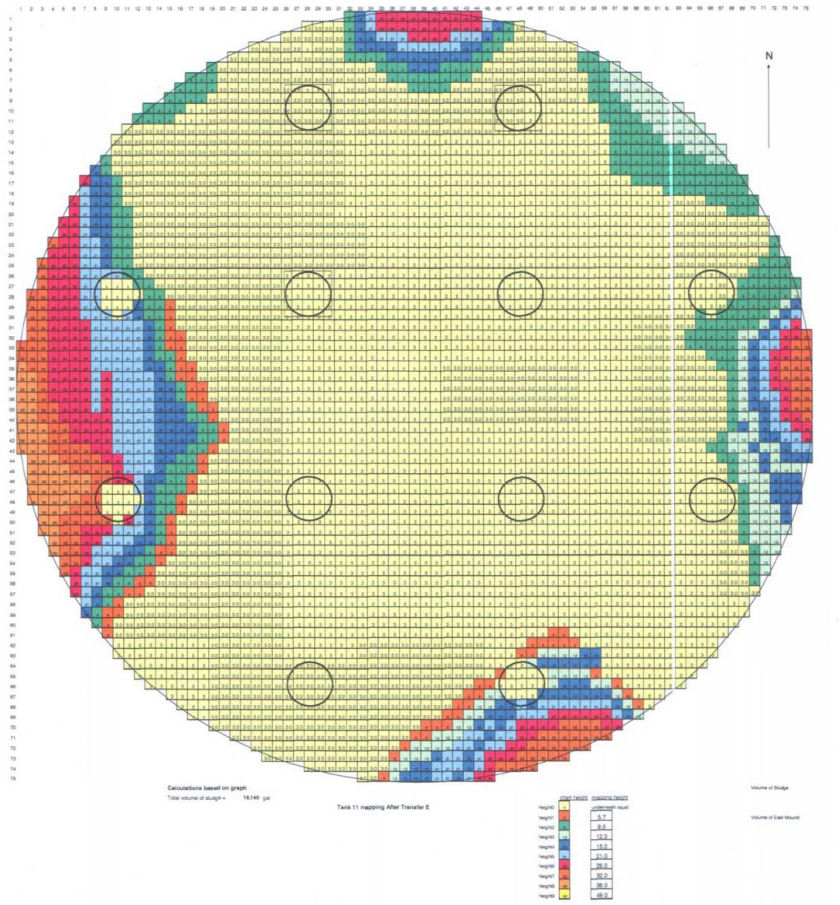


LL Liquid Level
SLP Slurry Pumps

[CBU-LTS-2005-00169, M-ESR-H-00240, M-EAR-H-00246, M-ESR-H-00256]

Tank 11 Waste Removal Campaign 2

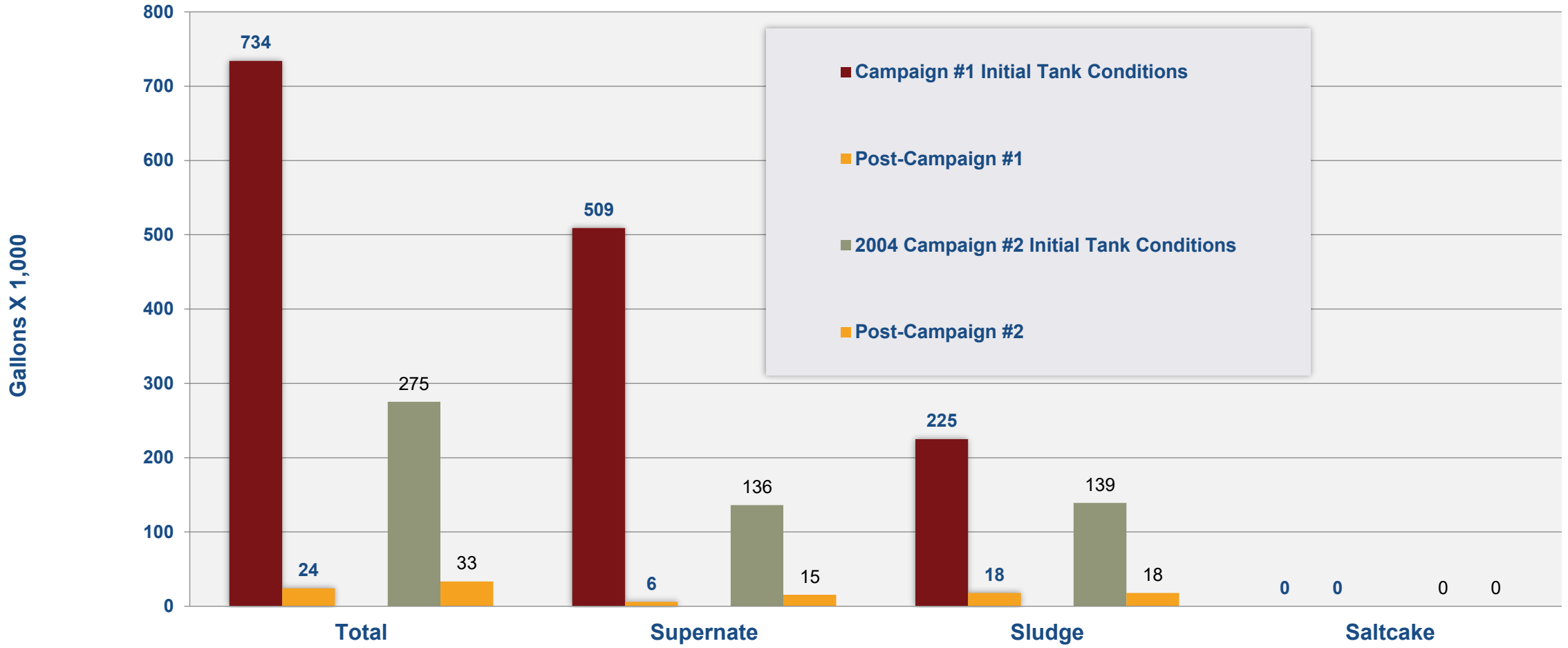
Tank 11 Mapping after Waste Removal Campaign 2 – Batches A – E



[CBU-LTS-2005-00169]

Tank 11 – Waste Removal Campaigns 1 & 2 Results

Waste Volumes before and after Campaigns 1 & 2

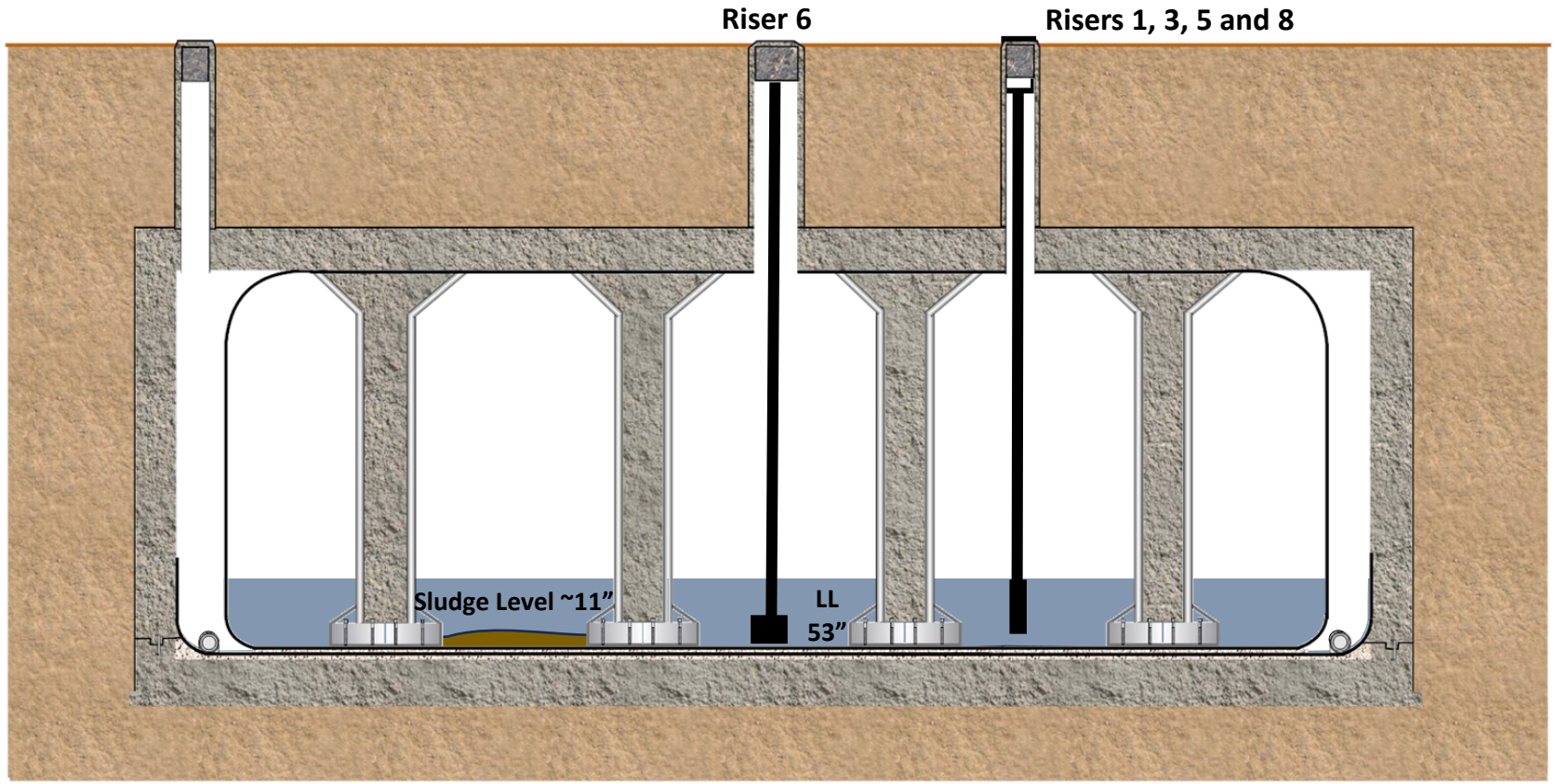


Tank 11 Waste Removal Campaign 3

- **Initial estimated sludge waste volume – 10.96 inches (~30 Kgal) [U-ESR-H-00226-1-ADD-4, U-ESR-H-00226-1-ADD-5, X-ESR-G-00055]**
- **Slurry Pumps in Risers 1, 3, 5, and 8 were operationally restored**
  - *SLPs moved back to Tank 11 from Tank 12*
  - *First mixing campaign with transfer to Tank 35 was performed from May 2024 through July 2024.*
  - *Mixing was ineffective in mobilizing the sludge heel*
    - Decision made to perform Low Temperature Aluminum Dissolution for the next mixing campaign.
- **Low Temperature Aluminum Dissolution (LTAD)**
  - *Initiated in November 2024 with the addition of caustic (i.e., ~ 50 kgal of sodium hydroxide).*
  - *Slurry pumps operated until reaching the LTAD target waste temperature of 80°C and operated in an indexing/rotating configuration throughout the remainder of the mixing campaign totaling 25 days at elevated temperature .*
    - LTAD target temperature maintained with the use of cooling coils.
  - *Primary tank inspection after completion of the Tank 11 to Tank 35 transfer on 3/29/2025 indicates LTAD was effective for heel removal.*
    - Residual waste volume estimated to be < 8,000 gal (< 3 inches)

Tank 11 – Waste Removal Campaign 3 (LTAD)

Pre-LTAD (February 2025)

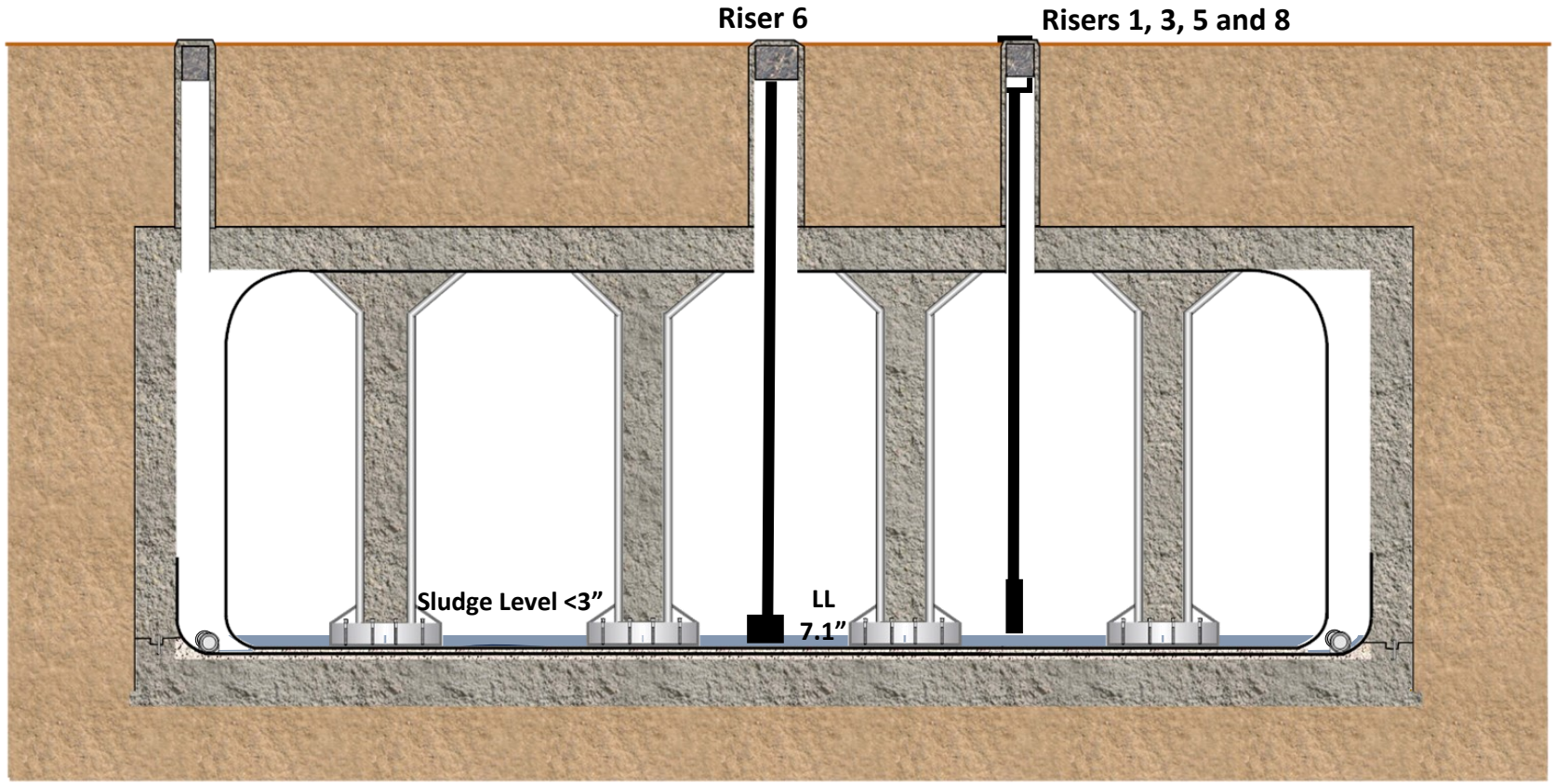


The liquid level is the level after caustic addition and at the start of the slurry pumps operation for the LTAD process (2/1/2025).

[U-ESR-H-00226-1-ADD-4, U-ESR-H-00226-ADD-5]

Tank 11 – Waste Removal Campaign 3 (LTAD)

Post-LTAD (March 2025)



[U-ESR-H-00254]

Tank 11 Waste Removal Campaign 3

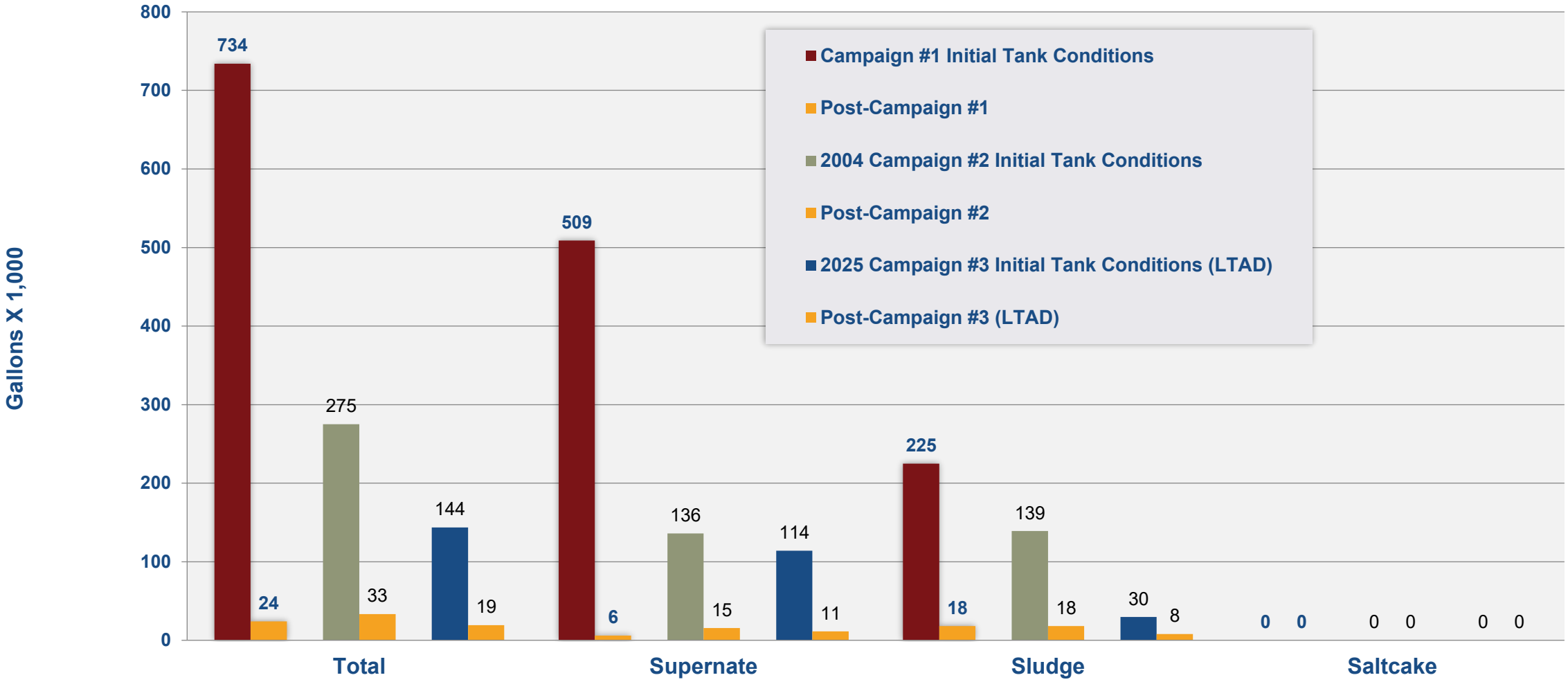
Tank Conditions After Waste Removal Campaign 3

Tank 11 Waste Removal Campaign 3

Tank Conditions After Waste Removal Campaign 3

Tank 11 – Waste Removal Campaigns 1, 2 & 3 Results

Waste Volumes before and after Campaigns 1, 2 & 3



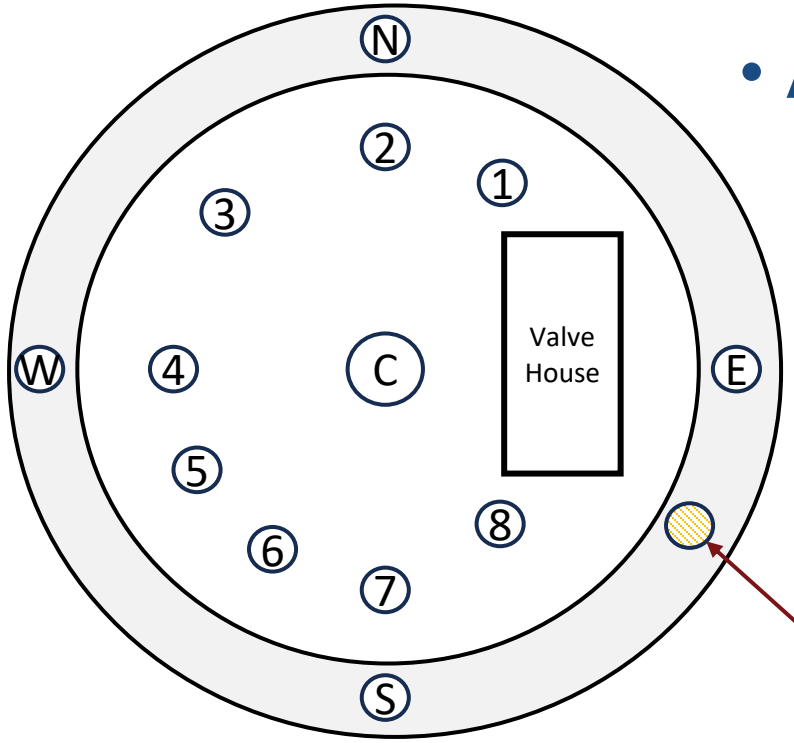
Tank 11 Annulus Inspection/Leak History through 2025

- **Through November 2023**
  - *A total of 2 leak-sites documented [SRMC-STI-2024-00076]*
  - *Four annulus risers available for inspection: North, South, East, and West*
  - *25% inspection capability*
  - *Leak-sites identified are located at 235” (West) and 189” (South) from the tank bottom.*
- **Latest inspected areas of Tank 11 annulus show no leakage (leak-sites dry and stable), no significant surface corrosion or other anomalies *[SRMC-STI-2024-00076]***
- ***Trace amount of waste on annulus floor [SRR-LWE-2018-00109, SRMC-STI-2024-00076]***
- ***Several occasions of water accumulation within annulus (rainwater inleakage)***
- ***Inspection of annular pan consistent in all inspected areas***
  - *No reason to believe uninspected areas would not have similar conditions*

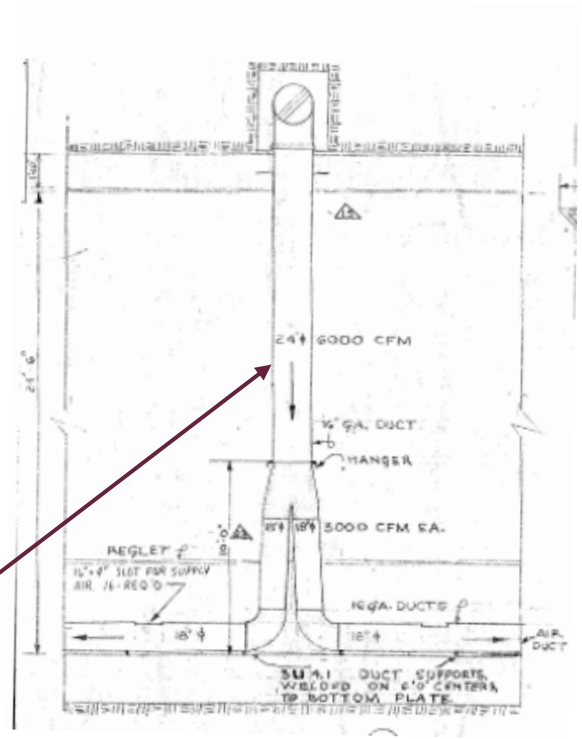
West Leak-site

Tank 11 – Riser Access

- **Primary Access**
  - *Eight 24-inch risers*
  - *One 42-inch central riser*
- **Annulus Access**
  - *Four 24-inch risers*



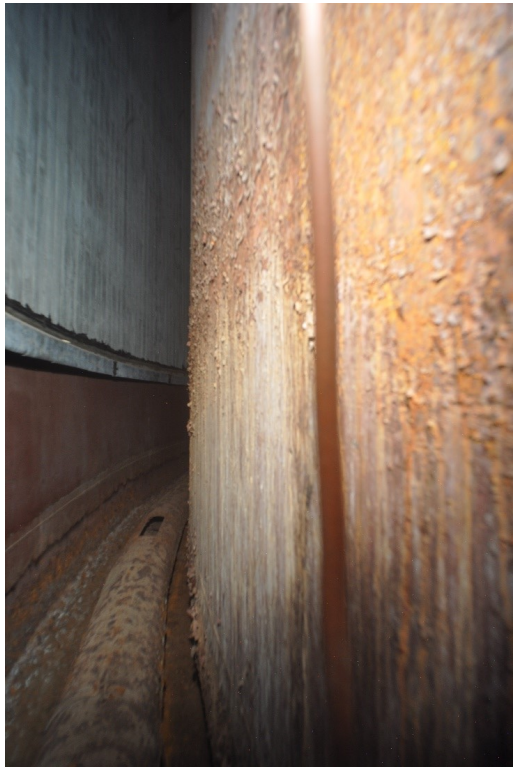
Vertical Dehumidification Duct



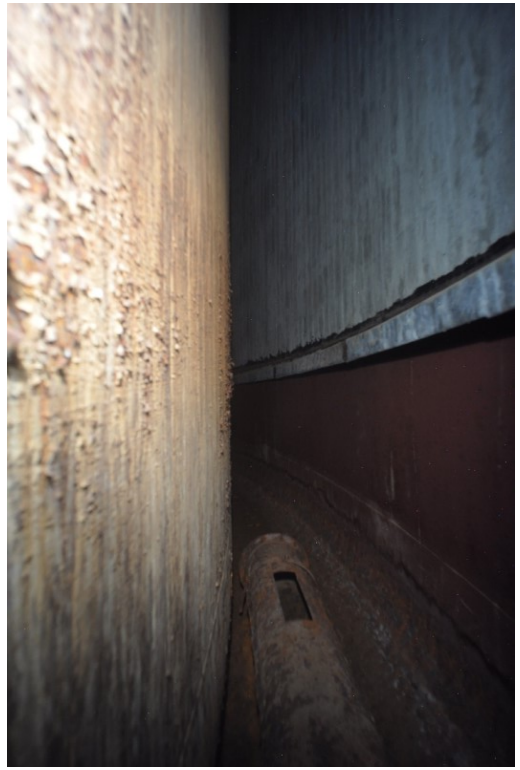
Tank 11 – Annulus East Riser*

***Pictures of Tank 11 annulus taken on September 2024**

East Riser Facing South



East Riser Facing North



Tank 11 – Annulus North Riser

North Riser Facing East

North Riser Facing West

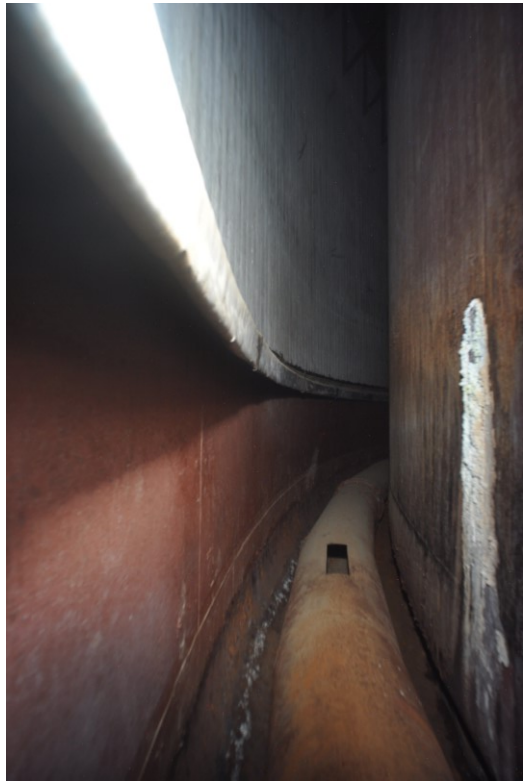
Tank 11 – Annulus South Riser

South Riser Facing East

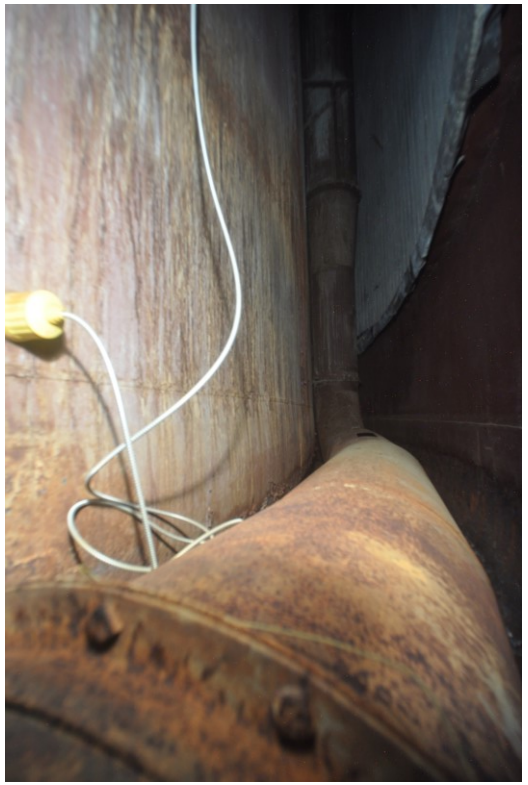
South Riser Facing West

Tank 11 – Annulus West Riser

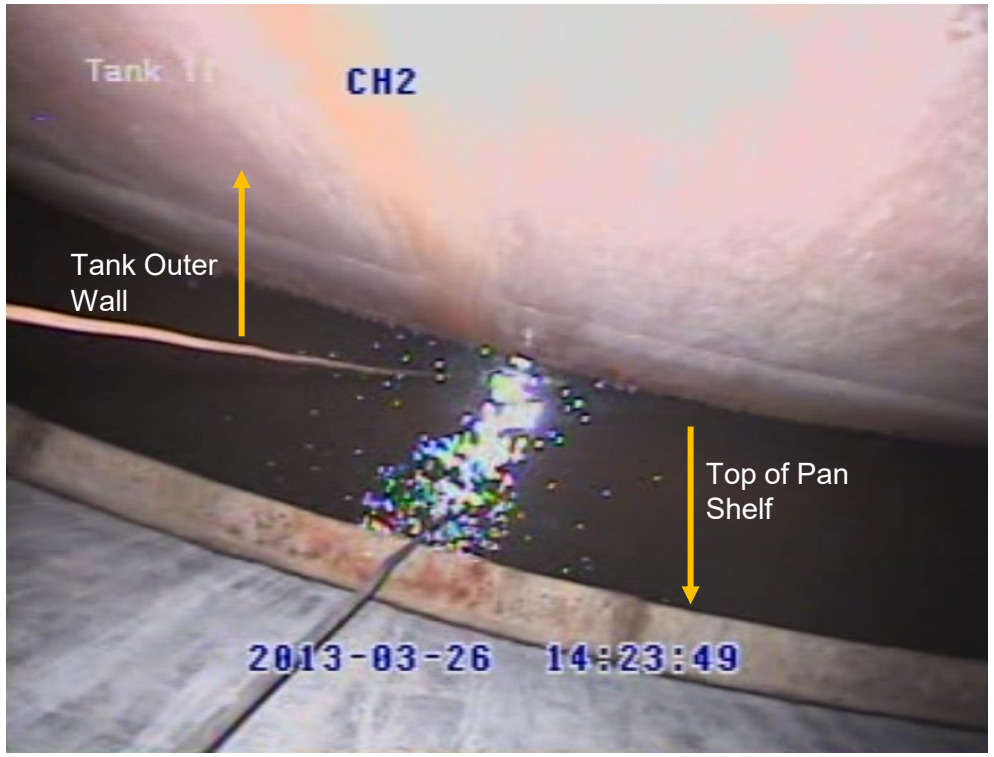
West Riser Facing North



West Riser Facing South



Tank 11 – Past Rainwater Inleakage



Liquid level ~ 20 inches

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