AUG 03 1998

ENGINEERING DATA TRANSMITTAL

1. EDT 610272

2. To: (Receiving Organization) Characterization Field Engineering	3. From: (Originating Organization) Process Control	4. Related EDT No.: NA
5. Proj./Prog./Dept./Div.: Tank Farms	6. Design Authority/ Design Agent/Cog. Engr.: K. D. Fowler	7. Purchase Order No.: NA
8. Originator Remarks: Transmittal of dispositions to Approved Checklist for Flammable Gas/Rotary Mode Core Sampling items.		9. Equip./Component No.: NA
		10. System/Bldg./Facility: 241-TX-113
11. Receiver Remarks:	11A. Design Baseline Document? [] Yes [X] No	12. Major Assm. Dwg. No.: NA
		13. Permit/Permit Application No.: NA
		14. Required Response Date: July 31, 1998

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	HNF-3094	NA	0	Rotary Mode Core Sampling Approved Checklist: 241-TX-113	NA	2	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 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN
		Design Authority	1	/	W. B. Barton W B Barton 7/31/98 R2-12
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1	/	Cog. Mgr. N. W. Kirch N W Kirch 8/3/98 R2-11			
		QA			
		Safety			
		Env.			

18.	19.	20.	21. DOE APPROVAL (if required)
K. D. Fowler [signature] 7/31/98 Signature of EDT Originator / Date	J. S. Schofield [signature] 7/31/98 Authorized Representative for Receiving Organization / Date	N. W. Kirch [signature] 8/3/98 Design Authority/ Cognizant Manager / Date	Ctrl. No. [] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (05/96) GEF097

S

Rotary Mode Core Sampling Approved Checklist: 241-TX-113

K. D. Fowler
Lockheed Martin Hanford Corp., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

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Key Words: flammable gas, single-shell tank, characterization, core sample, checklist

Abstract: The safety assessment for rotary mode core sampling was developed using certain bounding assumptions, however, those assumptions were not verified for each of the existing or potential flammable gas tanks. Therefore, a Flammable Gas/Rotary Mode Core Sampling Approved Checklist has been completed for tank 241-TX-113 prior to sampling operations. This transmittal documents the dispositions of the checklist items from the safety assessment.

DATE: HANFORD RELEASE
STA: 4 ID: 2
AUG 03 1998

Kara [signature] 8/3/98
Release Approval Date
Release Stamp

Approved for Public Release

CONTENTS

Author [signature] Date 7/31/98 Checked by LA Stauffer Date 7/31/98

1.0 PURPOSE

This report provides the dispositions of each issue contained in the Flammable Gas (FG)/Rotary Mode Core Sampling (RMCS) Approved Checklist for single-shell tank (SST) 241-TX-113.

2.0 INTRODUCTION

The safety assessment for RMCS (DE&SH 1997a) assessed safety aspects of the installation, operation, and removal of RMCS equipment in SSTs on the Flammable Gas Watch List, hereafter referred to as FG/RMCS operations. The safety assessment was developed using certain bounding assumptions, however, these assumptions have not been verified for each tank. Therefore, each issue included on the FG/RMCS Approved Checklist has been evaluated for tank 241-TX-113 prior to RMCS operations and the assumptions have been verified to be bounding.

This report was completed using the best available tank data as of July 20, 1998 from the Tank Characterization and Safety Resource Center (TCSRC), the Surveillance Analysis Computer System database (SACS), and the Tank Characterization Database (TCD) via the Tank Waste Information Network System II interface (TWINS2).

3.0 RMCS APPROVED CHECKLIST ITEMS

3.1 Tank Specific Hazards/Other Watch Lists

Issue: DE&SH 1997a does not address ferrocyanide issues even though some of the flammable gas tanks may also be on the Ferrocyanide Watch List. This checklist item is especially important for tanks that are on multiple Watch Lists (in addition to Flammable Gas Watch List).

Does the tank being considered for RMCS operations have a specific hazard or accident initiator that is not analyzed in Sections 3 and 4 of DE&SH 1997a?

Yes________ **No** __X__

If yes, the analyses in Sections 3 and 4 of DE&SH 1997a must be supplemented to cover the tank specific conditions.

Basis: Multiple hazards were analyzed in the RMCS Safety Assessment (DE&SH 1997a). No specific hazard or accident initiator that is not analyzed in DE&SH 1997a has been identified for this tank.

The ferrocyanide unreviewed safety question (USQ) has been closed. All open USQs regarding tank waste 1) have been addressed in the Authorization Basis documents applicable to tank 241-TX-113, 2) have been addressed in this check list, or 3) are not applicable. USQ Screen TF-97-0809 evaluates RMCS against applicable ignition controls.

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Tank 241-TX-113 has not been identified as a Watch List tank. However, controls on drill bit overheating are in place to minimize the potential for an exothermic waste reaction (DE&SH 1997a, Section 6, "Controls").

To prevent organic solvent fires which might be initiated by RMCS operations, an Ignition Control Program is required by the BIO (Leach 1997, Section 5.3.2.15). Ignition Control Program key elements are specified as sets of controls in FDH 1998. These key elements comprise intrusive controls, vehicle controls, flammable gas ignition source controls (set #1 and set #2), deviations from flammable gas ignition controls, compensatory ignition controls.

To assure Authorization Basis compliance during RMCS operations, applicable controls have been incorporated into the following procedures.

1) TO-020-451, Rev. D-10, "Setup and Takedown of Core Sample Systems," dated July 1, 1998.

2) TO-080-518, Rev. C-14, "Core Sampling with Trucks 3 and 4 (Rotary Bit)," dated June 24, 1998.

According to Table 5.3.2.15-6 in the BIO, solvent ignition controls are required for tank 241-TX-113 because it had not been vapor space sampled at the time Section 5.3.2.15 of the BIO was written. Tank 241-TX-113 was vapor sampled on August 6, 1997. Analysis detected 0.74 mg/m^3 of total non methane hydrocarbon. Using these results and calculations Table 5.3.2.15-6 are based on, solvent ignition controls would not be required for tank 241-TX-113 (Appendix B).

3.2 Flammable Gas Composition

Issue: Controls for this issue have been incorporated in the Basis for Interim Operation (BIO) (Leach 1997).

Is there new information that reveals there are other flammable gas species and/or the assumed value of the lower flammability limit LFL is not conservative.

Yes________ **No** X

If yes, the analysis must be revised to incorporate the new data.

Basis: Tank vapor sampling/monitoring on August 6, 1997 did not identify any significant concentration of flammable gases present. The data reported in the TCD show the maximum detected concentration of NH_3 = 24 ppmv. H_2, N_2O, and CH_4 were not detected and were reported as < 50 ppmv. Calculations using these maximum reported values show that the LFL of the H_2, CH_4, N_2O and NH_3 mixture is 2.1% as H_2 (Appendix A).

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There is no new information for tank 241-TX-113 that reveals that there are flammable gas species present which have not been considered in the BIO analysis or that the flammable gas composition assumed for the tank is not conservative.

3.3 Toxic Gas Composition

Issue: For toxic effects, the gas composition in a given gas release event (GRE) is assumed to be 60% ammonia or 75% nitrous oxide.

Has any evidence been discovered to indicate that the above values (especially the ammonia fraction) may be exceeded in the tank as a result of a new analysis or data, or that they are not conservative?

Yes________ **No** X

If yes, the consequence analysis in DE&SH 1997a must be re-evaluated. This can be achieved by simply scaling the new data with the 60% fraction used in the consequence analysis. The consequence analysis is the linear function of gas composition; thus, simple multiplication would be used to consider different gas concentrations.

Basis: Review of tank 241-TX-113 vapor sample data, level/temperature data and fill history, indicate no reason to believe the tank should have any GRE ammonia or nitrous oxide concentrations outside of those previously observed.

The method to estimate the vapor fraction of ammonia in tank waste gas used in DE&SH 1997a relies on either the hydrogen or nitrous oxide values. Maximum reported results for tank 241-TX-113 are:

Component	Concentration	Sample Date
[H_2]	<50 ppmv	8/06/97
[NH_3]	24 ppmv	8/06/97
[CH_4]	<50 ppmv	8/06/97
[N_2O]	<50 ppmv	8/06/97

Using this data to estimate the tank waste gas composition by the method used in DE&SH 1997a, Appendix C, indicates that ammonia comprises approximately 13.8% of the tank gas and nitrous oxide comprises approximately 28.7% of the tank gas (Appendix A).

* * * * * * * * * * * *

Author [signature] Date 7/31/98 Checked by [signature] Date 7/31/98

Issue: Also, results from the vapor space sampling program were reviewed. Major toxic gases that were found in the dome space of the presently defined flammable gas tanks are ammonia and nitrous oxide. Other gases are found in trace quantities and do not pose a concern. However, it was recognized that the existing data are limited and all tanks of interest are not covered.

Thus, is there any new data that reveals that toxic gases in excess of the hazardous limits have been detected in the tank?

Yes______ **No** _X_

If yes, the consequence analysis must be re-evaluated. The re-evaluation may be done by simply scaling the toxic gas fraction and the guidelines against the ammonia fraction and the associated Risk Guidelines.

Basis: Tank vapor sample data from August 6, 1997 identified no toxic gases in excess of hazardous limits in tank 241-TX-113. CO_2 (450 ppm), H_2O (11,000 mg/m^3) were the major components identified. Sample data is available from the TCD via TWINS2.

3.4 Waste Temperature

Issue: Does the best available tank temperature data show that the peak waste temperature (considering uncertainties) is less than 90°C (194°F)?

Yes _X_ **No**______

If no, (peak waste temperature ≥ 90°C), the envelope testing results discussed in DE&SH 1997a, Appendix F must be re-evaluated.

Basis: Temperature data from the SACS database from January 1, 1996 through July 21, 1998 have been plotted in Figure 1. These data show that the tank waste has remained below 24°C (75°F).

3.5 Waste Energetics

Issue: DE&SH 1997a, Table G-3 of Appendix G lists the frequency of waste fire accidents for the 100-series SSTs. The analysis given in Appendix G is based on waste composition data through December 1995. New data taken after December 1995 or revisions to the old database may alter the results of the analysis given in Appendix G.

Therefore, in using new or revised data, (taken after December 1995), it first must be verified that the conclusions of the analysis in Appendix G are not changed.

Not changed _X_ **Changed**______

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Basis: The most recent waste data obtained for tank 241-TX-113 is from January 1974 from the analysis of a liquid sample. This sample contained 51.6% water. The data is available from TCD via TWINS2. This tank waste data does not provide evidence that the conclusions of the analysis in Appendix G of DE&SH 1997a are changed in any way.

Criteria for evaluating the possibility of a propagating exothermic reaction in DE&SH 1997b are based on waste total organic carbon (TOC) concentration and percent water. The criterion states that no propagation is possible if the waste TOC(wt%) < 4.5 + 0.17 x (wt% H_2O) or if the waste contains > 20% water. Even dry materials would require ≥ 4.5 wt% TOC for propagation. No TOC concentration data is available for tank 241-TX-113, however, the tank is listed in the "low TOC" grouping in TCD.

Additionally, according to The Organic Complexant Topical Report, Meacham, et. al, 1998, the calculated reactive waste fraction in tank 241-TX-113 is 1.6%. There is 95% confidence that 98.4% of the waste in tank 241-TX-118 contains < 4.5% TOC.

3.6 Likelihood of Gas Release Events

Issue: Controls for this issue have been incorporated in the BIO. The large RMCS induced GRE probability as discussed in the BIO is "not postulated." Do additional data or analyses exist for the tank to indicate that the GRE probabilities used in the BIO are not conservative?

Yes_______ **No** __X__

If yes, the GRE probabilities need to be re-evaluated.

Basis: The most recent tank waste data available in the TCSRC is from 1974. The most recent vapor sample data are from August 6, 1997 vapor samples (TWINS2). These data indicate that the GRE probabilities used in the BIO are conservative. Tank 241-TX-113 is a Facility Group 2 tank, which by definition, has been conservatively postulated to have the potential for small spontaneous and large induced GREs. Large GREs from SSTs are not postulated during locally disturbing activities such as RMCS (Wagoner 1997). However, large GREs induced by global waste disturbing activities have not been ruled out for this tank.

* * * * * * * * * * *

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Issue: In general, before the FG/RMCS operations start on the tank, the best available tank specific data for gas inventory and gas release evidence is evaluated.

Have one or more of the following conditions been observed for the tank?

- Periodic level drops and level swells in excess of ± 3 in.
- Level drop ≥ 3 in. during or after an intrusive event.
- Dome concentration measurements ≥ 25% of the LFL before, during or after a waste intrusive event.
- A well defined nonconvective layer (parabolic temperature profile) below a supernate or convective layer (flat temperature profile) that would be indicative of potential rollovers.
- Retained gas inventory estimates (via level swell, fill history, etc.) is greater than 20% of the available dome space volume.

Yes_______ **No** __X__

If yes, the GRE probability model given in DE&SH 1997a, Appendix L must be re-evaluated. If the re-evaluation indicates that the existing GRE model given in DE&SH 1997a, Appendix L is not conservative for the tank, a revision to DE&SH 1997a will be necessary.

Basis: Level data from July 1, 1988 through July 20, 1998 show no periodic level drops and level swells in excess of three inches indicative of GRE behavior for tank 241-TX-113 (Figures 2 and 3). Interstitial liquid level (ILL) data (Figure 4) show a slow increase which may be attributed to the migration of liquid through the waste to the saltwell after the tank was jet pumped for interim stabilization in 1983. New instrument data indicate that the ILL is stabilizing.

Additionally, the temperature profile for the tank is not indicative of potential rollovers (Figure 5). The Waste Tank Summary Report for Month Ending April 30, 1998 (Hanlon 1998) states that the tank contains no supernate.

Evaluation of the tank (Hodgson et al. 1996) indicates that the tank does not generate enough flammable gas to pose a steady state flammability hazard. The results from flammable gas monitoring performed August 6, 1997 indicated < 0.5% of the LFL. In addition, Stauffer 1997, indicates that the tank headspace will not reach 25% of the LFL.

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The calculated available tank dome space volume is 70,813 ft^3. This is obtained from the total tank volume minus the waste volume calculated from the July 12, 1998 surface level reading, 197.02 inches.

$$\text{waste volume(gal)} = [\text{waste level(in)} - 12\text{in}] * 2754\ \text{gal/in} + 12{,}500\ \text{gal}$$

$$= (197.02 - 12) * 2754 + 12{,}500$$

$$\approx 522{,}045\ \text{gal}\quad (69{,}787\ ft^3)$$

140,600 ft^3	-	69,787 ft^3	≈	70,813 ft^3
(tank volume	-	waste volume	=	available dome space)

20% of the headspace is 14,163 ft^3. DE&SH 1997a assumes "a conservative void of 20% in the waste," and considers bounding gas release calculations performed by Los Alamos National Laboratory (Nichols, et al., 1994). Using the 20% void value, the volume of retained gas would be 13,957 ft^3 (19.7% of the available tank dome space volume).

69,787 ft^3 * 0.20	=	13,957 ft^3
(waste volume) * 0.20	=	retained gas volume

The retained gas inventory estimate is less than 20% of the available dome space.

Figure 1. Temperature Data

Tank 241-TX-113

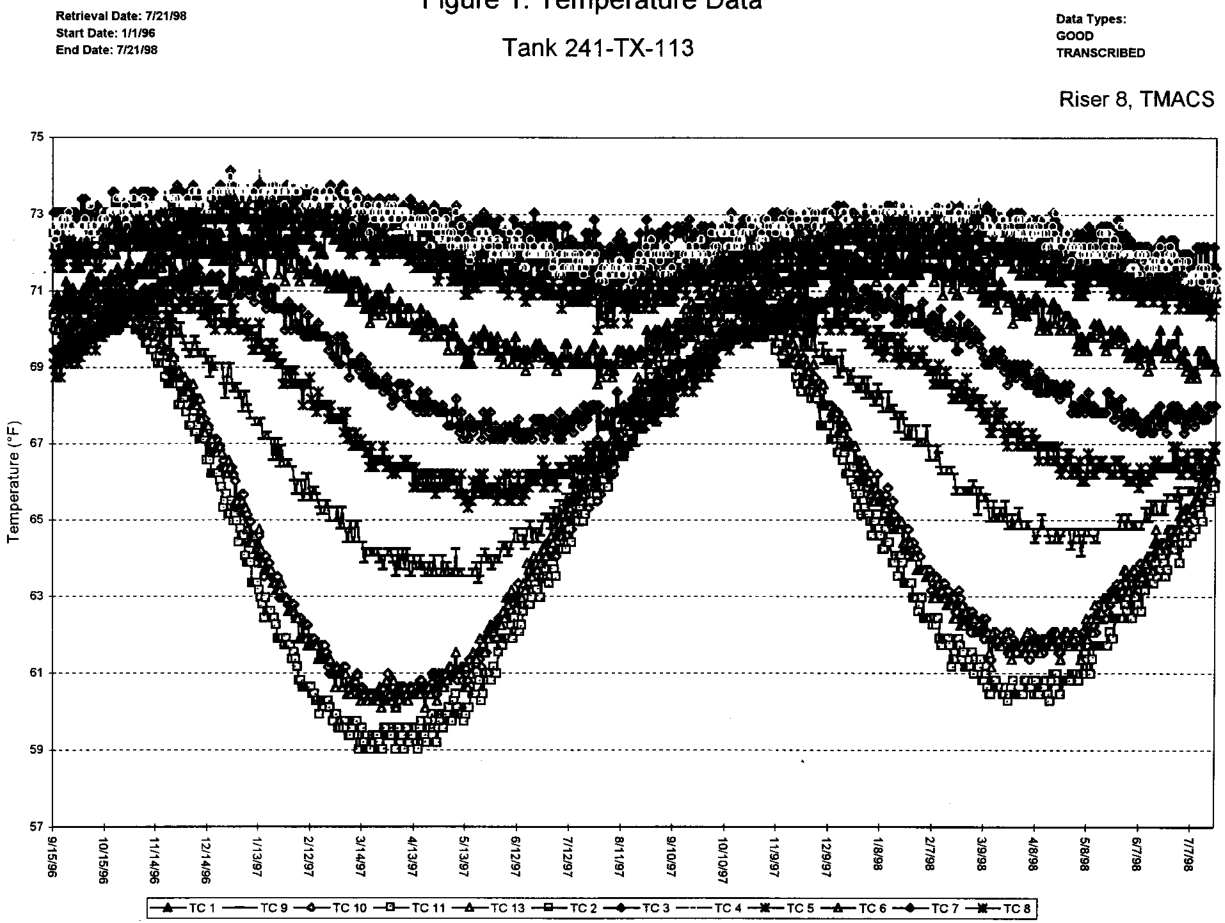
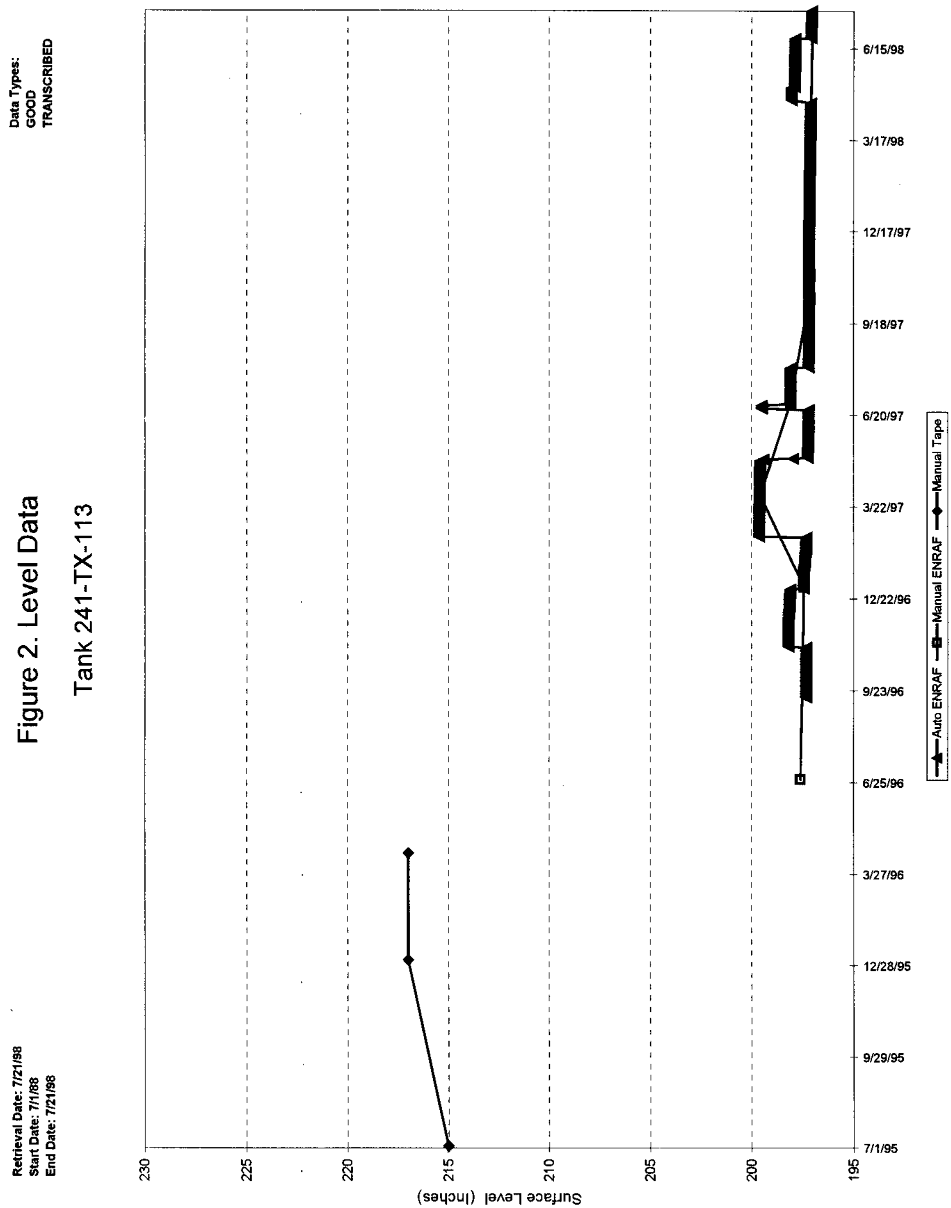


Figure 2. Level Data

Tank 241-TX-113



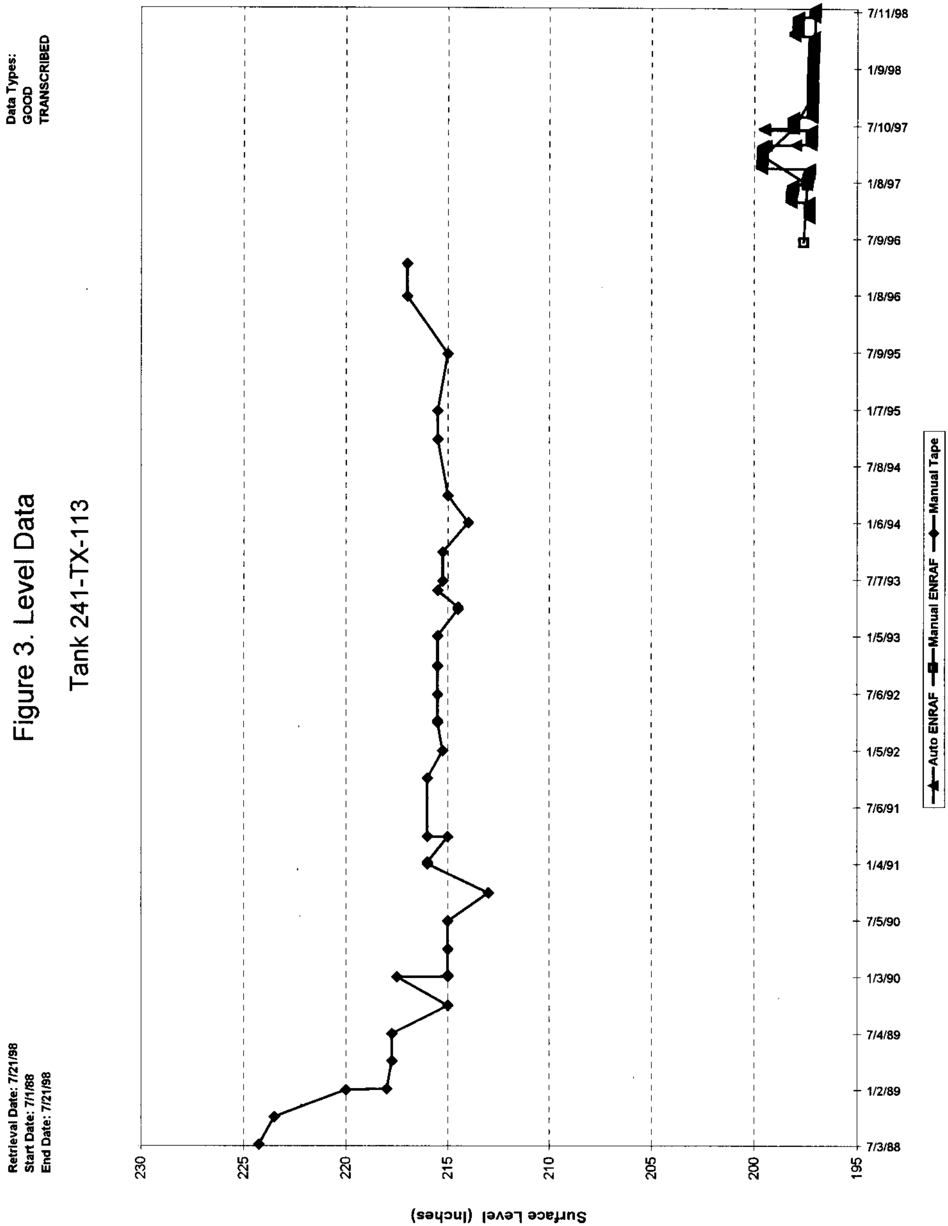


Figure 3. Level Data
Tank 241-TX-113
Data Types:
GOOD
TRANSCRIBED
Retrieval Date: 7/21/98
Start Date: 7/1/88
End Date: 7/21/98
Surface Level (Inches)
230
225
220
215
210
205
200
195
7/3/88
1/2/89
7/4/89
1/3/90
7/5/90
1/4/91
7/6/91
1/5/92
7/6/92
1/5/93
7/7/93
1/6/94
7/8/94
1/7/95
7/9/95
1/8/96
7/9/96
1/8/97
7/10/97
1/9/98
7/11/98
Auto ENRAF
Manual ENRAF
Manual Tape

Figure 4. ILL Data

Tank 241-TX-113

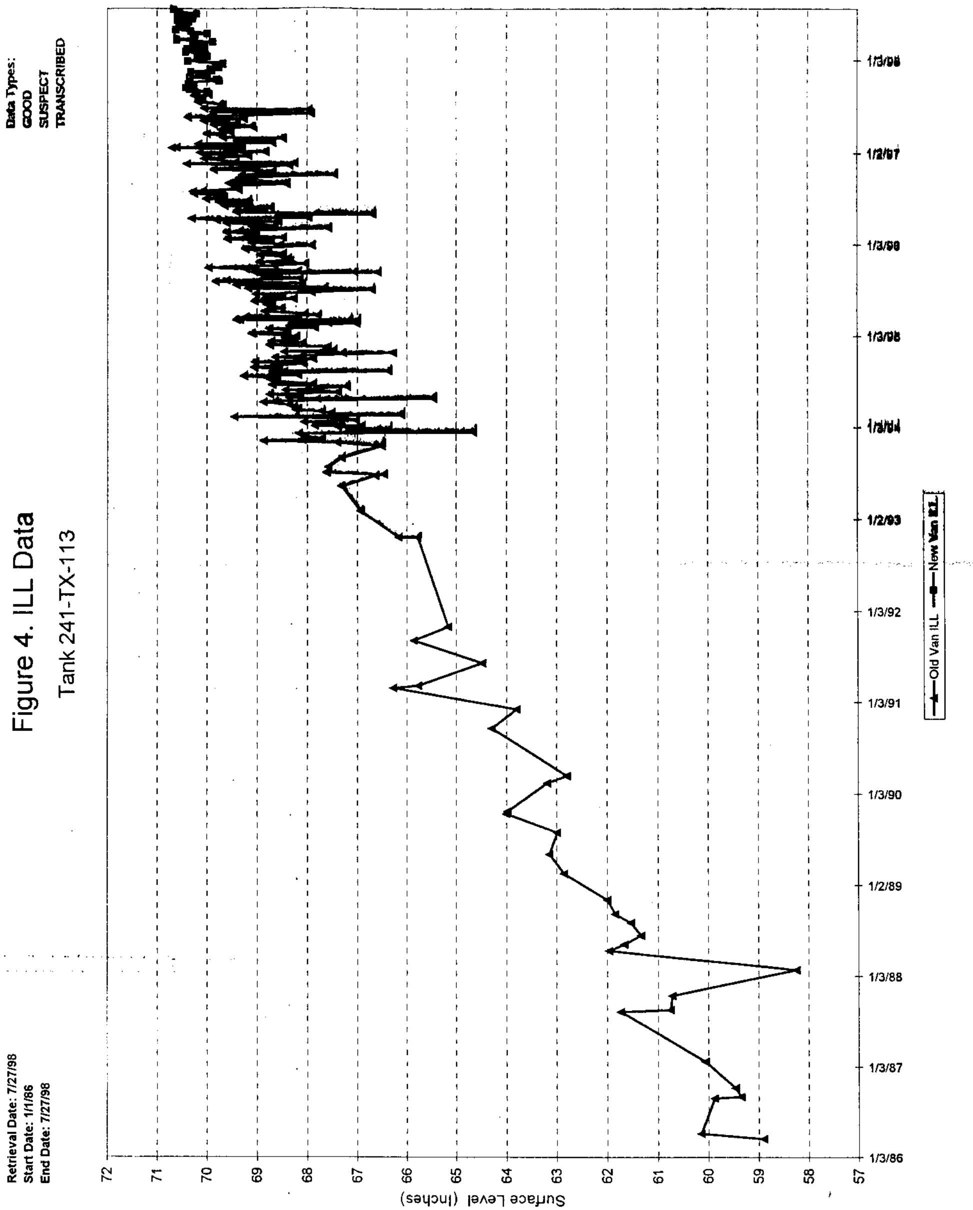
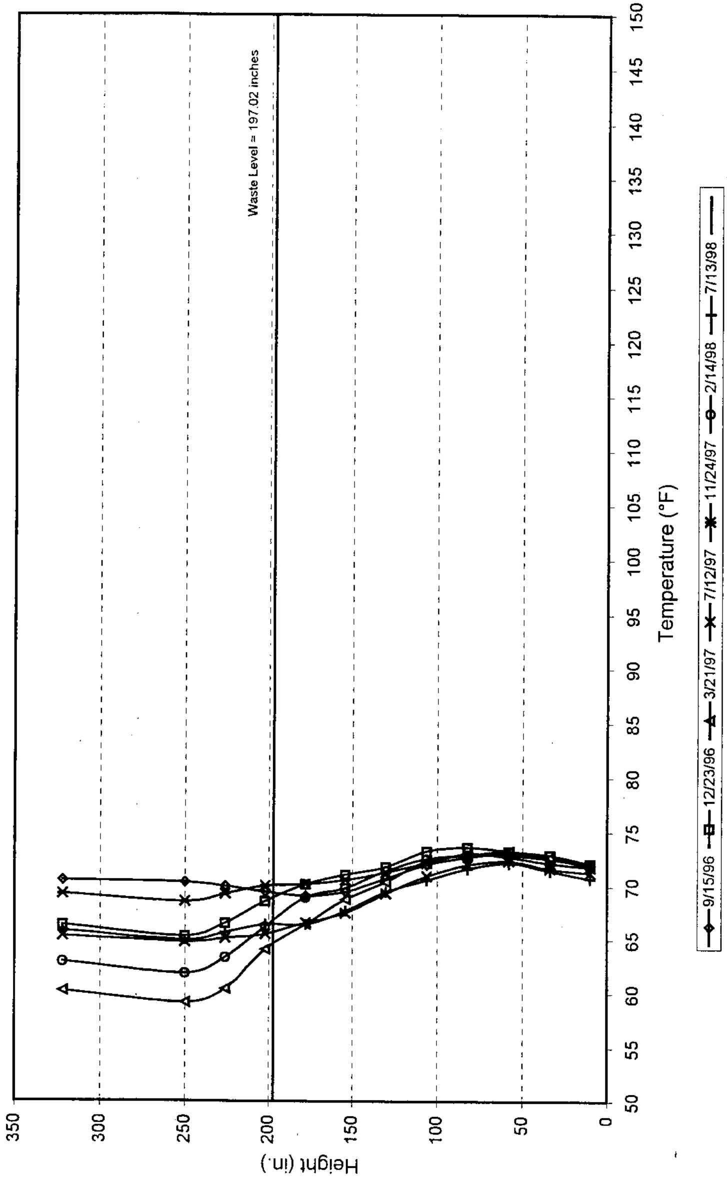


Figure 5. Temperature Profiles

241-TX-113



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Wagoner, J. D., 1997, letter to H. J. Hatch , President, FDH, "Contract Number DE-AC06-96RL13200 - Approval of Rotary Mode Core Sampling (RMCS) Authorization Basis Change Request," DOE-RL: 97-WSD-165, Incoming: 9755946, dated July 8, 1997.

APPENDIX A

Supporting Calculations for HNF-3094

Consisting of 3 pages
including this cover sheet

Author *[signature]* Date 7/31/98 Checked by *L A Stauffer* Date 7/31/98

X_i = vapor fraction of component i
nc = non-condensable vapor (H_2, CH_4, N_2O)
condensable vapor = NH_3

Maximum sampling/monitoring values (ppmv) -August 6, 1997 from TCD

$H_2 := 50$ $CH_4 := 50$ $N2O := 50$ $NH_3 := 24$

Calculate Xnc,i for each nc gas

$$X_{ncH2} := \frac{H_2}{H_2 + CH_4 + N2O} \qquad X_{ncN2O} := \frac{N2O}{H_2 + CH_4 + N2O} \qquad X_{ncCH4} := \frac{CH_4}{H_2 + CH_4 + N2O}$$

$$X_{ncH2} = 0.333 \qquad X_{ncN2O} = 0.333 \qquad X_{ncCH4} = 0.333$$

Calculate the NH_3 fraction in release gas

From equation C-4 from DE&SH 1997a

$$S1 := X_{ncH2} \cdot \frac{NH_3}{H_2} \qquad XNH_3 := \frac{S1}{S1 + 1} \qquad XNH_3 = 0.138$$

$XNH_3 = 13.8\,\%$ NH_3 in postulated gas release.

Estimate overall waste gas composition

Volume fraction, X, of component, i

Given: $XNH_3 = 0.138$ from above,

$XH_2 := (1 - XNH_3) \cdot X_{ncH2}$ $XH_2 = 0.287$ 28.7 %

$XN2O := (1 - XNH_3) \cdot X_{ncN2O}$ $XN2O = 0.287$ 28.7 %

$XCH_4 := (1 - XNH_3) \cdot X_{ncCH4}$ $XCH_4 = 0.287$ 28.7 %

Maximum gas composition considered for toxic effects in the RMCS Safety Assessment are 60% NH_3 and 75% N_2O.

Calculate LFL in terms of hydrogen concentration

Equation C-7 from DE&SH 1997a

$$LFL := \frac{1}{\frac{1}{.04} + \frac{\frac{XNH_3}{XH_2}}{.15} + \frac{\frac{XCH_4}{XH_2}}{.05}}$$

$LFL = 0.021$ or 2.1% as H_2

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Max. and min. % H_2O and max. TOC reported in most recent tank data.

Taken from TCD via TWINS2

In solids

TOC_{max1} not reported

ρ_1 = not reported

Percent Water = not reported

max wt% TOC_1 based on TOC_{max1}

In liquid

TOC_{max2} not reported

ρ_2 = not reported

Percent Water = 51.6 (max value)

Water fraction, $H2O_2 := 0.516$

max wt% TOC_2 based on TOC_{max2}

Dry wt. basis calculations

Waste solids % TOC on a dry weight basis not available.

Waste liquid % TOC on a dry weight basis not available.

Appendix G of the RMCS Safety Assessment uses the following criteria:
No propagation is possible if:

TOC(wt%)<4.5 + 0.15 wt% H_2O

or

20% $\geq$ wt% H_2O

APPENDIX B

Organic Solvent Ignition Control Determination Calculations

Consisting of 4 pages
including this cover sheet

Author: "Huckaby; James L" <jim.huckaby@pnl.gov> at ~EXCHANGE
Date: 7/29/98 10:56 AM
Subject: RE: TX-113 VAPOR SAMPLE EVAL.
-- Message Contents --

Kenny,

The attached Excel spreadsheet was used to estimate the effective surface area of semivolatile organic solvents in Screening for Organic Solvents in Hanford Waste Tanks Using Organic Vapor Concentrations (Huckaby, JL, and DS Sklarew, 1997, PNNL-11698). In that report tank TX-113 appears with preliminary data, but I have updated the spreadsheet so that it now contains the official final values from the TCD for that tank. Note that organic vapor concentrations in the spreadsheet start out at STP (273.15K, 760 torr) whereas in the TCD this particular tank has data at 298.15K and 760 torr. Also, I have used a value of 0.01 for the semivolatile fraction, x (column U in the attached). The sample analyses actually suggest that the semivolatile fraction is zero (no semivolatile organic vapors were detected/reported), but to provide some idea of how sensitive the model is to the choice of x, I used 0.01. The bottom line is that the vapor sample analyses and modeling approach of the cited report indicate that the effective surface area of semivolatile organic solvents in this tank is negligibly small.

Jim

<<os980729.xls>>

-----Original Message-----
From: Fowler, Kenneth D (Kenny)
Sent: Wednesday, July 29, 1998 9:51 AM
To: Huckaby, James L
Subject: TX-113 VAPOR SAMPLE EVAL.

Hi Jim,
Jim Crocker in sampling said that you did a calculation of the potential organic pool in TX-113 based on the latest vapor sample (8/6/97). Do you have a memo, DSI or s omething out on it??? I'm doing a sampling checklist and need to address the BIO ignition controls.

Thanks,
Kenny

	Tank	Date Sampled	Headspace Temperature (C)	TC Tree Headspace Temperature (C)	Headspace pressure (torr)	ORNL TST Sum	PNNL TST Sum	PNNL SUMMA Sum	SAS TST Sum	SAS SUMMA Sum	TO-12 TNMHC	ORNL TST Sum	PNNL TST Sum	PNNL SUMMA Sum	SAS TST Sum	SAS SUMMA Sum	TO-12 TNMHC	Max TNMOC	Min Temp (C)
46	S101	6/6/96	30.4	30.8	744.2	na	13	15	na	na	8.3	na	12	13	na	na	7.3	13	30.4
47	S102	3/14/95	24.3	24.2	741.2	10	na	21	na	na	na	9.0	na	18	na	na	na	18	24.2
*	S102	1/26/96	19	25.8	748.7	na	na	na	na	na	16	na	na	na	na	na	15	15	19
*	S102	4/4/96	23.1	24.1	753.3	na	na	na	na	na	16	na	na	na	na	na	15	15	23.1
*	S102	9/19/96	28.5	29	745.0	na	na	na	na	na	27.5	na	na	na	na	na	24	24	28.5
*	S102	12/19/96	26.3	26.5	753.6	na	na	na	na	na	17	na	na	na	na	na	15.4	15.4	26.3
*	S102	2/11/97	22.5	23.9	749.0	na	na	na	na	na	19.46	na	na	na	na	na	17.7	17.7	22.5
48	S103	6/12/96	22.6	23.7	742.4	na	13.0	7.2	na	na	2.7	na	11.7	6.5	na	na	2.4	11.7	22.6
49	S105	12/7/95	21.7	23	748.4	2.7	na	na	na	na	2.5	2.5	na	na	na	na	2.3	2.5	21.7
50	S106	6/13/96	19.1	19.4	740.2	na	14	9.2	na	na	3.9	na	13	8.4	na	na	3.6	13	19.1
51	S107	6/18/96	26.6	27.8	745.2	na	na	na	na	na	7.1	na	na	na	na	na	6.3	6.3	26.6
52	S108	12/6/95	22.6	22.1	750.8	0.96	na	na	na	na	2.6	0.9	na	na	na	na	2.4	2.4	22.1
53	S109	6/4/96	20.5	18.8	741.9	na	na	na	na	na	3.7	na	na	na	na	na	3.4	3.4	18.8
54	S110	12/5/95	26.2	27.7	748.8	2.9	na	na	na	na	3.8	2.6	na	na	na	na	3.4	3.4	26.2
55	S111	3/21/95	23.0	21.4	731.2	2	na	2	na	na	na	1.8	na	1.8	na	na	na	1.8	21.4
56	S112	7/11/95	30.8	20	742.9	na	5.0	5.9	na	na	8.2	na	4.6	5.3	na	na	7.5	7.5	20
57	T104	2/7/96	14.3	15.1	740.5	na	na	1.9	na	na	1.9	na	na	1.8	na	na	1.8	1.8	14.3
58	T107	1/18/95	21.3	17.4	742.8	1.5	na	3.9	na	na	na	1.4	na	3.6	na	na	na	3.6	17.4
59	T110	8/31/95	18.6	19.9	744.5	na	0.6	0.14	na	na	1.1	na	0.6	0.1	na	na	1.0	1.0	18.6
60	T111	1/20/95	15.4	16.1	747.1	24	na	22	na	na	na	23	na	20	na	na	na	23	15.4
61	TX104	5/5/97	15.2	16.7	743.2	na	na	na	0.786	1.5	0.21	na	na	na	0.7	1.4	0.2	1.4	15.2
62	TX105	12/20/94	24.8	25.7	740.0	1.3	na	5.2	na	na	na	1.2	na	4.6	na	na	na	4.6	24.8
63	TX106	3/5/97	18.1	19.9	746.5	na	na	na	6.1	4.5	1.6	na	na	na	5.6	4.1	1.5	5.6	18.1
64	TX111	10/12/95	22.6	19.6	749.5	12	na	16	na	na	16	11	na	15	na	na	15	15	19.6
65	TX113	8/6/97	18.0	19.1	742.4	na	na	na	4.5	8.4	0.81	na	na	na	4.1	7.7	0.7	7.7	18
66	TX114	3/25/97	16.4	na	744.5	na	na	na	12	9.5	3	na	na	na	11.1	8.8	2.3	11.1	16.4
67	TX118	12/16/94	21.5	22	742.0	6.4	na	11	na	na	9.2	5.8	na	10	na	na	8.3	10	21.5
68	TY101	4/6/95	15.6	16.6	737.3	1.3	na	1.6	na	na	na	1.2	na	1.5	na	na	na	1.5	15.6
69	TY102	4/12/96	13.7	14.6	741.3	na	0.97	0.96	na	na	0.35	na	0.9	0.9	na	na	0.3	0.9	13.7
70	TY103	4/11/95	15.9	16.4	745.9	65	na	32	na	na	na	60	na	30	na	na	na	60	15.9
*	TY103	11/22/96	18.5	19.1	738.1	na	12	84	na	na	46	na	10.9	76.4	na	na	41	76	18.5

Tank	Date Sampled	Fraction of semivol's[a]	Ventilation Rate, Q (m3/h)	Max Obs'd Semivol Conc., Cobs (mg/m3 at tank P & T)	Calc'd Saturation Conc., Csat (mg/m3)	Mass Transfer Coeff, k (m/h)	Best Estimate (m2)	Surface Area > 1 m2 ?	Ventilation Rate Variance Term	Max. Obs'd Semivol Conc Variance Term	Calc'd Saturation Conc. Variance Term	Mass Transfer Coeff. Variance Term	Upper Estimate w/ 95% confidence (m2)	Surface Area > 1 m2 ?
S101	6/6/96	na	17.0	12.86	330.2	1.5	0.47		8.1E-02	5.3E-03	3.3E-02	8.7E-03	1.06	Yes
S102	3/14/95	0.03	17.0	0.55	195.2	1.2	0.040		6.1E-04	3.7E-05	2.3E-04	6.5E-05	0.09	
S102	1/26/96	0.03	17.0	0.44	122.8	0.9	0.065		1.6E-03	9.7E-05	6.1E-04	1.7E-04	0.15	
S102	4/4/96	0.03	17.0	0.44	177.3	1.1	0.037		5.0E-04	3.1E-05	1.9E-04	5.4E-05	0.08	
S102	9/19/96	0.03	17.0	0.73	281.9	1.4	0.032		3.8E-04	2.3E-05	1.4E-04	4.0E-05	0.07	
S102	12/19/96	0.03	17.0	0.46	234.0	1.3	0.026		2.5E-04	1.5E-05	9.4E-05	2.7E-05	0.06	
S102	2/11/97	0.03	17.0	0.53	168.1	1.1	0.048		8.7E-04	5.3E-05	3.3E-04	9.3E-05	0.11	
S103	6/12/96	0.07	17.0	0.77	169.6	1.1	0.07		1.8E-03	1.1E-04	6.7E-04	1.9E-04	0.16	
S105	12/7/95	na	17.0	2.46	156.6	1.1	0.25		2.4E-02	1.5E-03	9.2E-03	2.5E-03	0.57	
S106	6/13/96	0.15	17.0	1.97	123.9	0.9	0.29		3.2E-02	2.0E-03	1.2E-02	3.4E-03	0.66	
S107	6/18/96	na	17.0	6.34	240.0	1.3	0.35		4.6E-02	2.9E-03	1.8E-02	4.9E-03	0.80	
S108	12/6/95	na	17.0	2.36	162.3	1.1	0.23		1.9E-02	1.2E-03	7.5E-03	2.1E-03	0.52	
S109	6/4/96	na	17.0	3.38	120.6	0.9	0.53		1.0E-01	6.7E-03	4.1E-02	1.1E-02	1.20	Yes
S110	12/5/95	na	17.0	3.42	232.0	1.3	0.20		1.4E-02	9.0E-04	5.6E-03	1.5E-03	0.44	
S111	3/21/95	na	17.0	1.78	152.5	1.1	0.19		1.3E-02	8.3E-04	5.2E-03	1.4E-03	0.43	
S112	7/11/95	0.01	17.0	0.07	134.5	1.0	0.01		3.4E-05	2.1E-06	1.3E-05	3.6E-06	0.02	
T104	2/7/96	na	17.0	1.79	79.3	0.7	0.58		1.2E-01	7.9E-03	4.9E-02	1.3E-02	1.31	Yes
T107	1/18/95	na	17.0	3.58	106.0	0.9	0.70		1.8E-01	1.2E-02	7.3E-02	1.9E-02	1.58	Yes
T110	8/31/95	na	17.0	1.03	118.4	0.9	0.16		9.8E-03	6.0E-04	3.8E-03	1.1E-03	0.37	
T111	1/20/95	0.93	17.0	20.94	88.0	0.7	7.2	Yes	1.9E+01	2.0E+00	1.2E+01	2.1E+00	17.02	Yes
TX104	5/5/97	na	17.0	1.39	86.3	0.7	0.381		5.4E-02	3.4E-03	2.1E-02	5.8E-03	0.86	
TX105	12/20/94	na	17.0	4.60	205.6	1.2	0.32		3.7E-02	2.4E-03	1.5E-02	4.0E-03	0.71	
TX106	3/5/97	na	17.0	5.62	113.1	0.9	1.00		3.7E-01	2.5E-02	1.6E-01	4.0E-02	2.27	Yes
TX111	10/12/95	0.04	17.0	0.60	129.7	1.0	0.08		2.5E-03	1.5E-04	9.4E-04	2.7E-04	0.18	
TX113	8/6/97	0.01	17.0	0.08	112.1	0.9	0.01		6.5E-05	3.9E-06	2.5E-05	7.0E-06	0.03	
TX114	3/25/97	0.11	17.0	1.26	96.6	0.8	0.28		3.0E-02	1.9E-03	1.2E-02	3.2E-03	0.64	
TX118	12/16/94	0.13	17.0	1.29	153.9	1.1	0.13		6.8E-03	4.2E-04	2.6E-03	7.3E-04	0.30	
TY101	4/6/95	na	17.0	1.47	89.7	0.8	0.38		5.3E-02	3.3E-03	2.1E-02	5.7E-03	0.85	
TY102	4/12/96	na	17.0	0.90	74.9	0.6	0.32		3.9E-02	2.4E-03	1.5E-02	4.1E-03	0.73	
TY103	4/11/95	0.97	17.0	58.48	92.2	0.8	38	Yes	5.5E+02	2.5E+02	1.5E+03	5.9E+01	119.00	Yes
TY103	11/22/96	0.97	17.0	74.11	117.3	0.9	31.96	Yes	3.8E+02	1.7E+02	1.1E+03	4.1E+01	99.03	Yes

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Process Control	Date 7/28/98
Project Title/Work Order		EDT No. 610272
Rotary Mode Core Sampling Approved Checklist: 241-TX-113		ECN No. NA

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
ONSITE					
Lockheed Martin Hanford, Corp.					
W. B. Barton	R2-12	X			
V. C. Boyles	R2-11	X			
R. N. Dale	S7-12	X			
T. R. Farris	S7-12	X			
K. D. Fowler (3)	R2-11	X			
T. A. Hu	R2-11	X			
N. W. Kirch	R2-11	X			
J. G. Kristofzski	R2-12	X			
D. J. McCain	R2-12	X			
J. S. Schofield	S7-12	X			
L. A. Stauffer	R2-11	X			
T. C. S. R. C.	R1-10	X			
Lockheed Martin Services, Inc.					
Central Files	A3-88	X			

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