

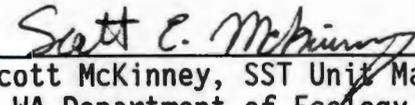
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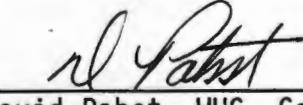
Meeting Minutes Transmittal/Approval  
Unit Managers Meeting: SST Operable Unit  
345 Hills Street, Room 28  
Richland, Washington

May 28, 1992

From/ Appvl:  Date: \_\_\_\_\_  
Jim Davis, SST Unit Manager, DOE-RL

Appvl:  Date: 6/9/92  
Scott McKinney, SST Unit Manager,  
WA Department of Ecology

Appvl: Not Present Date: \_\_\_\_\_  
Doug Sherwood, SST Unit Manager,  
EPA Region X

Appvl:  Date: 6/9/92  
David Pabst, WHC, Contractor Representative

Meeting Minutes are attached. Minutes are comprised of the following:

- Attachment #1 - Meeting Summary/Summary of Action Items & Agreements
- Attachment #2 - Agenda for Meeting
- Attachment #3 - Attendance List

- Handout 1 - Tri-Party Agreement Milestone Status, M-05-00 through M-10-00
- Handout 2 - DOE letter 92-TPA-043 dated May 4, 1992
- Handout 3 - Hanford Site Waste tank Safety Issue Resolution Programs
- Handout 4 - SST Interim Stabilization/Isolation
- Handout 5 - Tank Waste Characterization
- Handout 6 - Waste Retrieval Overview
- Handout 7 - Environmental Restoration SST Worksopce



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**UNIT MANAGERS MEETING: SINGLE-SHELL TANKS  
MEETING SUMMARY/SUMMARY OF ACTION ITEMS AND AGREEMENTS**

**May 28, 1992**

**Introduction:** (D. Pabst, WHC). The meeting convened at 9:30 a.m. Introductions were made. WHC provided opening comments and reviewed the agenda. The intent of this meeting was to provide an overview to the new Ecology Unit Manager, Scott McKinney, on the single-shell tank (SST) activities. Detailed technical discussions will be held in future meetings.

**Tri-Party Agreement Milestone Status M-05-00 Through M-10-00:** D. Pabst, WHC  
A program assessment of all TPA milestones associated with single-shell tanks was provided. Refer to handout 1.

As a part of the discussions on M-05-00, Interim Stabilization, reference was made to the May 4, 1992, letter from John Wagoner to Chuck Clarke and Dana Rasmussen which requested technical discussions on delays being experienced in the stabilization efforts. A copy of the letter was provided to Ecology (S. McKinney), and is included in these minutes as handout 2. June 23, 1992, was established as the tentative schedule for initiating these technical discussions. The specific time and location will be confirmed at the Milestone Review Meeting to be held June 9, 1992.

**Single-Shell Tank System Overview:** R. Raymond, WHC. A basic overview of the SST history and current programs was provided by WHC. A copy of the Tank Farm Surveillance and Waste Status Summary Report for January 1992, WHC-EP-0182-46, was provided to Ecology and other attendees. No other handouts were provided.

**Tank Safety Issue Resolution:** G. Wilson, WHC. WHC provided an overview of the waste tank safety issues and discussed potential plans for their resolution. Refer to handout 3.

**Stabilization and Isolation:** T. Rainey, WHC. The interim stabilization and isolation of SSTs was discussed in the form of a general briefing. Several issues were highlighted, but limited technical discussions were held. Ecology requested a copy of the draft Near Term Safety Study. RL indicated that the report was in review and was not in a condition for release. An action item was initiated.

**Action Item 05/28/92-01.** RL to provide to Ecology the date when the Near Term Safety Study will be available, and subsequently provide a copy of the plan to Ecology and EPA. Actionee: G. Bishop Due Date: June 23, 1992

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**Tank Waste Characterization:** P. Hernandez, RL. An overview presentation on the core sampling and characterization activity was provided. Several issues were highlighted, but limited technical discussions were held. Refer to handout 5.

**Action Item 05/28/92-02:** RL/WHC to present at the next Unit Manager Meeting a brief discussion on Liquid Observation Wells and their use in tank leak detection. Actionee: D. Pabst Due Date: June 23, 1992

Brief discussions were held on the technical difficulties being experienced in the area of rotary mode sampling development. It was agreed that more detailed discussions would be required, and the first meeting was scheduled for June 9, 1992, prior to the Milestone Review Meeting. D. Pabst, WHC, will coordinate this meeting.

Ecology commented that it was commencing to review the Waste Characterization Plan, Revision 3. RL and WHC recommended that since the next revision is in work which will substantially alter the characterization plan, that Ecology delay reviews until receipt of the next plan, scheduled for September 1992.

**Tank Waste Retrieval:** J. M. Henderson, WHC. The retrieval program was presented in general. In the area of technology development associated with milestone M-06-00, it was specifically noted that not all test and evaluation is technology development, and that only those areas which require new, innovative systems, or novel adaptations of existing systems would be included in the M-06-00 activities. Refer to handout 6.

**Environmental Restoration SST Workscope:** M. Hughes, WHC. A correlation of RCRA/CERCLA Operable Units to the single-shell tanks was provided, with a brief overview of the efforts planned for the near future leading to tank farm (e.g., not tank waste contents) characterization. Refer to handout 7.

**Closing Remarks.** Ecology, RL and WHC established the date for the next Unit Manager Meeting for single-shell tanks to be June 23, 1992. The meeting was adjourned at 1:00 p.m.

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AGENDA  
TRI-PARTY AGREEMENT  
Unit Managers Meeting

Attachment 2

May 28, 1992, 9:30 a.m. to 1:00 p.m.  
345 Hills, Room 27A, Richland, Washington

<u>Time</u>	<u>Topic</u>	<u>Presenter DOE/Contractor</u>
9:30	Introductions	
9:35	Single-Shell Tank TPA Milestone Status	J. Yerxa/D. Pabst
9:45	Single-Shell Tanks - System Overview	Bishop/Raymond
10:15	Single-Shell Tank Safety Program	Christensen/Wilson
10:45	Stabilization and Isolation Program	Bishop/Raymond
11:15	Core Sampling and Characterization Program	Clark/Propson
11:45	Waste Retrieval Program	Davis/Henderson
12:15	Closure/Closure Planning Program	Freeberg/Hughes
12:45	Establish Date for Next Unit Manager Meeting	
1:00	Adjourn	

**SINGLE-SHELL TANK UNIT MANAGER MEETING  
MAY 28, 1992**

List of Attendees

Name	Organization	Telephone
David Pruss	WHC TPA	509 376 9048
THOMAS E RANNEY	WHC TWR	509 373-3531
Richard Raymond	WHC TWR	509 373-2785
Alan Michiels	Stone & Webster	509-376-1985
JON YERXA	DOE - TPA	(509) 376-9628
SHARON CASH	WHC - TPA	(509) 376-6204
Scott McKinney	Ecology	(206) 459-6725
Jim DAVIS	DOE	509 376 6678
Tim Bishop	RL	509-373-2113
<del>George Lockard</del>	WHC	509-373-5523
BRUCE NICOLL	DOE	509 376-6000
Paul Hernandez	DOE - TFPO	509 376 2209
JOHN PROPSON	WHC	(509) 373-1765
Mike Mahaffey	WHC - TD	509-376-1120
JR LANS	WHC Closure	509 376-7508
RT MILLER	WHC <sup>RCPA</sup> CLOSURE	(509) 376-2622
J. Mark Henderson	WHC - SST Retrieval	(509) 372-0377
C.S. LOUIE	SWEC - Technology Development	(509) 376-3502
THIVANN FREEMAN-POILLARD	WHC - ENV. RESTORATION ENG.	509-376-1882
M.C. Hughes	WHC - Program Off. <sup>ENV Restoration</sup>	(509) 376-0787
R.L. Miller	WHC <sup>ENV RESTORATION</sup> Program Office	509/376-7966

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AGENDA  
9 2 | TRIP-PARTY AGREEMENT 6 5 8  
Unit Managers Meeting

May 28, 1992, 9:30 a.m. to 1:00 p.m.  
345 Hills, Room 27A, Richland, Washington

<u>Time</u>	<u>Topic</u>	<u>Presenter DOE/Contractor</u>
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9:35	Single-Shell Tank TPA Milestone Status	J. Yerxa/D. Pabst
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1:00	Adjourn	

# **UNIT MANAGER MEETING SINGLE-SHELL TANKS**

## **TRI-PARTY AGREEMENT MILESTONE STATUS M-05-00 THROUGH M-10-00**

**D. B. PABST  
MAY 28, 1992**

# SINGLE-SHELL TANKS POINTS OF CONTACT

## UNIT MANAGERS

- Stabilization/Isolation
- Waste Retrieval
- Tank Farm Closure
- Sampling/Characterization

## DOE-RL

Guy Bishop  
(509) 373-2113

Jim Davis  
(509) 376-6678

Roger Freeberg  
(509) 376-7176

John Clark  
(509) 376-2246

## WHC

Rick Raymond  
(509) 373-2785

Mark Henderson  
(509) 372-0377

Mike Hughes  
(509) 376-0787

John Propson  
(509) 373-1765

## TRI-PARTY AGREEMENT

- Integration

Jon Yerxa  
(509) 376-9628

David Pabst  
(509) 376-9048

Ecology Unit Manager

Scott McKinney

(206) 459-6725

EPA Unit Manager

Doug Sherwood

(509) 376-9529

## MAJOR AND INTERIM MILESTONES - SINGLE-SHELL TANKS (Sheet 1 of 11)

NUMBER	MILESTONE	COMPLETION	ISSUES/STATUS
M-05-00*	<p><b>Complete single-shell tank interim stabilization.</b></p> <p>Complete the single-shell tank interim stabilization activities (removal of pumpable liquid from those 51 single-shell tanks not yet stabilized) for all single-shell tanks except 241-C-105 and 241-C-106. All 149 tanks, including 241-C-105 and 241-C-106 will be interim stabilized and interim isolated by September 1996</p>	<p><b>Due: Sept. 1995</b> <b>Proj/Act: TBD</b></p>	<p>Technical Schedule</p>
M-05-01	Interim stabilize 3 single-shell tanks	<p>Due: Sept 1989 Proj/Act: Sept 1989</p>	Completed
M-05-02	Interim stabilize an additional 4 single-shell	<p>Due: Sept. 1990 Proj/Act: Sept 1990</p>	Completed
M-05-03	Interim stabilize an additional 4 single-shell tanks	<p>Due: Sept. 1991 Proj/Act: TBD</p>	Missed

\*Subject of Probable Future TPA Change Request Action

Status as of 5/28/92

## MAJOR AND INTERIM MILESTONES - SINGLE-SHELL TANKS (Sheet 2 of 11)

NUMBER	MILESTONE	COMPLETION	ISSUES/STATUS
M-05-04*	Interim stabilize an additional 9 single-shell tanks	Due: Sept. 1992 Proj/Act: TBD	Technical Schedule
M-05-05*	Interim stabilize an additional 11 single-shell tanks	Due: Sept. 1993 Proj/Act: TBD	Technical Schedule
M-05-06*	Interim stabilize an additional 8 single-shell tanks	Due: Sept. 1994 Proj/Act: TBD	Technical Schedule
M-05-07*	Interim stabilize an additional 10 single-shell tanks (stabilization complete except for 241-C-105 and 241-C-106)	Due: Sept. 1995 Proj/Act: TBD	Technical Schedule
M-05-08*	Interim stabilize Tanks 241-C-105 and 241-C-106	Due: Sept. 1996 Proj/Act: TBD	Technical Schedule
M-05-09*	Complete interim stabilization and interim isolation of all 149 single-shell tanks	Due: Sept. 1996 Proj/Act: TBD	Technical Schedule

\*Subject of Probable Future TPA Change Request Action

Status as of 5/28/92

## MAJOR AND INTERIM MILESTONES - SINGLE-SHELL TANKS (Sheet 3 of 11)

NUMBER	MILESTONE	COMPLETION	ISSUES/STATUS
M-06-00	<p>Develop single-shell tank waste retrieval technology and complete scale-model testing.</p> <p>Various waste retrieval technologies will be evaluated for retrieving each of the several types of single-shell tank wastes. Emphasis will be placed on optimizing waste removal while minimizing personnel exposure. Promising technologies will be evaluated for each waste type and one or more will be selected for testing using simulated waste in a scale model (minimum 1:12 scale) tank</p>	<p>Due: June 1994 Proj/Act: June 1994</p>	On Schedule
M-06-01	Identify waste retrieval technologies to be tested in scale-model tank	<p>Due: Oct. 1990 Proj/Act: Oct. 1990</p>	Completed
M-06-02	Initiate waste retrieval testing in scale-model tank	<p>Due: Oct. 1992 Proj/Act: Aug. 1992</p>	On Schedule or Early

\*Subject of Probable Future TPA Change Request Action

Status as of 5/28/92

## MAJOR AND INTERIM MILESTONES - SINGLE-SHELL TANKS (Sheet 4 of 11)

NUMBER	MILESTONE	COMPLETION	ISSUES/STATUS
M-07-00*	<p><b>Initiate full-scale demonstration of waste retrieval technology.</b></p> <p>A full-scale waste retrieval demonstration at a pre-selected single-shell tank will follow scale model testing of waste retrieval technologies (Milestone M-06-00). This demonstration will be complete when it succeeds in removing no less than 95 percent of the radioactive and chemical waste inventory from the single-shell tank. If any waste remains in the tank or t he surrounding soil, final tank closure will proceed under an approved closure plan in Milestone M-08 or M-09. Demonstration initiation is defined as startup of the waste retrieval equipment in the selected single-shell tank</p>	<p><b>Due: Oct. 1997</b> <b>Proj/Act: Oct. 1997</b></p>	<p><b>Technical Schedule</b></p>

\*Subject of Probable Future TPA Change Request Action

Status as of 5/28/92

## MAJOR AND INTERIM MILESTONES - SINGLE-SHELL TANKS (Sheet 5 of 11)

NUMBER	MILESTONE	COMPLETION	ISSUES/STATUS
M-07-01	Submit tank selection criteria, retrieval options and recommended tank selection to Ecology for concurrence	Due: Oct. 1993 Proj/Act: June 1992	Schedule
M-07-02	Ecology concurrence/non-concurrence of tank selection criteria, retrieval options, and tank selection	Due: Dec. 1993 Proj/Act: Aug. 1992	Schedule
M-07-03	Complete final design for installation of piping and other required waste removal piping and other required waste removal equipment	Due: Dec. 1994 Proj/Act: Dec. 1994	Planning
M-07-04	Submit completion date and completion criteria for full-scale demonstration project to Ecology for concurrence	Due: Oct. 1997 Proj/Act: Oct 1997	Planning
M-07-05	Ecology concurrence/non-concurrence of completion date/criteria	Due: Dec. 1997 Proj/Act: Dec. 1997	Planning

\*Subject of Probable Future TPA Change Request Action

Status as of 5/28/92

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# MAJOR AND INTERIM MILESTONES - SINGLE-SHELL TANKS

## (Sheet 6 of 11)

NUMBER	MILESTONE	COMPLETION	ISSUES/STATUS
M-08-00	<p><b>Initiate full-scale tank farm closure demonstration project.</b></p> <p>The full-scale tank farm demonstration project will include waste retrieval and the installation of a final cover. Decisions as to the appropriate disposal of wastes, tanks, contaminated piping, and soils will follow detailed characterization and regulatory agency approval as part of the closure process. For purposes of this milestone, initiation is defined as full-scale waste retrieval. The full-scale demonstration will serve to verify the various technologies being developed for tank farm closures</p>	<p><b>Due: June 2004</b>  <b>Proj/Act: June 2004</b></p>	<p><b>Planning</b></p>
M-08-01	<p><b>Submit tank farm selection criteria, closure method(s), tank farm selection rationale, and recommended tank farm selection to Ecology for approval</b></p>	<p><b>Due: Jan. 1999</b>  <b>Proj/Act: Jan 1999</b></p>	<p><b>Planning</b></p>

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**MAJOR AND INTERIM MILESTONES - SINGLE-SHELL TANKS**  
**(Sheet 7 of 11)**

<b>NUMBER</b>	<b>MILESTONE</b>	<b>COMPLETION</b>	<b>ISSUES/STATUS</b>
M-08-02	Complete final design for the installation of required piping and other required waste removal equipment	Due: Jan. 2001 Proj/Act: Jan 2001	Planning
M-08-03	Submit tank farm closure plan for selected tank farm to Ecology for approval	Due: Dec. 2003 Proj/Act: Dec 2003	Planning
M-09-00	<p><b>Complete closure of all 149 single-shell tanks.</b></p> <p>Closure and removal of required waste from the 149 single-shell tanks will be effected in accordance with the approved closure plan(s). As stated in the Hanford Defense Waste-Environmental Impact Statement Record of Decision, a supplemental EIS will be prepared prior to making any final decisions regarding disposal of single-shell tank waste. The final closure plan(s) will address the recommendations of the supplemental EIS</p>	Due: June 2018 Proj/Act: June 2018	Planning

**MAJOR AND INTERIM MILESTONES - SINGLE-SHELL TANKS**  
**(Sheet 8 of 11)**

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<b>NUMBER</b>	<b>MILESTONE</b>	<b>COMPLETION</b>	<b>ISSUES/STATUS</b>
M-09-01	Complete preparation of supplemental EIS and issue draft for public review	Due: June 2002 Proj/Act: June 2002	Schedule
M-09-02	Submit closure plan to Ecology for approval	Due: Dec. 2003 Proj/Act: Dec. 2003	Schedule

# MAJOR AND INTERIM MILESTONES - SINGLE-SHELL TANKS

## (Sheet 9 of 11)

NUMBER	MILESTONE	COMPLETION	ISSUES/STATUS
M-10-00	<p><b>Complete analyses of at least two complete core samples from each single-shell tank</b></p> <p>Obtain and analyze a minimum of two core samples from each single-shell tank. Samples will be collected and analyzed to determine the characteristics of significant waste strata to support timely development of tank waste retrieval technology and to assist in preparation of single-shell tank closure plans and the supplemental EIS. Additional sampling may be determined to be necessary to ensure representative samples are obtained from each tank. Samples will be collected and analyzed in accordance with a single-shell tank waste analysis plan approved by Ecology. Data from this initial characterization may be adequate to identify those tanks whose waste will be retrieved. Additional sampling and analysis will be necessary to justify any decision to leave tank waste in place</p>	<p><b>Due: Sept. 1998</b></p> <p><b>Proj/Act: Sept 1998</b></p>	<p><b>Technical Schedule</b></p>

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## MAJOR AND INTERIM MILESTONES - SINGLE-SHELL TANKS (Sheet 10 of 11)

NUMBER	MILESTONE	COMPLETION	ISSUES/STATUS
M-10-01	Submit draft waste sampling and analysis plan to National Academy of Sciences, Ecology, and EPA	Due: Mar. 1989 Proj/Act: Mar. 1989	Completed
M-10-02	Submit waste sampling and analysis plan to Ecology for approval	Due: May 1989 Proj/Act: May 1989	Completed
M-10-03	Obtain 15 core samples from 2 tanks (reference sampling tanks)	Due: Dec. 1989 Proj/Act: Dec. 1989	Completed
M-10-04	Obtain 4 core samples from 2 single-shell tanks (SSTs)	Due: Sept. 1991 Proj/Act: Aug 1991	Completed
M-10-05	Issue "Integrated Plan - Sampling and Analysis of Hanford Site Wastes Measuring Greater Than 10 mREM per Hour"	Due: Mar. 1992 Proj/Act: Mar. 1992	Completed
M-10-06	Obtain 20 core samples from single-shell tanks (SSTs)	Due: Sept. 1992 Proj/Act: Sept 1992	Technical Schedule
M-10-07	Obtain 24 core samples from 12 tanks	Due: Sept. 1993 Proj/Act: Sept 1993	Technical

## MAJOR AND INTERIM MILESTONES - SINGLE-SHELL TANKS (Sheet 11 of 11)

NUMBER	MILESTONE	COMPLETION	ISSUES/STATUS
M-10-08	Obtain 44 core samples from 22 tanks	Due: Sept. 1994 Proj/Act: Sept 1994	Technical
M-10-09	Obtain 48 core samples from 24 tanks	Due: Sept. 1995 Proj/Act: Sept 1995	Technical
M-10-10	Obtain 48 core samples from 24 tanks	Due: Sept. 1996 Proj/Act: Sept 1996	Technical
M-10-11	Obtain 48 core samples from 24 tanks	Due: Sept. 1997 Proj/Act: Sept 1997	Technical
M-10-12	Obtain 38 core samples from 19 tanks	Due: Sept. 1998 Proj/Act: Sept 1998	Technical
M-10-13*	Restore rotary mode sampling capability at the Hanford Site	Due: Sept. 1992 Proj/Act: Mar. 1993	Technical Schedule



# Department of Energy

Richland Operations Office  
P.O. Box 550  
Richland, Washington 99352

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MAY 04 1992

92-TPA-043

Ms. Dana A. Rasmussen  
Regional Administrator  
U.S. Environmental Protection Agency  
Region 10  
1200 Sixth Avenue  
Seattle, Washington 98101



Mr. Chuck Clarke, Director  
State of Washington  
Department of Ecology  
P.O. Box 47600  
Olympia, Washington 98504-7600

Dear Ms. Rasmussen and Mr. Clarke:

## INTERIM STABILIZATION OF SINGLE-SHELL TANKS AT HANFORD SITE

Over the past several months we have all come to realize the benefit of tri-party discussions in the early phase of solving technical issues. As an example, our joint meetings have proven successful in generating new interim milestones for groundwater wells under milestone M-24-00. We are approaching another juncture wherein I can foresee substantial mutual advantage if our respective staffs work together to resolve issues prior to entering into formal Dispute Resolution. The current issue that requires resolution involves the interim stabilization of single-shell tanks (SST), milestone M-05-00.

Interim stabilization of Hanford's SSTs has experienced difficulties since the onset of the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement). Change packages have been approved by the three parties in 1990 and 1991, each implementing a substantiated delay. Another change package was submitted for your consideration in September 1991, which almost went to formal Dispute Resolution when the parties differed on the sufficiency of information to support modifying the milestones. Since that time, U.S. Department of Energy, Richland Field Office (RL) has continued to pursue a technically supportable plan for achieving interim stabilization of



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the remaining SSTs. It is in all our best interests that interim stabilization of these SSTs proceed as quickly as possible. However, we must be confident that the stabilization process does not create additional safety issues in the tank farms.

On January 30, 1992, during the Dispute Resolution process for milestone M-14-00, I proposed a procedure for the future in which our organizations work together, informally, in a method which supplements the formal procedures of the Tri-Party Agreement. In correspondence to you, I outlined four steps that I believe will enhance the understanding of problems and provide avenue for jointly resolving issues. Those steps are:

- (1) RL submit a written request to review potential modifications to milestones;
- (2) Following approval of RL's request, the regulators jointly review the potential modification to Tri-Party Agreement milestones, with an allowance provided by the regulators for any delay in RL's progress towards meeting an established milestone while such reviews are being conducted;
- (3) If agreement is reached by the parties, submit a formal change package by any party, as appropriate, to reflect the results of such a review; and
- (4) If no agreement is reached, or if RL's request to review potential modifications is denied, any party may submit a formal change package as provided by the Tri-Party Agreement.

In recent months, both U.S. Environmental Protection Agency and the State of Washington Department of Ecology (Ecology) have concurred, in varying degrees, with the benefits to this type of an approach. I now solicit your support for implementing a method similar to that which I proposed in January 1992, to work together to resolve the issues surrounding interim stabilization of the remaining sixteen SSTs not on the watch list and the twenty-eight SSTs (including SSTs 241-C-105 and -106) that are not yet available for interim stabilization due to safety restrictions. The fact that further delays in this milestone are inevitable has been discussed with your people at the Unit Manager and Project Manager levels. The Tri-Party Agreement change packages are necessary for this milestone. We had committed to provide a change package to you this month. Rather than send you a unilateral position, I want my people to work with your people to come to a cooperatively-derived, supportable change to this milestone.

Toward this end, I propose that Mr. Steven H. Wisness, coordinate a series of discussions between cognizant, technical staff from your two organizations, RL and Westinghouse Hanford Company, with the objective to develop and process two change packages for milestone M-05-00. The first change package will address only those SSTs that are available for stabilizing (non-watch list),

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and which have yet to be stabilized (a total of 16 tanks, either in progress or being prepared for stabilization at this time,) The second change package will address the twenty-eight SSTs that are not, at this time, available for interim stabilization due to safety restrictions. Although the end product of interim stabilization is the same for these two categories, the issues involved are substantially different and should be addressed separately.

I ask that you support these discussions with resources available to you. My staff and I are eager to work together with you in this spirit of cooperation to provide timely resolution of this issue. Please contact me and provide your comments and, hopefully, your commitment to support this endeavor. Should you have questions, feel free to call me, or your staff may call Mr. S. H. Wisness on (509) 376-6798, or Mr. R. D. Izatt on (509) 376-5441.

Sincerely,



John D. Wagoner  
Manager

EAP:SHW

cc: P. T. Day, EPA  
N. Pierce, Ecology  
D. B. Jansen, Ecology  
T. B. Veneziano, WHC

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**Hanford Site  
Waste Tank Safety Issue  
Resolution Programs**

presented to

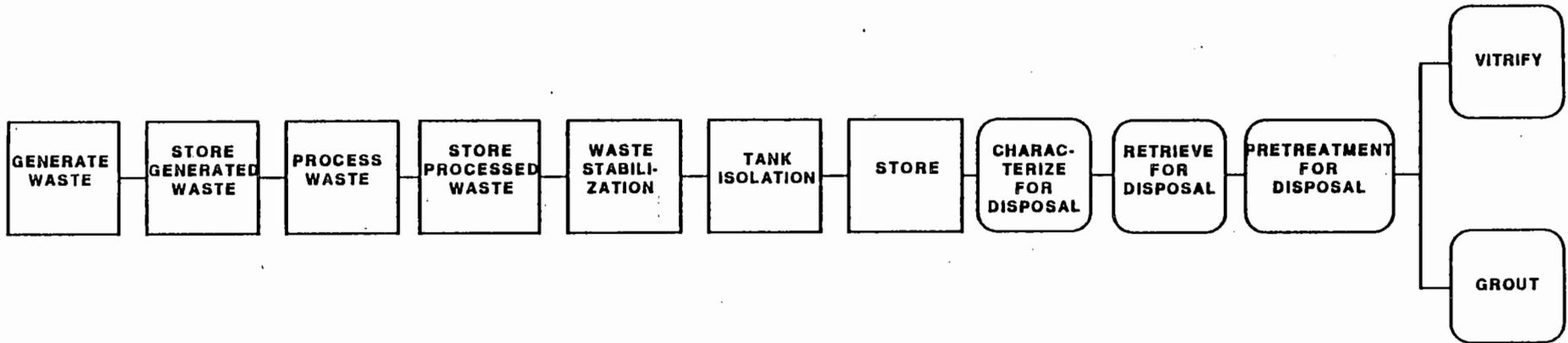
**SST Unit Managers**

by

**G. R. (George) Wilson  
Westinghouse Hanford Company  
May 28, 1992**

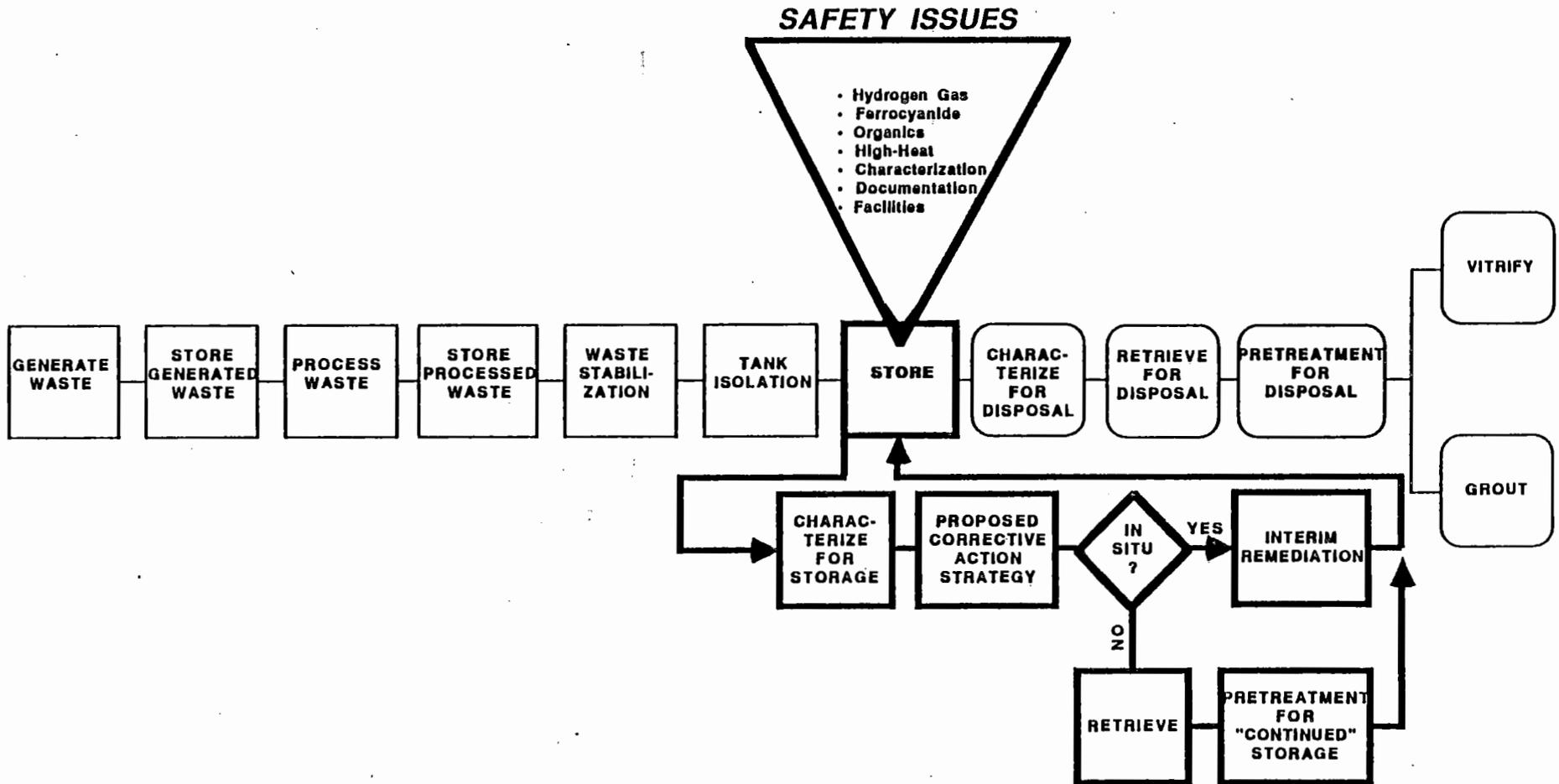
# WASTE TANK PROGRAM

General Overview: Generation to Disposal



# WASTE TANK SAFETY PROGRAM

## Effect of Waste Tank Program



# **HANFORD SITE WASTE TANK SAFETY ISSUES METHODOLOGY**

- **Initial list compiled by WHC**
  - **Driven by:**
    - \* **GAO report on ferrocyanide**
    - \* **Wyden Amendment**
- **Reviewed and commented on by:**
  - **DOE**
  - **High-Level Waste Tank Safety Task Force**
  - **Technical Advisory Panel**
- **Formally submitted to DOE on January 20, 1991, and documented in the Wyden Amendment response (June 1991)**

## **WYDEN AMENDMENT**

***Public Law 101-510, Section 3137: "Safety Measures for Waste Tanks at Hanford Nuclear Reservation" - November 5, 1990***

**(a) Identification and monitoring of certain tanks - submitted February 1991**

**- Requirement:**

**"...(Tanks) with a serious potential for release of high-level waste due to uncontrolled temperature or pressure."**

**And insure continuous monitoring of those tanks is carried out to "...detect a release or excessive temperature or pressure..."**

**- Response:**

- \* Identified 53 tanks for "watch list" (48 SSTs, 5 DSTs)**
- \* Monitoring (instrument upgrading) identified as a need**

## **WYDEN AMENDMENT (Continued)**

***Public Law 101-510, Section 3137: "Safety Measures for Waste Tanks at Hanford Nuclear Reservation" - November 5, 1990***

**(b) Action Plans - submitted March 1991**

**- Requirement:**

**"...develop action plans to respond to excessive temperature or pressure or a release from..." any of the identified ("watchlist") tanks**

**- Response:**

**\* Generic action plans for the site response were submitted**

**\* Specific action plans were submitted**

## WYDEN AMENDMENT (Continued)

*Public Law 101-510, Section 3137: "Safety Measures for Waste Tanks at Hanford Nuclear Reservation" - November 5, 1990*

(c) Prohibitions - submitted March 1991

- Requirement:

No additions of high-level nuclear waste to be made to identified tanks (except to return samples) unless the Secretary determines that:

- \* No safer alternative exists, or
- \* "...the tank does not pose a serious potential for release of high-level nuclear waste."

- Response:

- \* Transfer lines into SSTs are physically isolated
- \* DSTs are administratively isolated and "locked and tagged"

NOTE: DOE-HQ directed RL to perform an audit of the prohibition effectiveness

- Audit turned up a potential by pass route (flush water)
- WHC declared the planned saltwell pumping of C Farm a potential violation and delayed saltwell pumping to gain Secretary approval

## **WYDEN AMENDMENT (Continued)**

***Public Law 101-510, Section 3137: "Safety Measures for Waste Tanks at Hanford Nuclear Reservation" - November 5, 1990***

**(d) Reports - submitted May 91**

**- Requirement:**

**"...the Secretary shall submit to Congress a report on actions taken to promote tank safety..."**

**And the "...timetable for resolving outstanding safety issues on how to handle the waste in such tanks."**

**- Response:**

**\* Scrubbed the safety issue list to 23 (4 of the original 27 were primarily environmental)**

**\* Prepared a draft implementation plan for the safety issues (WHC-EP-0422)**

**\* Prepared for the Secretary the report to Congress (a summary of WHC-EP-0422)**

# HANFORD SITE WASTE TANK SAFETY ISSUES PRIORITIZATION

- **Based on criteria defined by the High-Level Waste Tank Task Force**
  - **Priority 1\*:** Most of the conditions necessary to lead to an uncontrolled release
  - **Priority 2:** Some of the conditions necessary to lead to an uncontrolled release under extreme assumptions
  - **Priority 3:** Conditions that could lead to release of fission products during interim storage (5-30 years)

**\*Correlated with the watchlist tanks identified for the Wyden Amendment (however, not a necessary condition)**

# HANFORD SITE TANK FARM SAFETY ISSUES

## ***Priority 1:***

***"Issues/situations that contain most necessary conditions that could lead to worker (onsite) or offsite radiation exposure through an uncontrolled release of fission products, e.g., Tank 101-SY."***

- 1. Hydrogen gas generation in 101-SY and other tanks (23 tanks)**
- 2. Potential explosive mixtures of ferrocyanide in tanks (24 tanks)**
- 3. Potential organic-nitrate reactions in tanks (8 tanks)**
- 4. Continued cooling required for high heat generation in Tank 106-C (1 tank)**

**NOTE: Some tanks are on more than one list.**

# **PRIORITY 1 WASTE TANK SAFETY ISSUES**

## ***1. Hydrogen Gas Generation in 101-SY and Other Tanks***

**Issue: Unreviewed Safety Question**

**Potential release of flammable gasses in concentrations above the lower flammability limit in conjunction with an ignition source (18 SSTs and 5 DSTs)**

**Status: Identification of the mechanism occurring to cause the episodic releases in 101-SY (most active tank)**

**- "Windows" used to operate in tank**

- \* Installed TV cameras**
- \* Retrieved crust samples**
- \* Retrieved core samples**
- \* Remove equipment**
- \* Install Instrumentation**

**Plans: Develop and employ potential mitigation alternatives**

**Develop and implement a longer-term (5-30 year) remediation corrective action strategy**

# **PRIORITY 1 WASTE TANK SAFETY ISSUES**

## ***2. Potential Explosive Mixtures of Ferrocyanide in Tanks***

**Issue: Unreviewed Safety Question**

**Could the concentrations and distribution of ferrocyanide and nitrate/nitrite in the tanks lead to an explosion if allowed to heat up or if an uncontrolled exothermic reaction could occur (24 SSTs)**

**Status: Through modeling, monitoring, and characterization gain a better understanding of the ferrocyanide reactivity for the tanks**

**Plans: Develop a position paper to lay out the status of concern relative to the ferrocyanide issue**

**Continue to pursue a technical basis for mitigation and remediation or for doing nothing**

## **PRIORITY 1 WASTE TANK SAFETY ISSUES**

### ***3. Potential Organic-Nitrate Reaction in Tanks***

**Issue:** High organic concentrations in the tanks could support an exothermic reaction at elevated temperatures (356 °F/180 °C)

**Status:** A program to attack the technical issues is being developed. It will involve modeling, sampling, monitoring, and characterization

Much of what is being developed for the other Priority 1 safety issues is applicable to this issue

**Plans:** Continue to develop the technical basis for mitigation and remediation or for doing nothing

## **PRIORITY 1 WASTE TANK SAFETY ISSUES**

### ***4. Continued Cooling required for High-Heat Generation in Tank 106-C***

**Issue:** Without water additions (in the event of a leak) the tank could exceed structural temperature limits resulting in potential tank collapse

**Status:** Partial retrieval is being pursued as the preferred alternative

Alternatives to retrieval for cooling in the near-term are being investigated

**Plans:** Continue with the development and implementation of partial retrieval

Evaluate near-term alternatives to water additions for cooling in the event of a tank leak

# HANFORD SITE TANK FARM SAFETY ISSUES

## *Priority 2*

*"Issues/situations that have present (or contain) some conditions that could lead to an uncontrolled release of fission products under extreme assumptions."*

- Insufficient tank contents characterization to support evaluations
- Inadequate safety documentation
- \* • Tank criticality concerns
- Maintenance and upgrade of tank farm facilities and equipment
- Inadequate single-shell tank leak detection system
- Instrument upgrades in single and double-shell tanks
- Tank safe operating life
- Single-shell tank emergency pumping
- \*\* • S-302-A leaking catch tank
- Tank toxic vapor releases
- Improvement in conduct of operations
- Lack of plant essential drawings
- Double-shell tank space requirements
- Response to a leaking double-shell tank

\* New Issue: Not Included in the FY 1991 Wyden Response on Tank Safety. Also, a USQ

\*\*Corrective Action: Complete, issue not officially closed.

# HANFORD SITE TANK FARM SAFETY ISSUES

## *Priority 3*

*"Issues/situations that could lead to the future release of fission products if tanks are viewed as intermediate storage (5-30 years) of High-Level Waste (HLW), e.g., Corrosion/leakage, operating practices, buried single wall transfer lines."*

- Transfer line concrete encasement integrity and secondary containment compliance
- AZ tank farm ventilation line
- Excessive hydroxide consumption in Tank 107-AN
- Sealing of single-shell tanks to prevent intrusions
- Improved leak detection in double-shell tanks
- Intertank ventilation connections

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**Single Shell Tanks  
Interim Stabilization/Isolation**

**T. E. Rainey  
Single-Shell Tank Unit Managers Meeting**

**May 28, 1992**

**APRIL, 1992**

**SST INTERIM STABILIZATION/ISOLATION**

---

**MILESTONE DESCRIPTION**

- o **M-05-00**                      **Complete single-shell tank interim stabilization on all tanks except C-105 and C-106 by September, 1995. Complete interim stabilization and isolation on all tanks by September, 1996.**

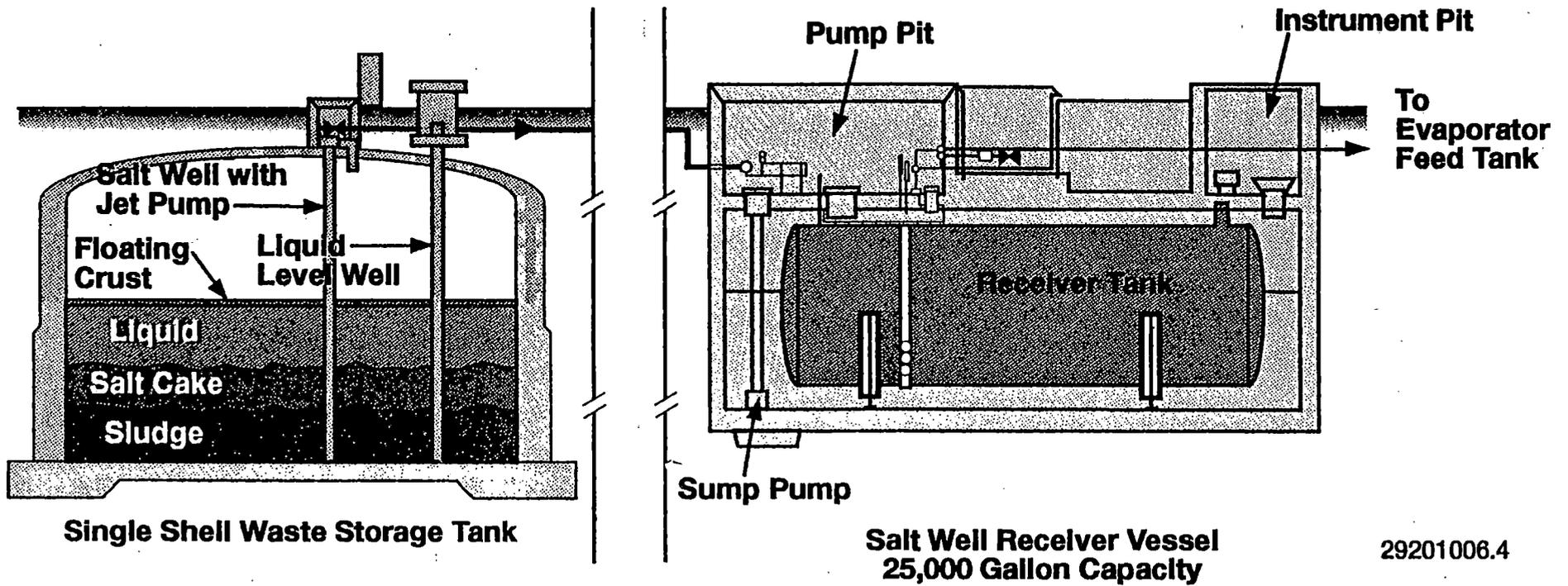
**APRIL, 1992****SST INTERIM STABILIZATION/ISOLATION**

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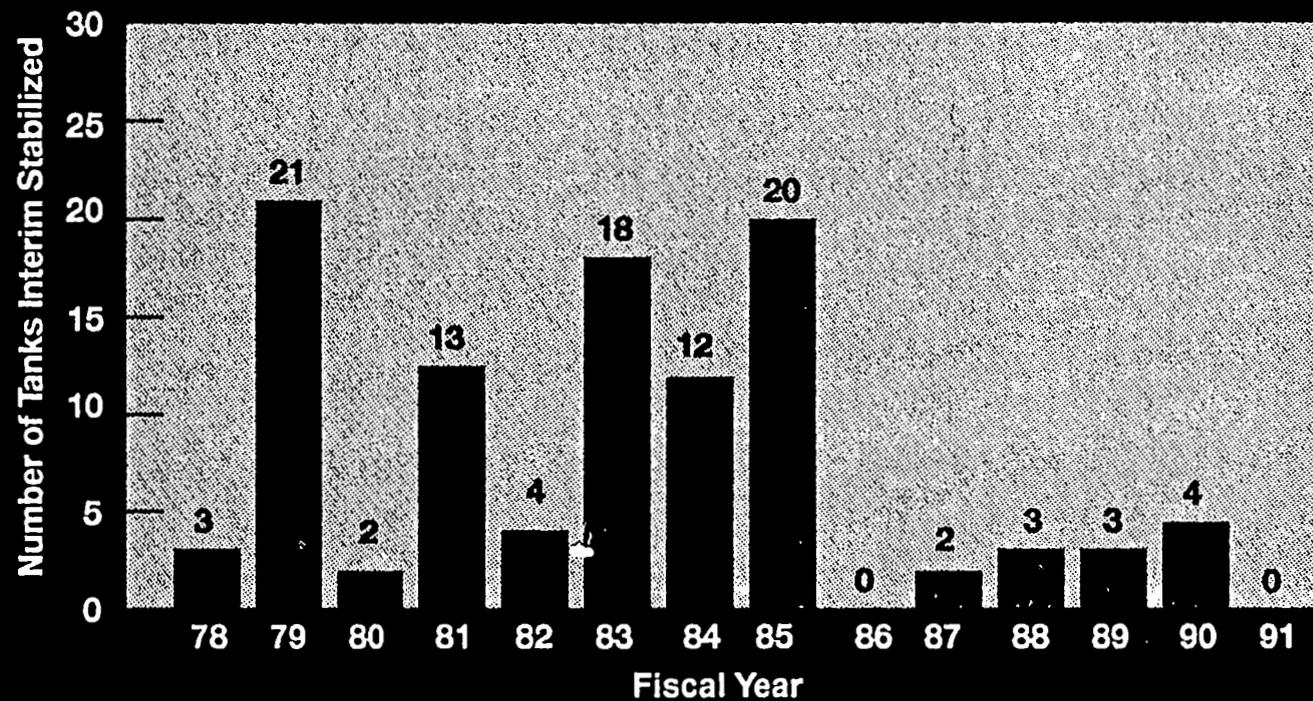
**MILESTONE DESCRIPTION (continued)**

- o Deliverable(s)**
  - Interim stabilization will be considered complete when pumping of each tank is complete. Pumping is considered complete when as much liquid as practical is removed to a double-shell tank. This occurs when pumping rate drops to 0.05 gpm. At this point, only 5000 gallons of supernatant, and 50,000 gallons of interstitial liquid remain in the tank.**
  
  - Interim isolation will be considered complete when all openings (not required for surveillance) have been sealed with at least one barrier.**

# Jet Pump Salt Well System



# Single-Shell Tanks Interim Stabilized by Fiscal Year



29111018.1C

**APRIL, 1992****SST INTERIM STABILIZATION/ISOLATION**

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**SCHEDULE PERFORMANCE**

- o **M-05-03 - (4 tanks by 9-30-91)** Missed completion date. Pumping of five tanks suspended for six weeks at end of August due to concerns over compliance with Wyden Amendment. Pumping restarted in 241-BY farm and 241-C farm in November. Pumping suspended on January 28, 1992 due to incident involving unidentified noxious fumes. Issues requiring resolution prior to restart of pumping include: criticality evaluation, completion of near-term study, and verification that tanks do not belong on organic watchlist.

**APRIL, 1992****SST INTERIM STABILIZATION/ISOLATION**

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**SCHEDULE PERFORMANCE (continued)**

**o M-05-04 -  
(9 tanks by 9-30-92)**

**For 11 remaining nonwatchlist tanks, physical and material condition of farms impact schedule and will likely pace stabilization work of remaining tanks. A detailed scope of this work has been prepared.**

**For 27 remaining watchlist tanks and C-105, unresolved safety issues (hydrogen generation, ferrocyanide, and high temperature) must be addressed prior to proceeding with stabilization. It is extremely unlikely that a technical rationale can be developed in the near-term to authorize stabilizing a watchlist tank until the tank is remediated and/or removed from the watchlist.**

**APRIL, 1992**

**SST INTERIM STABILIZATION/ISOLATION**

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## **TECHNICAL SCOPE**

- o The schedule remains dependent on removal of current pumping restrictions. When this will occur is unknown.**
  
- o 44 tanks remain to be stabilized.**
  - 17 nonwatchlist tanks**
  - 27 watchlist tanks**
  
- o Watchlist tanks designated by public law 101-510, section 3137 (Wyden Amendment). Most have unreviewed safety concerns over hydrogen generation or ferrocyanide content. Others contain potentially flammable organics, or high temperature.**

**APRIL, 1992**

**SST INTERIM STABILIZATION/ISOLATION**

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**TECHNICAL SCOPE (continued)**

- o **A near-term safety study is evaluating risks of causing safety issue by pumping.**
  
- o **A safety study of nonwatchlist tanks is being conducted to appraise safety concerns on stabilization of these tanks.**
  - **Identify and evaluate hazards**
  
  - **Determine adequacy of existing monitoring and emergency response plans**
  
- o **Resolution of unresolved safety issues may require presently unanticipated modifications or alterations to the affected tanks, which would delay stabilization even further.**

**APRIL, 1992**

**SST INTERIM STABILIZATION/ISOLATION**

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**ACCOMPLISHMENTS**

**241-BY TANK FARM (TANKS BY-102, 109)**

**241-C TANK FARM (TANKS C-102, 107, 110)**

**CRANE MODIFICATION FOR SUPPLIED AIR - COMPLETE**

**241-S TANK FARM (TANKS S-101, 103, 106, 107, 108, 109, 110)  
RESOURCE LOADED SCHEDULE ISSUED  
DESIGN PACKAGES 90% COMPLETE**

**241-U AND 241-T TANK FARMS (TANKS U-102, 111, T-104, 111)  
RESOURCE LOADED SCHEDULES ISSUED**

**APRIL, 1992**

**SST INTERIM STABILIZATION/ISOLATION**

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**ACCOMPLISHMENTS (continued)**

**SAFETY STUDY FOR INTERIM STABILIZATION OF REMAINING  
NON-WATCH LIST TANKS.**

**INDEPENDENT HAZARD IDENTIFICATION COMPLETE  
HAZARD AND ACCIDENT INITIATOR EVALUATION COMPLETE.**

**DRAFT OF NEAR-TERM SAFETY STUDY ISSUED.**

APRIL, 1992

SST INTERIM STABILIZATION/ISOLATION

**MAJOR MILESTONE M-05  
FINANCIAL DATA SUMMARY (\$000)**

Through April

	<u>BCWS</u>	<u>BCWP</u>	<u>ACWP</u>	<u>EAC</u>	<u>BAC</u>
<b>FY-92</b>	<b>4333</b>	<b>3345</b>	<b>3518</b>	<b>6200</b>	<b>6139</b>

APRIL, 1992

SST INTERIM STABILIZATION/ISOLATION

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## ISSUES/CONCERNS

CRITICALITY USQ HAS STOPPED  
ALL TANK FARM TRANSFERS.

PUMPING OF 241-C-102 SUSPENDED  
BECAUSE OF POTENTIAL  
APPLICATION OF NEW ORGANIC  
WATCHLIST CRITERIA.

CONCERNS OF SAFETY PROBLEMS  
DEVELOPING AS RESULT OF  
REMOVING LIQUID.

SAFETY RESTRICTIONS ON  
PUMPING WATCHLIST TANKS.

## CORRECTIVE/ACTION

ADDITIONAL SAMPLING,  
ANALYSIS, AND  
EVALUATION REQUIRED.

WHC IS EVALUATING  
CONCERNS AND WILL ISSUE  
CONCLUSIONS.

COMPLETE NEAR-TERM  
SAFETY STUDY.

DEVELOP MORE VIABLE  
CONTINGENCY FOR  
EMERGENCY PUMPING.

# TANK WASTE CHARACTERIZATION

Presented to

**Single-Shell Tanks  
Unit Managers Meeting**

By

**Paul Hernandez**

**May 28, 1992**

## **TANK WASTE CHARACTERIZATION**

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- **CHARACTERIZATION OBJECTIVES**
- **ORIGIN OF WASTE**
- **TANK INFORMATION**
- **CHARACTERIZATION ACTIVITIES**
- **SAMPLING METHOD**
- **FY 1992 INTEGRATED CORE SAMPLING SCHEDULE**
- **SUMMARY**

## **TANK WASTE CHARACTERIZATION OBJECTIVES**

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- **DETERMINE CHEMICAL, PHYSICAL, AND RADIOLOGICAL PROPERTIES OF TANK WASTE**
- **PROVIDE DATA TO MEET VARIOUS PROGRAM NEEDS INCLUDING**
  - **SAFETY ISSUE RESOLUTION**
  - **OPERATIONAL**
  - **WASTE RETRIEVAL**
  - **PRETREATMENT**
  - **GROUT**
  - **HWVP**
  - **SST DISPOSAL DECISION**
- **IDENTIFY TECHNOLOGY NEEDS AND APPLICATIONS TO SUPPORT THE ABOVE OBJECTIVES**

## **ORIGIN OF WASTES AT HANFORD**

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- **EARLY EIGHT HANFORD REACTORS**
- **N REACTOR**
- **FUEL FABRICATION PLANTS**
- **CHEMICAL PROCESSING PLANTS**
- **FAST FLUX TEST FACILITY**
- **LABORATORIES**

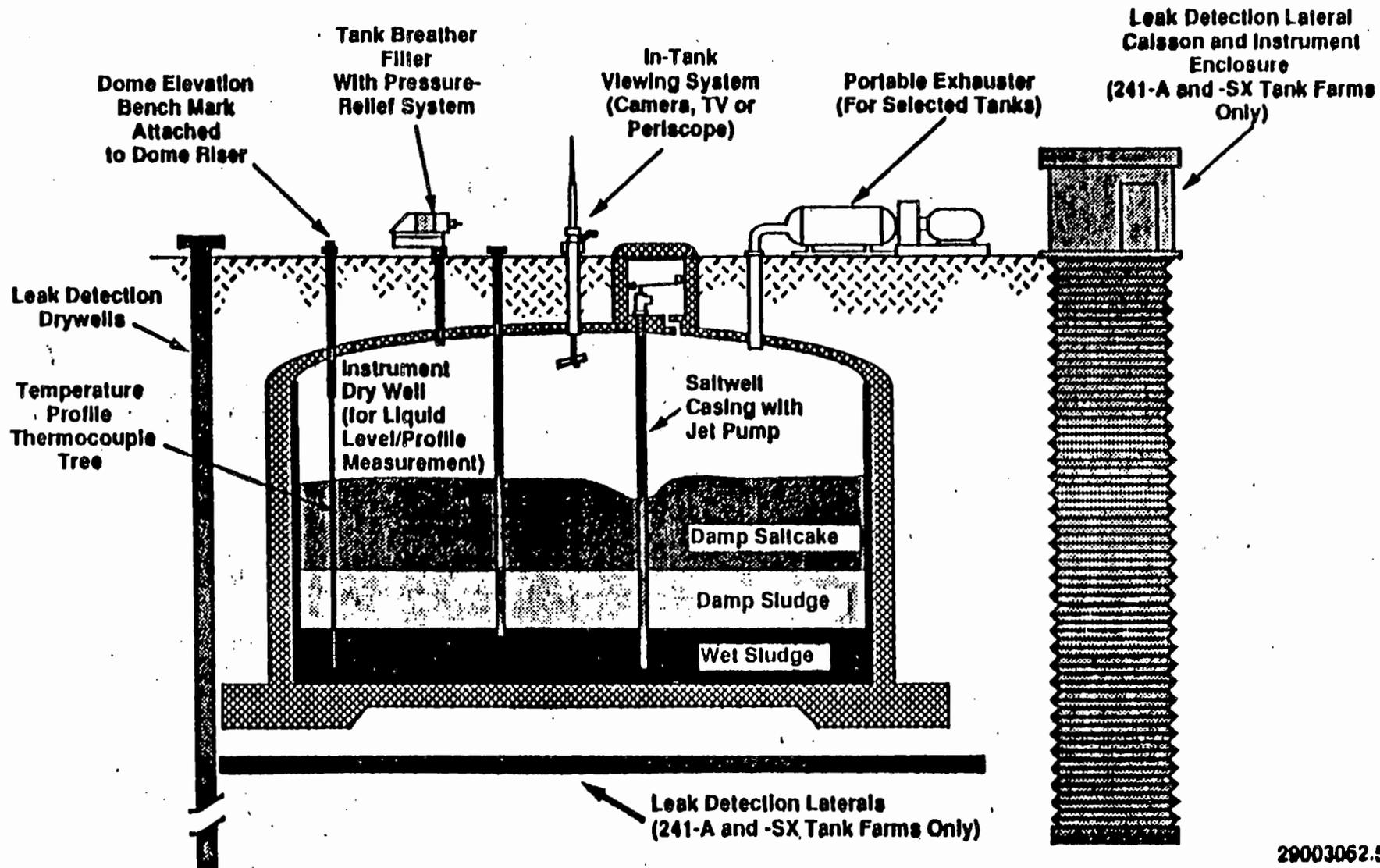
## **WASTE TANK INFORMATION**

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- **149 SINGLE-SHELL TANKS**
  - **REMOVED FROM ACTIVE SERVICE BY NOVEMBER 1980**
  - **5,000 TO 1,000,000 GALLON TANKS**
  - **BURIED A MINIMUM OF 6 FEET**
  
- **28 DOUBLE-SHELL TANKS**
  - **REMAIN IN ACTIVE SERVICE**
  - **TO 1,000,000 GALLONS**
  - **BURIED MINIMUM OF 7 FEET**

# Single-Shell Waste Tank

## Tank Surveillance Instrumentation

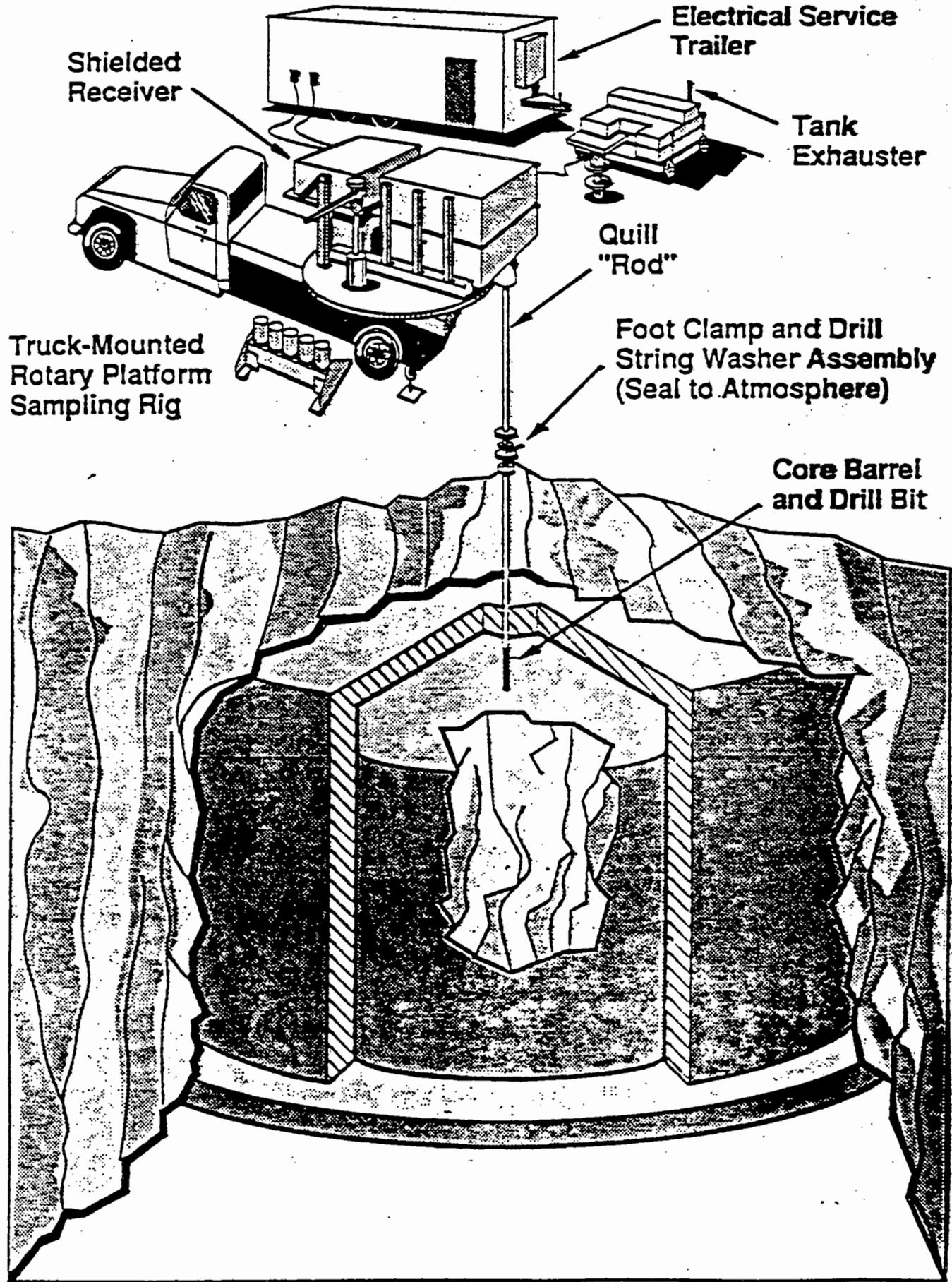


## **CHARACTERIZATION ACTIVITIES**

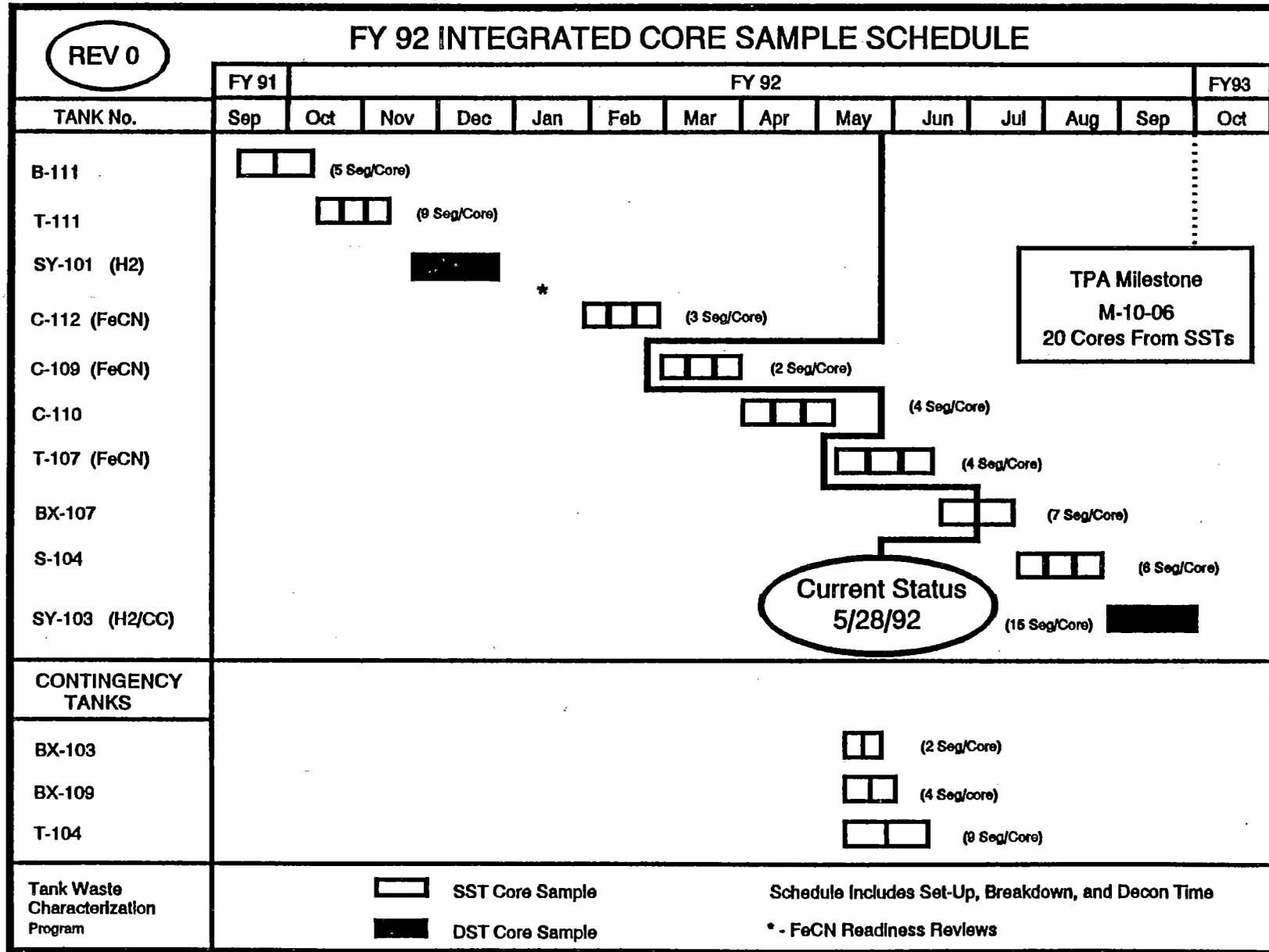
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- **INTERACT WITH CUSTOMER ON ESTABLISHMENT OF DATA QUALITY OBJECTIVES**
- **COORDINATE/DIRECT SAMPLING ACTIVITIES**
- **PROVIDE LEAD IN ESTABLISHING AN INTEGRATED SAMPLING SCHEDULE**
- **DEVELOP ANALYTICAL METHODS**
- **COORDINATE SAMPLE TRANSPORTATION, RECEIPT, ANALYSIS, AND ARCHIVING WITH LABORATORIES**
- **MULTI-YEAR EFFORT**

# Waste Characterization



9 2 1 2 6 4 7 0 7 1 1



## **CURRENT SAMPLING METHOD: CORE SAMPLING TRUCK**

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- **MODIFIED CORE DRILLING DESIGN, REMOTE OPERATIONS**
- **MULTIPLE SEGMENTS (1-INCH DIAMETER X 19-INCH LONG) TAKEN TO OBTAIN FULL CORE SAMPLE**
- **SAMPLES LIQUIDS, SLURRIES, SLUDGES - MODIFICATIONS UNDER WAY TO ALLOW SAMPLING OF HARD WASTES**

# Single-Shell Tank Unit Managers Meeting

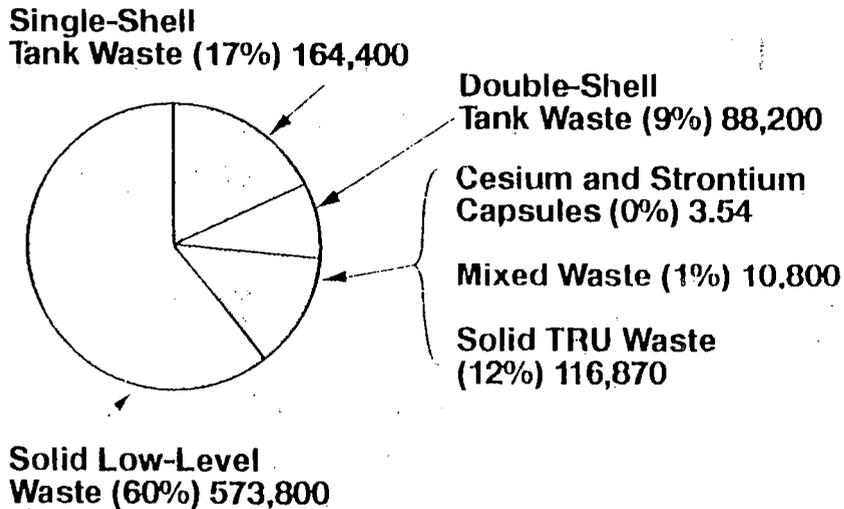
## Waste Retrieval Overview

J.M. Henderson, Manager  
SST Retrieval

May 28, 1992

# Hanford Site Waste

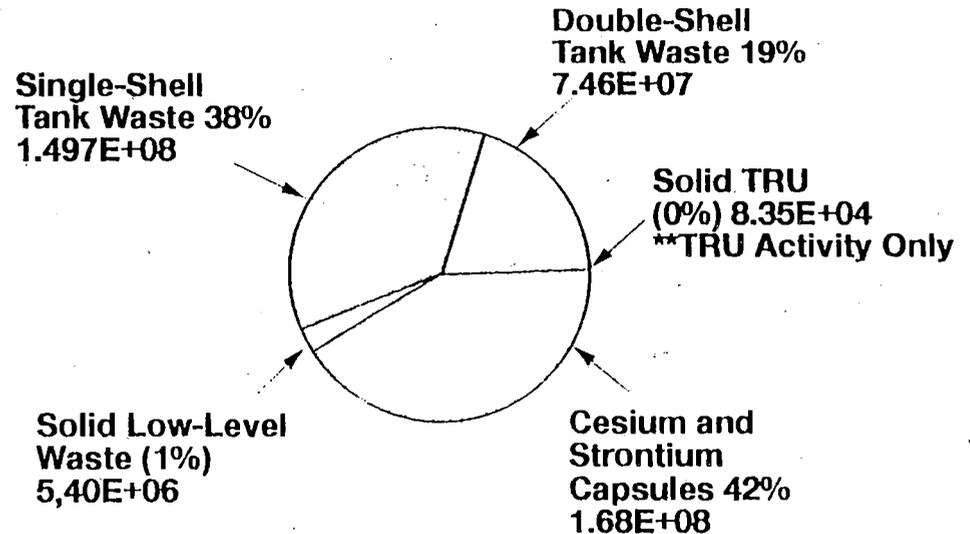
## Volume



Total Volume: \*954,073

\*Does not include past practice units and surplus facilities information per 1991 Integrated Data Base submittal

## Radioactivity



Total Radioactivity: \*3.98E+08 Ci

## Key Hazardous Materials

- Nitrates
- Nitrites
- Chromium
- Cobalt
- Heavy Metals
- Cyanide
- Carbon Tetrachloride
- Selenium
- Trichlorethylene

Single-Shell Tank Unit Managers Meeting  
Waste Retrieval Overview

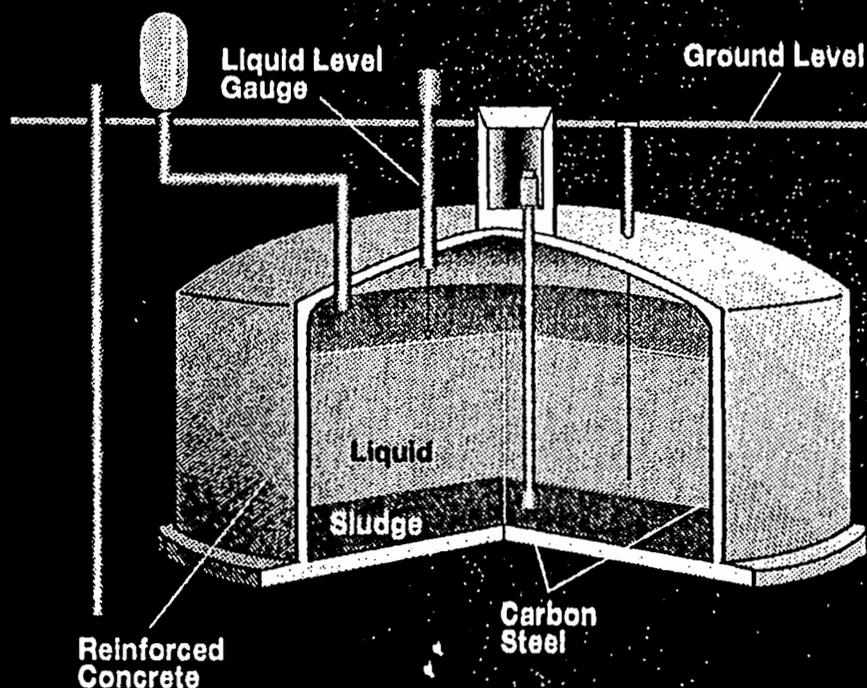
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## TANK WASTE DESCRIPTION

- **Single-Shell Tank Waste\***
  - Sludge volume: approximately 12.5 M gal
  - Salt cake volume: approximately 23.5 M gal
  - Drainable liquids: approximately 6.9 M gal
  
- **Single-Shell Tanks**
  - Tanks containing > 95% salt cake waste: approx. 30
  - Tanks containing > 95% sludge waste: approx. 75
  - Tank containing mixtures of sludge and salt cake: approx. 45
  - Tank containing less than 2' of waste: 13
  - Assumed leaking tanks: 66
  - Watch list tanks: 48

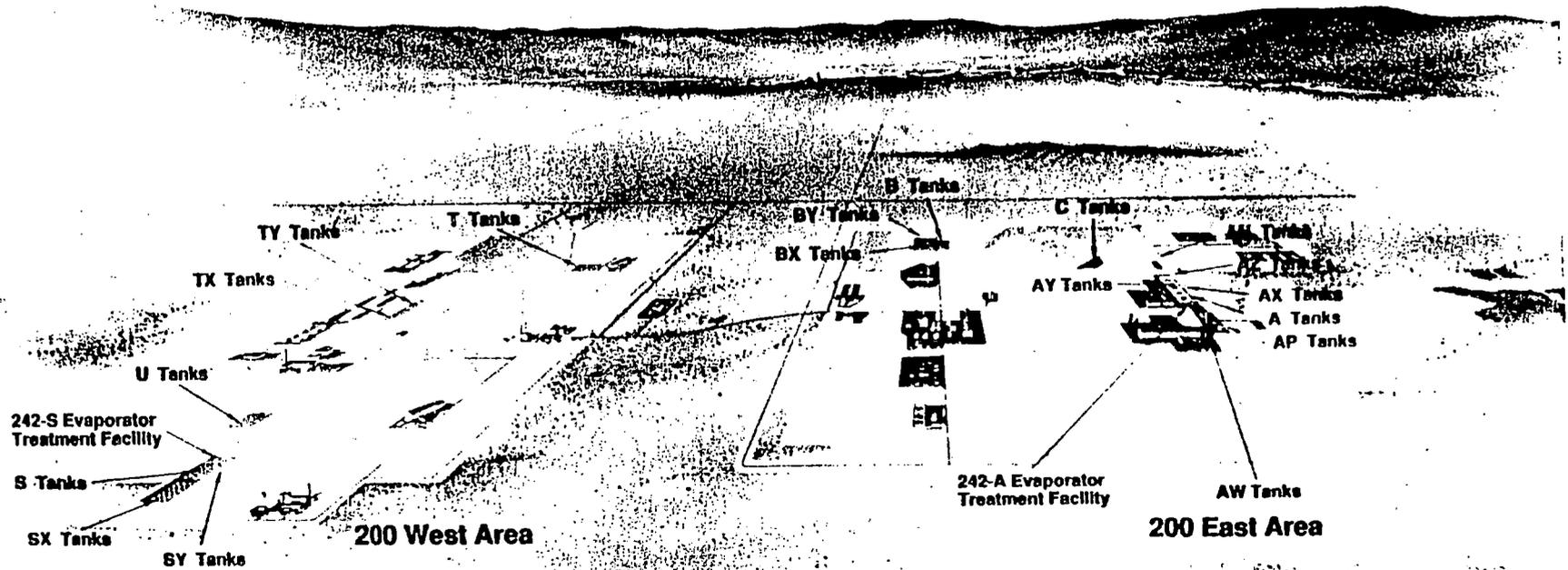
\* January 1992

# Single-Shell Tanks



- 149 Tanks Constructed 1943-64
- 55,000 to 1 Million Gallon Capacity
- Bottom of Tanks at Least 150 Feet Above Groundwater
- No Waste Added to Tanks Since 1980
- Tanks Currently Contain
  - ~37 Million Gallons of Saltcake, Sludge, and Liquid
  - ~ 155 Million Curies
- 66 are assumed to have Leaked ~1 Million Gallons

# Hanford Site Tanks and Evaporators



## WASTE RETRIEVAL PROGRAM OBJECTIVES

- Integrate retrieval with safety issue resolution and waste treatment and disposal
- Implement innovative retrieval technology development and demonstration program
- Construct retrieval systems on a schedule to support safety issue resolution and to provide feed to pretreatment, vitrification, and grout (as needed)

Single-Shell Tank Unit Managers Meeting  
Waste Retrieval Overview

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## MAJOR CHALLENGES IN RETRIEVAL OF HANFORD TANK WASTES

- Several waste types with unique compositions
  - Multiple retrieval techniques are anticipated
- Safety issues associated with waste
- Limited characterization of physical properties of waste
- Limited access to waste
- 66 known or suspected leaking SSTs
- Interference from tank internals
- Aging transfer and utility systems

## **MAJOR CHALLENGES IN RETRIEVAL OF HANFORD TANK WASTES (CONT)**

- **Limited available DST storage space for retrieved wastes**
- **Handling and transport of radioactive and hazardous materials**
- **Confinement of waste during retrieval operations**
  - **Confinement barriers**
  - **Tank ventilation systems**
  - **Confinement structures**

Single-Shell Tank Unit Managers Meeting  
Waste Retrieval Overview

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## WASTE RETRIEVAL DRIVERS

- Resolution of tank safety issues: Retrieve and treat the waste
- Comply with regulations: RCRA, CAA
- Comply with Tri-Party Agreement Milestones
  - M-06, Develop single-shell tank waste retrieval technology and complete scale-model testing 6/94
  - M-07, Initiate full-scale demonstration of waste retrieval technology 10/97
  - M-08, Initiate full-scale tank farm closure demonstration project 6/2004
  - M-09, Complete closure of all 149 SSTs 6/2018
- Proceed with waste disposal - grout and glass
- Provide adequate tank space

# Single-Shell Tank Unit Managers Meeting

## Waste Retrieval Overview

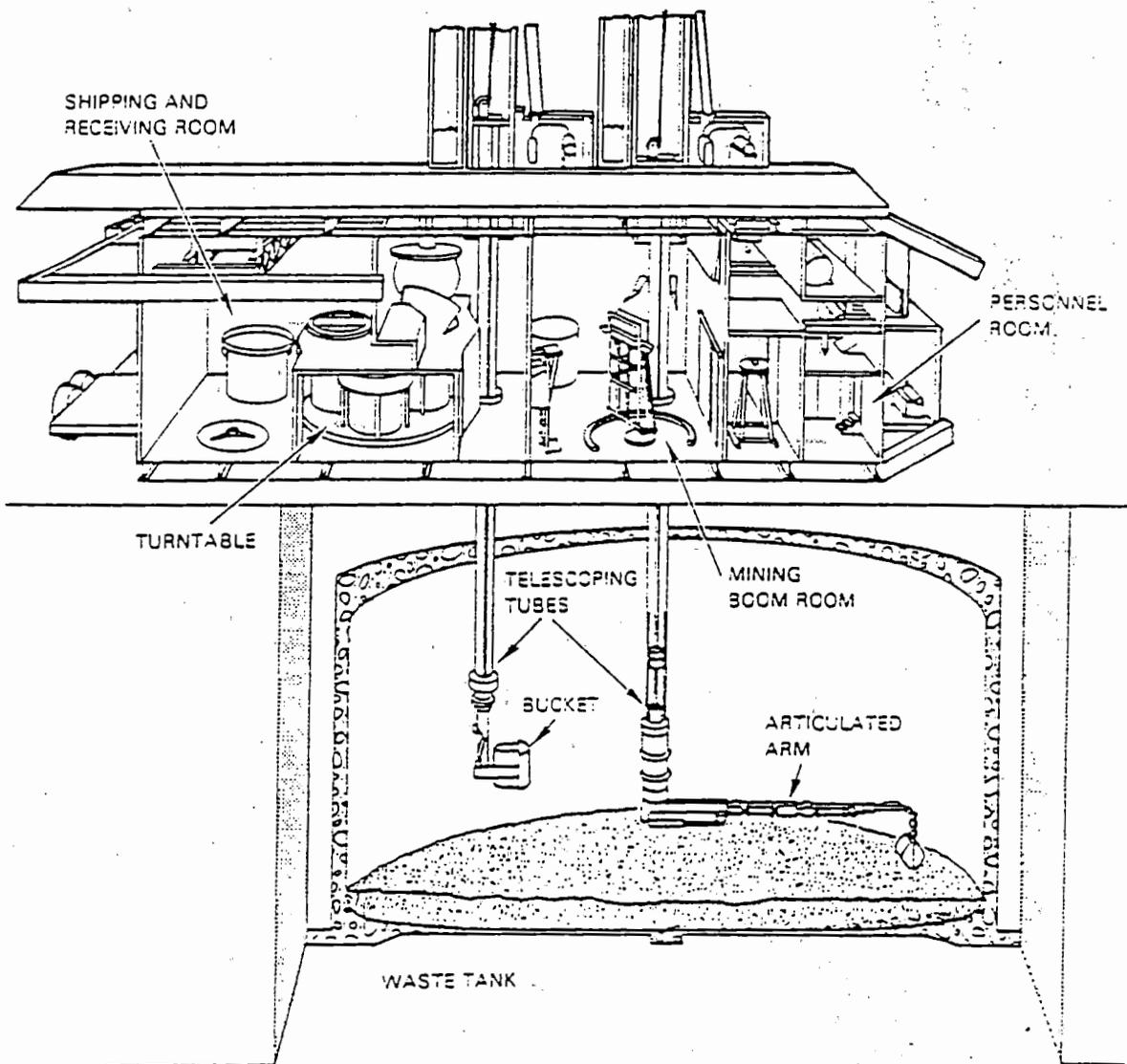
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### PRELIMINARY TANK RETRIEVAL SEQUENCE ESTABLISHED

<u>TANK</u>	<u>PROJECT</u>	<u>PURPOSE</u>	<u>SUPPORT OF TPA MILESTONE</u>
101-SY	W-211	Safety-Flammable Gas	
101-AZ	W-151	HWVP Feed	M-03
103-SY	W-211	Safety-Flammable Gas	
102-AZ	W-211	HWVP Feed	
104-AN	W-211	Safety-Flammable Gas	
106-C	W-139	Safety-High Heat	M-07
106-AN	W-211	Tank Space	
103-C	W-M08	Safety-Organic	
112-C	W-M08	Safety-Ferrocyanide	
104-AW	W-211	Tank Space	
109-C	W-M08	Safety-Ferrocyanide	
106-AW	W-211	Tank Space	
105-C	W-M08	HWVP Feed	
104-BY	W-XXX	Safety-Ferrocyanide	
101-AW	W-211	Tank Space	
108-C	W-M08	Safety-Ferrocyanide	
102-AY	W-211	Tank Space	
110-BY	W-XXX	Safety-Ferrocyanide	
102-AW	W-211	Tank Space	
111-C	W-M08	Safety-Ferrocyanide	

## WASTE RETRIEVAL CONCEPTS

- Retrieval Options
  - Mechanical
  - Hydraulic
  - Pneumatic
  - Hybrids
  
- Mechanical Retrieval
  - Long-reach manipulator-based systems
    - Dry mining of wastes
    - Transfer to surface via bucket and screw mechanisms
    - Low retrieval rates
    - Complex systems
    - Options with large and multiple small openings in tank dome
    - Confinement systems/structures required
    - Cask and/or slurry transfer to DST systems

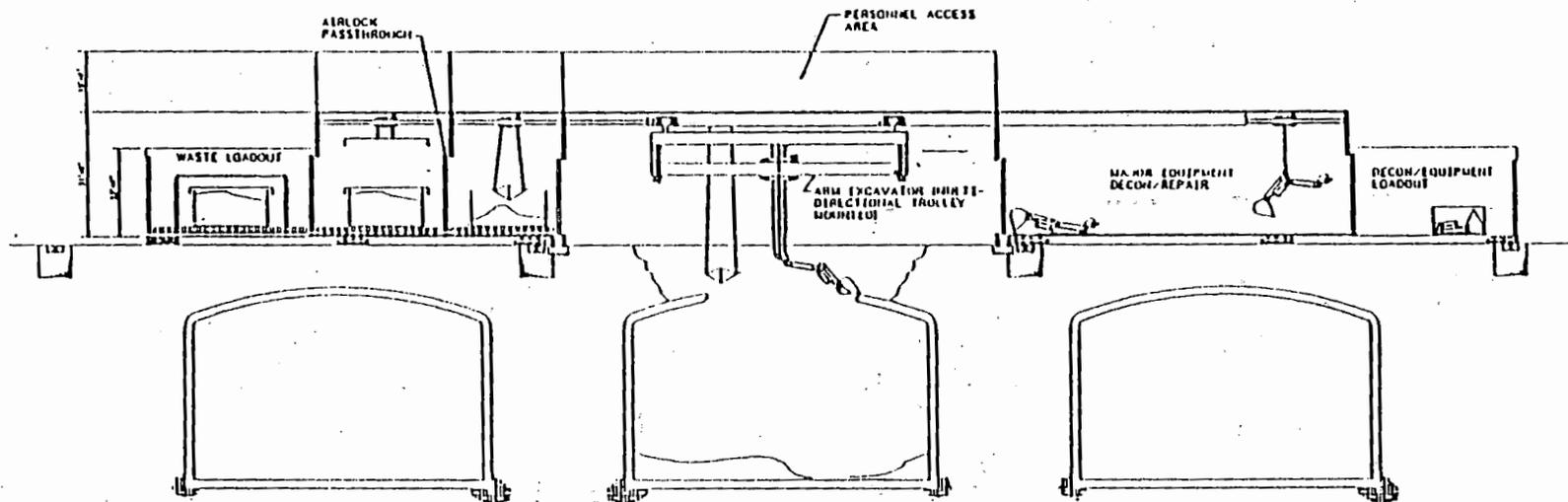


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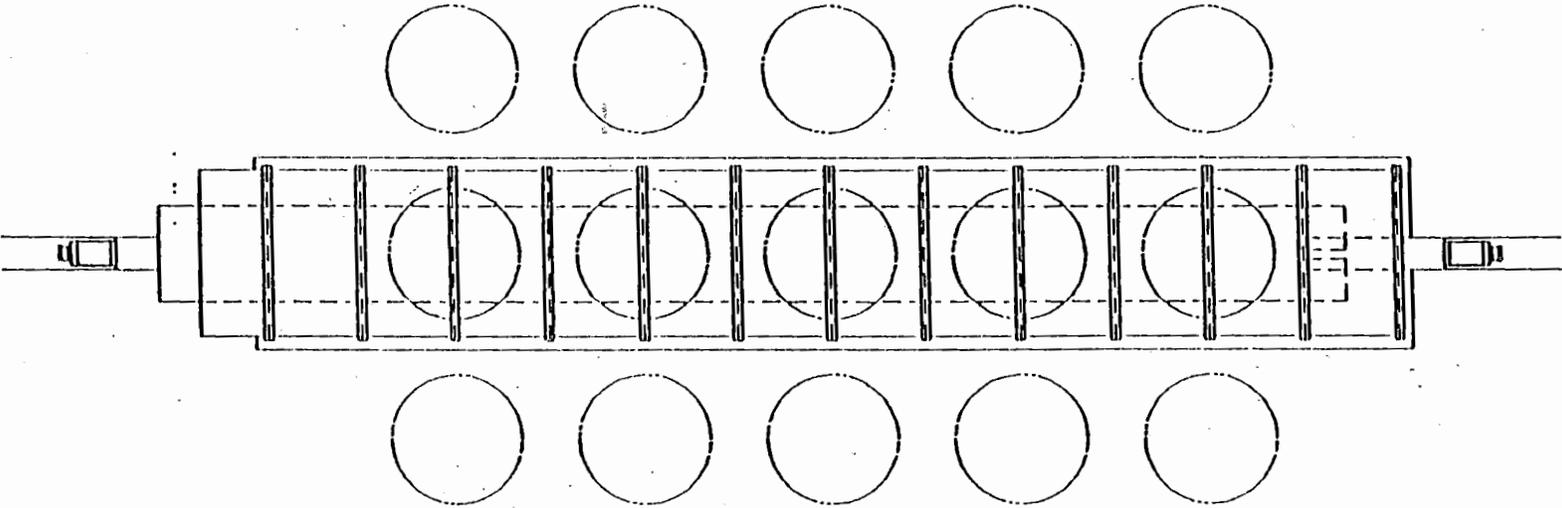
Prototype Waste Retrieval System.

9 2 1 2 6 4 7 0 7 2 5

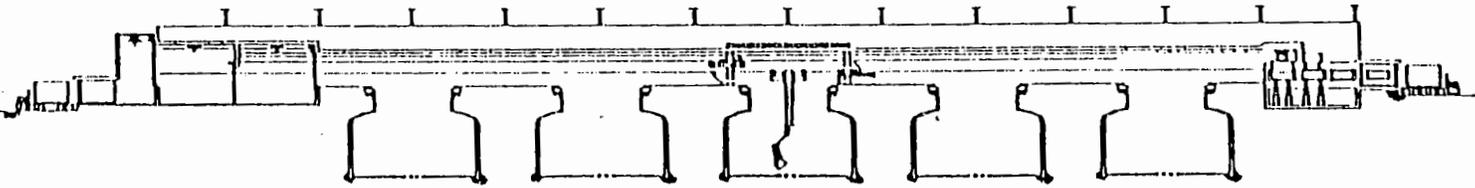
# Single Tank Confinement



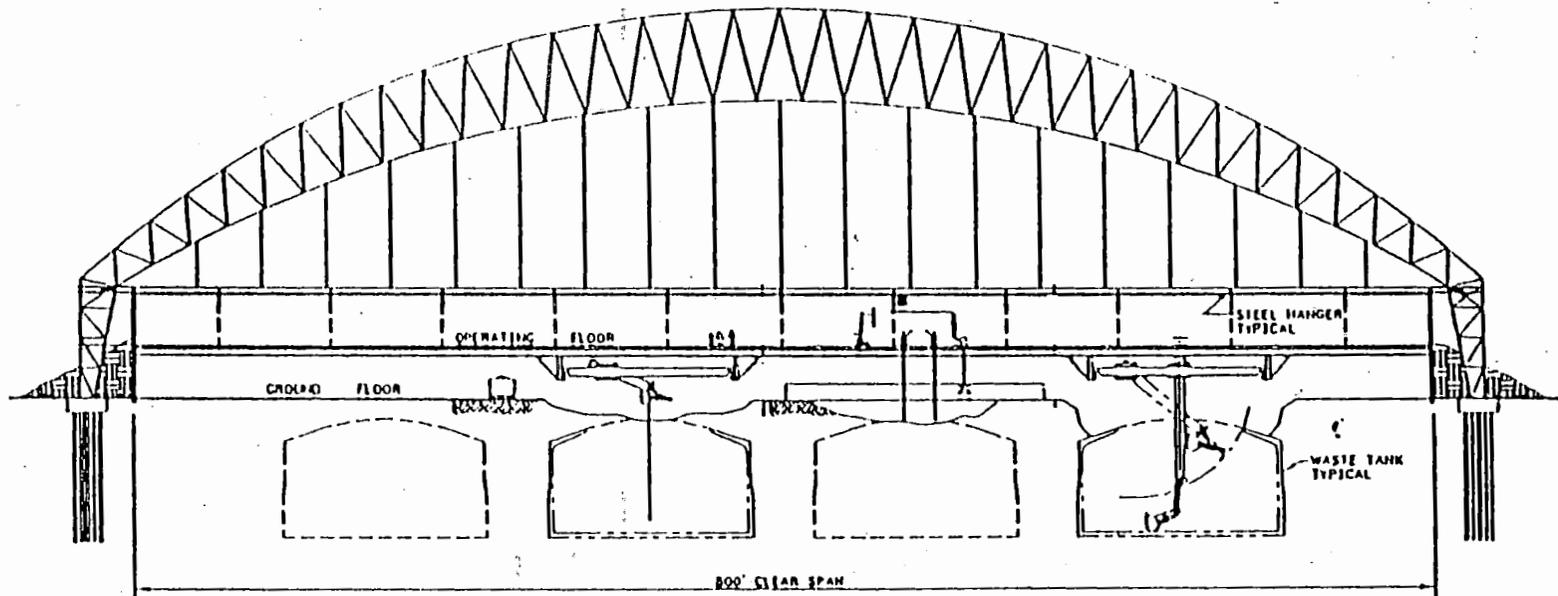
# Multi-Tank Confinement



PLAN



# Tank Farm Confinement



## WASTE RETRIEVAL CONCEPTS (CONT)

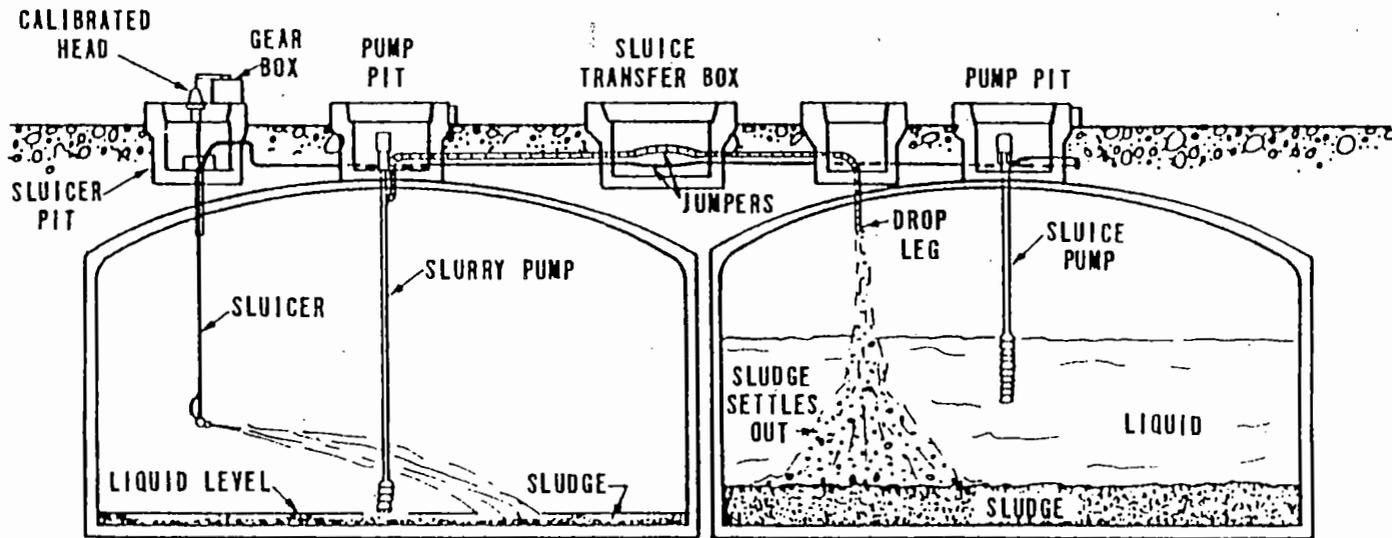
- **Mechanical Retrieval (cont)**
  - **Other remote mining concepts**
    - **Side or bottom entry**
    - **Cask transfer**
    - **Major confinement requirements**
    - **Tank access concerns**
    - **Not well developed**

Single-Shell Tank Unit Managers Meeting  
Waste Retrieval Overview

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## WASTE RETRIEVAL CONCEPTS (CONT)

- Hydraulic Retrieval
  - Past practice sluicing - sludge retrieval
    - Uranium, strontium, and cesium recovery operations during 1950's through 1970's
    - 24 M gallons of waste transferred
    - Large tank space requirements
    - Used for bulk material processing and in some cases, tank clean-out
    - 100-150 GPM, 200 PSI water
    - Sludge pump transfer to other SST's and/or processing facilities
    - No development required
    - Moves soft waste quickly
    - Potentially lowest cost option



SLUICE TANK

SLUDGE RECEIVER TANK

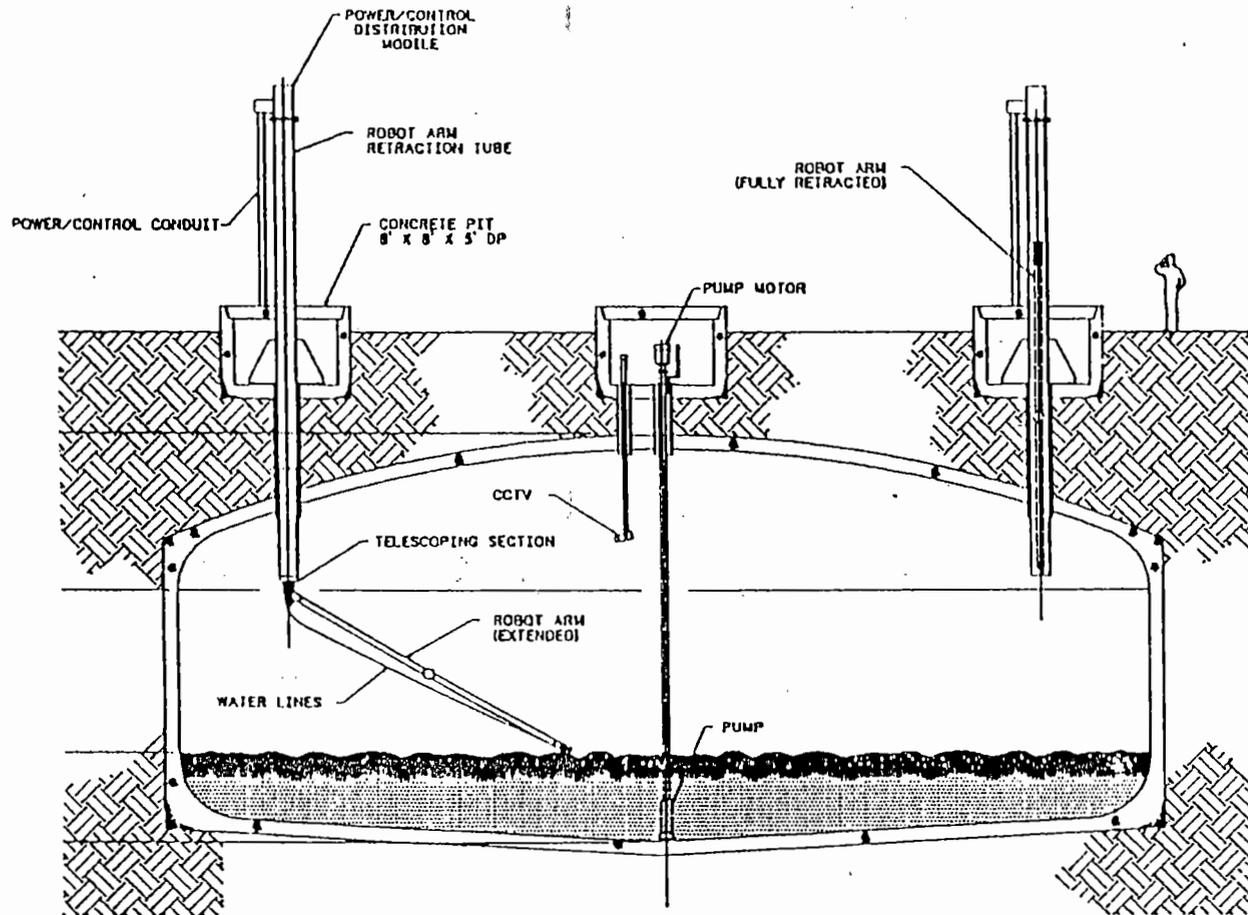
Single-Shell Tank Unit Managers Meeting  
Waste Retrieval Overview

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## WASTE RETRIEVAL CONCEPTS (CONT)

- Limited Sluicing
  - Low volume (6-10 GPM), high pressure (10,000 psi) water used to dislodge wastes
  - Multiple light-duty manipulator systems operated in-tank
  - Lower water volumes reduce leak potential and amount of additional waste created
  - Multiple new tank penetrations required

# LIMITED SLUICING CONCEPT



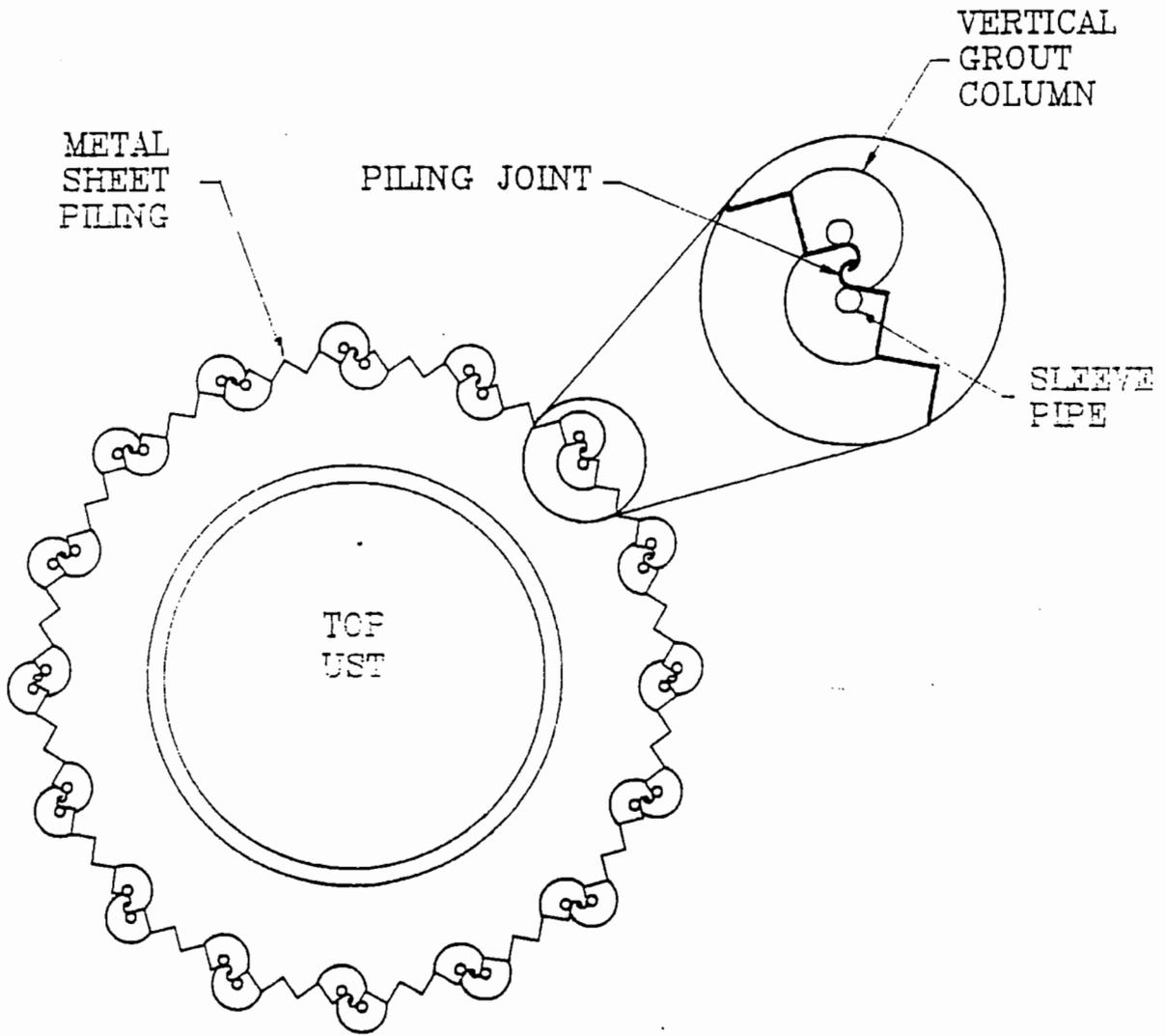
TK-241-C-106

## WASTE RETRIEVAL CONCEPTS (CONT)

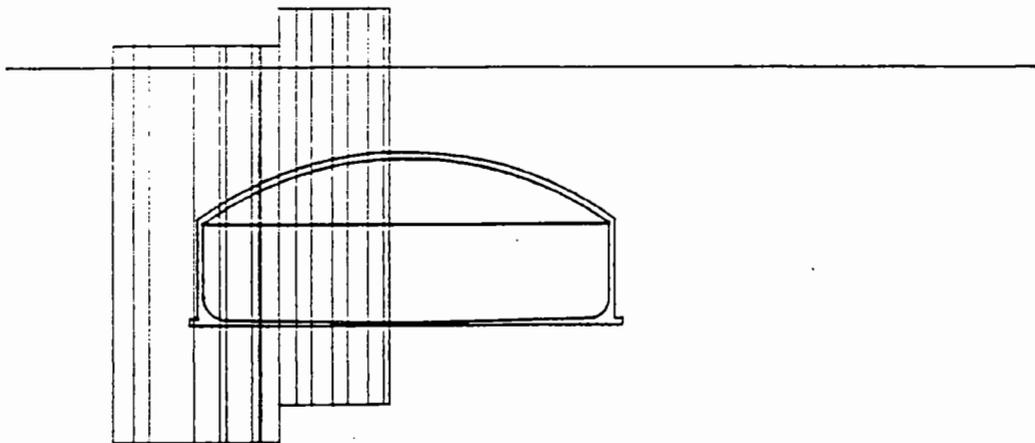
- Sub-Surface Barriers
  - May be used in conjunction with any sluicing option
  - Used in construction and mining industries, to limit water flows to pumpable rates
  - Very difficult to achieve leak-tight containment
  - Barrier working group meeting, Tucson, February 1992
    - National and international technologies evaluated

## WASTE RETRIEVAL CONCEPTS (CONT)

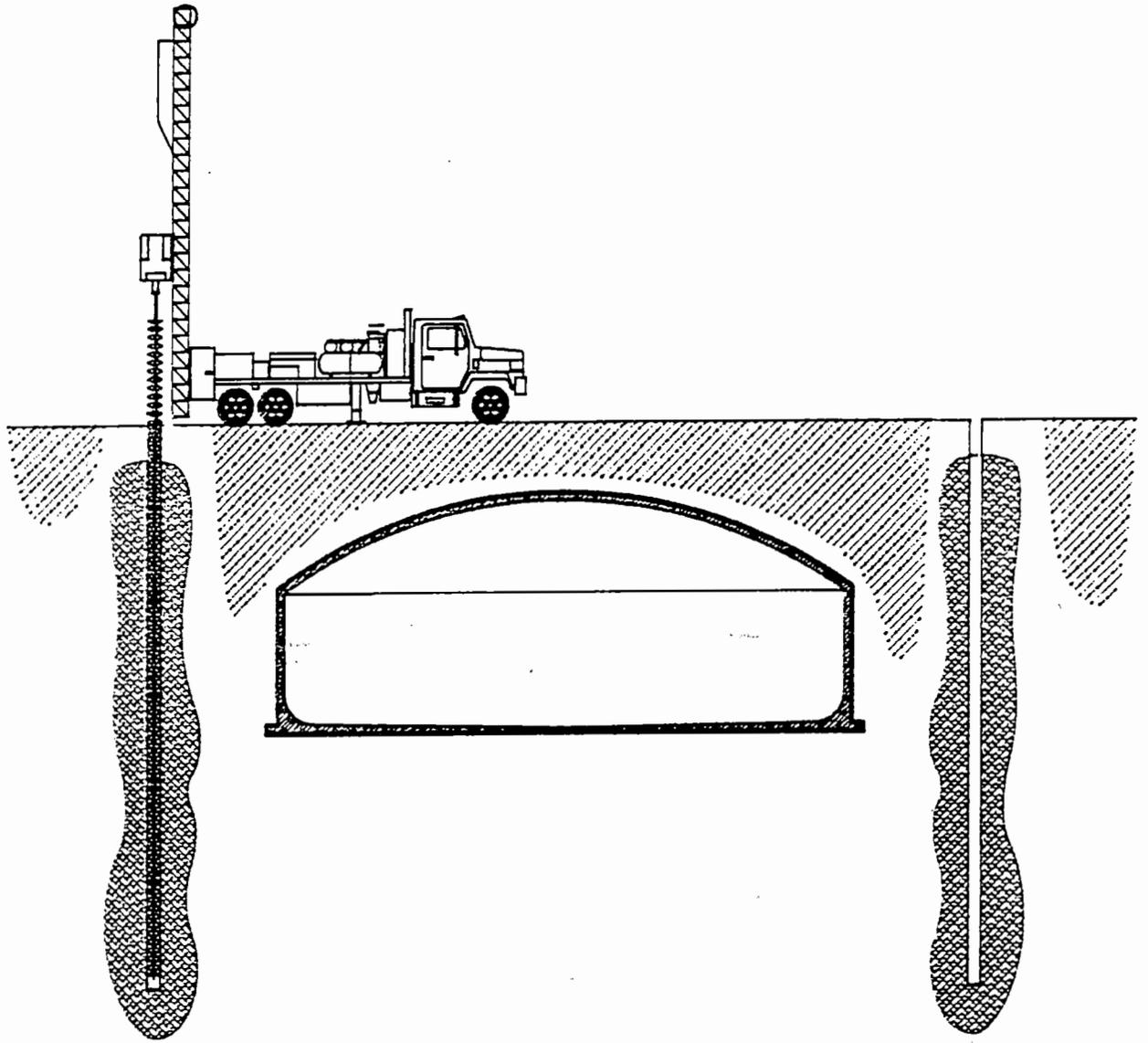
- **Sub-Surface Barriers (cont)**
  - **Recommended options for demonstrations**
    - **Vertical metal sheet piling, coupled with in-situ permeation grout**
    - **Vertical and horizontal grout curtains installed via in-situ permeation**
  - **Engineering studies and demonstration planned under UST-ID**
  - **Functions and requirements definition and regulatory strategies must be developed**



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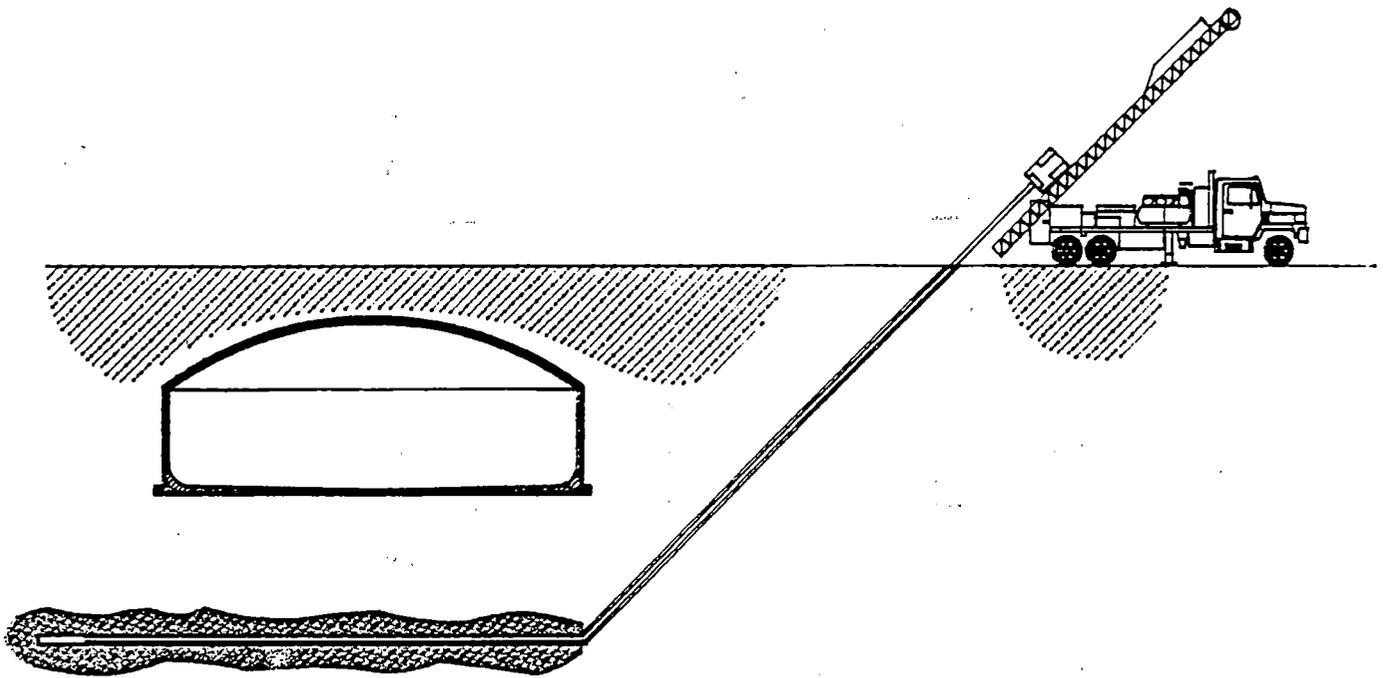


Vertical Sheet Metal Piling with Grout Sleeves



9 2 1 2 6 4 7 0 7 3 7

Vertical In Situ Permeation Grout



9 2 1 2 6 4 7 0 7 3 8

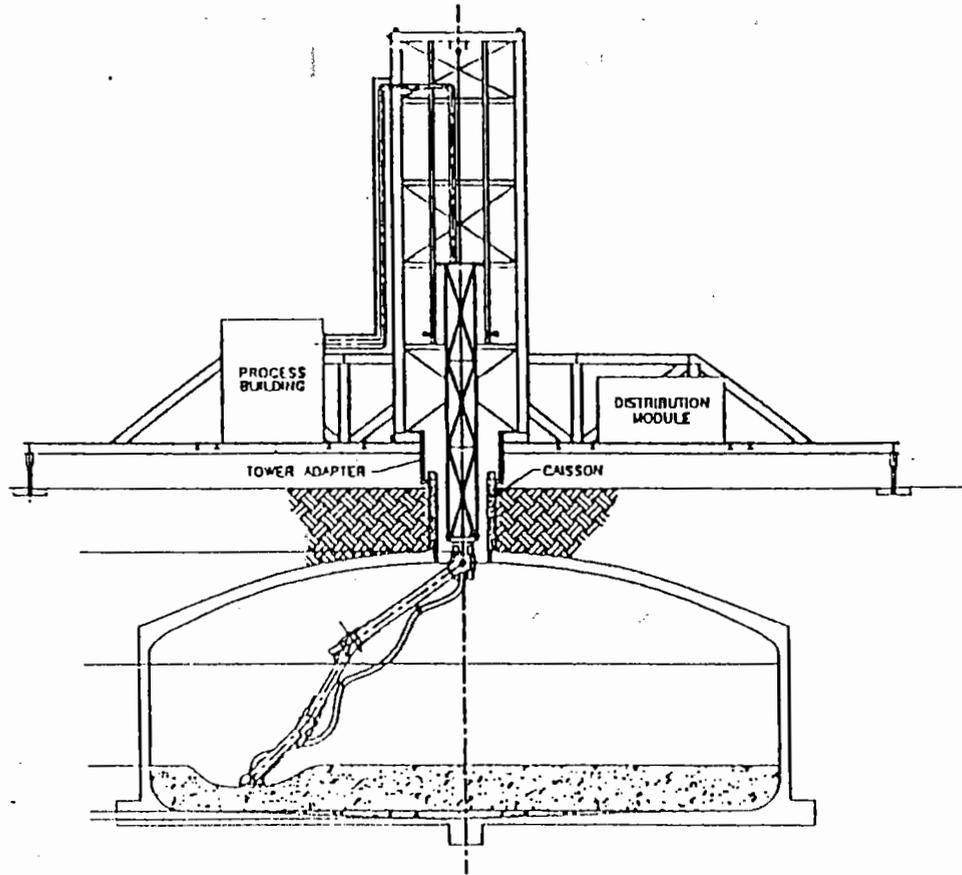
Horizontal In Situ Permeation Grout

## WASTE RETRIEVAL CONCEPTS (CONT)

- Pneumatic Retrieval
  - Position waste mobilization tools (end effectors) on long-reach manipulator systems
  - Use air conveyance system to transfer waste up and out of the tank
  - End effectors include:
    - Water jets
    - Air jets
    - Mechanical cutters/grinders
    - Confined sluicing

9 2 1 2 6 4 7 0 7 4 0

CONFINED SLUICING SYSTEM

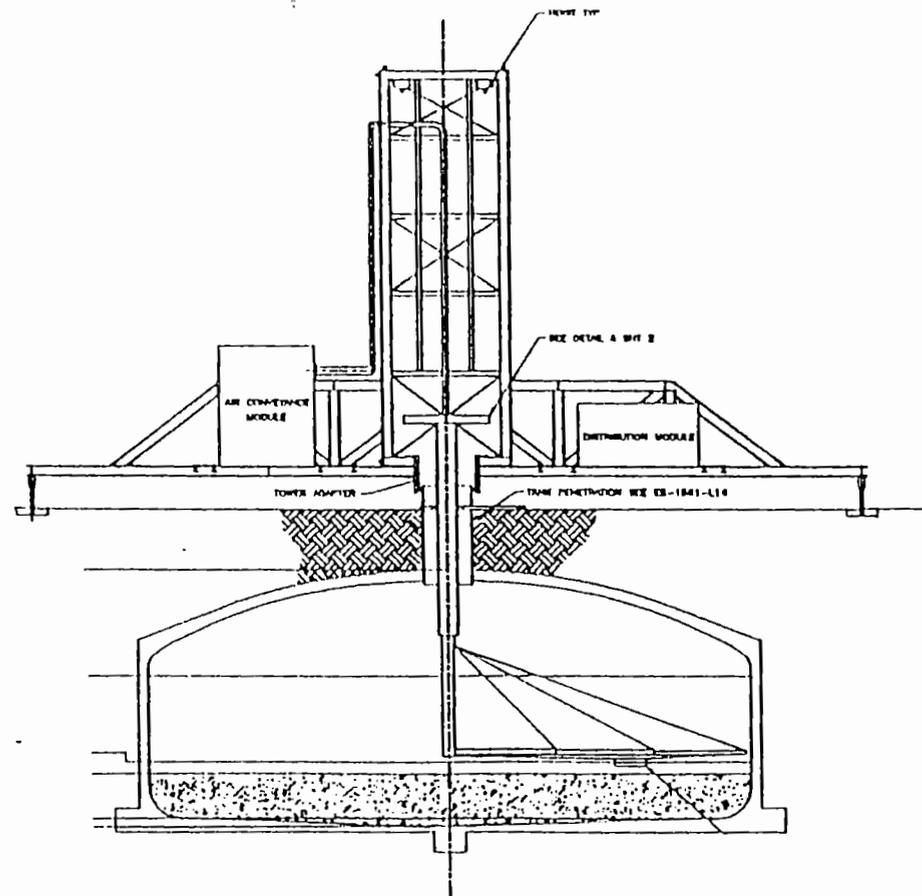


## WASTE RETRIEVAL CONCEPTS (CONT)

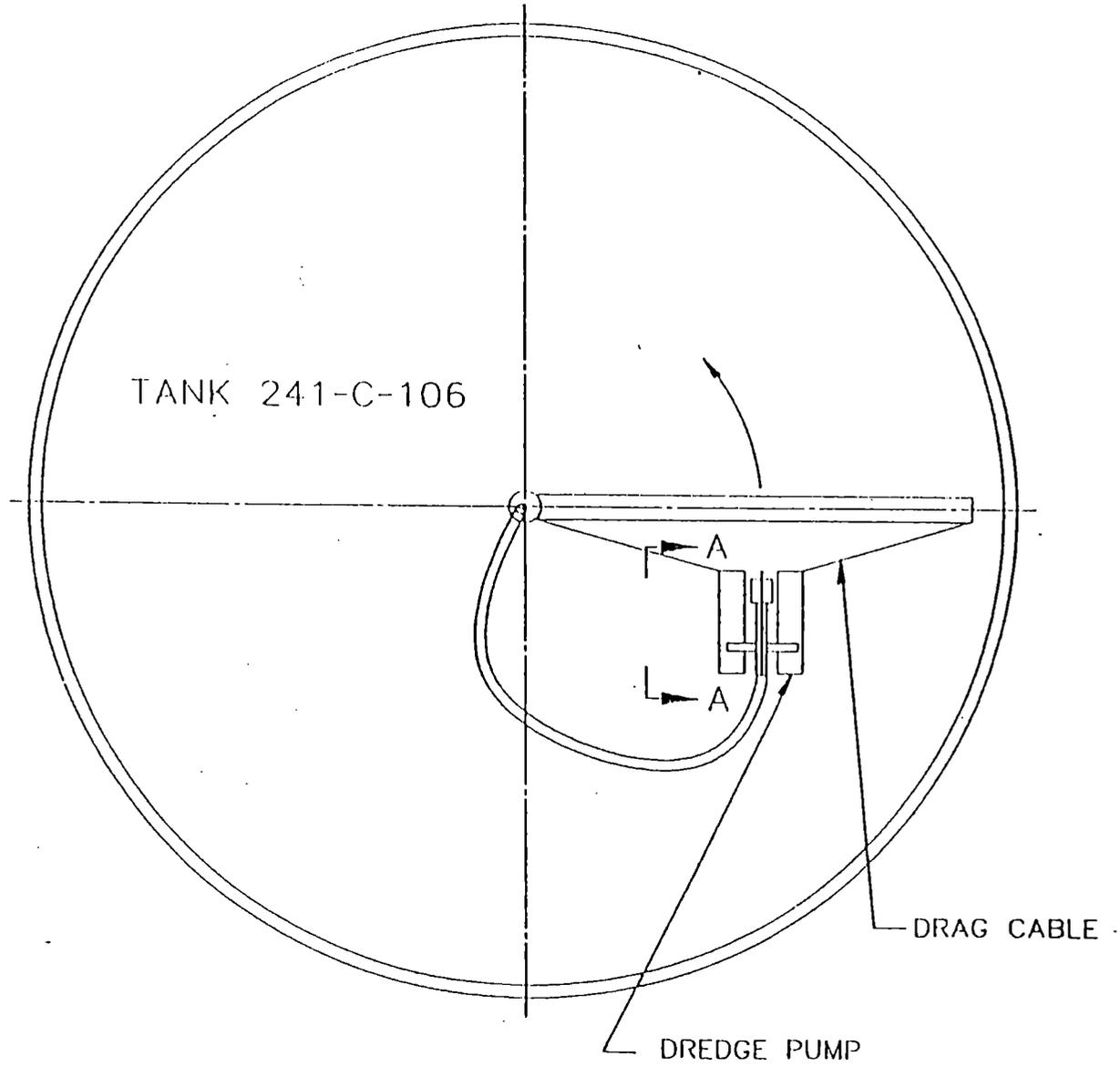
- Hybrids
  - Combined concepts from sluicing and pneumatic retrieval options
    - Long-reach manipulator systems
    - Sluicing end effectors
    - Sludge pump for waste transfer
  - Dredging
    - Simple drag arm
    - Dredge system pulled around tank
    - Air conveyance or sludge pump for waste transfer
  - Tethered systems

9 2 1 2 6 4 7 0 7 4 2

# DRAG ARM



9 2 1 2 6 4 7 0 7 4 3



## SST WASTE RETRIEVAL DEVELOPMENT

- M-06, Develop SST retrieval technologies and complete scale-model testing; 6/94
  - M-06-01, Identify waste retrieval technologies to be tested in SST scale-model tank
    - Completed 10/10/90
    - Technology development focus on long-reach manipulator type retrieval systems with various end effectors
  - M-06 Plan (draft) under evaluation to address TWRS retrieval strategies

## **SST WASTE RETRIEVAL DEVELOPMENT (CONT)**

- Definition of "technology" vs overall SST retrieval test and evaluation program is being worked
  - Not all test and evaluation is technology development
- M-06, Develop SST Retrieval technologies and complete scale-model testing (cont)
  - Only those areas which require new, innovative systems, or novel adaptations of existing systems will be included
- Sub-surface barrier evaluations may be included in the plan
- Responsibility for the M-06 milestone has transferred to EM-30

Single-Shell Tank Unit Managers Meeting  
Waste Retrieval Overview

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## DEVELOPMENT ACCOMPLISHMENTS

- Initial tests conducted during 1970's
- Recent testing initiated during FY 1990: simple concept evaluation tests
- Underground Storage Tank Robotics Test Bed established at Hanford during FY 1991
  - Installed and integrated manipulator systems, sensors, and control systems
  - Performed demonstrations of long-reach manipulators, waste dislodging tools, integrated control systems, tank mapping systems, and camera systems
  - Formed strong team of participants across DOE complex

## SST TANK WASTE RETRIEVAL PROJECTS

- W-139, Tank 106-C waste retrieval
  - Goal: Retrieve 95% of waste from safety tank 241-C-106
    - Resolves high-heat safety issue
    - Provides early feed to HWVP
    - Completes interim stabilization action for 106-C, if not possible by other means
  - Project in pre-conceptual study stage
    - Start conceptual design: 10/93<sup>92</sup>
    - Start retrieval system procurement: FY 1993
    - Initiate retrieval FY 1999

## SST TANK WASTE RETRIEVAL PROJECTS (CONT)

- W-139, Tank 106-C waste retrieval (cont)
  - Retrieval Options
    - Confined sluicing
    - Past practice sluicing with sub-surface barrier
  - Tank leak study initiated - May 1992
    - Simple tank leak model - ranges of leaks
    - Performance assessment
    - Initial results early FY 1993
  - Decision on retrieval option required in FY 1993

## SST TANK WASTE RETRIEVAL PROJECTS (CONT)

- M-07, SST retrieval demonstration
  - Tank selection evaluations underway; priority:
    - Tank safety issue resolution
    - HWVP Feed
    - Demonstration of retrieval functions
    - Tank 106-C is prime candidate
  - Recommendations to be transmitted to Ecology during FY 1992
- M-08, SST tank farm closure demonstration
  - Farm selection studies will start in FY 1993
    - Tank safety issue closure is top priority
      - C Farm: 4 ferrocyanide tanks, 2 high heat tanks,  
1 organic tank

Single-Shell Tank Unit Managers Meeting  
Waste Retrieval Overview

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## SST TANK WASTE RETRIEVAL PROJECTS (CONT)

- By Farm: 10 ferrocyanide tanks
  - Target for start of detailed design: FY 96-97
- Future SST Project(s)
  - To retrieval waste from remaining SSTs
  - Actions part of M-09, complete closure of all 149 single-shell tanks

Single-Shell Tank Unit Managers Meeting  
Waste Retrieval Overview

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## ISSUES FOR FURTHER DISCUSSION

- **M-06 Plan**
  - Milestone scope definition
  - Testing program
  - Participation by other DOE contractors
- **Retrieval Regulatory Drivers**
  - Closure interface
  - Can we sluice SST waste?
  - Retrieval option for 241-C-106
- **M-07 Tank Selection**

9 2 1 2 6 4 7 0 7 5 2

**ENVIRONMENTAL RESTORATION**

**SST WORKSCOPE**

**May 28, 1992**

**M. C. (Mike) HUGHES**

**R. L. (Bob) MILLER**

**JHIVAUN FREEMAN-POLLARD**

## SST OPERABLE UNIT CLOSURES

May 28, 1992

SIX SST OPERABLE UNITS - 149 TANKS				
Operable Unit	Single Shell Tanks			
	55,000 gal	533,000 gal	758,000 gal	1,000,000 gal
200-BP-7	4	24	12	0
200-PO-3	4	12	0	10
200-RO-4	0	0	12	15
200-TP-5	0	0	24	0
200-UP-3	4	12	0	0
200-TP-6	4	12	0	0

## SST OPERABLE UNIT CLOSURES

May 28, 1992

SINGLE-SHELL TANK "HARDWARE"	
Piping	Miles and Miles
1,000,000 Gallon Tanks	25
758,000 Gallon Tanks	48
533,000 Gallon Tanks	60
55,000 Gallon Tanks	16
Diversion Boxes	57
Catch Tanks	10
Condensate Tanks	1
Vaults	1
Septic Tanks	7
Spills	35
Unplanned Releases	40
Cribs	1
Valve Pit	1
French Drains	1

**MAJOR WORK ACTIVITIES SCHEDULED THROUGH FY 1994**

**FY 1992**

- **Develop work plan to allow field investigation of Tank 241-T-106 leak to support findings associated with GAO Audit Item GAO-RCED-89-157.**

**FY 1993**

- **Implement work plan by drilling 180-ft borehole adjacent to 241-T-106 and analyzing samples to determine migration (if any) of plume.**

**FY 1994**

- **Issue report on findings of investigation (Close GAO Audit).**
- **Initiate preparation of work plans for two Operable Units (200-TP-6 and 200-PO-3).**



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