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Title/Desc:

INVESTIGATION OF LIQUID INTRUSION IN 241BX103

Sta 4 (3)

OCT 05 1995

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT No 612758

2. To: (Receiving Organization) Tank Stabilization and Engineering Support		3. From: (Originating Organization) Tank Stabilization and Engineering Support		4. Related EDT No.: NA	
5. Proj./Prog./Dept./Div.: 77420/N54A1		6. Cog. Engr.: Anjan Dasgupta		7. Purchase Order No.: NA	
8. Originator Remarks: Interim Stabilization Criteria, Interim Stabilization Status, Liquid Intrusion, Intrusion Routes, Intrusion Prevention				9. Equip./Component No.: NA	
				10. System/Bldg./Facility: NA	
11. Receiver Remarks:				12. Major Assm. Dwg. No.: NA	
				13. Permit/Permit Application No.: NA	
				14. Required Response Date: 10/95	

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-WM-ER-518		0	Investigation of Liquid Intrusion in 241-BX-103	NA	2	1	1

16. KEY					
Approval Designator (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec. 12.7)		1. Approval	4. Review	1. Approved	4. Reviewed no/comment
		2. Release	5. Post-Review	2. Approved w/comment	5. Reviewed w/comment
		3. Information	6. Dist. (Receipt Acknow. Required)	3. Disapproved w/comment	6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)										(G)	(H)
Req.	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Req.	Disp.
2	1	Cog. Eng. A. Dasgupta	<i>Anjan Dasgupta</i>	10/2/95	R1-80	D.R. ENGELMAN		10/2/95	R1-49	1	1
1	1	Cog. Mgr. V.C. Boyles	<i>V.C. Boyles</i>	10/4/95	R1-49	T.F. RAINEY		10/4/95	R2-80	1	1
		QA				D.T. VLADIMIROFF		10/4/95	R2-54	1	1
		Safety									
		Env.									

18. Signature of EDT Originator <i>Anjan Dasgupta</i> Date: 10/2/95		19. Authorized Representative for Receiving Organization <i>V.C. Boyles</i> Date: 10/4/95		20. Cognizant Manager <i>V.C. Boyles</i> Date: 10/4/95		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
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INSTRUCTIONS FOR COMPLETION OF THE ENGINEERING DATA TRANSMITTAL

(USE BLACK INK OR TYPE)

<u>BLOCK</u>	<u>TITLE</u>	
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(2)	To: (Receiving Organization)	• Enter the individual's name, title of the organization, or entity (e.g., Distribution) that the EDT is being transmitted to.
(3)	From: (Originating Organization)	• Enter the title of the organization originating and transmitting the EDT.
(4)	Related EDT No.	• Enter EDT numbers which relate to the data being transmitted.
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(10)	System/Bldg./Facility	• Enter applicable system, building or facility number, if appropriate.
(11)	Receiver Remarks	• Enter special or additional comments concerning transmittal.
(12)	Major Assm. Dwg. No.	• Enter applicable drawing number of major assembly, if appropriate.
(13)	Permit/Permit Application No.	• Enter applicable permit or permit application number, if appropriate.
(14)	Required Response Date	• Enter the date a response is required from individuals identified in Block 17 (Signature/Distribution).
(15)*	Data Transmitted	
(A)*	Item Number	• Enter sequential number, beginning with 1, of the information listed on EDT.
(B)*	Document/Drawing No.	• Enter the unique identification number assigned to the document or drawing being transmitted.
(C)*	Sheet No.	• Enter the sheet number of the information being transmitted. If no sheet number, leave blank.
(D)*	Rev. No.	• Enter the revision number of the information being transmitted. If no revision number, leave blank.
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(F)*	Approval Designator	• Enter the appropriate Approval Designator (Block 15). Also, indicate the appropriate approvals for each item listed, i.e., SQ, ESQ, etc.
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(17)	Signature/Distribution	
(G)	Reason	• Enter the code of the reason for transmittal (Block 16).
(H)	Disposition	• Enter the code for the disposition (Block 16).
(J)	Name	• Enter the signature of the individual completing the Disposition 17 (H) and the Transmittal.
(K)*	Signature	• Obtain appropriate signature(s).
(L)*	Date	• Enter date signature is obtained.
(M)*	MSIN	• Enter MSIN. Note: If Distribution Sheet is used, show entire distribution (including that indicated on Page 1 of the EDT) on the Distribution Sheet.
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RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-ER-518, REV 0

Document Title: Investigation of Liquid Intrusion in 241-BX-103

Release Date: 10/5/95

**This document was reviewed following the
procedures described in WHC-CM-3-4 and is:**

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara Broz

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SUPPORTING DOCUMENT

1. Total Pages 54

2. Title Investigation of Liquid Intrusion in 241-BX-103	3. Number WHC-SD-WM-ER-518	4. Rev No. 0
5. Key Words Interim Stabilization Status, Interim Stabilization Criteria, Single Shell Tank, Liquid Intrusion, Intrusion Prevention, Intrusion Routes	6. Author Name: Anjan Dasgupta Signature Organization/Charge Code 77420/N54A1	
7. Abstract <p>Although SST 241-BX-103 is classified as being interim stabilized and intrusion prevented, FIC readings have indicated the tank's surface level to be increasing in a 'step like' fashion even after the completion of intrusion prevention activities. This letter report discusses the finding of an investigation conducted to (i) determine if liquid intrusion (rather than other potential causes such as a change in the waste's physiochemical properties, instrumentation error, etc.) was responsible for the increase in the surface level and if so, (ii) recommend a likely course of action to pursue if the tank's supernate volume is exceeding the interim stabilization criterion. Engineering judgement (supplemented by analysis of historical tank data, tank video and photographs) was used to determine the extent to which the rise in the surface level could be attributed to various types of liquid intrusion and/or other phenomena. It was concluded that the rise in BX-103's surface level was indeed real (and most likely caused by liquid intrusion), and that the tank's supernate volume was exceeding the interim stabilization criterion of 5000 gallons. However the tank's surface level has remained fairly constant since August 1993. It was recommended that tank BX-103 be left 'as is' for the moment and continued being monitored. Pumping of BX-103 was recommended only under one of the following circumstances: (i) the tank leaks, (ii) the tank is once again subject to significant liquid intrusion in the future, or (iii) it is decided that all supernate be removed from a SST prior to retrieval of the tank's solid waste.</p>		
8. RELEASE STAMP <div data-bbox="1040 1617 1495 1851"><p>OFFICIAL RELEASE BY WHC DATE OCT 05 1995 <i>Sta 4</i></p> </div>		

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From: SST Stabilization and Engineering Support
Phone: 373-4765, R1-49
Date: March 21, 1995
Subject: LIQUID INTRUSION IN TANK 241-BX-103

To: D.B. Engelman

References:

- 1) WHC-SD-RE-TI-178, January 1994, S.L. Swaney, "Single Shell Tank Stabilization Record"
- 2) WHC-EP-0182-80, February 1995, B.M. Hanlon, "Waste Tank Summary for Month Ending December 31, 1994"
- 3) WHC-SD-WM-ER-337, May 1994, D.B. Engelman and C.E. Jenkins, "Managing The Assumed Leak From Single Shell Tank 241-T-111"
- 4) WHC-SD-WM-ER-311, September 1994, L.A. Gaddis, "Supporting Document for the Historical Tank Content Estimate for BX Tank Farm"
- 5) WHC-SD-WM-TI-565, July 1993, R.J. Van Vleet, "Radionuclide and Chemical Inventories for the Single Shell Tanks"

The purpose of this letter report is to discuss the present status of an investigation being conducted to (i) determine if liquid intrusion was/is taking place within tank 241-BX-103, and (ii) to develop a likely course of action to follow if the tank's current supernatant volume exceeds the supernatant volume criteria (of 5000 gallons) for interim stabilized tanks. The questions this letter report addresses, and the sections of the report where they are discussed are as follows:

- Section 1: Has there been a 'real' (rather than 'apparent') rise in the liquid level of tank BX-103, and if so, is the interim stabilization criteria for supernatant volumes being violated?
- Section 2: What other factors besides liquid intrusion may account for the rise of the tank's liquid surface level? How likely is it for any of these factors to have actually caused the increase in the tank's liquid level?
- Section 3: What are the potential route(s) of liquid entry into the tank (in the event that liquid intrusion is taking place)?
- Section 4: What is the most ideal course of action to pursue assuming (i) liquid intrusion is taking place in the tank, and (ii) the interim stabilization criteria for its supernatant volume is not being met?

If you have any questions, please call me @ 373-4765.

A. Dasgupta, Engineer
Tank Stabilization and Engineering Support

nlj

Attachments (2)

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1.0 Rise of tank 241-BX-103's liquid waste level:

Tank BX-103 was declared interim stabilized in November 1983 and intrusion prevented in October 1985 (ref. 1 and 4). However the liquid surface level of the tank has been rising even after the completion of intrusion prevention activities (ref. 2). To determine if an increase in tank BX-103's liquid level has indeed taken place, the following were examined:

- Historical surface level data: This data was gathered from references 2 and 4, and consists of liquid level readings taken between January 1983 and January 1995.
- In-tank photographs and video: Two sets of photographs (taken on 07/08/83 and 10/31/86) and a recent tank video recording (conducted on 10/27/94) were observed.

1.1 Evaluation of the tank's historical waste level data:

Evaluation of the tank's historical waste level data revealed the following: There has been a 'step like' increase in the tank's liquid level since 1983 (see figure 1). The typical pattern of level increase has been a sharp rise in the surface level over a short period of time (one to two years), followed by a long period (approximately six years) during which the level stays fairly constant, after which the level begins to rise again. The liquid level has remained constant (at 20.5 inches) since August 1993. Table 1 attempts to show the 'step like' trend of surface level rise by listing the approximate increase in liquid levels and volumes (if any) that occurred in the periods between (i) November 83 (when BX-103 was declared administratively stabilized) and October 1985 (when the tank was declared intrusion prevented), (ii) November 1985 and October 1991, (iii) November 1991 and July 1993, and (iv) August 1993 and January 1995. The estimated increases in liquid levels and volumes listed in this table were calculated based on the historical liquid surface level data available to the investigators.

TABLE 1

PERIOD	Approx. increase in liquid level	Approx. increase in liquid volume	Approx. increase in liq. level/year	Approx. increase in liq. vol./yr
11/83 - 10/85	0.7 in.	1925 gallons	0.35 in./yr	962.5 gal./yr
11/85 - 10/91	0 in.	0 gallon	0 in./yr	0 gal./yr
11/91 - 07/93	0.7 in.	1925 gallons	0.35 in./yr	962.5 gal./yr
08/93 - 01/95	0 in.	0 gallon	0 in./yr	0 gal./yr
Cumulative: 11/83 - 01/95	1.4 in.	3850 gallons	0.13 in./yr	350 gal./yr

There may be some uncertainties associated with the accuracy of the liquid level data. The liquid surface level measurements for tank BX-103 are made with a FIC gauge that has occasionally experienced operational problems. There is a remote possibility that the FIC may have been calibrated inaccurately following repairs. However, sufficient information (e.g. JCS packages,

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calibration records, etc.) was not available to determine if inaccurate calibration may be attributed as the cause of the increase in surface level measurement. No other liquid level measuring instrument (e.g. manual tape, zip cord, ENRAF gauge, or LOWs) is installed in BX-103. Were such an instrument available (and assuming it operated reliably), its waste level data would conform with/contradict the level increase trend observed upon evaluating the FIC data.

1.2 Evaluation of tank pictures/video:

Tank photographs taken on 7/8/83 and 10/31/86, as well as a recent video recording taken in October, 1994 were compared to see if an increase in the liquid surface level had occurred in the years following the interim stabilization and intrusion prevention of the tank. A difference in the surface level was detected when comparing the pictures taken in 1986 and 1983. The surface level of the supernate seemed to be higher in the photographs taken in 1986 compared to those taken in 1983. This increase in surface level observed upon comparing the photographs (taken in 1983 and 1986) conforms with historical liquid level data available for roughly the same period. A substantial increase in waste level (18.9 inches to 19.7 inches) occurred between January 1984 and January 1987 (see fig.1)). Although the video recording of the tank was not very clear, an increase in the beachline (i.e. the interface of the supernatant with the sludge lining the tank wall) seems to have occurred since the last pictures that were taken in 1986.

1.3 Calculation of Current Supernate Volume in Tank BX-103:

Solid level in tank at the time tank was stabilized (ref. 1) = 18 in.

Current liquid surface level (ref. 2) = 20.5 in.

Assuming an effective diameter of 75 feet (equal to the inner diameter of the tank), and assuming the thickness of crust surrounding the sidewall to be zero:

Volume of liquid corresponding to 1 inch = $(\pi/4) * (75 \text{ ft.})^2 * (1 \text{ ft.}/12 \text{ in.}) * (7.48 \text{ gal./ft.}^3) = 2750 \text{ gal./in.}$

Assuming that the solid level (of 18 inches) has not changed since the tank was declared interim stabilized and that the solid surface is uniform all across the tank, the difference between the supernatant liquid and solid waste levels is:

$$20.5 \text{ in.} - 18 \text{ in.} = 2.5 \text{ in.}$$

Thus the approximate current supernate volume = $(2.5 \text{ in.}) * (2750 \text{ gal./in.}) = \underline{6875 \text{ gallons}}$

If a 2 feet thick crust is assumed to be bordering the tank's sidewall, the effective diameter used in the calculation would be reduced to 71 feet (75 ft. - 4 ft.), thereby giving an approximate current supernate volume of 6170 gallons. [NOTE: The greater the thickness of the crust bordering the sidewall assumed, the smaller is the volume of supernate calculated. Given the fact that the crust's thickness can only be estimated (and not measured) from the video and pictures, there is a degree of uncertainty associated with the calculation of the supernate volume. Also, since the crust's thickness cannot be determined with certainty, the worst case scenario (i.e. a crust thickness of zero inch) must be assumed, in which case the calculated supernate volume exceeds the interim stabilization criteria.]

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The evaluation of the tank's historical liquid surface level data and tank photographs/videos confirms that BX-103's liquid level has been rising (albeit sporadically) since the tank's stabilization in 1983. Although the occasional malfunctioning of the FIC, the unavailability of other level measuring instrument in BX-103 to validate the accuracy of the FIC data, and the possibility of inaccurate FIC calibration or FIC drift/tape slippage may all lead to the consideration of the possibility that the increase in liquid level is 'apparent' rather than 'real', the inspection of tank photographs and video validate the notion that the increase in liquid level is indeed real. Photograph and video inspection also ruled out the occurrence of another source of instrument error: i.e. the development of crud on the FIC's plummet. The plummet was observed to be free of crud. The current supernate volume calculated for the tank exceeded the interim stabilization criteria of 5000 gallons. Given this tank is intrusion prevented, the following events become likely candidates to account for the increase in the liquid's surface level:

- 1a) One or more of the tank accesses (risers, pits, process line, etc.) were unaccounted for/accidentally left unisolated when intrusion prevention activities for this tank were being conducted.
- 1b) A breach in the tank's structure (e.g. tank dome, sidewall, etc.) or the degradation of one or more of the previously installed intrusion prevention devices (e.g. weather cover, seals, gaskets, etc.) is responsible for providing a route for liquid entry into the tank.
- 2) The increase in the tank's liquid level is not being caused by intrusion, but rather by a change in the tank's structure/configuration, or a change in the physiochemical properties of the waste.

Each of these possibilities will be discussed in the succeeding paragraphs, starting first with non-intrusion related phenomena that could account for the rise in the liquid surface level.

2.0 Events besides liquid intrusion that may account for the rise in liquid level:

These events roughly fall into two groups:

- a) Change in the structure or configuration of the tank, such as
 - Expansion/contraction of tank
 - FIC riser elevation change
- b) Change in the configuration or physiochemical properties of the tank's waste, such as
 - Slump and drop of tank sidewall waste
 - Elevation of the solid waste below the FIC plummet
 - Gas buildup in sludge

None of the aforementioned events was deemed likely to account for the rise in tank BX-103's liquid level. Reason(s) for rejecting these events as being responsible for causing the surface level rise are listed below:

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Expansion/contraction of tank: The likelihood of the tank's liquid level rising as a result of tank expansion/contraction is extremely slim. Expansion or contraction of the tank (however rare this phenomenon may be) can result either from mechanical or thermal processes. Mechanical processes, such as the compression of the tank by surrounding soil seems highly improbable, unless the 200E area has been very geologically active in the recent past. The occurrence and extent of thermal expansion/contraction depends upon a number of factors such as atmospheric temperature, the temperature and thermal conductivity of the surrounding soil, the thermal conductivity of the concrete shell and the steel liner, etc. Since temperatures both inside and outside of the tank are likely to fluctuate, so should the level of the liquid inside the tank if it was a strong function of temperature (i.e. the liquid surface level should show both 'increase' and 'decrease' trends as the temperatures rise and fall). However the liquid surface level has never shown a decreasing trend since 1983 (when the tank was declared interim stabilized). Most importantly, the dimension of the tank (inner diameter of 75 feet) compared to the amount of supernate that was in the tank at the time it was declared interim stabilized (approximately 2500 gallons) makes the rise in the liquid level caused by expansion/contraction seem highly improbable. Thus expansion/contraction (both mechanical and thermal) of the tank was determined unlikely to have caused the rise in the liquid surface level of the tank.

FIC riser elevation change: An increase in the FIC riser's elevation may cause the instrument's reference point to be raised, resulting in the FIC recording an 'apparent' (rather than 'real') increase in liquid level. However a change in the riser's elevation was ruled out as a factor causing the increase in liquid level because a comparison of the riser's elevation measurements made in 1986 and February 1994 showed the measurements to be virtually identical. Besides, comparison of past and recent pictures/videos show the rise in the tank's liquid surface level to be indeed real.

Slump and drop of tank sidewall waste: To cause a gradual rise in liquid surface level (approximately 2.5 inches in the last 10 years), a large volume of sidewall material would have to had gradually slumped/dropped off from the sidewalls of the tank. The volume of sidewall material that may have slumped/dropped off is hard to predict, given that this value is a function of parameters that cannot be measured easily (e.g. the original thickness and volume of the sidewall waste, the adhesive and cohesive properties of the sidewall waste material, etc). The volume of liquid that the sidewall waste may displace is not easy to estimate either, since this value depends upon several factors (e.g. porosity of the sidewall waste, the volume of waste that has slumped/dropped off, etc.) that cannot be measured or estimated easily. Comparison of tank photographs and videos revealed no distinct change to have occurred in either the configuration (i.e. strata) or the volume of the waste bordering the sidewall in the period during which the tank's liquid level has been rising. Although the occurrence of a slump/drop off the tank's sidewall waste cannot be ruled out with certainty, the probability of it causing the increase in the liquid's surface level appears to be very small.

Elevation of the sludge in the area below the FIC plummet: was ruled out as a likely factor to have caused the rise of BX-103's liquid level since comparison of old and recent tank pictures/videos showed no change in the sludge's level right below the FIC's plummet.

Gas Buildup in sludge: Radionuclides contained in the sludge may radiolyse water and other liquids to produce gases such as hydrogen and oxygen. The gases trapped inside the sludge would cause the sludge to swell (expand). The expanding sludge in turn would push the column of supernatant liquid

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it supports upward, thereby causing the FIC to record a higher value of liquid surface level than it actually should. The amount of gas trapped in the sludge at any given time depends upon many factors, e.g. the concentration of radionuclides in the sludge, the porosity and viscosity of the sludge, the temperature of the sludge, etc. Waste sample analysis data gathered from reference 4 (see Appendix E in attachment 1) as well as TRAC estimates (ref. 5) show very low concentrations of radionuclides (including those radionuclides with relatively large half lives, e.g. 90Sr). Since the tank was last sampled in 1975 (and it may be assumed that radionuclide concentrations have been reduced further due to radioactive decay), the concentration of radionuclides left in the sludge is probably too small to produce the amount of gas that would be required to cause the increase in the tank's liquid level. The fact that the tank is neither on the Hydrogen/Flammable gas watch list nor on the list of tanks with a high heat load ($> 40,000$ Btu/hr), further supports the theory that neither the concentrations of gases, nor the concentrations of the radionuclides (responsible for producing these gases) are very significant for tank BX-103. Also, gases trapped within the sludge are eventually released - the cycle of a gas buildup and release lasting an average of nine years. No such cycle has ever been observed to take place in tank BX-103. Thus based on the most recent sample analysis data, TRAC projections, and the fact that tank BX-103 is not a watch list tank, it seems very unlikely that gas buildup in the tank's sludge is responsible for the rise of its liquid level.

3.0 Liquid intrusion in tank BX-103:

Tank farm documents and design drawings (including isolation design drawings) were reviewed to identify potential routes of liquid entry into BX-103. Some of the questions addressed by this review and the corresponding answers are listed in Table 2.

Table 2

REVIEW QUESTION	ANSWER (Y/N/U)
Has water been added to tank following intrusion prevention?	No
Do lines cross tank dome or encasement?	Yes
Is BX-103 part of a cascade?	Yes
Does the tank have active exhausters	No
Does tank have breathers?	Yes
Is the process air line still connected to the tank?	Unknown
Is any unused riser(s) unsealed?	No
Has rain water/snow melt known to have entered the tank?	Unknown
Has line pressure test water ever been added to tank?	No
Is tank connected to the sludge cooler?	No

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At this stage of the investigation, the increase in tank BX-103's liquid surface level seems most likely to be caused by one of the following intrusion processes/modes:

- a) unisolated line(s) still connected to the tank.
- b) weather related intrusion (eg. rain water/snow melt entering the tank).
- c) condensation of air
- d) breach in one or more of the devices used to intrusion prevent the tank.

Review of the isolation design drawings indicated that some lines crossing the tank dome and encasement are still unsealed.

Evaluation of historical surface level data shows that the surface level reached a steady value of 19.7 inches shortly after the tank's intrusion prevention in October 1985 (see figure 1). The surface level remained fairly constant (at 19.7 inches) until October 1991 before rising again. This hints at the possible occurrence of a breach in one or more of the tank's intrusion prevention barriers (e.g. degradation of weather covers, gaskets, seals, etc.), thereby serving as a route for liquid entry into the tank. However the surface level of the tank has remained constant (at 20.5 inches) since August, 1993.

Tanks BX-101, BX-102, and BX-103 are parts of a cascade with BX-103 being on the receiving end of waste transfer relative to BX-101 and BX-102. The lines connecting these tanks in a cascade would likely have provided a route for liquid entry into BX-103, were it not for the fact that both BX-101 and BX-102 were interim stabilized (in 1978) and intrusion prevented prior to BX-103. No increase in tank BX-101 and BX-102's liquid levels have been noted since their stabilization.

The tank is passively ventilated. While no study attempting to quantify the amount of water that would condense in a passively ventilated tank is known to have been conducted, computer air exchange models for other tanks indicate this figure to be about 400 gallons/year within reason (ref. 3). The approximate increase of the tank's liquid volume between November, 1983 and January 1995 was calculated to be 350 gallons/yr (as indicated in Table 1). Although this number is fairly close to 400 gallons/year, specific data on the air exchange rate between the tank and the atmosphere needs to be compiled and a air exchange model needs to be developed before the rate of moisture condensation in tank BX-103 can be predicted fairly accurately.

It is also unknown if rain water/snow melt has entered the tank. The route through which the rain water/melted snow enters the tank may be extremely hard to detect if it occurs through cracks in the tank dome or sidewalls. A review of the available historical surface level data didn't indicate the existence of a correlation between the increase in surface level and seasonal changes.

Other potential accesses of liquid intrusion into tanks not covered by the review (e.g. tank pits, condenser hatchways, etc.) must also be investigated. Where ever and whenever possible, field investigations must be conducted to supplement the information gathered from isolation design drawings and other documents.

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4.0 Recommendations concerning the decision to pump tank BX-103:

Based on the evaluation of data available so far, it appears that the increase in tank BX-103's liquid surface level is 'real' and most likely caused by liquid intrusion. If the tank is indeed undergoing intrusion, any activity conducted to remove the tank's liquid will only alleviate (rather than solve) the level increase problem, unless the source of intrusion is discovered and isolated from the tank. Given that liquid intrusion into the tank is currently inactive, the following course of action is recommended to be pursued:

Leave the liquid contents of tank BX-103 'as is' for the moment, and continue monitoring the tank. Although the current supernate volume in BX-103 was estimated to have exceeded the interim stabilization criteria (see section 1.3), safety concerns associated with the continued storage of liquid in the tank appears to be minimal for the following reasons:

- (i) The structural integrity of the tank is sound (i.e. the tank has never been known to leak).
- (ii) The concentrations of radioactive elements/compounds (according to available chemical data and TRAC projections) are low enough to not cause any major safety concerns associated with long term storage of liquid waste in the tank. Also, BX-103 is not a watch-list tank.

Pumping of tank BX-103's liquid is not recommended at the present moment because:

- (i) Currently, funding to conduct intrusion prevention activities can only be obtained by diverting funds allocated to other key interim stabilization activities. Since liquid intrusion into tank BX-103 is currently inactive, the diversion of resources from other significant stabilization activities at the present moment is not recommended. Pumping the tank (without first solving the intrusion problem) can neither guarantee the non-occurrence of liquid intrusion in the future, nor the long term interim stabilization of the tank.
- (ii) Since BX-103 is already interim stabilized and intrusion prevented, most of the tank accesses (e.g. risers, pits, etc.) and the original waste transfer lines are isolated from the tank. Thus the pumping of tank BX-103 would require the reopening of certain previously isolated facilities (e.g. pump pit) and the installation of new pumping equipment (e.g. a new pump, overground waste transfer line, etc.). The cost associated with the procurement, installation, and testing of new pumping equipment, and the expenditure incurred in removing and disposing off old equipment (e.g. the old jet pump, weather covers, seals, gaskets, etc.) is quite significant given the small volume of supernate contained in the tank. The potential for contamination and worker exposure to radiation while removing/installing equipment must also be taken into account. Thus ALARA concerns and the substantial costs incurred to pump a relatively small volume of liquid (approximately 6875 gallons of supernate in the worst case scenario (see section 1.3)) make pumping a not-so-efficient mean to deal with the increase of the surface level of the tank.

Pumping of tank BX-103 may be conducted only under one of the following circumstances:

- (a) The tank leaks:
 - Use the LR-56 cask system to transfer the tank's liquid waste.

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- If a leak occurs before the LR-56 cask is available for use, overground waste transfer lines may be used to transfer tank BX-103's liquid waste.
- (b) Liquid intrusion into the tank becomes significantly active again in the future:
 - Identify source of intrusion, and implement the necessary activities to seal the intrusion route.
 - Use the LR-56 HLLW cask system to transfer the tank's liquid waste.
- (c) It is determined that no supernatant liquid should be present in the tank when retrieving the tank's solid waste, in which case:
 - Identify the source of liquid intrusion, and seal the intrusion route. These activities should be performed if and when separate funding to conduct intrusion-prevention activities (i.e. funds not obtained by diverting money from other stabilization projects) becomes available. Use the LR-56 HLLW cask system to transfer the tank's liquid waste after the intrusion route has been sealed.
 - If no funding is specifically allocated to perform intrusion-prevention activities, continue monitoring the tank and pump the tank (using the LR-56 cask system) right before the tank's solid waste is scheduled for retrieval.

The LR-56 HLLW cask system (designed in France to carry Type B radioactive liquid waste) presents the most convenient mean to transfer tank BX-103's liquid waste. It is scheduled for delivery at the Hanford site in November 1995. Utilizing the LR-56 cask instead of installing overground waste transfer lines would lead to the saving of both time and cost required to pump the tank. The cask has a waste carrying capacity of only 1060 gallons; however the small supernate volume and the low concentration of radionuclides in the supernate of tank BX-103 ensures that the number of trips made between the tank and the unloading facility, and consequently the human exposure to radiation is minimal.

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ATTACHMENT 2

This attachment contains historical data gathered from the appendices of the "Supporting Document for Historical Tank Content Estimate for BX Tank Farm" (WHC-SD-WM-ER-311). The types of data contained in the various appendices included as part of this attachment are as follows:

Appendix A:	Tank solid waste level history
Appendix B:	Thermocouple data
Appendix C:	Liquid Surface Level Data
Appendix D:	Riser information
Appendix E:	Waste Sample Analysis

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APPENDIX A
TANK SOLID WASTE LEVEL DATA

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241-BX-103 SINGLE-SHELL
TANK LEVEL HISTORY

WEC-ED-WM-ER-511 Rev. 0
518

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)
1-1948				
2				
3	9	-1		
4	491	174		
1-1949	523	186		
2	523	186		
3	523	186		
4	523	186		
1-1950	523	186		
2	523	186		
3	523	186		
4	523	186		
1-1951	523	186		
2	523	186		
3				
4				
1-1952				
2	530	188		
3	530	188		
4	530	188		
1-1953	530	188		
2	530	188		
3	530	188		
4	530	188		
1-1954	0	-12		
2	51	18		
3	0	-12		
4	0	-12		
1-1955	0	-12		
2		-12		
3	0	-12		
4	0	-12		
1-1956	0	-12		
2	0	-12		
3	530	188		
4	45	12		
1-1957	45	12		
2	54	15		
3	40	10		
4	40	10		
1-1958	37	9		
2	37	9		
3	37	9		
4				
1-1959	37	9		
2	37	9		

TANK LEVEL HISTORY

518

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)
3	37	9		
4	45	12		
1-1960	45	12		
2	48	13		
3	48	13		
4	48	13		
1-1961				
2	54	15		
3				
4	54	15		
1-1962				
2	54	15		
3				
4	533	191		
1-1963				
2	533	191		
3				
4	533	191		
1-1964				
2	522	185	95	30
3				
4	516	193	95	30
1-1965				
2	527	187	90	28
3	527	187	90	28
4	527	187	90	28
1-1966	527	187	90	28
2	527	187	90	28
3	527	187	90	28
4	527	187	90	28
1-1967	527	187	90	28
2	527	187	90	28
3	527	187	90	28
4	557	193	90	28
1-1968	307	107	90	28
2	209	71	90	28
3	343	120	90	28
4	314	110	74	22
1-1969	378	133	72	22
2	243	84	76	23
3	224	77	18	2
4	304	106	62	18
1-1970	110	35	37	9
2	425	150	51	14
3	389	137	48	13
4	542	193	51	14

241-BX-103 SINGLE-SHELL
TANK LEVEL HISTORY

WHC-SD-WM-ER-511, Rev. 0

518

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)
1-1971	442	156	51	14
2	541	192	51	14
3	437	154	51	14
4	406	143	54	15
1-1972	420	148	54	15
2	542	193	54	15
3	362	127	11	-1
4	399	141	11	-1
1-1973	322	113	34	8
2	487	173	34	8
3	428	173	34	8
4	503	178	46	12
1-1974	503	178	46	12
2	504	179	46	12
3	504	179	46	12
4	205	70	65	19
1-1975	293	102	54	15
2	238	82	54	15
3	499	177	54	15
4	169	57	54	15
1-1976	208	71	54	15
2	158	53	54	15
3	158	53	54	15
4	178	60	54	15
1-1977	169	64	76	23
2	76	23	76	23
3	76	23	76	23
4	76	23	76	23
1-1978	76	23	76	23
2	76	23	76	23
3	76	23	76	23
4	76	23	76	23
1-1979	76	23	76	23
2	76	23	76	23
3	76	23	76	23
4	76	23	76	23
1-1980	76	23	76	23
2	76	23	76	23
3	76	23	76	23
4	76	23	76	23
1-1981	76	23	76	23
2	76	23	76	23
3	75	23	76	23
4	76	23	76	23
1-1982	75	23	76	23
2	63	18	63	18

TANK LEVEL HISTORY

518

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)
3	63	18	62	18
4	63	18	62	18
1-1983	63	18	62	18
2	63	18	62	18
3	63	18	62	18
4	64	19	62	18
1-1984	65	19	62	18
2	65	19	62	18
3	65	19	62	18
4	65	19	62	18
1-1985	66	19	62	18
2	66	19	62	18
3	66	19	62	18
4	66	19	62	18
1-1986	66	19	62	18
2	66	19	62	18
3	66	19	62	18
4	66	19	62	18
1-1987	66	19	62	18
2	66	19	62	18
3	66	19	62	18
4	66	19	62	18
1-1988	66	19	62	18
2	66	19	62	18
3	66	19	62	18
4	66	19	62	18
1-1989	66	19	62	18
2	66	19	62	18
3	66	19	62	18
4	66	19	62	18
1-1990	66	19	62	18
2	66	19	62	18
3	66	19	62	18
4	66	19	62	18
1-1991	66	19	62	18
2	66	19	62	18
3	66	19	62	18
4	66	19	62	18
1-1992	66	19	62	18
2	66	19	62	18
3	66	19	62	18
4	66	19	62	18
1-1993	66	19	62	18
2	66	19	62	18
3				
4				

APPENDIX B
THERMOCOUPLE DATA

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518

241-BX-103
Thermocouple 3

(Thermocouple Elevation Unavailable)

241-BX-103
Thermocouple 4

(Thermocouple Elevation Unavailable)

Data obtained from WHC Surveillance Analysis Computer System (SACS), November 12, 1993.

518

241-BX-103
Thermocouple 1
(Thermocouple Elevation Unavailable)

241-BX-103
Thermocouple 2
(Thermocouple Elevation Unavailable)

Data obtained from WHC Surveillance Analysis Computer System (SACS), November 12, 1993.

518

241-BX-103
Thermocouple 7
(Thermocouple Elevation Unavailable)

241-BX-103
Thermocouple 8
(Thermocouple Elevation Unavailable)

Data obtained from WHC Surveillance Analysis Computer System (SACS), November 12, 1993.

241-BX-103
Thermocouple 5
(Thermocouple Elevation Unavailable)

241-BX-103
Thermocouple 6
(Thermocouple Elevation Unavailable)

Data obtained from WHC Surveillance Analysis Computer System (SACS), November 12, 1993.

518

241-BX-103

Thermocouple 11

(Thermocouple Elevation Unavailable)

241-BX-103

Thermocouple 12

(Thermocouple Elevation Unavailable)

Data obtained from WHC Surveillance Analysis Computer System (SACS), November 12, 1993.

518

241-BX-103 Thermocouple 9

(Thermocouple Elevation Unavailable)

241-BX-103 Thermocouple 10

(Thermocouple Elevation Unavailable)

Data obtained from WHC Surveillance Analysis Computer System (SACS), November 12, 1993.

518

TANK 241-BX-103
THERMOCOUPLE DATA

TREE #	DATE	THERMO #	TREE SET #	TEMP C	TEMP F	Y-MAX TEMP	COMMENTS
1	9/18/74	1	1	26.7	80.06	N	degree C/TWINS confirm
1	9/18/74	2	1	26.7	80.06	N	degree C/TWINS confirm
1	9/18/74	3	1	23.9	75.02	N	degree C/TWINS confirm
1	9/18/74	4	1	23.9	75.02	N	degree C/TWINS confirm
1	9/18/74	5	1	23.9	75.02	N	degree C/TWINS confirm
1	9/18/74	6	1	23.9	75.02	N	degree C/TWINS confirm
1	9/18/74	7	1	23.9	75.02	N	degree C/TWINS confirm
1	9/18/74	8	1	23.9	75.02	N	degree C/TWINS confirm
1	9/18/74	9	1	23.9	75.02	N	degree C/TWINS confirm
1	9/18/74	10	1	24.4	75.92	N	degree C/TWINS confirm
1	9/18/74	11	1	24.4	75.92	N	degree C/TWINS confirm
1	9/18/74	12	1	23.33	73.994	Y	degree C/TWINS confirm
1	12/11/74	1	1	22.22	71.999	N	degree C/TWINS confirm
1	12/11/74	2	1	21.11	69.999	N	degree C/TWINS confirm
1	12/11/74	3	1	21.11	69.999	N	degree C/TWINS confirm
1	12/11/74	4	1	21.11	69.999	N	degree C/TWINS confirm
1	12/11/74	5	1	21.11	69.999	N	degree C/TWINS confirm
1	12/11/74	6	1	21.11	69.999	N	degree C/TWINS confirm
1	12/11/74	7	1	21.11	69.999	N	degree C/TWINS confirm
1	12/11/74	8	1	21.11	69.999	N	degree C/TWINS confirm
1	12/11/74	9	1	20.56	69.006	N	degree C/TWINS confirm
1	12/11/74	10	1	18.33	64.994	N	degree C/TWINS confirm
1	12/11/74	11	1	32	89.6	N	degree C/TWINS confirm
1	4/11/75	1	1	32	89.6	N	degree C/TWINS confirm
1	4/11/75	2	1	28	82.4	N	degree C/TWINS confirm
1	4/11/75	3	1	26	78.8	N	degree C/TWINS confirm
1	4/11/75	4	1	25	77	N	degree C/TWINS confirm
1	4/11/75	5	1	25	77	N	degree C/TWINS confirm
1	4/11/75	6	1	25	77	N	degree C/TWINS confirm
1	4/11/75	7	1	25	77	N	degree C/TWINS confirm
1	4/11/75	8	1	25	77	N	degree C/TWINS confirm
1	4/11/75	9	1	25	77	N	degree C/TWINS confirm
1	4/11/75	10	1	23	73.4	N	degree C/TWINS confirm
1	4/11/75	11	1		81	Y	
1	7/25/75	1	1		80	N	
1	7/25/75	2	1		78	N	
1	7/25/75	3	1		76	N	
1	7/25/75	4	1		76	N	
1	7/25/75	5	1		76	N	
1	7/25/75	6	1		76	N	
1	7/25/75	7	1		76	N	
1	7/25/75	8	1		76	N	
1	7/25/75	9	1		76	N	
1	7/25/75	10	1		75	N	
1	7/25/75	11	1		75	Y	
1	7/25/75	12	1		73	N	
1	2/10/76	1	1		70	N	
1	2/10/76	2	1		70	N	
1	2/10/76	3	1		70	N	
1	2/10/76	4	1		70	N	
1	2/10/76	5	1		70	N	
1	2/10/76	6	1		69	N	
1	2/10/76	7	1		69	N	
1	2/10/76	8	1		69	N	
1	2/10/76	9	1		69	N	
1	2/10/76	10	1		69	N	
1	2/10/76	11	1		77	Y	
1	4/3/76	1	1		71	N	
1	4/3/76	2	1		69	N	
1	4/3/76	3	1		69	N	
1	4/3/76	4	1		69	N	
1	4/3/76	5	1		68	N	
1	4/3/76	6	1		67	N	
1	4/3/76	7	1		65	N	
1	4/3/76	8	1		65	N	
1	4/3/76	9	1		64	N	
1	4/3/76	10	1		64	N	

Data obtained from WHC Surveillance Analysis Computer System (SACS), November 12, 1993.

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TANK 241-BX-103
THERMOCOUPLE DATA

TREE #	DATE	THERMO #	TREE SET #	TEMP C	TEMP F	Y - MAX TEMP	COMMENTS
1	4/3/76	11	1		61	N	
1	7/20/76	1	1		70	Y	
1	7/20/76	2	1		67	N	
1	7/20/76	3	1		65	N	
1	7/20/76	4	1		65	N	
1	7/20/76	5	1		64	N	
1	7/20/76	6	1		64	N	
1	7/20/76	7	1		64	N	
1	7/20/76	8	1		64	N	
1	7/20/76	9	1		64	N	
1	7/20/76	10	1		63	N	
1	7/20/76	11	1		68	N	
1	1/11/77	1	1		69	Y	
1	1/11/77	2	1		82	N	
1	1/11/77	3	1		87	N	
1	1/11/77	4	1		84	N	
1	1/11/77	5	1		84	N	
1	1/11/77	6	1		84	N	
1	1/11/77	7	1		84	N	
1	1/11/77	8	1		84	N	
1	1/11/77	9	1		84	N	
1	1/11/77	10	1		81	N	
1	1/11/77	11	1		73	Y	
1	5/24/77	1	1		72	N	
1	5/24/77	2	1		68	N	
1	5/24/77	3	1		68	N	
1	5/24/77	4	1		64	N	
1	5/24/77	5	1		64	N	
1	5/24/77	6	1		64	N	
1	5/24/77	7	1		64	N	
1	5/24/77	8	1		64	N	
1	5/24/77	9	1		63	N	
1	5/24/77	10	1		62	N	
1	5/24/77	11	1		65	Y	
1	7/26/77	1	1		65	N	
1	7/26/77	2	1		64	N	
1	7/26/77	3	1		64	N	
1	7/26/77	4	1		64	N	
1	7/26/77	5	1		64	N	
1	7/26/77	6	1		64	N	
1	7/26/77	7	1		64	N	
1	7/26/77	8	1		64	N	
1	7/26/77	9	1		63	N	
1	7/26/77	10	1		63	N	
1	7/26/77	11	1		63	N	
1	10/24/77	1	1		60	N	
1	10/24/77	2	1		76	N	
1	10/24/77	3	1		75	N	
1	10/24/77	4	1		75	N	
1	10/24/77	5	1		75	N	
1	10/24/77	6	1		75	N	
1	10/24/77	7	1		75	N	
1	10/24/77	8	1		75	N	
1	10/24/77	9	1		75	N	
1	10/24/77	10	1		74	N	
1	10/24/77	11	1		91	Y	
1	1/16/78	1	1		89	N	
1	1/16/78	2	1		89	N	
1	1/16/78	3	1		89	N	
1	1/16/78	4	1		89	N	
1	1/16/78	5	1		89	N	
1	1/16/78	6	1		89	N	
1	1/16/78	7	1		89	N	
1	1/16/78	8	1		89	N	
1	1/16/78	9	1		89	N	
1	1/16/78	10	1		89	N	
1	1/16/78	11	1		89	N	

Data obtained from WHC Surveillance Analysis Computer System (SACSI), November 12, 1993.

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TANK 241-EX-103							
THERMOCOUPLE DATA							
TREE #	DATE	THERMO #	TREE SET #	TEMP C	TEMP F	Y = MAX TEMP	COMMENTS
1	1/16/78	10	1		68	N	
1	1/16/78	11	1		66	N	
1	4/24/78	1	1		72	Y	
1	4/24/78	2	1		69	N	
1	4/24/78	3	1		67	N	
1	4/24/78	4	1		67	N	
1	4/24/78	5	1		66	N	
1	4/24/78	6	1		66	N	
1	4/24/78	7	1		66	N	
1	4/24/78	8	1		66	N	
1	4/24/78	9	1		66	N	
1	4/24/78	10	1		66	N	
1	4/24/78	11	1		66	N	
1	4/24/78	12	1		59	N	
1	7/16/78	1	1		76	Y	
1	7/16/78	2	1		69	N	
1	7/16/78	3	1		70	N	
1	7/16/78	4	1		70	N	
1	7/16/78	5	1		69	N	
1	7/16/78	6	1		68	N	
1	7/16/78	7	1		70	N	
1	7/16/78	8	1		68	N	
1	7/16/78	9	1		69	N	
1	7/16/78	10	1		70	N	
1	7/16/78	11	1		69	N	
1	1/5/79	1	1		73	Y	
1	1/5/79	2	1		72	N	
1	1/5/79	3	1		72	N	
1	1/5/79	4	1		72	N	
1	1/5/79	5	1		72	N	
1	1/5/79	6	1		72	N	
1	1/5/79	7	1		72	N	
1	1/5/79	8	1		72	N	
1	1/5/79	9	1		72	N	
1	1/5/79	10	1		72	N	
1	1/5/79	11	1		69	N	
1	1/5/79	12	1		68	N	
1	4/7/79	1	1		67	Y	
1	4/7/79	2	1		65	N	
1	4/7/79	3	1		65	N	
1	4/7/79	4	1		65	N	
1	4/7/79	5	1		65	N	
1	4/7/79	6	1		65	N	
1	4/7/79	7	1		64	N	
1	4/7/79	8	1		64	N	
1	4/7/79	9	1		64	N	
1	4/7/79	10	1		64	N	
1	4/7/79	11	1		61	N	
1	7/1/79	1	1		64	Y	
1	7/1/79	2	1		62	N	
1	7/1/79	4	1		63	N	
1	7/1/79	5	1		63	N	
1	7/1/79	6	1		63	N	
1	7/1/79	7	1		63	N	
1	7/1/79	8	1		63	N	
1	7/1/79	9	1		63	N	
1	7/1/79	10	1		63	N	
1	7/1/79	11	1		63	N	
1	10/8/79	1	1		75	Y	
1	10/8/79	2	1		72	N	
1	10/8/79	3	1		74	N	
1	10/8/79	5	1		74	N	
1	10/8/79	6	1		74	N	
1	10/8/79	7	1		74	N	
1	10/8/79	8	1		74	N	
1	10/8/79	9	1		74	N	

Data obtained from WHC Surveillance Analysis Computer System (SACSI), November 12, 1993.

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TANK 241-BX-103 THERMOCOUPLE DATA							
TREE #	DATE	THERMO #	TREE SET #	TEMP C	TEMP F	Y = MAX TEMP	COMMENTS
1	10/8/79	10	1		74	N	
1	10/8/79	11	1		75	N	
1	1/8/80	1	1		78	Y	
1	1/8/80	2	1		75	N	
1	1/9/80	3	1		75	N	
1	1/9/80	4	1		75	N	
1	1/9/80	5	1		75	N	
1	1/9/80	6	1		75	N	
1	1/9/80	7	1		75	N	
1	1/9/80	8	1		75	N	
1	1/9/80	9	1		75	N	
1	1/9/80	10	1		75	N	
1	1/9/80	11	1		72	N	
1	4/4/80	1	1			N	O/S
1	7/5/80	1	1		78	Y	
1	7/5/80	2	1		78	N	
1	7/5/80	3	1		79	N	
1	7/5/80	4	1		76	N	
1	7/5/80	5	1		78	N	
1	7/5/80	6	1		78	N	
1	7/5/80	7	1		78	N	
1	7/5/80	8	1		78	N	
1	7/5/80	9	1		78	N	
1	7/5/80	10	1		78	N	
1	7/5/80	11	1		78	N	
1	7/5/80	12	1		78	N	
1	10/26/80	1	1		76	Y	
1	10/26/80	2	1		76	N	
1	10/26/80	3	1		76	N	
1	1/19/82	1	1		79	Y	
1	1/19/82	2	1		78	N	
1	1/19/82	3	1		77	N	
1	1/19/82	4	1		77	N	
1	1/19/82	5	1		75	N	
1	1/19/82	6	1		77	N	
1	1/19/82	7	1		77	N	
1	1/19/82	8	1		76	N	
1	1/19/82	9	1		76	N	
1	1/19/82	10	1		76	N	
1	1/19/82	11	1		76	N	
1	1/19/82	12	1		76	N	
1	5/6/82	1	1			N	O/S
1	7/13/82	1	1		71	N	
1	7/13/82	2	1		71	N	
1	7/13/82	3	1		71	N	
1	7/13/82	4	1		71	N	
1	7/13/82	5	1		71	N	
1	7/13/82	6	1		71	N	
1	7/13/82	7	1		71	N	
1	7/13/82	8	1		71	N	
1	7/13/82	9	1		71	N	
1	7/13/82	10	1		71	N	
1	7/13/82	11	1		71	N	
1	7/13/82	12	1		71	N	
1	10/16/82	1	1		77	N	
1	10/16/82	2	1		78	Y	
1	10/16/82	3	1		76	N	
1	10/16/82	4	1		77	N	
1	10/16/82	5	1		77	N	
1	10/16/82	6	1		77	N	
1	10/16/82	7	1		77	N	
1	10/16/82	8	1		77	N	
1	10/16/82	9	1		78	N	
1	10/16/82	10	1		76	N	
1	1/3/83	1	1			N	
1	4/3/83	1	1			N	

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WHA-50-WM-ER-518

TANK 241-BX-103							
THERMOCOUPLE DATA							
TREE #	DATE	THERMO #	TREE SET #	TEMP C	TEMP F	Y = MAX TEMP	COMMENTS
1	10/13/83	1	1			N	
1	11/1/83	1	1			N	NO DATA SHEETS IN OFFICE FOR 103-BX 10/83 THRU 11/81
1	11/12/91	1	1			N	
1	1/2/92	1	1			N	
1	7/2/92	1	1			N	
1	1/1/93	1	1			N	
1	7/24/93	1	1			N	NO THERMOCOUPLE READINGS O/S
1	7/31/93	1	1			N	TC#1-14 O/S

Data obtained from WHC Surveillance Analysis Computer System (SACS), November 12, 1993.

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LIQUID SURFACE LEVEL DATA

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Surface Level Data					
FIC					
Year	Month	Day	Hour	Minutes	Surface Level
91	1	1	7	3	19.8
91	1	2	7	2	19.8
91	1	3	7	3	19.8
91	1	4	7	2	19.8
91	1	5	7	2	19.8
91	1	6	7	2	19.8
91	1	7	7	2	19.8
91	1	8	7	3	19.8
91	1	9	7	2	19.8
91	1	10	7	2	19.8
91	1	11	7	3	19.8
91	1	12	6	2	19.8
91	1	13	7	3	19.8
91	1	14	7	4	19.8
91	1	15	7	3	19.8
91	1	16	7	4	19.8
91	1	17	7	4	19.8
91	1	18	7	4	19.8
91	1	22	7	4	19.8
91	1	23	7	4	19.8
91	1	24	7	4	19.8
91	1	25	7	3	19.8
91	1	26	7	3	19.8
91	1	27	7	3	19.8
91	1	28	7	10	19.8
91	1	29	7	2	19.8
91	1	30	7	10	19.8
91	1	31	7	2	19.8
91	2	1	7	2	19.8
91	2	2	7	4	19.8
91	2	3	7	3	19.8
91	2	4	7	3	19.8
91	2	5	7	4	19.8
91	2	6	7	4	19.8
91	2	7	7	4	19.8
91	2	8	7	4	19.8
91	2	9	7	4	19.8
91	2	10	7	3	19.8
91	2	11	7	4	19.8
91	2	12	7	4	19.8
91	2	13	7	4	19.8
91	2	14	7	4	19.8
91	2	15	7	3	19.8
91	2	16	7	2	19.8
91	2	17	7	2	19.8
91	2	18	7	3	19.7

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

Year	Month	Day	Hour	Minutes	Surface Level
91	2	19	7	2	19.8
91	2	20	7	3	19.8
91	2	21	7	2	19.8
91	2	22	7	2	19.8
91	2	23	7	2	19.8
91	2	24	7	3	19.8
91	2	25	7	3	19.7
91	2	26	7	3	19.7
91	2	27	7	2	19.8
91	2	28	7	2	19.8
91	3	1	7	2	19.8
91	3	2	7	2	19.7
91	3	3	7	3	19.8
91	3	4	7	3	19.7
91	3	5	7	3	19.7
91	3	5	7	2	19.7
91	3	7	7	2	19.7
91	3	8	7	2	19.7
91	3	9	7	2	19.7
91	3	10	7	2	19.8
91	3	11	7	2	19.7
91	3	12	7	3	19.8
91	3	13	7	3	19.8
91	3	14	7	3	19.7
91	3	15	7	3	19.7
91	3	16	7	3	19.8
91	3	17	7	2	19.8
91	3	18	7	3	19.8
91	3	19	7	3	19.8
91	3	20	7	2	19.8
91	3	21	7	3	19.8
91	3	22	7	2	19.7
91	3	23	7	3	19.7
91	3	24	7	3	19.8
91	3	25	7	3	19.7
91	3	26	7	3	19.8
91	3	27	7	3	19.8
91	3	28	7	3	19.8
91	3	29	7	3	19.8
91	3	30	7	3	19.8
91	3	31	7	3	19.8
91	4	1	7	3	19.8
91	4	2	7	3	19.8
91	4	3	7	3	19.8
91	4	4	7	3	19.8
91	4	5	7	3	19.8
91	4	6	7	3	19.7
91	4	7	7	3	19.8

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

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Year	Month	Day	Hour	Minutes	Surface Level
91	4	8	7	4	19.8
91	4	9	7	3	19.8
91	4	10	7	3	19.7
91	4	11	7	3	19.8
91	4	12	7	3	19.8
91	4	13	7	4	19.8
91	4	14	7	3	19.8
91	4	15	7	3	19.8
91	4	16	7	10	19.8
91	4	17	7	3	19.8
91	4	18	7	6	19.7
91	4	19	7	5	19.7
91	4	20	7	6	19.8
91	4	21	7	5	19.8
91	4	22	7	6	19.8
91	4	23	7	6	19.8
91	4	24	6	6	19.8
91	4	25	7	5	19.8
91	4	26	7	5	19.8
91	4	27	7	5	19.7
91	4	28	7	6	19.7
91	4	29	7	5	19.8
91	4	30	7	6	19.8
91	5	1	7	5	19.8
91	5	2	7	5	19.8
91	5	3	7	6	19.8
91	5	4	7	5	19.7
91	5	5	7	5	19.8
91	5	6	7	5	19.7
91	5	7	7	5	19.8
91	5	8	7	5	19.8
91	5	9	7	5	19.8
91	5	10	7	5	19.8
91	5	11	7	5	19.8
91	5	12	7	5	19.7
91	5	13	7	5	19.8
91	5	14	7	5	19.8
91	5	15	6	5	19.8
91	5	16	7	6	19.8
91	5	17	7	6	19.8
91	5	18	7	6	19.7
91	5	19	7	5	19.8
91	5	20	6	6	19.8
91	5	21	7	6	19.7
91	5	22	7	5	19.8
91	5	23	7	5	19.8
91	5	24	7	5	19.7
91	5	25	7	5	19.8

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

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Year	Month	Day	Hour	Minutes	Surface Level
91	5	26	7	5	19.8
91	5	27	7	5	19.8
91	5	28	6	5	19.8
91	5	29	7	5	19.8
91	5	30	7	5	19.8
91	5	31	7	5	19.8
91	6	1	7	5	19.7
91	6	2	7	5	19.7
91	6	3	7	5	19.8
91	6	4	7	5	19.8
91	6	5	7	5	19.8
91	6	6	7	6	19.8
91	6	11	7	5	19.7
91	6	12	7	4	19.7
91	6	13	7	5	19.8
91	6	14	7	5	19.8
91	6	15	7	5	19.7
91	6	16	7	5	19.8
91	6	17	7	5	19.8
91	6	18	7	5	19.8
91	6	19	7	5	19.8
91	6	20	7	5	19.8
91	6	21	7	6	19.8
91	6	22	7	5	19.8
91	6	23	7	5	19.8
91	6	24	7	5	19.8
91	6	25	7	6	19.8
91	6	26	7	3	19.8
91	6	27	7	2	19.8
91	6	28	7	3	19.8
91	6	29	7	2	19.8
91	7	1	10	6	19.8
91	7	8	10	6	19.8
91	7	23	10	6	19.8
91	7	29	10	6	19.8
91	8	5	10	2	19.8
91	9	23	10	3	19.8
91	9	30	10	3	19.8
91	10	1	10	2	19.8
91	10	14	10	2	19.8
91	10	31	6	2	19.9
91	11	1	7	2	19.9
91	11	2	7	3	19.9
91	11	3	7	3	19.9
91	11	4	7	2	19.9
91	11	5	7	3	19.9
91	11	6	7	3	19.9
91	11	7	7	2	19.9

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

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Year	Month	Day	Hour	Minutes	Surface Level
91	11	8	7	3	19.9
91	11	9	7	2	19.9
91	11	10	7	3	19.9
91	11	11	7	10	19.9
91	11	12	7	3	19.9
91	11	13	7	3	19.9
91	11	14	7	3	19.9
91	11	15	7	3	19.9
91	11	16	7	3	19.9
91	11	17	7	2	19.8
91	11	18	7	3	19.9
91	11	19	7	3	19.9
91	11	20	7	3	19.9
91	11	21	7	2	19.9
91	11	23	7	2	19.9
91	11	24	7	3	19.9
91	11	25	7	3	19.3
91	11	27	7	3	19.9
91	11	28	7	3	19.9
91	11	29	7	3	19.9
91	11	30	7	3	19.9
91	12	2	7	3	19.9
91	12	3	7	3	19.9
91	12	4	7	3	19.9
91	12	5	7	3	19.9
91	12	6	6	3	19.9
91	12	7	7	3	19.8
91	12	8	7	3	19.9
91	12	9	7	3	19.9
91	12	10	7	3	19.9
91	12	11	7	2	19.9
91	12	12	7	3	19.9
91	12	13	7	5	19.9
91	12	14	7	2	19.9
91	12	15	7	2	19.9
91	12	16	7	3	19.9
91	12	18	7	3	19.9
91	12	21	7	3	19.9
91	12	22	7	5	19.9
91	12	23	7	6	19.9
91	12	24	7	3	19.9
91	12	25	7	3	19.9
91	12	26	7	3	19.9
91	12	27	7	3	19.9
91	12	28	7	2	19.9
91	12	29	7	3	19.9
91	12	30	7	3	19.9
91	12	31	7	3	19.9

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

Year	Month	Day	Hour	Minutes	Surface Level
92	1	1	7	3	19.9
92	1	2	7	2	19.9
92	1	3	7	4	19.9
92	1	4	7	3	19.9
92	1	5	7	3	19.9
92	1	6	7	3	19.9
92	1	7	7	4	19.9
92	1	8	7	3	19.9
92	1	9	7	3	19.9
92	1	10	7	4	19.9
92	1	11	7	4	19.9
92	1	15	7	3	19.9
92	1	16	7	4	19.9
92	1	17	7	4	19.9
92	1	18	7	4	19.9
92	1	19	7	3	19.9
92	1	20	7	3	19.9
92	1	21	7	3	19.9
92	1	22	7	6	19.9
92	1	23	7	3	19.9
92	1	24	7	2	19.9
92	1	25	7	3	19.9
92	1	26	7	10	19.9
92	1	27	7	2	19.9
92	1	28	7	3	19.9
92	1	29	7	3	19.9
92	1	30	5	3	19.9
92	1	31	7	3	19.9
92	2	1	7	2	19.9
92	2	2	7	3	19.9
92	2	3	7	3	19.9
92	2	4	7	3	19.9
92	2	5	7	2	19.9
92	2	8	7	4	19.9
92	2	9	7	3	19.9
92	2	10	7	4	19.9
92	2	11	7	3	19.9
92	2	12	7	3	19.9
92	2	13	7	3	19.9
92	2	14	7	3	19.9
92	2	15	7	3	19.9
92	2	16	7	3	19.9
92	2	17	7	3	19.9
92	2	18	6	2	19.9
92	2	19	7	3	19.9
92	2	20	7	3	19.8
92	2	21	7	3	19.8
92	2	22	7	3	19.9

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

Year	Month	Day	Hour	Minutes	Surface Level
92	2	23	7	3	19.9
92	2	24	7	3	19.8
92	2	25	7	4	19.9
92	2	26	7	3	19.8
92	2	27	7	4	19.8
92	2	28	7	4	19.9
92	2	29	7	3	19.8
92	3	1	7	3	19.8
92	3	2	7	3	19.9
92	3	3	7	4	19.9
92	3	4	7	4	19.9
92	3	5	7	3	19.9
92	3	6	7	3	19.9
92	3	7	7	2	19.9
92	3	8	7	2	19.9
92	3	9	7	2	19.9
92	3	10	7	3	19.8
92	3	11	7	3	19.9
92	3	12	7	3	19.9
92	3	13	7	3	19.9
92	3	14	7	3	19.9
92	3	15	7	6	19.8
92	3	16	7	3	19.9
92	3	17	7	3	19.9
92	3	18	7	3	19.9
92	3	19	7	3	19.9
92	3	20	7	2	19.9
92	3	21	7	3	19.8
92	3	22	7	2	19.9
92	3	23	7	2	19.8
92	3	24	7	2	19.9
92	3	25	7	3	19.9
92	3	26	7	3	19.9
92	3	27	7	2	19.8
92	3	28	7	3	19.8
92	3	29	7	3	19.8
92	3	30	7	3	19.9
92	3	31	7	3	19.9
92	4	1	7	3	19.8
92	4	2	7	3	19.9
92	4	3	7	3	19.8
92	4	4	7	3	19.8
92	4	5	7	3	19.9
92	4	6	7	3	19.8
92	4	7	7	3	19.9
92	4	8	7	10	19.9
92	4	9	7	3	19.9
92	4	10	7	3	19.9

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

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Year	Month	Day	Hour	Minutes	Surface Level
92	4	11	7	3	19.8
92	4	12	7	4	19.9
92	4	13	7	3	19.9
92	4	14	7	3	19.9
92	4	15	7	2	19.9
92	4	16	7	3	19.8
92	4	17	7	3	19.8
92	4	18	7	2	19.9
92	4	19	7	2	19.9
92	4	20	7	3	19.8
92	4	21	7	3	19.9
92	4	22	7	2	19.8
92	4	23	7	3	19.9
92	4	24	7	3	19.8
92	4	25	7	4	19.8
92	4	26	7	3	19.8
92	4	27	7	4	19.8
92	4	28	7	3	19.8
92	4	29	7	3	19.9
92	4	30	7	3	19.9
92	5	1	7	3	19.9
92	5	2	7	3	19.8
92	5	3	7	3	19.8
92	5	4	7	3	19.8
92	5	5	7	4	19.8
92	5	6	7	3	19.8
92	5	7	7	4	19.8
92	5	8	7	3	19.8
92	5	9	7	4	19.9
92	5	10	7	4	19.8
92	5	11	6	3	19.9
92	5	12	7	3	19.9
92	5	13	7	3	19.8
92	5	14	7	3	19.9
92	5	15	7	3	19.8
92	5	16	7	3	19.8
92	5	17	7	2	19.8
92	5	18	7	3	19.8
92	5	19	7	3	19.9
92	5	20	7	3	19.9
92	5	21	7	3	19.9
92	5	22	7	2	19.8
92	5	23	7	3	19.8
92	5	24	7	3	19.8
92	5	25	7	3	19.8
92	5	27	6	3	19.8
92	5	28	7	2	19.8
92	5	29	7	2	19.8

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

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Year	Month	Day	Hour	Minutes	Surface Level
92	5	30	7	3	19.8
92	5	31	7	3	19.8
92	6	1	7	3	19.8
92	6	2	7	3	19.8
92	6	3	7	3	19.8
92	6	4	7	3	19.8
92	6	5	7	2	19.8
92	6	6	7	3	19.8
92	6	7	7	3	19.8
92	6	8	7	3	19.8
92	6	9	7	3	19.8
92	6	10	7	3	19.8
92	6	11	7	3	19.8
92	6	12	7	5	19.9
92	6	13	7	5	19.9
92	6	15	7	3	19.9
92	6	16	7	3	19.8
92	6	17	7	3	19.8
92	6	18	7	3	19.8
92	6	19	7	2	19.8
92	6	20	7	2	19.8
92	6	21	7	3	19.8
92	6	22	7	3	19.8
92	6	23	7	3	19.8
92	6	24	7	3	19.8
92	6	25	7	3	19.8
92	6	26	7	2	19.8
92	6	27	7	3	19.8
92	6	28	7	6	19.8
92	6	29	7	6	19.8
92	6	30	7	6	19.9
92	7	4	7	5	20
92	7	5	7	6	20
92	7	6	7	6	19.9
92	7	7	7	6	19.9
92	7	8	7	6	19.9
92	7	9	7	6	19.9
92	7	10	7	6	19.9
92	7	11	7	6	19.9
92	7	12	7	6	19.9
92	7	13	7	6	19.9
92	7	14	7	6	19.9
92	7	15	7	6	19.9
92	7	16	7	6	19.9
92	7	17	7	6	19.9
92	7	18	7	6	19.9
92	7	19	7	6	19.9
92	7	20	6	6	19.9

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

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Year	Month	Day	Hour	Minutes	Surface Level
92	7	25	4	6	19.9
92	8	3	10	2	19.8
92	9	11	10	3	20
92	9	14	10	3	20
92	9	17	7	6	20
92	9	18	7	6	20
92	9	21	7	6	20
92	9	22	7	3	20
92	9	23	7	3	20
92	9	24	7	3	20
92	9	25	7	3	20
92	9	26	7	2	20
92	9	27	7	2	20
92	9	28	7	2	20
92	9	29	7	3	20
92	9	30	7	2	20
92	10	1	7	3	20
92	10	2	7	2	20
92	10	3	7	3	20
92	10	4	7	3	20
92	10	5	7	3	20
92	10	6	7	3	20
92	10	8	7	2	20
92	10	9	7	3	20
92	10	10	7	3	20
92	10	11	7	3	20
92	10	14	7	3	20
92	10	15	7	4	20
92	10	16	7	3	20
92	10	17	7	3	20
92	10	18	7	3	20
92	10	19	7	3	20
92	10	20	7	3	20
92	10	21	7	3	20
92	10	24	7	3	20
92	10	25	7	3	20
92	10	27	7	4	20
92	10	28	7	3	20
92	10	29	7	3	20
92	10	30	7	3	20
92	10	31	7	3	20
92	11	1	7	3	20
92	11	2	7	3	20
92	11	3	7	3	20
92	11	4	7	3	20
92	11	10	7	3	20
92	11	11	7	4	20
92	11	12	7	3	20

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

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Year	Month	Day	Hour	Minutes	Surface Level
92	11	13	7	4	20
92	11	14	7	4	20
92	11	15	7	4	20
92	11	16	7	4	20
92	11	17	7	4	20
92	11	18	7	2	20
92	11	19	7	2	20
92	11	20	7	3	20
92	11	21	7	2	20
92	11	22	7	3	20
92	11	23	7	3	20
92	11	24	7	3	20
92	11	25	7	3	20
92	11	26	7	3	20
92	11	27	7	3	20
92	11	28	7	3	20
92	11	29	7	3	20
92	12	1	7	3	20
92	12	2	7	3	20
92	12	3	7	3	20
92	12	4	7	3	20
92	12	6	7	2	20
92	12	7	7	3	20
92	12	8	7	3	20
92	12	9	7	3	20
92	12	10	7	3	20
92	12	11	7	3	20
92	12	13	7	4	20
92	12	14	7	3	20
92	12	15	7	3	20
92	12	16	7	4	20
92	12	17	7	3	20
92	12	18	7	3	20
92	12	19	7	3	20
92	12	20	7	4	20
92	12	21	7	4	20
92	12	23	7	4	20
92	12	24	7	3	20
92	12	25	7	3	20
92	12	26	7	3	20
92	12	27	7	3	20
92	12	28	7	3	20
93	1	4	10	4	20
93	1	18	10	4	20.25
93	1	20	10	4	20.3
93	1	25	10	4	20.25
93	2	1	10	4	20.3
93	2	8	10	4	20.4

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

Year	Month	Day	Hour	Minutes	Surface Level
93	2	22	10	4	20.3
93	3	1	10	4	20.3
93	3	15	10	4	20.3
93	3	19	10	4	20.4
93	3	22	10	4	20.4
93	3	29	10	4	20.4
93	5	19	7	3	20.4
93	5	20	7	3	20.4
93	5	22	7	3	20.4
93	5	23	7	4	20.4
93	5	24	7	3	20.4
93	5	25	7	3	20.4
93	5	26	7	3	20.4
93	5	27	7	3	20.4
93	5	28	7	3	20.4
93	5	29	7	5	20.4
93	5	30	7	5	20.4
93	5	31	7	6	20.4
93	6	1	7	6	20.4
93	6	2	7	6	20.4
93	6	3	7	6	20.4
93	6	4	7	6	20.4
93	6	5	7	6	20.4
93	6	6	7	5	20.4
93	6	7	7	5	20.4
93	6	8	7	5	20.4
93	6	9	7	5	20.4
93	6	10	7	4	20.4
93	6	11	7	5	20.4
93	6	12	7	5	20.4
93	6	13	7	4	20.4
93	6	14	7	5	20.4
93	6	15	7	5	20.4
93	6	16	7	5	20.4
93	6	17	7	5	20.4
93	6	18	7	6	20.4
93	6	25	7	3	20.4
93	6	26	7	3	20.4
93	6	27	7	4	20.4
93	6	28	7	3	20.4
93	6	29	7	4	20.4
93	6	30	7	3	20.4
93	7	1	7	6	20.4
93	7	2	7	6	20.4
93	7	3	7	3	20.4
93	7	4	7	4	20.4
93	7	5	7	3	20.4
93	7	6	7	3	20.4

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

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Year	Month	Day	Hour	Minutes	Surface Level
93	7	7	7	4	20.4
93	7	8	7	4	20.4
93	7	9	7	5	20.4
93	7	10	7	3	20.4
93	7	11	7	3	20.4
93	7	12	7	2	20.4
93	7	13	7	3	20.4
93	7	14	7	6	20.4
93	7	15	7	6	20.4
93	7	16	7	6	20.4
93	7	17	7	7	20.4
93	7	18	7	6	20.4
93	7	19	7	3	20.4
93	7	20	7	3	20.4
93	7	21	7	3	20.4
93	7	22	7	3	20.4
93	7	23	7	3	20.4
93	7	24	7	3	20.4
93	7	26	7	3	20.4
93	7	27	7	3	20.4
93	7	28	7	4	20.4
93	7	29	7	3	20.4
93	7	30	7	3	20.4
93	7	31	7	3	20.4
93	8	1	7	3	20.4
93	8	2	7	6	20.4
93	8	3	7	3	20.4
93	8	4	7	3	20.4
93	8	5	7	4	20.4
93	8	7	7	4	20.4
93	8	8	6	4	20.4
93	8	9	7	4	20.4
93	8	10	7	4	20.4
93	8	11	7	4	20.4
93	8	12	7	4	20.4
93	8	13	7	4	20.4
93	8	14	7	3	20.4
93	8	15	7	4	20.4
93	8	16	7	4	20.4
93	8	17	7	4	20.4
93	8	18	7	3	20.4
93	8	19	7	4	20.4
93	8	20	7	4	20.4
93	8	21	7	4	20.4
93	8	22	7	4	20.5
93	8	23	6	3	20.4
93	8	24	7	4	20.5
93	8	25	7	4	20.5

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

Year	Month	Day	Hour	Minutes	Surface Level
93	8	26	7	4	20.5
93	8	27	7	5	20.4
93	8	28	7	4	20.5
93	8	29	7	3	20.4
93	8	30	7	4	20.5
93	8	31	7	4	20.5
93	9	1	7	4	20.5
93	9	30	7	3	20.5
93	10	1	7	6	20.5
93	10	2	7	5	20.5
93	10	3	7	6	20.5
93	10	4	7	6	20.5
93	10	5	7	6	20.5
93	10	6	7	6	20.5
93	10	7	7	5	20.5
93	10	8	7	4	20.5
93	10	9	7	3	20.5
93	10	10	7	10	20.5
93	10	11	7	3	20.5
93	10	12	7	4	20.5
93	10	13	7	3	20.5
93	10	14	7	4	20.5
93	10	15	7	4	20.5
93	10	16	7	4	20.5
93	10	17	7	3	20.5
93	10	18	7	4	20.5
93	10	19	7	4	20.5
93	10	20	7	3	20.5
93	10	21	7	4	20.5
93	10	22	7	4	20.5
93	10	23	7	4	20.5
93	10	24	7	4	20.5
93	10	26	7	10	20.5
93	10	27	7	4	20.5
93	10	28	7	4	20.5
93	10	29	7	10	20.5
93	10	30	7	4	20.5
93	10	31	7	6	20.5
93	11	1	7	6	20.5
93	11	3	7	6	20.5
93	11	5	7	6	20.5
93	11	6	7	6	20.5
93	11	7	7	6	20.5
93	11	8	7	6	20.5
93	11	9	7	3	20.5
93	11	10	7	4	20.5
93	11	11	7	4	20.5
93	11	12	7	4	20.5

Data obtained from WHC Surveillance Computer System Analysis (SACS), November 16, 1993.

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APPENDIX D
RISER INFORMATION

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WTC-50-10M-ER-518

241-BX-103

DESCRIPTION AND COMMENTS		
NO.	DIA.	
1	4"	TEMPERATURE PROBE
2	12"	FLANGE/BREATHING FILTER, G1 HOUSING
3	12"	(SLUICING NOZZLE) WC
4	4"	(RECIRCULATING DIP TUBE) WC
5	4"	(RECIRCULATING DIP TUBE) WC
6	12"	(SLUICING NOZZLE) WC
7	12"	FLANGE/B-222 OBSV PORT
8	4"	FIC, EM
13	42"	(HEEL SET)
14	42"	MANHOLE WC

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241-BX-103 WHC-SD-WM-10-218
Rev 00

2,008,700 Liters
[530,000 Gallons]

TANK RISER LOCATION

Approximate Grade Elevation 199.3m [653.9ft]

Ref: H-2-602, Rev. 8
Merrick Maps of
200 Area's 89210406

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APPENDIX E
WASTE SAMPLE ANALYSIS

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Waste Tank BX-103		
Analysis of Tank Farm Samples		
November 25, 1974		
Sample: T-8630		
COMPONENT	LAB VALUE	LAB UNIT
Physical Data		
Vis-OTR: Yellow, No solids, .15 Rad/hr		
PH:	12.9	
SpG:	1.063	
H2O	93.28	%
Chemical Analysis		
OH	0.353	M
Al	2.61×10^{-2}	M
Na	1.44	M
NO ₂	0.292	M
NO ₃	0.274	M
SO ₄	Cancelled by R.L. Walser	
PO ₄	4.01×10^{-2}	M
CO ₃	0.204	M
F	1.11×10^{-2}	M
Radiological Analysis		
Pu	2.53×10^{-5}	g/gal
89 + 90 Sr	1.57×10^2	uCi/gal
GEA: 106 RuRh	9.61×10^4	uCi/gal
GEA: 137 Cs	1.12×10^5	uCi/gal

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Waste Tank BX-103		
Analysis Of Tank Farm Samples		
March 27, 1975		
Received: March 17, 1975 Sample: T-2764		
COMPONENTS	LAB VALUE	LAB UNIT
Physical Data		
Vis-OTR: Brown, 1% solids 900 m/Rad/Hr		
pH	12.7	
H ₂ O	81.93	%
SpG	1.0373	
Chemical Analysis		
OH	0.359	M
Radiological Analysis		
GEA: Cs 134	7.70 E+03	uCi/gal
GEA: Cs 137	6.52 E+05	uCi/gal
GEA: Cs 125	9.24 E+03	uCi/gal

578

Waste Tank 103-BX		
ANALYSIS OF TANK FARM SAMPLES		
October 27, 1975		
Received: April 14, 1975		
Sample: T-3635		
COMPONENT	LAB VALUE	LAB UNITS
Physical Data		
Vis-OTR:	Light Brown-amber,	No solids, 800 mrad/hr
pH	12.0	
SpG	1.1383	
H2O	92.69	%
Chemical Analysis		
OH	0.264	M
Al	2.36E-02	M
Na	2.02	M
NO2	0.582	M
NO3	0.504	M
PO4	1.14E-02	M
F	7.02E-03	M
CO3	0.407	M
Pu	4.62E-04	g/gal
Radiological Analysis		
134 Cs	8.61E+02	uCi/gal
139 Cs	2.19E+05	uCi/gal
106 RuRh	1.62E+05	uCi/gal
154 Eu	1.01E+03	uCi/gal

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Waste Tank 103-BX		
ANALYSIS OF TANK FARM SAMPLES		
September 23, 1975		
Received: June 18, 1975		
Sample: T-5455		
COMPONENT	LAB VALUE	LAB UNITS
Physical Data		
Vis-OTR:	Brown, No solids, 600 mrad/hr	
pH	11.3	
SpG	1.124	
H2O	99.14	%
Chemical Analysis		
OH	0.788	M
Al	6.05E-03	M
NO2	0.908	M
NO3	0.433	M
CO3	0.620	M
Radiological Analysis		
89,90 Sr	6.01E+04	uCi/gal
GEA: 134 Cs	9.24E+02	uCi/gal
GEA: 137 Cs	1.79E+05	uCi/gal
GEA: 106 RuRh	2.21E+05	uCi/gal

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Waste Tank 103-BX		
ANALYSIS OF TANK FARM SAMPLES		
December 18, 1975		
Received: October 23, 1975		
Sample: T-9138		
COMPONENT	LAB VALUE	LAB UNITS
Physical Data		
Vis-OTR:	Yellow, No solids, 300 mrad/hr	
pH	10.6	
SpG	1.103	
H2O	86.18	%
Chemical Analysis		
OH	<4.74E-03	M
Al	2.51E-03	M
Na	1.99	M
NO2	0.433	M
NO3	0.339	M
PO4	1.09E-02	M
Cl	1.10E-02	M
F	3.84E-03	M
CO3	0.555	M
Pu	4.92E-04	g/gal
Radiological Analysis		
89,90 Sr	1.68E+04	uCi/gal
GEA: 134 Cs	8.46E+02	uCi/gal
GEA: 137 Cs	1.09E+05	uCi/gal
GEA: 106 RuRh	1.58E+05	uCi/gal