CH2M HILL ENGINEERING CHANGE NOTICE

Page 1 of 2 ☒ DM ☐ FM ☐ TM

1a. ECN 721735 R 2

1b. Proj. ECN - - R

2. Simple Modification	3. Design Inputs – For full ECNs, record information on the ECN-1 Form (not required for Simple Modifications)	4. Date
☒ Yes ☐ No		10/27/2004

5. Originator's Name, Organization, MSIN, & Phone No.	6. USQ Number	7. Related ECNs
T. A. Hu, Process/Waste Transfer Engineering, S5-08, 373-4098	No. - - - R - ☒ N/A	ECN-121735-R0, -R1

8. Title	9. Bldg. / Facility No.	10. Equipment / Component ID	11. Approval Designator
Steady-State Flammable Gas Release Rate Calculation and Lower Flammability Level...	Double-Shell Tank Farm	N/A	N/A

12. Engineering Documents/Drawings to be Changed (Incl. Sheet & Rev. Nos.)	13. Safety Designation	14. Expedited/Off-Shift ECN?
RPP-5926, Rev. 3E	☐ SC ☐ SS ☐ GS ☒ N/A	☐ Yes ☒ No

15a. Work Package Number	15b. Modification Work Completed	15c. Restored to Original Status (TM)	16. Fabrication Support ECN?
N/A	N/A Responsible Engineer / Date	N/A Responsible Engineer / Date	☐ Yes ☒ No

17. **Description of the Change** (Use ECN Continuation pages as needed)

Revision 4 of RPP-5926 is a complete revision of the document. It incorporates new gas generation rate calculations and more recent Best Basis Inventory data to calculate the flammable gas time to the lower flammability limit for all DSTs and SSTs.

18. **Justification of the Change** (Use ECN Continuation pages as needed)

Revision 4 is the annual update of the calculations for steady-state hydrogen generation rate and the time to the lower flammability limit.

Note: The USQ is not applicable because this proposed change is in support of a safety basis amendment being submitted to ORP for approval.

19. **ECN Category**

☒ Direct Revision
☐ Supplemental
☐ Void/Cancel

ECN Type

☐ Supercedure
☐ Revision

20. **Distribution**

Name	MSIN	Name	MSIN
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1a. ECN 721735 R 2

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21. Revisions Planned (Include a brief description of the contents of each revision)

N/A

Note: All revisions shall have the approvals of the affected organizations as identified in block 11 "Approval Designator," on page 1 of this ECN.

22. Design Basis Documents

☐ Yes ☒ No

23. Commercial Grade Item Dedication Numbers (associated with this design change)

N/A

24. Engineering Data Transmittal Numbers (associated with this design change, e.g., new drawings, new documents)

N/A

25. Other Non Engineering (not in HDCS) documents that need to be modified due to this change

Type of Document	Document Number	Update Completed On	Responsible Engineer (print/sign and date)
Alarm Response Procedure	N/A		
Operations Procedure	N/A		
Maintenance Procedure	N/A		

Type of Document	Document Number	Type of Document	Document Number
N/A			

26. Field Change Notice(s) Used?

☐ Yes ☒ No

If Yes, Record Information on the ECN-2 Form, attach form(s), include a description of the interim resolution on ECN Page 1, block 17, and identify permanent changes.

NOTE: ECNs are required to record and approve all FCNs issued. If the FCNs have not changed the original design media then they are just incorporated into the design media via an ECN. If the FCN did change the original design media then the ECN will include the necessary engineering changes to the original design media.

27. Design Verification Required?

☐ Yes ☒ No

If Yes, as a minimum attach the one page checklist from TFC-ENG-DESIGN-P-17.

28. Approvals

Facility/Project Signatures		Date	A/E Signatures		Date
Design Authority			Originator/Design Agent		
Resp. Engineer	T. A. Hu	10-27-04	Professional Engineer		
Resp. Manager	T. M. Horner	10/27/04	Project Engineer		
Quality Assurance			Quality Assurance		
IS&H Engineer			Safety		
NS&L Engineer			Designer		
Environ. Engineer			Environ. Engineer		
Engineering Checker			Other		
Other	S. A. Barker	10/27/04	Other		
Other			DEPARTMENT OF ENERGY / OFFICE OF RIVER PROTECTION		
Other			Signature or a Control Number that tracks the Approval Signature		
Other					
Other			ADDITIONAL SIGNATURES		
Other					
Other					

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DISTRIBUTION	Process/Waste Transfer Engr.	Date 10/27/2004
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Steady-State Flammable Gas Release Rate Calculation and Lower Flammability Level Evaluation for Hanford Tank Waste

T. A. Hu
CH2M HILL Hanford Group
Richland, WA 99352
U.S. Department of Energy Contract DE-AC27-99RL14047

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Key Words: hydrogen generation, flammable gas, lower flammability limit, rate equation model, ammonia, liquid/vapor equilibrium

Abstract: Assess the steady-state flammability level at normal and off-normal ventilation conditions. The hydrogen generation rate was calculated for 177 tanks using the rate equation model. Flammability calculations based on hydrogen, ammonia, and methane were performed for 177 tanks for various scenarios.

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Tank Farm Contractor (TFC) **RECORD OF REVISION**	(1) Document Number RPP-5926, Rev. 4	Page 1

(2) Title

Steady-State Flammable Gas Release Rate Calculation and Lower Flammability Level Evaluation for Hanford Tank Waste

Change Control Record

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2	Total revision to update the hydrogen rates and flammability to Nov. 2001 BBI data. (ECN 665039)	T.A. Hu	N.W. Kirch 6/30/02
2A	Add Appendix I, flammability evaluation of 5 DSTs with highest LFL. (ECN 720321)	T.A. Hu	N.W. Kirch 3/20/03
3	Total revision to update the hydrogen rates and flammability to July 2003 BBI data.	T.A. Hu	N.W. Kirch 9/30/03
3A	Add Appendix J, flammability evaluation of vacuum retrieval project of 241-C Tank Farm 200-Series.	T.A. Hu	T.M. Horner 11/19/03
3B	Add Appendix K, flammability evaluation to raise DST operation waste level to 460 inch.	T.A. Hu	T.M. Horner 12/23/03
3C	Add Appendix L, flammability evaluation of retrieval project on 241-C-103 and 241-C-105	T.A. Hu	T.M. Horner 1/22/04
3D	Add Appendix M, flammability evaluation of 241-AY-102 to support receiving condensate	T.A. Hu	T.M. Horner 4/20/04
3E	Update Appendix K, (Title, See Rev 3B) ECN-721735-R1	T.A. Hu	T.M. Horner 6/2/04
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RPP-5926
Revision 4

Steady-State Flammable Gas Release Rate Calculation and Lower Flammability Level Evaluation for Hanford Tank Waste

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
Office of River Protection under Contract DE-AC27-99RL14047

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EXECUTIVE SUMMARY

Flammable gases such as hydrogen, ammonia, and methane are observed in the tank dome space of the Hanford Site high-level waste tanks. This report assesses the steady-state flammability level under normal and off-normal ventilation conditions in the tank dome space for 177 double-shell tanks and single-shell tanks at the Hanford Site. The steady-state flammability level was estimated from the gas concentration of the mixture in the dome space using estimated gas release rates, Le Chatelier's rule and lower flammability limits of fuels in an air mixture. A time-dependent equation of gas concentration, which is a function of the gas release and ventilation rates in the dome space, has been developed for both soluble and insoluble gases. With this dynamic model, the time required to reach the specified flammability level at a given ventilation condition can be calculated.

In the evaluation, hydrogen generation rates can be calculated for a given tank waste composition and its physical condition (e.g., waste density, waste volume, temperature) using the empirical rate equation model provided in HNF-3851, *Empirical Rate Equation Model and Rate Calculations of Hydrogen Generation for Hanford Tank Waste*. The release rate of other insoluble gases and the mass transport properties of the soluble gas can be derived from the observed steady-state gas concentration under normal ventilation conditions. The off-normal ventilation rate is assumed to be natural barometric breathing only. A large body of data is required to do both the hydrogen generation rate calculation and the flammability level evaluation. For tank waste that does not have sample data, a statistical-based value from probability distribution regression was used based on data from tanks having similar waste types.

This report (Revision 4) has adopted the recent upgraded hydrogen generation rate model (documented in HNF-3851, Revision 1). The hydrogen generation rate model has been comprehensively updated to include a new water radiolysis equation, the radiolysis contribution from total alpha, the corrosion equation, and the activation energy of both thermal and radiolysis terms. The newly developed water radiolysis term, especially, provides more accurate estimates of G-values for the low and intermediate salt condition. This report also updates the input data of hydrogen generation rate calculations for 177 tanks using the waste composition information in the Best-Basis Inventory Detail Report[1] in the *Tank Waste Information Network System*, and the waste temperature data in the Surveillance Analysis Computer System (SACS)[2] (dated April 1, 2003 -through April 1, 2004). However, the release rate of methane, ammonia, and nitrous oxide is based on the input data (dated October 1999) as stated in Revision 0 of this report. Scenarios for adding waste to existing waste (dated April 2004) have been studied to predict the gas generation rates and the effects of smaller dome space on the flammability limits to address the issues of routine water additions and other possible waste transfer operations. In the flammability evaluations with zero ventilation, an increase of 5 °C of the waste temperatures for

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[1] TWINS, 2001, *Tank Waste Information Network System*, Internet address: http://twins.pnl.gov:8001 queried September 27, 2004.

[2] SACS, 2001, Surveillance Analysis Computer System, Queried April 1, 2003 through April 1, 2004, SACSPROD database; also available at http://twins.pnl.gov:8001.

all double-shell tanks, and water addition of 10 kgal and 1 kgal for 100- and 200-series tanks, respectively, are performed. Annual maximum waste temperatures are used based on highest temperatures for any one day. Also the gas diffusion effect through the concrete dome space is included in the mass balance equations for single-shell tanks under the zero ventilation condition.

Overall, the flammability assessment indicates that no tank will exceed 25% of the lower flammability limit under normal ventilation conditions. Off-normal ventilation conditions evaluated in this report included shutdown of the active ventilation system coupled with closure of the air inlet for actively ventilated systems and isolation of the high-efficiency particulate air breather filter for passively ventilated tanks. For the off-normal condition, with the barometric breathing rate, the shortest time to reach 25% of the lower flammability limit is 12 days for double-shell tanks (e.g., tank 241-AY-102) and 31 days for single-shell tanks (e.g., tank 241-B-203). Considering 10 and 1 kgal water additions and 5 °C temperature increases for double-shell tanks under zero ventilation scenario with only a diffusion mechanism for gas releases for single-shell tanks, the shortest time to reach 25% of the lower flammability limit is 12 days for double-shell tanks (e.g., tank 241-AY-102) and 29 days for single-shell tanks (e.g., tank 241-B-203). Note that off-normal ventilation conditions rarely occur.

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LIST OF TERMS

BBI	best-basis inventory
DST	double-shell tank
GRE	gas release event
HEPA	high-efficiency particulate air
HGR	hydrogen generation rate
LFL	lower flammability limit
SACS	Surveillance Analysis Computer System
SST	single-shell tank
TCD	Tank Characterization Database
TOC	total organic carbon
TWINS	Tank Waste Information Network System

1.0 INTRODUCTION AND BACKGROUND

This report provides the methodology to predict the steady-state gas release rate and to evaluate the steady-state flammability level of the tank dome space under both normal and off-normal ventilation operating conditions for 177 underground nuclear waste storage tanks at the Hanford Site. Revision 0 of this report replaced two previous calculation notes: HNF-SD-WM-CN-116, *Calculation Note Hydrogen Generation Rates At Steady State Flammable Gas Concentrations for Single-Shell Tanks*, and HNF-SD-WM-CN-117, *Calculations of Hydrogen Release Rate at Steady State for Double-Shell Tanks.* Revision 0 also provided the technical basis for establishing flammable gas controls. The focus of this report is the loss of ventilation transient such that technical safety requirement surveillance frequencies and action times can be established. This report also provides the following:

- Estimates of the flammable gas release rates in the tank dome space
- Estimates of the time to reach 25% of the lower flammability limit (LFL) and the LFL following the loss of normal ventilation in actively and passively ventilated double-shell tanks (DST) and single-shell tanks (SST)
- Estimates of the minimum ventilation rate required to maintain less than 25% of the LFL
- Estimates of the maximum dome space concentrations following an extended loss of normal ventilation.

The methodology presented in this report can be used in other applications.

To clarify the application of the subject document, "steady-state" has been defined as the condition of no active operational changes to the tank, and the non-GRE (gas release event) condition with GRE defined as a 500-ppm rise in hydrogen concentration followed by exponential decay of the released flammable gas. For this application the following assumptions were used: (1) long-term variations in ventilation rates brought about by seasonal effects or ventilation rate changes within the exhaust system operating range are minimal and neglected; (2) the variability of the hydrogen concentration about the baseline is less than that produced by a GRE. When the results from only one sample were available, the sample was assumed to have been taken at steady-state condition unless clear documentation shows the existence of a GRE condition.

This report is organized as follows: Chapter 2.0 describes the hydrogen generation rate (HGR) model calculation and summarizes the empirical equation of HGRs. Chapter 3.0 describes the methodology to evaluate the flammability level of the gas mixture in the dome space. Details of the validity of the LFLs in air, ammonia liquid-vapor equilibrium model, time-dependent gas concentration model, and the flammability level calculations are discussed. Chapter 4.0 discusses the input data and results of the gas generation calculations and the flammability evaluations under various ventilation conditions. Chapter 5.0 gives the overall summary and conclusions. Detailed formula, input data, and calculation results for 177 DST and SSTs are

given in Appendices A through F. In addition, flammable gas evaluations for special cases or some scenarios are given in Appendices G through H

1.1 REVISION 1

Revision 1 of this report differs from Revision 0 in the following ways:

- The mass balance equation (Equation 3-5) and its derived equations in the methodology of flammability assessment section (Chapter 3.0) were modified by redefining the ventilation rate as the outlet measurement or calculated outlet flow for natural breathing plus gas generation to reflect total gas leaving the tank.

- The input data and calculations for DST 241-SY-101 were updated to reflect the tank waste status after 616 kgal of active flammable-gas-generation waste material were transferred between December 1999 and February 2000, as provided in RPP-6517, *Evaluation of Hanford High-Level Waste Tank 241-SY-101*. As of April 2001, the HGR in DST 241-SY-101 was 3.1 E-3 ft^3/min, which is one-tenth the generation rate before the remediation task. Other than the data for DST 241-SY-101, all the input data used were from Revision 0, which presents data as of October 1999, unless noted in Revision 1.

- The liquid/vapor equilibrium model was added to address the behavior of the highly soluble gas ammonia.

- The off-normal ventilation calculations used in the flammability assessment were more clearly defined and text was added.

1.2 REVISION 2

Revision 2 was issued to cover the following items:

- The U.S. Department of Energy's comments on Revision 1 were resolved. Primarily, the off-normal ventilation conditions were redefined and it was clarified that the off-normal conditions rarely occur. Second, the discussions on the discrepancies of the ammonia mass transport properties between the field data-derived values and the direct calculation of mass transport coefficient, h, and using 100% surface area were redone. Third, several editorial errors were identified and corrected.

- The HGRs for 177 tanks were updated using the waste composition information in the latest best-basis inventory (BBI) detailed calculation report generated by the *Tank Waste Information Network System* (TWINS) and temperature data in Surveillance Analysis Computer System (SACS) (dated November 2001) as the input data. In this revision, DST 241-AY-102 has the highest HGR instead of DST 241-AN-102 (Revision 1). This is because the updated input data for DST 241-AY-102 include the waste received from SST 241-C-106, and the tank also shows higher tank waste temperature than previously.

- The flammability calculations for the 177 tanks were updated to reflect the updated HGRs. For off-normal ventilation condition, the updated flammability calculations were performed at barometric breathing rate for DSTs, and at both barometric breathing and zero ventilation rates for SST. The SSTs was sealed off as much as possible under the interim stabilization project.

- Using BBI data dated November 15, 2001, SST 241-A-101 has the greatest HGR among the SSTs, but the tank was undergoing saltwell pumping, which reduced both the HGR and flammability. The HGR and flammability are recalculated based on the latest waste volume information (February 28, 2002) to reflect the saltwell pumping activity.

- To address routine water addition and other possible waste transfer operations, flammability assessments were performed on several waste addition cases. The resulting information were used to determine the flammable gas control for the ventilation surveillance frequency and the waste compatibility program.

1.3 REVISION 2A

Revision 2A made no changes to the text or Appendices A through H. It added a new Appendix I (subsequently changed to Appendix H in Revision 3. The new Appendix I contained flammability evaluations on the sensitivity of waste temperature and water addition under zero ventilation condition for top three flammability-level and aging-waste DSTs.

Appendix I contained a complete set of equations derived for flammability evaluations under zero ventilation condition for both soluble and insoluble gases. A simple and conservative heat transfer model (RPP-6213, *Hanford Waste Tank Bump Accident and Consequence Analysis*), used in evaluation of the steam bump hazard, was used for tank waste temperature increase analysis in the gas generation rate calculations.

1.4 REVISION 3

Revision 3 updated the HGR calculations and thus changed the flammability evaluations based on the latest BBI data from July 15, 2003, which resulted in changes to Appendices A, B, D, and H. The text was modified to reflect the changes.

1.5 REVISIONS 3A THROUGH 3E

Revision 3A to 3E made no changes to the main text or Appendices A through I of Revision 3. It added a new Appendix J to M (Appendices J and M were subsequently changed to Appendices F and G in Revision 4).

1.6 REVISION 4

In Revision 4, the HGR equation model has been upgraded and documented (HNF-3851, *Empirical Rate Equation Model and Rate Calculations of Hydrogen Generation for Hanford*

Tank Waste) following the Waste Treatment Project studies (24590-WTP-RPT-RT-04-0002) on the applicability of the HGR model on the waste treatment processes. In this revision the methodology to calculate the HGR is also, updated using the latest HGR model. The improvements to the HGR model include the following:

- Development of water radiolysis equation which is more accurate and covers a wider range of tank waste concentrations
- Addition of the radiolysis term from total alpha contribution for both organic and water radiolysis
- Introduction of the hydrogen generation efficiency on the corrosion mechanism to remove conservatism from the model
- Refit of both thermolysis and radiolysis equations because of the changes to the water radiolysis equation and the new gas generation data.

Revision 4 also introduces the diffusion effect through the concrete dome of the SSTs by adding the diffusion term in the mass balance equation. A time-dependent gas concentration equation to include the diffusion mechanism has been developed and applied to the flammable gas evaluation for SSTs. The gas diffusion coefficients for the calculations are taken from RPP-18491, *Flammable Gas Diffusion Through Single-Shell Tank Domes.*

The HGR calculation was also updated in Revision 4 and the flammability evaluation was changed based on the latest BBI data from September 27, 2004, and the latest temperature data from SACS from April 1, 2003 to April 1, 2004.

1.7 GAS GENERATION

The gases generated in the tank waste are a mixture of hydrogen, nitrogen, ammonia, nitrous oxide, methane, and other hydrocarbons. Hydrogen is the most abundant gas and contributes more than 90% of the flammable components in the dome space for most of the storage tanks containing gas-generating waste. All of these gases except ammonia have low solubility and are almost fully released to the dome space or partially trapped in the solid layers of waste. Because of its high solubility, 99% of the ammonia generated is dissolved and stored in the liquid waste (PNNL-11450, *Composition and Quantities of Retained Gas Measured in Hanford Waste Tanks 241-AW-101, A-101, AN-105, AN-104, and AN-103*) rather than being released to the dome space. For most of the tanks, little methane is generated, but methane is the major species among the observed hydrocarbon vapors. Nitrous oxide is not flammable by itself, but it is an oxidizer. Studies provided in *Flammability and Flame Propagation in H_2-N_2O-CH_4-NH_3-O_2-N_2 Mixtures*, Explosion Dynamics Laboratory Report FM97-4 (Pfahl and Shepherd 1997), show that concentrated nitrous oxide can lower the flammability limit of fuels in an air mixture.

Understanding gas generation phenomena and predicting the gas generation and gas release rates are important in controlling the flammable gas hazard and planning daily operations in the tank farms. For example, the overall rate of generation is needed to verify that any given tank has sufficient ventilation to ensure that the level of flammable gases is maintained below the

operational flammability limit in its dome space. In the past decade, many studies (HNF-SP-1193, *Flammable Gas Project Topical Report*) have been conducted on the mechanisms of gas generation, gas release, and gas retention of tank waste using simulated or actual waste. Systematic tank waste characterization programs and various tank safety programs have generated a tremendous amount of tank waste data. This information provided the basis for HNF-3851. The model is tank-waste-constituent- and tank-condition-based and provides a tool to estimate the generation rate for not only the current tank waste contents, but also tanks with contents that have changed. The other observed gases–ammonia, methane, and nitrous oxide–are not modeled to have a general rate equation for calculating generation rates as a function of waste constituents.

The report provides the methodology for calculating gas release rates. The hydrogen HGR equation model (HNF-3851) is used to estimate the hydrogen release rate by subtracting the field-observed gas accumulation rate, if any, from the model-calculated generation rate. The gas release rates for ammonia, methane, and nitrous oxide–the minor gases of interest observed in tank dome spaces–are derived from vapor concentration data, ventilation rates in the respective tank dome spaces, and other information about tank waste.

While updating the DST 241-SY-101 calculations for the Revision 1 of the report, the dome space steady-state ammonia concentration in DST 241-SY-101 rose from a preremediation concentration of 4 ppm (before the waste was transferred) to 400 ppm (January 14, 2001). Based on the value of 400 ppm, the derived ammonia release rate, if used as a constant, will predict a value of 108% of the LFL as the steady-state ammonia concentration under the off-normal condition of a loss of ventilation. This is a factor of 50 times larger than the equilibrium value predicted by the model. Apparently, treating the ammonia release rate as constant is over-conservative when the ammonia concentration in the dome space is high. Therefore, the liquid-vapor equilibrium model provided in RPP-4941, *Methodology for Predicting Flammable Gas Mixtures in Double-Contained Receiver Tanks*, is introduced into the methodology to address the dome space calculations for ammonia. A time-dependent equation for gas concentration in a tank dome space was developed by solving the mass balance equations for the gas volume. Once the steady-state gas release rates or the mass transport properties of soluble gas are obtained, a time-dependent gas concentration can be derived from the equation for a given ventilation condition. Therefore, the flammability level of the gas mixture in a dome space can be calculated under both normal and off-normal ventilation conditions. Also, the time required to reach a specified flammability level in a dome space and the minimum ventilation rate required to prevent reaching that level can be estimated.

1.8 DOCUMENT ORGANIZATION

Attachment A to TFC-ENG-DESIGN-C-10, *Engineering Calculations*, provides a list of certain sections to be included in engineering documents. The following notes where the sections in this document correspond to the TFC-ENG-DESIGN-C-10 attachment.

1. Title and Identifier (required) – See title page.

2. Objective/Purpose (required) – See Chapter 1.0.

3. Summary of Results and Conclusions (optional depending on calculation length or complexity) – See Executive Summary.

4. Introduction/Background (optional) – See Chapter 1.0.

5. Input Data (required) – See Chapter 4.0 and Appendix A, B, C, D, F.

6. Assumptions (required if assumptions are made) – See Chapters 2.0 and 3.0.

7. Method of Analysis (required) – Calculation methods are in Chapter 3.0 and spreadsheets in appendices.

8. Use of Computer Software (required if software is used) – The only software used are Excel[3] spreadsheets.

9. Results (required) – See Chapter 4.0 as well as various summary tables.

10. Conclusions (required) – See Section 5.0.

11. Recommendations (optional) – None included.

[3] Excel is a registered trademark of Microsoft Corporation, Redmond, Washington.

2.0 HYDROGEN GENERATION RATE MODEL

Several hydrogen rate models have been proposed (WHC-EP-0702, *Criteria for Flammable Gas Watch List Tanks*; WHC-SD-WM-TI-724, *Methodology for Flammable Gas Evaluations*; WHC-SD-WM-SARR-015, *Topical Report on Flammable Gases in Non-Burping Waste Tanks*; PNNL-11297, *Status and Integration of Studies of Gas Generation in Hanford Wastes*; and HNF-SD-WM-CN-117) to estimate the HGR for Hanford tank waste, but these models are based on either the waste simulant data or very limited tank waste data. A more comprehensive HGR model (described in *Empirical Rate Equation Model of Hydrogen Generation for Hanford Tank Waste*, paper presented at American Nuclear Society, 1999 Winter Meeting, and HNF-3851) was developed and validated based on a large body of tank waste data. The model constructed a set of semi-empirical rate equations to simulate the gas generation mechanisms of thermal chemical reactions, radiolysis of water and organic components, and corrosion processes. The rate equations are formulated as a function of physical and chemical properties of tank waste and are able to estimate the HGR of waste under current conditions, including the rates for newly mixed waste with known properties. The model has been applied to calculate the generation rate for more than 28 SSTs and DSTs and shows good agreement with field-observed rates.

2.1 SEMI-EMPIRICAL RATE EQUATIONS

The empirical rate equation for hydrogen generation in Hanford Site waste developed above contains the simulation of thermal reaction, HGR_{thm}, radiolysis of water and organic, HGR_{rad}, and the corrosion process, HGR_{corr}. This rate equation is a function of waste composition (TOC, aluminate ion, NO_3^-, NO_2^- and Na^+), radiation dose, temperature, liquid fraction, and tank wetted area. Both the thermal and organic radiolysis rates follow Arrhenius behavior with a derived activation energy. The equation for HGR in the units of moles per kilogram per day can be summarized as follows (Equation 2-1):

$$HGR = HGR_{thm} + HGR_{rad} + HGR_{corr} \tag{2-1}$$

where:

$$HGR_{thm} = a_{thm} \times (r_f \times [TOC]) \times [\mathrm{Al}]^{0.4} \times L_f \times \exp^{(-E_{thm}/RT)}$$

$$HGR_{rad} = [(G(\mathrm{H}_2)^{\beta/\gamma}_{H2O} + G(\mathrm{H}_2)^{\beta/\gamma}_{ORG}) \times H^{\beta/\gamma}_{Load} + (G(\mathrm{H}_2)^{\alpha}_{H2O} + G(\mathrm{H}_2)^{\alpha}_{ORG}) \times H^{\alpha}_{Load}] \times L_f \times CF_1$$

$$HGR_{corr} = R_{corr} \times E_{H_2} \times A_{wetted} / M_{\tan k} \times CF_2$$

with:

$$G(\mathrm{H}_2)^{\beta/\gamma}_{ORG} = a_{rad} \times \exp^{(-E_{rad}/RT)} \times (r_f \times [TOC])$$

$$G(H_2)^{\beta/\gamma}_{H2O} = \frac{0.32}{1+2.4[NO_3^-]+0.62[NO_2^-]+0.31[Na^+]^2_{ex}} + \frac{0.13}{1+139[NO_3^-]+54[NO_2^-]}$$

$$G(H_2)^{\alpha}_{ORG} = 0.5 \times a_{rad} \times \exp^{(-E_{rad}/RT)} \times (r_f \times [TOC])$$

$$G(H_2)^{\alpha}_{H2O} = \frac{1.05}{1+2.4[NO_3^-]+0.63[NO_2^-]} + \frac{0.35}{1+3900[NO_3^-]+1400[NO_2^-]}$$

and:

E_{thm}	=	89.6 kJ/mole, the activation energy for the thermal reaction
a_{thm}	=	3.94 E+09 mole/kg-day, pre-exponential factor of the thermal rate
E_{rad}	=	48.8 kJ/mole, activation energy in organic radiolysis, G
a_{rad}	=	1.11 E+07 H_2/100 eV, the pre-exponential term in organic radiolysis, G
r_f	=	0.6 for DSTs and 0.3 for SSTs (unitless), the total organic carbon reactivity coefficient Note: The r_f = 0.3 for SSTs is an average value from the tanks tested. If tank has a high fraction of energetic organic compounds, the r_f can be adjusted to as high as 0.6.
R	=	8.314 J/mole/K, gas constant
R_{corr}	=	6.0 E-08 for DSTs and 2.4 E-07 for SSTs ($ft^3/min/ft^2$), corrosion coefficient
E_{H2}	=	the hydrogen generation efficiency coefficient from corrosion is 20 percent if $[NO_3^-]$, $[NO_2^-]$, and $[OH^-]$ > 0.1, otherwise it is 50 percent.
[TOC]	=	total organic carbon concentration in the liquid waste (wt%) Note: Insoluble energetic organic compounds (excluding oxalate) in the solid layer should be considered case by case when data is available
$[Al^{+3}]$	=	aluminum concentration in liquid waste (wt%)
$[NO_3^-]$	=	nitrate ion concentration in the liquid waste (moles/L)
$[NO_2^-]$	=	nitrite ion concentration in the liquid waste (moles/L)
$[Na^+]_{ex}$	=	concentration of sodium minus nitrate and nitrite concentration in liquid waste (moles/L)
$H_{load}^{\beta/\gamma}$	=	total heat load of the tank from beta/gamma (Watt/kg)
H_{load}^{α}	=	total heat load of the tank from total alpha (Watt/kg)
L_f	=	liquid weight fraction in the waste (unitless)
T	=	temperature of waste (K)
A_{wetted}	=	area of steel exposed to moisture-containing waste (ft^2)
M_{tank}	=	total mass in the waste (kg)
CF_1	=	conversion factor from (H_2/100 eV)(Watts/kg) to (Mole/kg-day)
CF_2	=	conversion factor from (m^3/kg-min) to (Mole/kg-day).

In general, the HGR caused by chemical reactions follows Arrhenius behavior and the rate from radiolysis is proportional to the radiation dose. In addition, the HGRs from radiation effects in tank waste samples have been observed to be temperature dependent as provided in PNNL-12181, *Thermal and Radiolytic Gas Generation on Material from Tanks 241-U-103,*

241-AW-101, 241-S-106, and 241-S-102: Status Report. The analysis of all available gas generation data provided in HNF-3851 shows that this temperature-dependent reaction follows Arrhenius behavior, which may result from a multi-step degradation of organic compounds initiated by radiolysis, followed by thermal reactions. The water radiolysis rate is assumed to be temperature independent, with the G_{H2O} value reduced by scavenging effects.

The numerical parameters in the equations are established by analyzing gas generation kinetic data from waste samples with the aid of tank field surveillance data and tank waste characterization data. The reactivity coefficient, r_f, was used to adjust for differences in reactivity of total organic carbon (TOC) among the tanks. HNF-3851 describes this model in detail. For comparison, Table 2-1 lists the field-observed and model-calculated total HGRs, and the ratio between these values for 28 tanks.

Table 2-1. Comparison of Model-Calculated and Field-Observed Hydrogen Generation Rates.

Tanks	G_{mod} (ft^3/min) Total HGR from Model	G_{field} (ft^3/min) Total HGR from Field	G_{mod} (L/day) Total HGR from Model	G_{field} (L/day) Total HGR from Field	Ratio Between Model and Field
241-AN-101	1.73E-04	2.50E-04	7	10	0.69
241-AN-103	4.54E-03	4.76E-03	186	195	0.95
241-AN-104	5.53E-03	2.55E-03	227	104	2.17
241-AN-105	5.14E-03	3.06E-03	211	125	1.68
241-AN-107	1.09E-02	5.25E-03	447	214	2.09
241-AW-101	3.55E-03	3.17E-03	146	129	1.12
241-AY-102	2.10E-02	1.70E-02	859	691	1.24
241-AZ-101	2.79E-02	9.44E-03	1,144	385	2.97
241-AZ-102	2.90E-02	1.90E-02	1,190	775	1.54
241-SY-101	5.96E-02	2.44E-02	2,441	993	2.45
241-SY-102	9.66E-04	7.26E-04	40	30	1.34
241-SY-103	3.63E-03	3.54E-03	149	145	1.02
241-A-101	5.64E-03	2.14E-03	231	87	2.65
241-C-104	2.56E-03	2.21E-03	105	90	1.16
241-C-106	1.62E-02	9.03E-03	664	368	1.80
241-S-102	1.25E-03	1.64E-03	51	67	0.77
241-SX-101	6.64E-04	4.20E-04	27	17	1.59
241-SX-103	3.03E-03	1.27E-03	124	52	2.40
241-SX-104	1.31E-03	2.51E-04	53	10	5.23
241-SX-105	5.77E-03	4.82E-03	236	197	1.20
241-SX-106	1.53E-03	1.24E-03	63	50	1.25
241-U-102	1.05E-03	1.10E-03	43	45	0.96
241-U-103	1.46E-03	1.48E-03	60	60	1.00
241-U-105	1.37E-03	1.61E-03	56	65	0.86

Table 2-1. Comparison of Model-Calculated and Field-Observed Hydrogen Generation Rates.

Tanks	G_{mod} (ft^3/min) Total HGR from Model	G_{field} (ft^3/min) Total HGR from Field	G_{mod} (L/day) Total HGR from Model	G_{field} (L/day) Total HGR from Field	Ratio Between Model and Field
241-U-106	1.12E-03	6.62E-04	46	27	1.70
241-U-107	4.71E-04	8.27E-04	19	34	0.57
241-U-108	9.42E-04	1.41E-03	39	57	0.67
241-U-109	5.44E-04	7.11E-04	22	29	0.77

Among these 28 tanks, six SSTs and two DSTs are underestimated by the model comparing the field-estimated rate (i.e., the ratio is less than one). Again, these eight tanks have relatively low generation rates (below 70 L/day) except for DST 241-AN-103, which has a rate of 195 L/day with the ratio of 0.95. Overall the model-predicted rates agree very well, within a factor of three, with field-estimated rates.

3.0 METHODOLOGY TO ESTIMATE STEADY-STATE FLAMMABILITY LEVEL

This chapter describes the methodology used to evaluate the steady-state flammability level in the dome space for all DSTs and SSTs. The methodology also provides a technical basis for flammable gas controls in tank farm operations. The evaluation will address the flammability level in the dome space under both normal and off-normal ventilation conditions. In the evaluation, the steady-state gas release rates and ventilation rates are needed to derive the steady-state gas concentration under given ventilation conditions. Based on the flammable gas concentrations, the level of flammability of the mixture can be calculated. Under current normal ventilation conditions, the steady-state flammability level in the tank dome space is below 25% of the LFL for all tanks (HNF-3294, *Adequacy of Ventilation Rates to Remediate Flammable Gas Levels in Headspace of Hanford Tanks – Status Report*). The primary evaluation is focused on the flammable gas level under off-normal ventilation conditions.

The major gases of concern were identified as hydrogen, ammonia, nitrous oxide, and methane in the tank dome space. Among these identified gases, hydrogen is the primary flammable gas in the tank dome space. The gas release rate of hydrogen in the dome space can be determined by subtracting the gas accumulation rate from the generation rate calculated with the rate equation model described in Chapter 2.0. The other two flammable gases, ammonia and methane, have much lower concentrations in the dome space and have no general model for calculating their gas generation rates; therefore, the steady-state gas release rates for ammonia and methane are estimated by their steady-state gas concentrations under normal ventilation conditions. Nitrous oxide is an oxidizer; the concern is whether its concentration is high enough to lower the LFL of hydrogen, ammonia, and methane as established in air. The gas release rate of nitrous oxide also is derived by the steady-state gas concentration under normal ventilation conditions.

To evaluate the flammable gas level, a time-dependent gas concentration model was established. This model can calculate the steady-state flammability level for a given ventilation condition. The model also can estimate the time required to reach certain flammability levels in the dome space under different ventilation conditions and calculate the minimum ventilation rate to keep the dome space below the specified flammability limit.

3.1 LOWER FLAMMABILITY LIMITS

The National Fire Protection Agency codes require that operations be terminated when the concentration of flammable gases exceeds 25% of the LFL. Based on the empirical rule developed by Le Chatelier in the late 19th century, the LFL of mixtures of multiple flammable gases in air can be determined. Le Chatelier's rule (*Limits of Flammability of Gases and Vapors*, [Coward and Jones 1952]) can be written in terms of the LFL concentration of the fuel mixture, LFL_m, as follows:

$$LFL_m = \frac{100}{\sum_i^n \left(\frac{C_i}{LFL_i} \right)} \tag{3-1}$$

where:

C_i = volume percent of fuel gas *i* in the fuel gas mixture
LFL_i = volume percent of fuel gas *i* at its LFL in air alone.

If LFL_m is greater than 100%, the mixture is above the LFL. In the tank dome space, hydrogen gas is the fuel of concern; other gas fuels identified are ammonia and methane. WHC-SD-WM-ES-219, *Laboratory Flammability Studies of Mixtures of Hydrogen, Nitrous Oxide, and Air*, has shown experimentally that the LFL_m of a mixture of hydrogen, ammonia, and methane in an air-nitrous oxide atmosphere can be computed using Le Chatelier's rule as presented in Equation 3-2.

$$LFL_m = \frac{[H_2]}{LFL_{H2}} + \frac{[NH_3]}{LFL_{NH3}} + \frac{[CH_4]}{LFL_{CH4}} \tag{3-2}$$

where:

$[H_2]$ = volume percent of hydrogen in the fuel gas mixture
$[NH_3]$ = volume percent of ammonia in the fuel gas mixture
$[CH_4]$ = volume percent of methane in the fuel gas mixture
LFL_{H2} = volume percent of hydrogen at its LFL in air alone
LFL_{NH3} = volume percent of ammonia at its LFL in air alone
LFL_{CH4} = volume percent of methane at its LFL in air alone.

For simplicity, in Equation 3-2, flammable gases with concentrations lower than that of methane are omitted. The flammability of the individual gases in air is fairly well characterized. The LFL_{H2}, LFL_{NH3} and LFL_{CH4} are 4, 15, and 5%, respectively, at the upward propagation LFL, which is more conservative than the downward propagation LFL. In addition to the flammable gases included in Equation 3-2, nitrous oxide was observed in the tank dome space. Nitrous oxide plays the role of oxidizer in the mixture and has the potential to decrease the amount of fuel required to reach the LFL. The effect of the multiple oxidizers (e.g., N_2O and O_2) was not addressed in Equation 3-2.

Pfahl and Shepherd (1997) from the California Institute of Technology have conducted a series of flammability studies on gas mixtures generated from Hanford Site tank waste. The studies show that the established LFLs of individual fuels in the air will decrease if concentrated N_2O is present in the mixtures. For example, in the mixture NH_3-N_2O-air with a ratio of 13.2-19.8-67.0, the system will be flammable, although the ammonia volume percent is 13.2 and is lower than the LFL_{NH3} of 15% in air. This fuel-oxidizer mixture will be flammable with the ammonia volume percent as low as 8% if the N_2O concentration is 65%. For NH_3-N_2O-air mixtures, Pfahl and Shepherd (Figure 32 in 1997 report) suggest that the ammonia flammability limit will be 15% if the N_2O does not exceed 8%. These test results are for turbulent conditions, with an

ignition energy of 8 J. For a CH_4-N_2O-air mixture, the data show that the ratio of 4.5-10.1-85.4 is not flammable. For an H_2-N_2O-air mixture, the data show that a mixture with the ratio of 5.7-10-84.3 has incomplete combustion. It should be noted here that the ignition energy of 8 J used in these experiments is very large compared to the energy in most electrostatic discharge sparks (typically a few millijoules) that might occur inside a Hanford Site tank.

This information suggests that the flammability limit established in the fuel-air mixture for each gas will not be reduced unless the N_2O volume percent exceeds 8%. In this evaluation, the volume percents of 4, 15, and 5% will be used for LFL_{H2}, LFL_{NH3} and LFL_{CH4}, respectively, in Equation 3-2. In each case, the concentration of nitrous oxide was evaluated and did not exceed 8%, therefore, the oxidizer effect of lowering these flammability limits can be ignored.

3.2 VENTILATION CONDITIONS IN TANK DOME SPACE

Under normal operating conditions, the ventilation conditions can be active ventilation or passive ventilation. The tank dome spaces of all DSTs and some SSTs are equipped with an active ventilation system. For active ventilation systems, the main ventilation flow is designed to go through an installed inlet filter. The 241-AP Tank Farm is an exception to this system; inlet air flows through cover blocks or gaps in riser covers, and other tank openings. The size of the inlet openings was designed to be either fully adjustable or to have just an on-off valve. These filtered inlets are used to control the ventilation rate and to adjust the negative pressure to prevent leakage of tank hazardous materials or to provide control for any other operational needs. For passively ventilated tanks, the ventilation flow goes mainly through high-efficiency particulate air (HEPA) breather filters. Under normal operating conditions, the active ventilation rates range from 100 to 700 ft^3/min, while the passive ventilation rates typically range from 0.5 to 10 ft^3/min. On actively ventilated tanks, the off-normal operating ventilation condition considered in the flammability assessment is that the ventilation system is shut down and the air inlet is closed; on passively ventilated tanks, the HEPA breather filter isolation valve is closed or a blank is installed. For these conditions, the only venting flow is through the gaps between the cover blocks or riser covers. The off-normal condition allows three possible tank ventilation conditions: no ventilation flow, ventilation flow caused only by barometric breathing, or ventilation flow caused by natural breathing, which is a combination of ventilation by barometric breathing plus thermal convection. The barometric breathing rate, V_{bb}, is estimated as 0.45% of the dome space volume per day (WHC-EP-0651, *Barometric Pressure Variations*) and is given in Equation 3-3:

$$V_{bb} = 0.45\% \cdot Vol_{headspace} \left(\frac{ft^3}{day} \right) \tag{3-3}$$

where:

$Vol_{headspace}$ = volume of the tank dome space (ft^3).

During off-normal operating conditions, the most likely ventilation rate is either natural breathing or barometric breathing. The natural breathing rate is estimated to be 5 to 10 times the barometric breathing rate, but the estimation of the thermal convection flow is not available. In general, the zero-flow condition is considered to be impossible because of the many openings into the tanks. However, since 1980, a great effort has been made to seal off the openings as much as possible for SSTs under the interim stabilization project to prevent water intrusion. In this evaluation, the barometric breathing rate, which is more conservative but reasonable, will be used for the ventilation rate for DSTs when normal ventilation is not present. For SSTs, both barometric breathing rate and zero ventilation rate will be evaluated under off-normal ventilation condition. As the shown in the calculations later, there is not much difference between the zero and barometric breathing rate in terms of time to reach 25% and 100% of the LFL because the barometric breathing rate is very small and close to zero. Using a tracer gas, the measured passive ventilation rates (PNNL-11925, *Waste Tank Ventilation Rates Measured with A Tracer Gas Method, Fiscal Year 1998 Summary*) under normal ventilation conditions in SSTs ranged from 1.7 to 10 ft^3/min for most tanks. No similar measurements for the passive rates (i.e., the active ventilation system is shut down with the air-inlet open) are available for DSTs. Unfortunately, no ventilation rate measurements have been made for the condition where the air inlet is shut off. For the off-normal condition, based on Equation 3-3, the calculated barometric breathing rate for most tanks is around 0.5 ft^3/min or less (as shown in Table D-2 of Appendix D), which is one-third to one-twentieth of normal conditions.

3.3 TIME-DEPENDENT GAS CONCENTRATION MODEL

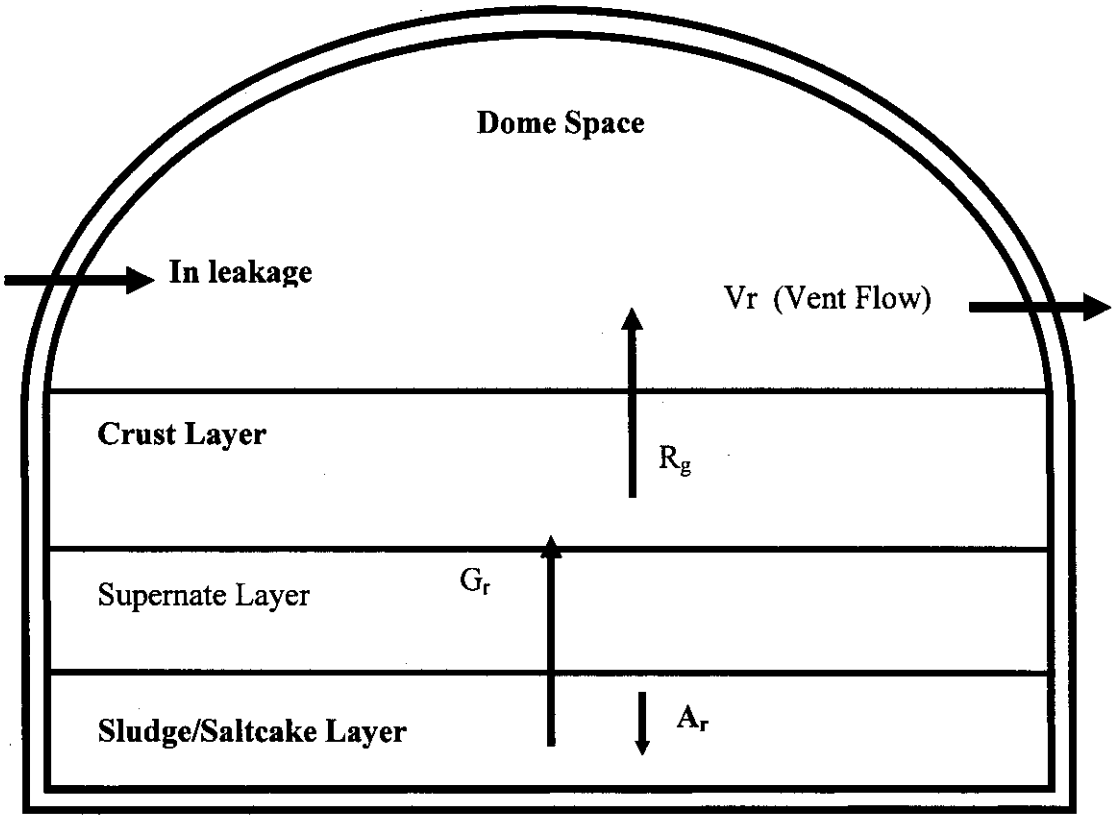
An equation was developed to calculate the time-dependent flammable gas concentration in the dome space. The concentration is a function of the gas release rate and the ventilation rate. Figure 3-1 shows a simplified tank dome space system.

In general, most of the tanks contain supernatant liquid and sludge/saltcake layers. A few tanks, including DST 241-AN-103, have a thin crust layer above the supernatant liquid. The gas release rate (R_g) is the net result of the generation rate (G_r) and the accumulation rate (A_r). The gas accumulation rate refers to the rate at which gas is trapped in the sludge/saltcake layer. The ventilation flows (V_r) are available as field measurements taken at the output streams. These flows are the sum of air inflows from the inlets and tank cracks and openings and the gases released from tank waste. The gas volume change rate can be formulated from a mass balance as provided in Equation 3-4:

$$\text{Gas Change Rate in Tank Dome Space} = \text{Gas Release Rate from the Waste Surface} - \text{Gas Exit Rate} \qquad (3\text{-}4)$$

Equation 3-4 can be changed to calculate the gas volume change rate for SSTs where the tank dome is made of concrete. Assuming that there is no ventilation flow available but the gas can diffuse out through the concrete dome, then the "Gas Exit Rate" term in Equation 3-4 is changed to the gas diffusion rate.

Figure 3-1. A Simplified Tank System for Time-Dependent Gas Concentration Model.



3.3.1 Insoluble Gas

For the less soluble gases such as hydrogen or methane, the gas release rate can be considered to be constant; therefore, the mass balance equation can be written as a differential equation as given in Equation 3-5:

$$Vol\frac{\partial[C_g]}{\partial t} = R_g - V_r \cdot [C_g] \tag{3-5}$$

where:

$[C_g]$ = gas concentration (volume percent)
Vol = volume of the tank dome space (volume)
R_g = gas release rate from the waste surface (volume/time)
V_r = ventilation rate in the dome space (volume/time).

As given in Equation 3-5, the gas exhaust rate is simply the gas concentration times the output ventilation rate. By solving the differential Equation 3-5, a time-dependent gas concentration at time t, $[C_g](t)$, in units of volume percent is given in Equation 3-6:

$$[C_g]_{\%}(t) = [C_g]_{\%}(t_0)\exp(-\lambda t) + \left[\frac{R_g}{V_r}\right]_{\%}[1-\exp(-\lambda t)] \tag{3-6}$$

with

λ = V_r / Vol

where:

R_g	=	hydrogen release rate from the waste surface (volume/time)
V_r	=	ventilation rate in the dome space (volume/time)
$[C_g](t_o)$	=	initial gas concentration at time t (volume percent)
Vol	=	volume of the tank dome space (volume)
λ	=	decay parameter from the venting (inverse time).

In Equation 3-6, the first term represents how the initial gas concentration decays away exponentially with the factor of $e^{(-\lambda t)}$ and second term represents how the gas level builds up in the form of $[R_g/V_r]_{\%}$ with the factor of $[1- e^{(-\lambda t)}]$ as time goes on.

For the case of gas exiting by the diffusion effect through the dome, the mass balance equation can be written as a differential equation as given in Equation 3-6a:

$$Vol\frac{\partial[C_g]}{\partial t} = R_g - A\times Q = R_g - A\times\sum_i \frac{D_i}{L_i}\times([C_g]-[C_o]) \tag{3-6a}$$

where:

$[C_g]$	=	gas concentration in the tank headspace (volume percent)
$[C_o]$	=	gas concentration outside the tank (volume percent)
Vol	=	volume of the tank dome space (volume)
R_g	=	gas release rate from the waste surface (volume/time)
Q	=	the diffusion flux (concentration/area-time)
A	=	the area of the dome to diffuse (area)
D_i	=	the ith layer effective diffusivity (area/time)
L_i	=	the thickness of the ith layer to diffuse (length)

As given in Equation 3-6a, the gas exhaust rate is the gas diffusion rate, which is the diffusion flux, Q_i, times the surface area of the dome. The diffusion flux is defined as the simply the gas concentration gradient between the dome space and outside over the path-length for diffusion times the diffusivity. The summation of the diffusion rates in Equation 3-6a accounts for several diffusion resistances in series (e.g. paint, concrete, and soil for a transfer structure wall). Assuming the gas concentration outside is diluted infinitely becoming zero. By solving the

differential Equation 3-6a, a time-dependent gas concentration at time t, $[C_g](t)$, in units of volume percent is given in Equation 3-6b:

$$[C_g]_{\%}(t) = [C_g]_{\%}(t_0)\exp(-\lambda t) + \left[\frac{R_g}{A \times \sum_i \frac{D_i}{L_i}}\right]_{\%} [1 - \exp(-\lambda t)] \tag{3-6b}$$

with

λ = A x Σ (D_i/L_i)/Vol

where:

R_g = hydrogen release rate from the waste surface (volume/time)
V_r = ventilation rate in the dome space (volume/time)
$[C_g](t_o)$ = initial gas concentration at time t (volume percent)
Vol = volume of the tank dome space (volume)
λ = decay parameter from the venting (inverse time).

3.3.2 Soluble Gas

For a highly soluble gas, such as ammonia, the gas release rate from liquid waste is not a constant, but depends on the material transport properties and the ammonia concentration gradient between the liquid and vapor phases and appropriate Henry's Law constants. Thus the differential equation of mass balance in Equation 3-5 and the time-dependent gas concentration Equation 3-6 have different formats. For a closed system, Henry's Law describes the relationship of a soluble gas in the liquid and vapor phases as provided in Equation 3-7:

$$C_l = K_H \cdot P_g \tag{3-7}$$

where:

C_l = ammonia concentration in the liquid phase (mole/L)
K_H = Henry's Law constant (mole/L-atm)
P_g = partial pressure of the ammonia (atm).

The Henry's Law constant is a function of temperature in pure water. In mixed salt solutions, Henry's Law constants are functions of both temperature and the concentrations of the ions in the solution. "The Estimation of Gas Solubility in Salt Solutions at Temperature from 273 K to 363 K," AICHE Journal (Weisenberger and Schumpe 1996), provides a formula to calculate Henry's Law constant as given in Equation 3-8:

$$K_H = K_H{}^o \cdot 10^{-\sum_i (h_i + h_g) \cdot C_i} \tag{3-8}$$

with

$$K_H^o = e^{(-8.0964+3917.5/T-0.00314T)}$$

where:

K_H^o = Henry's Law constant in the pure water (g-mole/L-atm)
h_i = ionic dependent coefficient
h_g = gas specific constant for ammonia
C_i = ion concentration in the solution.

However, the Weisenberger and Schumpe (1996) formula is good only for the solution up to 5 M. RPP-4941 reported Henry's Law constants for DST 241-SY-101 simulant waste at different dilution conditions and temperatures. This study covers solution concentrations ranging from 5 to 21 M at temperatures of 20 °C to 70 °C. These results provide a correction factor to the calculated Henry's Law constant from the Weisenberger and Schumpe (1996) formula. For example, the measured Henry's Law constant is five times the calculation from the Weisenberger and Schumpe (1996) formula for the undiluted sample of 21 M at 70 °C.

For soluble gas, the gas release rate depends on the equilibrium mechanism between the liquid and vapor phases described earlier. A comprehensive soluble gas transfer methodology applied to Hanford Site waste has been described in RPP-4941.

Consider the two-film theory of gas transfer. The ammonia release will encounter the resistance from two films, the liquid film and the gas film, between the bulk liquid and bulk vapor phases. The release rate is proportional to the difference between the ammonia liquid concentration and the ammonia vapor concentration before reaching equilibrium. It also is proportional to the mass transport coefficient, h, and the effective area, A. Therefore, the release rate can be derived as provided in Equation 3-9:

$$R_g = h \cdot A \cdot (C_l - C_l^{EQ}) = h \cdot A \cdot (C_l - K_H \cdot P_g) = h \cdot A \cdot (C_l - K_H \cdot P \cdot v \cdot C_g) \qquad (3\text{-}9)$$

where:

h = overall mass transport coefficient from liquid to vapor (m/sec)
A = effective area for the transport (1000 x m^2)
C_l^{EQ} = corresponding liquid ammonia concentration in equilibrium at the current ammonia vapor pressure (g-mole/L)
C_l = current ammonia concentration in liquid (g-mole/L)
P_g = ammonia gas partial pressure (atm)
P = dome space total pressure (atm)
v = specific molar volume of gas in the dome space (L/mole)
C_g = current ammonia concentration in the dome space (g-mole/L)
K_H = Henry's Law constant (mole/L-atm).

As Equation 3-9 shows, the ammonia gas release rate clearly is a function of the ammonia concentrations in the liquid and vapor phases and the Henry's Law constant for ammonia in the solution. In the two-film-theory of gas transfer, the overall mass transport coefficient h contains the transport coefficient h_l for gas through the liquid film and h_g for the gas through the gas film.

Equations of the calculated h are described in detail in RPP-4941 and summarized in Appendix E.

A sensitivity study indicates that the overall mass transport coefficient, h, varies by several factors, while the effective tank waste surface area, A, for mass transport is difficult to determine, particularly for the SSTs, where the waste surfaces are mostly crusts. Dome space ammonia concentrations would be overestimated by several orders of magnitude if the full area for the SST is used as the effective transport surface. As discussed in Section 3.4, however, the product of h and A can be determined by field data at steady-state conditions. Once h times A is determined, the gas release rate can be calculated by Equation 3-9. Applying the ammonia release rate from Equation 3-9 to the mass balance in Equation 3-5 results in Equation 3-10:

$$Vol\frac{\partial[C_g]}{\partial t} = h \cdot A \cdot (C_l - K_H \cdot P \cdot v \cdot C_g) - [V_r] \cdot [C_g] \tag{3-10}$$

Dividing by Vol and rearranging the terms, Equation 3-10 becomes Equation 3-11:

$$\frac{\partial[C_g]}{\partial t} = k_2 - k_1 \cdot [C_g] \tag{3-11}$$

with $$k_1 = [V_r + h \cdot A \cdot K_H \cdot P \cdot v]/[Vol]$$

and $$k_2 = [h \cdot A \cdot C_l]/[Vol].$$

The solution of Equation 3-11 is given as Equation 3-12:

$$[C_g](t) = [C_g](t_0)\exp(-k_1 \cdot t) + \left[\frac{k_2}{k_1}\right][1 - \exp(-k_1 \cdot t)]. \tag{3-12}$$

3.4 STEADY-STATE GAS CONCENTRATION AND GAS RELEASE RATE

For insoluble gas, when the systems reach steady state (set time, t, to infinity in Equation 3-6), the exponential term drops out from Equation 3-6 and a steady-state gas concentration is given in Equation 3-13:

$$[C_g]_{\%}^{ss} = \left[\frac{R_g}{V_r}\right] \times 100 \tag{3-13}$$

where:

$[C_g]_{\%}^{ss}$ = steady-state gas concentration (volume percent)
R_g = gas release rate (volume/time)

V_r = ventilation rate in the dome space (volume/time).

Using Equation 3-13, the steady-state gas concentrations in the tank dome space can be calculated by knowing the gas release rate and the ventilation rate.

The gas release rate, R_g, can be estimated by subtracting the gas accumulation rate from the gas generation rate as shown in Equation 3-14:

$$R_g = G_r - A_r \tag{3-14}$$

where:

G_r = gas generation rate from waste (volume/ time)
A_r = gas accumulation rate due to gas trapping (volume/ time).

For hydrogen, the generation rate can be calculated using the empirical rate equation described in Section 2.1. The accumulation rate (HNF-3851) can be determined in the field, based on the waste level change rate and the gas composition data from the retained gas sampler. If the waste level does not change noticeably, the hydrogen release rate will be the same as the HGR.

For other insoluble gases, no gas generation rate model is available. Therefore, the steady-state gas release rate can be estimated from the known steady-state concentration in the dome space under normal ventilation conditions by rearranging Equation 3-13 as shown in Equation 3-15:

$$R_g = \left(\frac{[C_g]_{\%}^{ss}}{100} \right) \cdot V_r \tag{3-15}$$

where:

$[C_g]_{\%}^{ss}$ = steady-state gas concentration (volume percent)
R_g = gas release rate (volume/time)
V_r = ventilation rate in the dome space (volume/time).

In this report, the gas release rates for methane and nitrous oxide were obtained from their steady-state concentrations under normal ventilation conditions using Equation 3-15. Then the calculated gas release rate was used to calculate the steady-state concentrations for off-normal conditions. This methodology is a reasonable way to determine methane concentrations under off-normal conditions because methane is insoluble and whatever gases are generated are released directly to the dome space.

For highly soluble gases, from Equation 3-12, the steady-state concentration can be expressed as Equation 3-16:

$$[C_g]^{ss} = \left[\frac{k_2}{k_1} \right] = \left[\frac{h \cdot A \cdot C_l}{V_r + h \cdot A \cdot K_H \cdot P \cdot v} \right] \tag{3-16}$$

As discussed in Section 3.3, the mass transport properties, the product of h and A, are difficult to estimate directly from tank waste properties, particularly for tank waste covered with an irregular crust layer. However, for the known steady-state vapor concentration C^{ss}, the liquid concentration C_l; along with Henry's Law constant and the ventilation rate V_r, the product of h and A can be determined. By rearranging Equation 3-16, the product of h and A can be expressed as Equation 3-17:

$$h \cdot A = \left[\frac{C_g^{\ ss} \cdot V_r}{(C_l - K_H \cdot P \cdot v \cdot C_g^{\ ss})} \right] \tag{3-17}$$

Once the product of h and A is determined from the steady state under normal ventilation conditions, the steady-state concentration under off-normal condition can be calculated using Equation 3-16. In addition, under the off-normal ventilation conditions, the ammonia concentration can be estimated using the time-dependent gas concentration of Equation 3-12, as well as the gas release rate of Equation 3-9.

Note that the product of h and A depends on the waste configuration and will be different if the waste is perturbed or changed physically. For the off-normal ventilation calculations, the overall steady-state ammonia concentration is governed by the liquid ammonia concentration. The product of h and A will change only the ammonia release rate, which indicates how fast the system will reach the steady state.

The steady-state flammability evaluation of this work is based on current tank waste data at storage conditions. For those tanks actively receiving waste, including DSTs 241-AP-108 and 241-AN-101 as dilute receiver tanks, the flammability level will be reevaluated during the waste transfer compatibility assessment based on the predicted post-transfer condition of the tank waste. For hydrogen, the release rate still can be calculated based on the predicted tank waste condition using this rate equation model. For methane, because steady-state methane vapor data are not available before the waste transfer, the release rate will be estimated as 10% of the model-calculated HGR. This is a reasonable estimate because, for all tanks, methane is less than 10 volume percent of the hydrogen in the generated gas as given in the gas generation study by PNNL-12181 and retained gas sampler results in PNNL-13000, *Retained Gas Sampling Results for the Flammable Gas Program*. For ammonia, instead of estimating the release rate, the ammonia vapor concentration at thermodynamic equilibrium for a given waste condition will be used as a bounding value in the flammability level evaluation. This ammonia vapor concentration can be calculated based on the measured liquid ammonia concentration and other tank waste conditions using Henry's Law and the Weisenberger and Schumpe (1996) model as described earlier. For the off-normal ventilation condition, which is about 0.5 ft^3/min or less, an equilibrium prediction of the ammonia concentration is reasonable and conservative.

3.5 TIME TO REACH LOWER FLAMMABILITY LIMIT

For active ventilation system interruptions, the time for the dome space to build up to flammable gas concentrations exceeding the LFL is one of the main concerns of this evaluation.
A time-dependent LFL, $LFL_m(t)$ of the mixture can be calculated using the time-dependent gas concentration (Equation 3-6 for insoluble gas or Equation 3-12 for soluble gas) and Le Chatelier's rule (Equation 3-2) as provided in Equation 3-18:

$$LFL_m(t) = \frac{[H_2](t)}{LFL_{H2}} + \frac{[NH_3](t)}{LFL_{NH3}} + \frac{[CH_4](t)}{LFL_{CH4}} \tag{3-18}$$

where:

$[H_2](t)$	=	hydrogen concentration (volume percent) at time t
$[NH_3](t)$	=	ammonia concentration (volume percent) at time t
$[CH_4](t)$	=	methane concentration (volume percent) at time t
LFL_{H2}	=	volume percent of hydrogen at its LFL in air alone
LFL_{NH3}	=	volume percent of ammonia at its LFL in air alone
LFL_{CH4}	=	volume percent of methane at its LFL in air alone.

The volume percent of the LFLs; LFL_{H2}, LFL_{NH3}, and LFL_{CH4} are 4, 15, and 5%, respectively, which have been established for a fuel-air mixture.

The time to reach a specified gas concentration under given ventilation conditions for insoluble gas can be obtained by rewriting Equation 3-6 as Equation 3-19:

$$t = \frac{\ln\left\{\frac{R_g - V_r \cdot C_g(t_0)}{R_g - V_r \cdot C_g(t)}\right\}}{\lambda} \tag{3-19}$$

with

λ	=	V_r /Vol

where:

R_g	=	gas release rate (volume/time)
V_r	=	barometric breathing rate (volume/time)
$[C_g](t_o)$	=	initial gas concentration at time t_o (ppmv)
$[C_g](t)$	=	gas concentration at time t (ppmv).

Similarly, for soluble gases, the time to reach a specified gas concentration under a given ventilation condition can be obtained by rewriting Equation 3-12 as Equation 3-20:

$$t = \frac{\ln\left\{\frac{k_2 - k_1 \cdot C_g(t_0)}{k_2 - k_1 \cdot C_g(t)}\right\}}{k_1} \tag{3-20}$$

with $$k_1 = [V_r + h \cdot A \cdot K_H \cdot P \cdot v]/[Vol]$$

and $$k_2 = [h \cdot A \cdot C_l]/[Vol].$$

However, the time to reach a specified flammability limit of the mixture was not calculated explicitly. A customized Excel macro function, which was developed using Visual Basic[4] and is based on Equation 3-19 for an insoluble gas and Equation 3-20 for a soluble gas, is used to calculate the time to reach a specific flammability limit.

3.6 THE MINIMUM VENTILATION RATE TO MAINTAIN DOME SPACE BELOW 25 OR 100 PERCENT OF THE LOWER FLAMMABILITY LIMIT

Whether the dome space of a tank will reach the specified flammability limit or not depends on the competition between the gas release rates and the ventilation rates of the system. For steady state, the flammability limit of the mixture in the dome space can be calculated using Equation 3-2. For insoluble gas, the required steady-state gas concentrations in Equation 3-2 can be calculated using Equation 3-13 for insoluble gas and Equation 3-16 for soluble gas, where the ventilation rate is embedded in both equations. If the ventilation rate is zero (i.e., no gas exits the tank), the system will reach the LFL sooner or later, and then flammability will continue to increase beyond 100% of the LFL. The ventilation will reduce the steady-state concentration. A ventilation rate, defined as the minimum vent rate, which the steady-state concentrations will just reach the specified flammability limit using Equation 3-2 for parameters in Equations 3-13 and 3-16. If the dome space ventilation rate is larger than this minimum, the system will never reach the specified flammability limit. Again, the ventilation rate is embedded in the equation, and a customized Excel macro function developed using Visual Basic code is used to calculate the minimum ventilation needed to stay below the specified flammability limit.

3.7 TIME-DEPENDENT GAS CONCENTRATION UNDER ZERO VENTILATION CONDITION

For insoluble gas, under zero ventilation, the mass balance equation (Equation 3-5) can be rewritten as Equation 3-21:

$$Vol \frac{\partial [C_g]}{\partial t} = R_g \tag{3-21}$$

where:

$[C_g]$ = gas concentration (volume percent)
Vol = volume of the tank dome space (volume)
R_g = gas release rate from the waste surface (volume/time).

[4] Visual Basic is a registered trademark of Microsoft Corporation.

By solving the differential Equation 3-21, a time-dependent gas concentration at time t, $[C_g]_{\%}(t)$, in the unit of volume percent is given in Equation 3-22:

$$[C_g]_{\%}(t) = [C_g]_{\%}(t_0) + \left[\frac{R_g}{Vol} \cdot t\right]_{\%} \tag{3-22}$$

where:

R_g	=	gas release rate from the waste surface (volume/time)
$[C_g]_{\%}(t_o)$	=	initial gas concentration at time t (volume percent)
Vol	=	volume of the tank dome space (volume).

In Equation 3-22, $[C_g]_{\%}(t_o)$ represents initial gas concentration and $[R_g\, t/Vol]_{\%}$ represents how the gas level builds up as time goes on. In the actual calculation in Chapter 4.0, the gas concentration was calculated analytically as shown in Equation 3-23 instead of as shown in Equation 3-22, because the hydrogen release rate is variable as time progresses rather than a fixed value. This is because the tank waste heats up under the zero ventilation condition and the hydrogen release rate increases.

$$[C_g]_{\%}(t) = [C_g]_{\%}(t_0) + \sum_{t=0}^{t}\left[\frac{R_g(t)}{Vol} \cdot t\right]_{\%} \tag{3-23}$$

The summation of gas concentration in the second term on the right side of Equation 3-23 is calculated in the time step of 1 day. As shown in Chapter 4.0, the time step of 1 day is a reasonable choice considering the change of HGR for the temperature increase rates used.

For a highly soluble gas such as ammonia, the mass balance in Equation 3-10 can be rewritten for the zero ventilation condition as shown in Equation 3-24:

$$Vol\frac{\partial[C_g]}{\partial t} = h \cdot A \cdot (C_l - K_H \cdot P \cdot v \cdot C_g) \tag{3-24}$$

where:

h	=	overall mass transport coefficient from liquid to vapor (m/sec)
A	=	effective area for the transport (1,000 x m^2)
C_l	=	current ammonia concentration in liquid (g-mole/L)
P	=	dome space total pressure (atm)
v	=	specific molar volume of gas in the dome space (L/mole)
C_g	=	current ammonia concentration in the dome space (g-mole/L)
K_H	=	Henry's Law constant (mole/L-atm).

Dividing by *Vol* and rearranging the terms, Equation 3-24 becomes Equation 3-25:

$$\frac{\partial[C_g]}{\partial t} = g_2 - g_1 \cdot [C_g] \tag{3-25}$$

with

$$g_1 = \frac{[h \cdot A \cdot K_H \cdot P \cdot v]}{Vol}$$

and

$$g_2 = \frac{[h \cdot A \cdot C_l]}{Vol}$$

The solution of Equation 3-25 is given as Equation 3-26:

$$[C_g](t) = [C_g](t_0)\exp(-g_1 \cdot t) + \left[\frac{g_2}{g_1}\right][1 - \exp(-g_1 \cdot t)] \tag{3-26}$$

In some cases, particularly when $h\ A$ is large, the $g_1 t$ is much greater than one in a few days. So the decay rate exp $(-g_1.t)$ goes to zero in a few days, thus the vapor concentration is simply the vapor equilibrium concentration C_{eq} with liquid phase as shown in Equation 3-27:

$$C_{eq} = \frac{C_l}{K_H \cdot P \cdot v} \tag{3-27}$$

3.8 TANK WASTE TEMPERATURE INCREASE RATE

Under normal operation, tank waste temperature ranged from an ambient temperature as low as 15 °C up to 78 °C. This tank waste temperature range reflected seasonal temperature changes, which oscillate up and down throughout the year. During the off-normal operation, however, the tank waste temperature could increase due to the loss of active or passive ventilation. For DSTs, the tank waste temperature could increase even more if the ventilation of the annulus is shut down. For example, the tank waste temperature of DST 241-AY-102 increased 13 °F in one month while the annulus ventilation was shut down. It is known that the flammable gas generation rate is a function of temperature. In the HGR model (HNF-3851), the thermolysis rate and the organic *G* value of the radiolysis rate are an exponential function of temperature. In this section, a simple and conservative heat transfer model (RPP-6213), used in evaluation of the steam bump hazard, is used for tank waste temperature increase analysis in the gas generation rate calculations and is described below.

With the tank under the zero ventilation condition, the temperature change with time can be estimated using a lumped capacitance solution for the transient waste temperature as shown in Equation 3-28:

$$(\rho_{ncl} \cdot V_{ncl} \cdot c_{ncl} + \rho_{cl} \cdot V_{cl} \cdot c_{cl}) \frac{\partial T}{\partial t} = Q - \frac{k_s \cdot A \cdot (T - T_{\infty,s})}{R} - \frac{k_s \cdot A \cdot (T - T_{\infty,a})}{\delta} \qquad (3\text{-}28)$$

where:

V_{ncl} = volume of the nonconvective layer (m^3)
ρ_{ncl} = density of the nonconvective layer (kg/m^3)
c_{ncl} = specific heat of the nonconvective layer (J/kg-k)
V_{cl} = volume of the convective layer (m^3)
ρ_{cl} = density of the convective layer (kg/m^3)
c_{cl} = specific heat of the convective layer (J/kg-k)
Q = tank waste heat load (Watt)
k_s = soil thermal conductivity (W/m-K)
A = tank heat transfer area (m^2)
T = waste average temperature (K)
$T_{\infty,s}$ = average ambient soil temperature (K)
$T_{\infty,a}$ = average ambient air temperature (K)
δ = soil thickness (m)
R = tank radius (m).

The right side of Equation 3-28 represents the net heat generation rate, which is the total heat source generation rate Q from tank waste minus the upward (second term) and downward (third term) heat transfer rates. For a given tank waste temperature T along with other waste conditions, the temperature increase rate $\partial T/\partial t$ can simply be calculated by dividing the net heat generation rate by the product of mass of waste and waste specific heat using Equation 3-28. The following parameter values were taken from RPP-6213 and apply to all tanks:

- Heat capacity: 3,300 J/kg-k
- Air temperature: 285 K
- Soil temperature: 287 K
- Heat exchange area: 411 m^2
- Soil thermal conductivity: 1 W/m-K
- Soil overburden thickness: 4 m
- Tank radius: 11 m.

Note that Equation 3-28 can be used for tanks having similar waste temperatures for convective and nonconvective layers. For tanks having distinct temperatures between layers (i.e., aging tank waste [241-AY/AZ Tank Farms]), the energy balance equation should be written for each layer as shown in Equations 3-29 and 3-30:

$$\rho_{cl} \cdot V_{cl} \cdot c_{cl} \frac{\partial T_{cl}}{\partial t} = Q_{cl} - \frac{k_s \cdot A}{\delta}(T_{cl} - T_{\infty,a}) + h_{ex} \cdot A \cdot (T_{ncl} - T_{cl}) \qquad (3\text{-}29)$$

$$\rho_{ncl} \cdot V_{ncl} \cdot c_{ncl} \frac{\partial T_{ncl}}{\partial t} = Q_{ncl} - \frac{k_s \cdot A}{R}(T_{ncl} - T_{\infty,s}) - h_{ex} \cdot A \cdot (T_{ncl} - T_{cl}) \tag{3-30}$$

where:

T_{cl} = waste temperature of the convective layer (K)
Q_{cl} = tank waste heat load of the convective layer (Watt)
T_{ncl} = waste temperature of the nonconvective layer (K)
Q_{ncl} = tank waste heat load of the nonconvective layer (Watt)
h_{ex} = heat transfer coefficient for heat exchange between two layers ($W/m^2/K$).

Symbols that are not defined in Equations 3-29 and 3-30 are defined in Equation 3-28. As described in RPP-6213, the heat exchange coefficient was adjusted to meet the quasi-steady approximation in Equation 3-31:

$$\frac{\partial T_{cl}}{\partial t} = \frac{\partial T_{ncl}}{\partial t} \tag{3-31}$$

For the given waste temperatures and other waste conditions, once h_{ex} is determined, the temperature increase rate $\partial T_{ncl}/\partial t$ or $\partial T_{cl}/\partial t$ can be calculated.

As shown in Equations 3-28 to 3-30, this heat transfer model is relatively conservative in terms of overestimating the heatup rate because it considers only the upward and downward heat transfer but neglects the heat transfer from the sides. Additionally, the temperature increase rates for the convective and nonconvective layers may be different throughout the heatup process while Equation 3-31 assumes they are the same. For example, while DST 241-AY-102 lost annulus cooling in August 2001, it was observed that the temperature increase rate for the convective layer was slower than the temperature increase rate for the nonconvective layer in the first few weeks; in time, the two temperature increase rates got closer. The calculated temperature increase rate (0.27 °C/day from Table H-2 of Revision 3)) using Equation 3-31 is comparable, but larger than the rate observed (0.24 °C/day estimated from the temperature data on personal computer interface for SACS) in August 2001. Overall, the temperature data of DST 241-AY-102 validates that the assumption of Equation 3-31 is reasonable and conservative.

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4.0 EVALUATIONS OF STEADY-STATE FLAMMABILITY LEVEL

In this chapter, steady-state gas releases from the 28 DSTs and 149 SSTs are evaluated quantitatively against tank ventilation conditions using the methodology described in Chapters 2.0 and 3.0 to determine if the resulting flammability level becomes a safety concern.

Section 4.1 contains the calculated HGRs and discusses collection of input data and setup of the Excel spreadsheet for rate calculations. Section 4.2 covers the data collection, estimation of ventilation rates for both normal and off-normal conditions, and the steady-state gas concentrations for the normal ventilation rate. Section 4.3 discusses the steady-state gas release rates for the flammability level evaluation. For hydrogen, the gas release rate is the net result of the model-calculated gas generation rate minus the field-estimated gas accumulation rate. For ammonia, methane, and nitrous oxide, the gas release rates were extrapolated from steady-state concentrations at normal ventilation rates. For those tanks showing higher predicted steady-state ammonia concentrations (more than 0.5%) under off-normal ventilation conditions and flammability levels exceeding 25% of the LFL in Revision 0, the ammonia concentration has been reanalyzed with the liquid/vapor equilibrium model as described in Section 3.4. Section 4.4 describes the evaluation of flammability levels in the tank dome space for all 177 tanks. The evaluations include the following:

- Calculation of total flammability level, as well as the distribution from each flammable gas under both normal and off-normal ventilation conditions
- The time required for the flammable gases concentration in the tank dome space to reach various flammability levels when the normal ventilation system is shut down
- The minimum ventilation rate required to keep the dome space concentration below the specified flammability limit.

Details of the results of the inventory data from BBI and surveillance data from SACS, HGR calculations, ammonia mass transport properties, and flammability evaluations in the tank dome space for the 177 tanks are given in Appendices A through F. Appendices G and H provide flammability evaluation for C-200 series SSTs and DST 241-AY-102, respectively, under special conditions.

4.1 HYDROGEN GENERATION RATE MODEL CALCULATIONS

In the evaluation, the HGR were calculated for each tank based on the semi-empirical rate equation model. The total generation rate was calculated for each waste layer in each tank. The generation rate is a function of tank waste conditions; thus, a large tank waste database is needed. The analytical and surveillance data necessary to perform the rate calculations are available for some tanks. For those tanks without current measured data, process history data and waste type information were used.

An Excel spreadsheet was set up to calculate HGRs for all 177 Hanford Site DSTs and SSTs. The spreadsheet has four sections covering input data (Section 4.1.1), derived data

(Section 4.1.2), and calculated unit rates and total rates (Section 4.1.3). The spreadsheet was set up to allow for easy upgrades and to facilitate checking the rate calculations.

4.1.1 Input Data

The data required to estimate hydrogen generation include the concentrations of TOC, hydroxide, nitrate ion, nitrite ion, sodium ion, and aluminate ion in the liquid phase; the total heat load for plutonium (^{238}Pu, ^{239}Pu, and ^{240}Pu), americium (^{241}Am) cesium (^{137}Cs) and strontium (^{90}Sr); liquid and bulk densities; total solids and supernatant liquid tank waste volumes; the weight percent of water for liquid and sludge layers; tank waste temperature, and the tank dome space temperature. The organic species present provide the source term for thermolysis and organic radiolysis and the TOC data are used as an indicator of organic species. Aluminate is a catalyst in the thermal reaction and the aluminate concentration was used in the thermolysis rate calculation. Nitrate, nitrite, and sodium concentrations are used to estimate the scavenger effect for radiolysis of pure water. Also nitrate, nitrite, and hydroxide are used to evaluate the efficiency of hydrogen generation from the corrosion process of tank liner. Tank waste temperature is needed to calculate the radiolysis G-value and to account for the Arrhenius behavior of the thermolysis rate. The cesium and strontium concentrations are used to estimate the heat load from beta/gamma radiation of the tank waste, which is the power source for both water and organic radiolysis. Similarily, plutonium isotopes and americium are used to estimate the heat load from total alpha of the tank, and also function as the power source for both water and organic radiolysis. Weight-percent water data were used to estimate the liquid fraction of the waste because the model considers that gas generation reactions occur most effectively in the liquid phase. The density and waste volume are used to calculate the total mass of the waste and to estimate the wetted tank surface area to calculate the corrosion rates. The temperature in the tank dome space is used to convert the total gas generation rate from mole to volume per unit time.

The BBI, Tank Characterization Database (TCD), and SACS were queried to obtain the required waste properties and compositions. Data missing from the database were estimated, based on the methodology presented in SNL-000198, *Flammable Gas Safety Analysis Data Review*.
In Revision 0 of this report, the input data used were prepared based on data available as of October 1999 and documented in RPP-6069, *Input Data for Hydrogen Generation Rate Model Calculation*. In Revision 4 of this report, the input data of waste compositions including TOC, nitrate ion, nitrite ion, aluminum, cesium, strontium, density, and volume were queried from the BBI detail calculation database, and the preferred density and weight percent water in TWINs (queried on September 27, 2004). Note that the date of data quoted in the parenthesis is referred to as the date of data published, but is not the date of data gathering. The actual cut-off date of the data gathering of April 1, 2004, can be found in the inventory derivation documents. The required temperature data of the tank waste and tank headspace were obtained from SACS (queried on April 1, 2003 to April 1, 2004). In addition, for about 40 SSTs, the concentrations of TOC, nitrate ion, nitrite ion, and aluminum in liquid phase were not available from the BBI detailed calculations, thus the values prepared in Revision 0 were used instead.

To extract the information from the BBI detail report to the format of the required input data, several things were done:

- The required data were downloaded from BBI detail calculation database and listed in Appendix A.

- In BBI detail calculations, more than one density was used in a waste layer for a number of tanks. A single representative density labeled as preferred density was chosen for each waste layer for 177 tanks, and the preferred density along with weight percent water data were listed in Appendix A.

- In BBI detail calculations, the multiplier was introduced to compensate for differences in weight-percent water and density when the concentration data came from different data sources for a given waste layer. The concentrations used in the input data of Revision 3 of this report were recalculated by dividing the inventory of each analyte with the preferred density and the waste volume as

  In BBI: $$Inventory = density \times Volume \times Concentration \times Multiplier \quad (4\text{-}1)$$

  In this report: $$NewConcentration = Inventory \div (PreferedDensity \times Volume) \quad (4\text{-}2)$$

- The input data required the information from the supernatant liquid layer, solid layer (the waste below the supernatant liquid layer), and the total waste. The values of waste composition from various waste types of the solid layer were weight averaged to one value.

- The concentrations of TOC, nitrate ion, nitrite ion, and aluminum in the liquid phase and the liquid density for solid layer were assigned the same value as the supernatant liquid layer if no interstitial liquid data were available. The final waste inventory data are listed in Table B-1 of Appendix B.

In BBI development, the total waste volume is divided into three parts: solid, liquid, and retained gas (if there is any). In the detail calculation report, the volume of retained gas is not reported because it has no contribution to the analytes inventory. Although the retained gas has no contribution to the HGR calculations, it is part of the total waste volume and will impact the headspace volume calculation, and thus the flammability calculations. Table A-3 in Appendix A lists the tanks with reported retained gas inventory from the BBI derivation document in TWINS.

The temperature data of tank waste and tank headspace were obtained from SACS. The maximum temperature from April 1, 2003 to April 1, 2004, was used to obtain an averaging temperature within each waste layer (supernatant and solid layers) and the headspace. The maximum value over a one year period throughout the tank was used to cover the seasonal effect. The temperature sensitivity study on the aging waste tanks was performed in Appendix H of Revision 3 of this report to prevent the possible underestimation of the temperature gradient vertically caused by cooling for using the average value.

With the given tank waste inventory data, physical properties like volume and density, and the waste and headspace temperature data as discussed above, an input data spreadsheet for HGR calculation was prepared and is listed in Table B-1 of Appendix B. For these data not available from the Appendix A, the information and data from Revision 0 of this report are used.

In Revision 0 of this report, missing data were estimated, based on the methodology presented in SNL-000198. Waste tanks were first classified into one of six groups, based on the volumes of the liquid, saltcake, and sludge layers. The criteria for the various tank classifications also are presented in SNL-000198. Data from tanks in a given classification were used to create a distribution that was assumed to describe the total population of data for a given tank classification. This distribution then was used to provide a range of data including the missing data. In cases where insufficient data were available to create a statistically valid distribution, data from similar groups of tanks were combined to create a distribution of data (SNL-000198). For single-point calculations, the mean of the distribution is used to describe the missing values. In Monte Carlo statistical analyses, the full range of data for the tank waste classification was used.

This methodology of providing values and distributions for missing data was not optimized to provide the "best" waste properties or compositions with respect to waste chemical makeup. This methodology was prepared to determine missing data for flammable gas safety analyses. Because sufficient analytical data for all waste types are not available to estimate the missing data at the waste-type level, the methodology in SNL-000198 was used to determine overall composition ranges when a finer resolution of data was not statistically justified. As a result, the mean values used in this analysis were not optimized based on waste characteristics, but were developed to fit the available data related to flammable gas safety analyses.

The SST 241-A-105 HGR has not been calculated. The steel liner leaked and the tank has been interim stabilized. The waste moisture content is unknown, but is expected to be very low. The HGR is very sensitive to moisture content (the main hydrogen source). Because this key parameter is unknown and cannot be estimated, no attempt is made to estimate the corresponding HGR. The input data of DST 241-AY-102 are from the latest core sampling results. The latest sampling has reflected depleted nitrate and nitrite values on the bottom segment (i.e., zero) in the tank and results in a factor of two HGR increase compared to the HGR calculated by the BBI data.

4.1.2 Derived Data

Once the input data were provided, the derived data were calculated before performing the final rate calculations. In the "derived data section" the input data are converted to the system of units used in the equations and other necessary parameters are derived. The derivation includes waste level, the tank surface area wetted by the waste, total mass, liquid fractions of the layers, layer heat load, layer density, total heat load, conversion of nitrate ion and nitrite ion to units of "moles per liter," conversion of TOC and aluminum to units of "weight percent," and water radiolysis and total radiolysis G-values. The purpose of the derived data section is twofold. First, necessary unit conversions were built into the spreadsheet so the spreadsheet can take the input data directly from the TCD. Second, it prepares the necessary parameters, which reduces the cumbersome task of completing the rate calculations and makes error checking easier and more effective. Details of the derived data are provided in Appendix B, Table B-2.

4.1.3 Calculated Hydrogen Generation Rates

The HGRs were calculated for the total tank waste, as well as for different waste layers. The waste layers are the convective layer (supernatant liquid) and the nonconvective layer (sludge/saltcake); a few tanks have a crust layer on top of the convective layer. The rates for each layer are presented as radiolysis rates, thermolysis rates, corrosion rates, and total generation rates in units of mole per kilogram per day and moles per cubic meter per second.

Details of the calculated rates per unit mass or per unit volume are provided in the Appendix B, Table B-3. Note that the unit rate of the corrosion rate is a function of wetted surface area, so the unit volume rate depends on the waste volume. The unit rate from corrosion is an average rate for a given tank waste volume. The total gas generation rate for a tank (in units of cubic feet per minute and liters per day) was calculated by multiplying the unit rates by the total waste volume; the results are provided in Appendix B, Table B-4. Table 4-1 lists the 10 tanks with the highest model-calculated hydrogen generation based on the current waste content.

For the water addition study, the input data are modified by adding 10 kgal of water to 100-series tank and 1 kgal to 200-series tank and listed in Appendix B, Table B-5. The required input data listed in Appendix B, Table B-1, are used as the starting point before water addition. It is assumed that the water is well mixed with supernatant, and that the concentration, density, and the weight percent of water of the supernatant are adjusted accordingly by a simple dilution factor. The dilution factor is the ratio between current waste volume and current waste volume plus the volume of 10 kgal and 1 kgal of water for 100- and 200-series tanks.

Table 4-1. Calculated Top Ten Hydrogen Generation Rates In Dome Space for 177 Tanks With Current Waste.

Tank	HGR from radiolysis Grad B/γr (ft^3/min)	HGR from radiolysis Grad alpha (ft^3/min)	HGR from thermolysis Gtherm (ft^3/min)	HGR from corrosion Gcorr (ft^3/min)	Percent of HGR from radiolysis (Grad B/γ)%	Percent of HGR from radiolysis (Grad alpha)%	Percent of HGR from thermolysis (Gtherm)%	Percent of HGR from corrosion (Gcorr)%	Total HGR from model Gmod (ft^3/min)
241-AY-102	3.40E-02	7.97E-04	8.97E-04	3.35E-04	94.4%	2.21%	2.5%	0.9%	3.60E-02
Supernatant	2.17E-04	8.74E-07	3.75E-04	1.60E-04	28.8%	0.12%	49.8%	21.3%	7.53E-04
Solid Layer	3.37E-02	7.96E-04	5.22E-04	1.75E-04	95.8%	2.26%	1.5%	0.5%	3.52E-02
241-AZ-102	2.02E-02	1.15E-03	6.70E-04	1.47E-04	91.1%	5.19%	3.0%	0.7%	2.22E-02
Supernatant	1.13E-02	3.54E-06	5.05E-04	8.06E-05	95.0%	0.03%	4.3%	0.7%	1.18E-02
Solid Layer	8.97E-03	1.15E-03	1.65E-04	6.64E-05	86.7%	11.09%	1.6%	0.6%	1.04E-02
241-AZ-101	1.85E-02	9.19E-04	2.47E-03	1.50E-04	83.9%	4.17%	11.2%	0.7%	2.21E-02
Supernatant	9.05E-03	3.56E-07	2.21E-03	8.53E-05	79.8%	0.00%	19.5%	0.8%	1.13E-02
Solid Layer	9.46E-03	9.18E-04	2.63E-04	6.51E-05	88.4%	8.58%	2.5%	0.6%	1.07E-02
241-AN-102	3.65E-03	2.34E-05	5.94E-03	1.47E-04	37.4%	0.24%	60.9%	1.5%	9.76E-03
Supernatant	3.16E-03	1.37E-05	5.36E-03	8.16E-05	36.7%	0.16%	62.2%	0.9%	8.61E-03
Solid Layer	4.94E-04	9.72E-06	5.85E-04	6.56E-05	42.8%	0.84%	50.7%	5.7%	1.15E-03
241-C-103	8.48E-03	4.30E-04	0.00E+00	6.24E-04	88.9%	4.51%	0.0%	6.5%	9.53E-03
Supernatant	4.78E-07	7.92E-09	0.00E+00	4.77E-07	49.6%	0.82%	0.0%	49.5%	9.62E-07
Solid Layer	8.47E-03	4.30E-04	0.00E+00	6.24E-04	88.9%	4.51%	0.0%	6.5%	9.53E-03
241-AN-107	4.42E-03	9.28E-05	3.52E-03	1.50E-04	54.0%	1.13%	43.0%	1.8%	8.18E-03
Supernatant	3.16E-03	6.49E-05	2.81E-03	7.60E-05	51.7%	1.06%	46.0%	1.2%	6.12E-03
Solid Layer	1.26E-03	2.79E-05	7.05E-04	7.41E-05	60.9%	1.35%	34.2%	3.6%	2.06E-03
241-SX-103	7.64E-04	1.45E-05	6.17E-03	3.91E-04	10.4%	0.20%	84.1%	5.3%	7.34E-03
Supernatant	NA	NA	NA	NA	NA	NA	NA	NA	NA
Solid Layer	7.64E-04	1.45E-05	6.17E-03	3.91E-04	10.4%	0.20%	84.1%	5.3%	7.34E-03
241-SX-105	3.87E-04	2.41E-05	4.39E-03	3.49E-04	7.5%	0.47%	85.2%	6.8%	5.15E-03
Supernatant	NA	NA	NA	NA	NA	NA	NA	NA	NA
Solid Layer	3.87E-04	2.41E-05	4.39E-03	3.49E-04	7.5%	0.47%	85.2%	6.8%	5.15E-03
241-AY101	3.95E-03	6.03E-04	5.87E-05	8.05E-05	84.2%	1.29E-01	1.3%	1.7%	4.69E-03
Supernatant	2.05E-05	8.58E-07	3.21E-05	1.86E-05	28.4%	1.19E-02	44.6%	25.8%	7.20E-05
Solid Layer	3.93E-03	6.02E-04	2.66E-05	6.20E-05	85.0%	1.30E-01	0.6%	1.3%	4.62E-03
241-AN-104	1.24E-03	1.01E-06	2.02E-03	1.47E-04	36.3%	2.98E-04	59.4%	4.3%	3.40E-03
Supernatant	7.16E-04	2.39E-08	9.91E-04	5.33E-05	40.7%	1.36E-05	56.3%	3.0%	1.76E-03
Solid Layer	5.20E-04	9.90E-07	1.03E-03	9.34E-05	31.6%	6.02E-04	62.6%	5.7%	1.64E-03

Notes:

To convert cubic feet to liters, multiply the value by 28.454 L/ft^3.

HGR = hydrogen generation rate.

NA = not applicable.

DST 241-AY-102 has the largest HGR, 3.60 E-2 ft^3/min; this rate is approximately 70 percent of the value of 5.66 E-2 ft^3/min calculated in Revisions 3 of this report. The rate difference may result from the latest core sampling results of tank 241-AY-102, which show that the nitrate and nitrite has clear gradient values decreased from top to bottom and only the bottom segment has shown a value less than detection limit. Again, the nitrate and nitrite values are less than detection limit, and results in a large water radiolysis G-value of 0.24 H_2 per 100 electron volts because there is no scavenging effect from the nitrite and nitrite salts. The generation rate of the solid layer in Revision 4 was calculated by summing the generation rate of individual layers based on the each segment data of the core sampling. In Revision 3, the nitrate and nitrite are treated as zero and use the average value of strontium and cesium for whole solid layer. Also note that the generation rate of SST 241-C-103 has jumped to the top ten, where the HGR increased by a factor of four compared to Revision 3 calculation. This increase is due to the HGR model update. The water radiolysis G-value has increased from the Revision 3 default value of 0.005 to 0.22 in Revision 4. Also note that this dramatic change in G-H_2O has been amplified by multiplying a large heat load of 10 Kw for this tank. With the new water radiolysis equation, the G-H_2O of many tanks increased, however, not all of the tanks had a large increase in HGR depending the heat load. In addition, the HGR of tank 241-A-104 has dropped from the top ten because the current BBI assessment indicates that the weight percent water of the waste drops to zero and it leads to almost no hydrogen generation. Generation rates from radiolysis, thermolysis, and corrosion are listed in Table 4-1 for solid and liquid layers for each tank. The contribution from thermolysis and radiolysis varied from tank to tank. Corrosion contributed 7% or less to the overall HGR for the listed tanks in Table 4-1. Tanks without sample-based data use the default data from the waste grouping analysis, which have a larger uncertainty.

4.2 TANK VENTILATION RATES AND STEADY-STATE GAS CONCENTRATIONS

Tank ventilation and steady-state gas concentration data collection and data reduction are documented in RPP-5660, *Collection and Analysis of Selected Tank Headspace Parameter Data*. Ventilation rates at the tank outlet were determined by a number of methods, including tracer studies, Standard Hydrogen Monitoring System hydrogen composition decay curves, direct measurements of hydrogen, and calculations from earlier flammable gas hazard analyses. The ventilation rates were for normal ventilation conditions, either passive or active, in conjunction with steady-state gas concentration data to estimate the gas release rates.

Dome space gas composition data were based on analytical data from RPP-5660, when available. The TWINS database was queried to obtain all gas sample data. The data were reduced using mean values for single-point calculations and derived distributions for Monte Carlo analyses. Values for missing data were determined using the methodology described in SNL-000198. The ventilation rates and the steady-state gas concentrations under normal operating conditions, along with waste volumes and dome space volumes for all 177 tanks, are listed in Appendix D, Table D-1. For sludge tanks, dome space gas concentrations are very small, less than 50 ppm hydrogen, methane, and ammonia. For these tanks, the ratios between the various gases are questionable and are not an accurate analysis of gas generation rates.

4.3 STEADY-STATE GAS RELEASE RATES FOR H_2, NH_3, CH_4, AND N_2O

To evaluate the steady-state flammability levels under different ventilation conditions, the steady-state gas release rates were used to calculate the flammable gas concentrations for a given ventilation condition. For hydrogen, the steady-state release rates were calculated by subtracting the gas accumulation rate from the model calculated generation rate. The HGRs are calculated in Section 4.1 and listed in Appendix B. In the past, a few tanks had a noticeable waste level increase. The waste level increase rate can be converted to a total waste volume increase rate, which then is multiplied by the hydrogen fraction obtained from the retained gas sample analysis. The steady-state gas release rates of CH_4, NH_3, and N_2O were derived from the steady-state concentrations under normal ventilation rates using Equation 3-15. he historical data derived release may be too large compared to the calculated hydrogen generation rate because of the effect of waste transfers. Since the calculated hydrogen generation rate reflects the latest tank inventory data, the calculations of methane release were constrained to no more than 20% of the latest calculated hydrogen generation rate of that tank. The calculated gas release rates of H_2, NH_3, CH_4, and N_2O are listed in Appendix D, Table D-1.

For ammonia, however, the method described in the previous paragraph would largely overestimate the steady-state concentrations under off-normal ventilation conditions for those tanks having relatively large release rates calculated from the steady-state concentration. For example, for DST 241-SY-101, the steady-state release rate obtained from the dome space concentration of 400 ppm under normal ventilation conditions predicts a steady-state concentration of 108% of the LFL for the off-normal ventilation condition. This value is two orders of magnitude larger than the current estimated value of 0.4% of the LFL using the liquid-vapor equilibrium mechanism. In Revision 0, similar overestimations of ammonia concentration also were reported for DSTs 241-AN-102 and 241-AN-107.

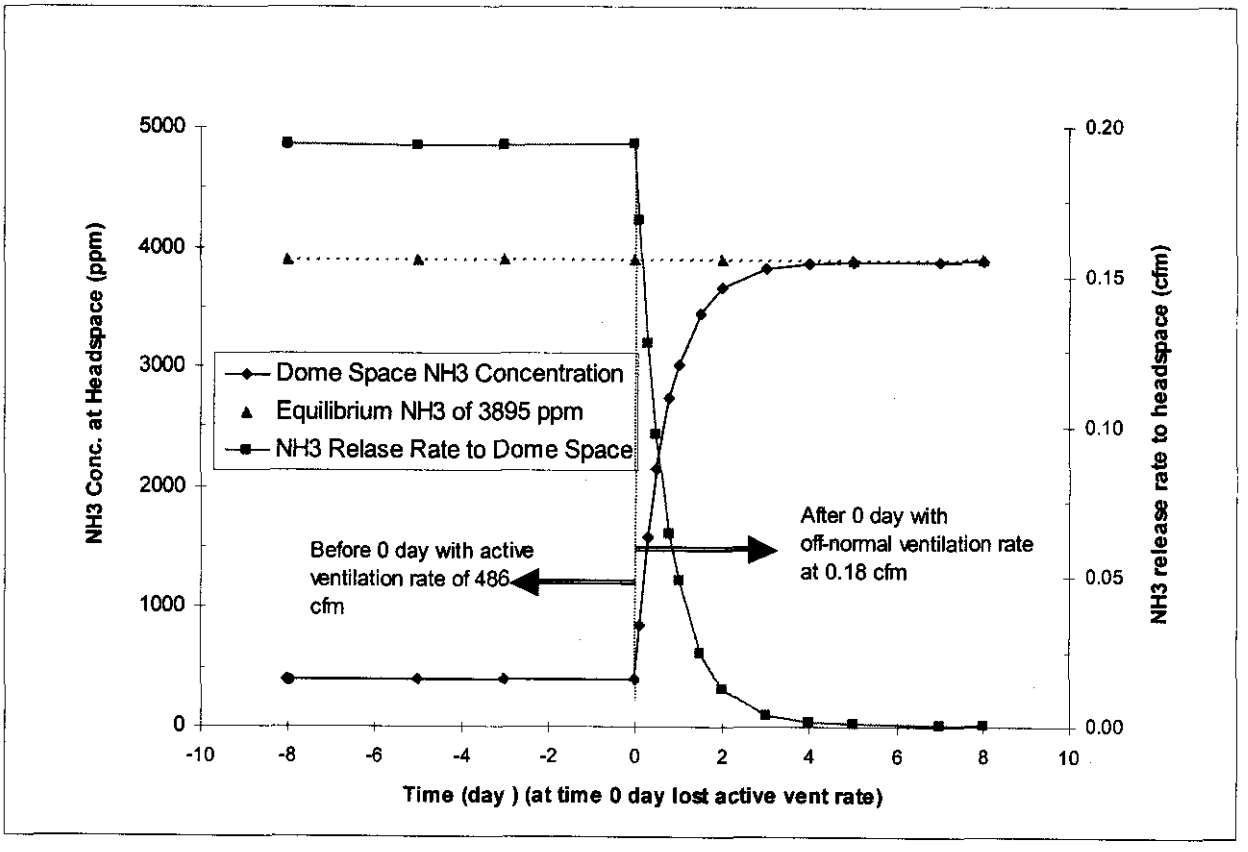
As described in Chapter 3.0, ammonia is very soluble, and the gas release rate is not a constant but is governed by the liquid-vapor equilibrium defined by Henry's Law, the mass transport coefficient, h, and the effective transport surface area, A. The ammonia release rate is driven by the gradient between the vapor and liquid phases before reaching equilibrium. Therefore, a greater difference results in a larger release rate.

For a closed system (i.e., a zero ventilation rate), the final release rate is zero when the system reaches equilibrium. An open system will never reach the equilibrium concentration, but will reach a steady-state release condition. At steady state, the concentration is lower than the equilibrium value, and the larger the ventilation rate, the lower the steady-state concentration of ammonia. For a given system, the release rate at steady state also is proportional to the ventilation rate. Therefore, if the steady-state release rate obtained at a high ventilation rate (i.e., normal active ventilation) is used as a constant to predict the steady-state concentrations for the off-normal low ventilation condition, the ammonia dome space concentration for the off-normal ventilation condition could be greatly overestimated.

Figure 4-1 demonstrates the relationship of the equilibrium value, the steady-state concentration, and the release rate of ammonia under both normal and off-normal conditions for DST 241-SY-101 after remediation. As shown in Figure 4-1 for the normal ventilation rate of 486 ft^3/min, the steady-state concentration of ammonia is 400 ppm, which is far below the

equilibrium value of 3,895 ppm. For an off-normal ventilation rate of 0.18 ft^3/min, the ammonia concentration is computed to increase exponentially and took less than 8 days to reach steady state with the concentration of 3,882 ppm, which is lower than but very close to the equilibrium value. Also, note that the steady-state release rate from 0.19 ft^3/min under normal ventilation conditions of 486 ft^3/min is computed to drop exponentially to 7.6 E-4 ft^3/min for the off-normal ventilation condition of 0.18 ft^3/min.

Figure 4-1. Ammonia Concentration and Release Rate for Double-shell Tank 241-SY-101 Before and After Loss of Active Ventilation.



For many SSTs and some of the DSTs with lower concentrations of ammonia, the ammonia release rate was too small to contribute significantly to reaching 25% of the LFL even under off-normal ventilation conditions. Therefore, this method of considering ammonia release rates as constants would be a simple method for screening out tanks with small release rates. Using this method would prevent use of the liquid-vapor equilibrium method, which requires liquid and dome space ammonia concentration data and more complex calculations.

4.4 STEADY-STATE MASS TRANSPORT PROPERTIES "h" AND "A" FOR AMMONIA

As discussed in Chapter 3.0, it is difficult to estimate the effective area, A, of the mass transport in the liquid-vapor equilibrium model. The effective area is the actual waste surface area

available for ammonia transport, and will be the full or partial tank cross-sectional area depending on how much true liquid surface is available. The ammonia concentration could be overestimated by two orders of magnitude in the liquid-vapor equilibrium model if 100% of the effective area is used. In this report, the ammonia concentration analysis follows the logic in the following steps to perform the dome space ammonia calculations:

1. The ammonia concentration in all DSTs was analyzed using the liquid-vapor equilibrium model as described in Chapter 3.0. The mass transport properties, the product of h and A, were obtained from the steady-state concentration under normal conditions by applying Equation 3-17. Then, using this product of h and A, the time-dependent ammonia concentration and flammability under off-normal conditions were calculated.
2. The ammonia concentrations for the SSTs were first evaluated by assuming a constant release rate. If the ammonia concentrations computed using this conservative approach were more than 0.5% and the total flammability was above 20% of the LFL, the ammonia concentration was reanalyzed more accurately using the liquid-vapor equilibrium method as was done for the DSTs.

The input data collected included the ammonia concentrations in the liquid and in the dome space under normal ventilation conditions, the waste volume and ionic composition, and the temperatures of the waste and the dome space under both normal and off-normal conditions. Appendix C, Table C-1, gives the liquid concentrations in the DSTs and selected SSTs for the ions such as nitrate, nitrite, and aluminum used in the calculation of the HGR. The additional ion constituents required are carbonate, chloride, chromium, fluorine, hydroxide, iron, nickel, phosphate, potassium, sodium, and sulfate. Other required data include the tank waste density, temperature, and weight-percent water. These data were obtained from the BBI reports. Where tank ion concentrations or waste properties were not available in the BBI detail report, an average value from the sample analysis data contained in the TCD was used. The tank waste temperature values were the only figures not taken from the BBI or the TCD. They were obtained from RPP-5660, Table 3-2. However, the input data for ammonia calculation were not updated in Revision 3 because the required liquid ammonia data is not available. The ammonia calculations remain the same as in Revision 1 of the report; however, ammonia has a minor contribution to the flammability at steady-state.

Based on Equation 3-8, the Henry's Law constants were calculated and are listed in Appendix C, Table C-2. Table C-2 also includes the summations of ion concentrations, the Henry's Law constants in pure water, and the correction factors for the calculated Henry's Law constants, K_H, for salt solutions. The correction factors were assigned using the tank waste concentrations and temperatures according to the study results for ammonia solubility in high-concentration salt solutions (RPP-4941). The mass transport properties of the product h and A were calculated using Equation 3-17 and are listed in Appendix C, Table C-3. Based on the products of h and A, the time-dependent ammonia concentration and percent of the LFL under off-normal ventilation conditions were calculated, as discussed in Section 4.5. As discussed in Chapter 3.0, the product of h and A depends on the waste configuration and physical and chemical properties, particularly the surface area, A, which is the effective surface for gas transport from the liquid to the vapor phase. For example, if the waste was disturbed or the configuration of the waste surface changed, both the effective surface area and h could change, so the product of h and A would

change. Therefore, what has been calculated as the product of h and A in this report reflects only the current ammonia transport status of storage tank waste at steady state.

As a comparison, Table 4-2 lists the products of h and A from the values derived from the field data under normal conditions using Equation 3-17 and from the calculated h using the equations in Appendix E with a 100% tank surface area, A. For most of the tanks, the values for h and A derived from field data are a few orders of magnitude smaller than the values from the calculated h and 100% area A. Two possible factors can contribute to this discrepancy. First, many tanks may not have 100% transport area A, particularly for those tanks having a large crust layer or solid waste on the surface. Second, from Equation 3-17, the field-data-derived values of h and A rely mainly on the ammonia vapor data and ventilation rate in the headspace, and the corresponding value of liquid concentration in the waste (usually the value of $K_H P v C_g^{ss}$ is much smaller than C_l). The uncertainties of these input data and the fact that these data are not measured simultaneously can contribute to errors in the field-derived h and A values.

Next, the ammonia underneath the liquid surface could be depleted and present a large gradient throughout the tank. In this case, the measured liquid-phase ammonia data from the middle or bottom sections of the tank will be too large for the observed vapor data. Also, the equations used to calculate h in Appendix E may involve large uncertainties. In all cases, note that the values of the product of h and A determine how fast the ammonia will be released to the dome space. The bounding value for the flammability is the steady-state ammonia concentration in the dome space. The last column of Table 4-2 lists the steady-state ammonia concentrations under off-normal conditions. For all calculated values, the ammonia concentration is less than 8,300 ppm, which contributes less than 6% of the LFL to the total flammability.

Table 4-2. The Calculation of Ammonia Transport Properties. (2 sheets)

Tank	$(NH_3)^{ss}$ in Dome Under Normal Vent (ppm)	Liquid $[NH_3]$ in Waste (µg/mL)	Normal Vent Rate in the Dome Space (ft^3/min)	Product h A (ft^3/min) From Field Data at Normal Vent	Product h A (ft^3/min) From Calculated h and 100% A	$(NH_3)^{ss}$ at Off-Normal Vent (ppm)
241-AN-101	11	40	113	2.85 E-02	1.02 E+00	55
241-AN-102	300	210	119	1.80 E-01	2.03 E+00	857
241-AN-103	7	345	100	1.33 E-03	3.50 E+00	2,034
241-AN-104	21	246	100	5.92 E-03	3.08 E+00	2,011
241-AN-105	15	210	100	5.02 E-03	2.91 E+00	1,523
241-AN-106	1	210	117	3.99 E-04	1.12 E+00	123
241-AN-107	400	210	129	3.60 E-01	1.94 E+00	759
241-AP-101	125	439	108	2.57 E-02	1.26 E+00	827
241-AP-102	75	439	135	1.83 E-02	1.15 E+00	728
241-AP-103	1	250	200	5.76 E-04	1.48 E+00	248
241-AP-104	3	133	71	1.23 E-03	1.18 E+00	136
241-AP-105	7	324	176	2.79 E-03	1.75 E+00	800
241-AP-106	5	68	111	6.54 E-03	1.11 E+00	104

Table 4-2. The Calculation of Ammonia Transport Properties. (2 sheets)

Tank	$(NH_3)^{ss}$ in Dome Under Normal Vent (ppm)	Liquid $[NH_3]$ in Waste (μg/mL)	Normal Vent Rate in the Dome Space (ft^3/min)	Product h A (ft^3/min) From Field Data at Normal Vent	Product h A (ft^3/min) From Calculated h and 100% A	$(NH_3)^{ss}$ at Off-Normal Vent (ppm)
241-AP-107	5	1,060	342	1.16 E-03	7.14 E-01	909
241-AP-108	27	800	129	3.14 E-03	8.82 E-01	852
241-AW-101	5	10	100	3.92 E-02	3.05 E+00	89
241-AW-102	3	74	292	7.16 E-03	7.74 E-01	80
241-AW-103	138	512	134	3.63 E-02	7.06 E-01	437
241-AW-104	6	169	141	3.64 E-03	6.99 E-01	142
241-AW-105	43	1,010	194	5.97 E-03	5.49 E-01	625
241-AW-106	28	355	158	8.59 E-03	2.06 E+00	1,164
241-AY-101	5	113	250	7.69 E-03	1.55 E+00	286
241-AY-102	4	74	250	1.05 E-02	1.60 E+00	207
241-AZ-101	1	125	150	8.31 E-04	2.79 E+00	331
241-AZ-102	6	438	112	1.01 E-03	1.96 E+00	1,181
241-SY-101	400	1,044	486	1.42 E-01	2.09 E+00	3,870
241-SY-102	12	1,150	363	2.67 E-03	1.24 E+00	1,771
241-SY-103	59	1,290	116	3.88 E-03	3.14 E+00	5,581
241-A-101	394	531	10	5.17 E-03	3.74 E+00	8,253
241-A-103	261	531	8	2.61 E-03	3.21 E+00	2,922
241-C-103	324	1,210	10	1.94 E-03	1.88 E+00	3,159
241-S-101	765	1,210	6	2.94 E-03	2.59 E+00	5,817
241-S-102	588	1,700	2	5.47 E-04	3.01 E+00	4,312
241-SX-103	31	1,800	53	6.11 E-04	3.55 E+00	4,977
241-U-102	651	745	2	1.66 E-03	2.08 E+00	2,157
241-U-103	722	1,400	2	9.56 E-04	2.47 E+00	4,582
241-U-105	1,936	1,600	5	5.64 E-03	2.22 E+00	6,909
241-U-107	448	403	12	1.34 E-02	1.98 E+00	1,380
241-U-108	684	1,050	4	1.87 E-03	2.57 E+00	4,345

Note:

To convert the unit of ft^3 to L, multiply the value by 28.454 L/ft^3.

4.5 FLAMMABILITY EVALUATION AND RESULTS

With the collected ventilation rates and steady-state gas concentrations, the flammable gas concentrations, expressed as a percent of the LFL, in the tank dome space under normal ventilation conditions were calculated using Equation 3-18 and are listed in Appendix D, Table D-1. The highest observed level is < 2.63% of the LFL (SST 241-C-103). This suggests

that the tank dome space of all tanks under current ventilation rates, whether actively or passively ventilated, will not exceed 25% of the LFL.

For off-normal ventilation conditions, there is no guarantee that every tank will have a pathway for barometric breathing due to the sealing-off action for interim stabilization; thus the flammability calculation will be performed under both barometric breathing rate and zero ventilation rate for water addition and temperature increase condition. A study focusing on the sensitivity of waste temperature and water addition in the flammability evaluation under zero ventilation for DSTs has been done and documented in Appendix H of Revision 3 of this document. The study concluded that for the flammability evaluation under zero ventilation condition, 10 and 1 kgal of water will be added to the tank waste for 100- and 200-series DST and SSTs. Also 5 °C temperature increase will apply to all DSTs. In addition, the diffusion mechanism through concrete tank dome has been included in the flammability calculation under zero ventilation condition for 149 SSTs.

Detailed calculation results on the case of water addition and 5 °C temperature increase for DSTs are given in Appendix D. The summarized results are given in Tables 4-3 under barometric breathing condition, and Tables 4-4 and 4-5 for DSTs and SSTs, respectively under zero ventilation condition with water addition and temperature study.

4.5.1 Off-Normal Condition With Barometric Breathing

For off-normal ventilation rates, assuming only barometric breathing rate, $V_{bb,}$, is available (discussed in Section 4.2), the steady-state concentration can be calculated using Equation 3-13 for insoluble gas and using Equation 3-16 for the soluble gas; the results are listed in Appendix D, Table D-2. In the calculation for the off-normal condition, the initial concentrations are assumed to be the steady-state concentrations under normal ventilation conditions; these concentrations are listed in Appendix D, Table D-1. As listed in Table D-2, under the off-normal condition with barometric breathing rate, 30 tanks are computed to exceed 25% of the LFL when the system reaches steady state, and 7 tanks are predicted to reach 100% of the LFL.

Equation 3-18 gives the formula to calculate the flammable gas concentrations at a given time with the aid of a time-dependent gas concentration equation (Equation 3-6 for insoluble gas and Equation 3-12 for soluble gas). Because the time variable cannot be expressed explicitly in an equation, a customized Excel macro was developed using Visual Basic to iterate the calculations by increasing the time until the specified LFLs in Equation 3-18 are met. The calculated times to reach 25% and 100% of the LFL (time-to 25% LFL and 100% LFL) under the off-normal ventilation condition with barometric breathing rate are listed in Appendix D, Tables D-3 and D-4. In the calculations, the flammability level of each flammable gas also is calculated for each case to understand the distribution of each gas's contribution to the total LFL.

Another needed variable is the minimum ventilation rate required to prevent the tank dome space from exceeding 25% of the LFL. Equation 3-18 gives the time-dependent flammable gas concentration in terms of percent of the LFL; however, the ventilation rate is embedded in the time-dependent concentration as given in Equations 3-6 and 3-12. No explicit solution was developed to find the minimum ventilation rate in Equation 3-18. For those tanks exceeding the

specified flammability level, the minimum ventilation rate can be found by gradually increasing the ventilation rate from zero until a total flammability level of less than the specified 25% or 100% of the LFL, is obtained. A customized Excel macro was developed using Visual Basic code to iterate this equation automatically to find the minimum ventilation rate. Details of the calculated minimum ventilation rates are listed in Appendix D, Tables D-3 and D-4, for 25% and 100% of the LFL, respectively.

Table 4-3 lists all the tanks (22 DSTs and 8 SSTs) that will reach 25% of the LFL with current waste content and barometric breathing only. In the off-normal condition with barometric breathing rate, DST 241-AY-102 and SST 241-B-203 give the shortest time to 25% of the LFL as 12and 31 days for DSTs and SSTs, respectively. Overall, under barometric breathing rate, five DSTs and two SSTs are computed to reach 100% of the LFL if the off-normal condition persists long enough. It takes 58 and 184 days to reach 100% of the LFL for DST 241-AY-102 and SST 241-B-203, respectively. Note that the results of this calculation listed in Table 4-3 are based on the BBI information queried on September 27, 2004.

Table 4-3. Time to Reach 25% and 100% of the LFL With Water Addition Under Barometric Breathing Condition. (2 sheets)

DSTs	Time to reach 25% LFL $t_{25\%}$ (day)	Time to reach 100% LFL $t_{100\%}$ (day)	SSTs	Time to reach 25% LFL $t_{25\%}$ (day)	Time to reach 100% LFL $t_{100\%}$ (day)
241-AY-102	12	58	241-B-203*	31	184
241-AZ-102	15	72	241-B-204*	34	211
241-AZ-101	17	80	241-C-103*	75	not occur
241-AN-102	19	92	241-SX-103*	108	not occur
241-AN-107	21	107	241-SX-105*	215	not occur
241-AN-104	66	not occur	241-T-201	247	not occur
241-AW-104	67	not occur	241-C-107	305	not occur
241-AN-105	82	not occur	241-C-104	671	not occur
241-AW-101	90	not occur			
241-AN-101	92	not occur			
241-AN-103	132	not occur			
241-AP-108	132	not occur			
241-AP-102	182	not occur			
241-AP-106	197	not occur			
241-AP-104	201	not occur			
241-SY-103	210	not occur			
241-AW-106	249	not occur			
241-AP-107	345	not occur			
241-SY-102	512	not occur			
241-AP-103	578	not occur			
241-AW-103	1023	not occur			

Table 4-3. Time to Reach 25% and 100% of the LFL With Water Addition Under Barometric Breathing Condition. (2 sheets)

DSTs	Time to reach 25% LFL $t_{25\%}$ (day)	Time to reach 100% LFL $t_{100\%}$ (day)	SSTs	Time to reach 25% LFL $t_{25\%}$ (day)	Time to reach 100% LFL $t_{100\%}$ (day)
241-AY-101	1180	not occur			

Notes:

[1]Tanks not listed here will not reach 25% of the LFL under barometric breathing conditions.

[2] Calculation based on the BBI data of September 27, 2004, and the PCSACs data from April 1, 2003 to April 1, 2004.

DST = double-shell tank.

LFL = lower flammability limit.

SST = single-shell tank.

4.5.2 Off-Normal Condition with Zero Ventilation

A zero ventilation condition means a closed system. Without considering or including other possible mechanisms for gas leaving the system, such as diffusion through the dome space concrete wall, it is expected that every tank will reach 100% of the LFL under zero ventilation given adequate time. A complete set of equations for flammability evaluation under zero ventilation is given in Section 3-7 for both soluble and insoluble gases. In this model calculation, it is reasonable to assume that the tank will not be pressurized, thus, the newly generated gas will slowly push the old gas composition out and form a new concentration of flammable gas without increasing the pressure.

For SSTs, if gas diffusion is considered as the only mechanism for ventilation, then the gas concentration such as hydrogen methane can be calculated using Equation 3-6b. The required gas diffusivity, thickness of the coating on the dome, the dome area, and the calculated effective diffusion rate are given in Table F-1 and F-2 of Appendix F. For ammonia, the diffusion mechanism is too small to impact its equilibrium concentration. So the ammonia concentrations remain unchanged during the calculation.

For DSTs, the temperature effect under zero ventilation condition is considered. Other than 5 °C temperature increase on top of current tank temperature, it also considers the temperature continues rising in the closed system. The temperature increase rates are calculated using Equation 3-28 for the case when temperatures of convective and non-convective layer are the same and using Equations 3-29 to 3-31 when the temperature is different. The required input data for the calculation for each layer of each tank includes density, volume, heat load, and waste temperature. Other input parameters commonly used in the calculations for all tanks are the following (values are taken from RPP-6213):

- Heat capacity: 3,300 J/kg,
- Air temperature: 285 °K,
- Soil temperature: 287 °K,
- Heat exchange area: 411 m^2,
- Soil thermal conductivity: 1 W/m-K,

- Soil overburden thickness: 4 m,
- Tank radius: 11 m.

For tanks treated as a whole, the temperature increase rate is the net heat rate, which is the tank heat load minus upward and downward heat lost, divided by the product of mass and heat capacity. For tanks with distinct temperatures between layers, the heat transfer coefficients are adjusted and determined until the calculated temperature increase rates are equal for convective and nonconvective layers. Once the heat transfer coefficients are determined, the heatup rates are finalized.

At the given initial temperature along with temperature increase rate, the gas concentrations for hydrogen and methane are calculated as the temperature changes in the time step of 1 day. The accumulated gas concentrations are calculated daily using Equation 3-23, since the day of losing the normal ventilation condition. The initial concentration condition in Equation 3-23 is a steady-state concentration at the normal ventilation condition. The hydrogen release rate, which is assumed to be the same as the HGR, is calculated daily using the rate equation model documented in RPP-3851, or summarized in Chapter 2.0, based on the calculated temperature of each day.

Because methane does not have a rate equation model available, its daily gas release rate is calculated with the initial release rate at the given initial tank waste temperature, plus the daily increase rate due to tank waste heatup under the zero ventilation condition. The daily increase rate of methane uses the same daily increase HGR, which is the ratio between the HGRs of the current and previous days. The initial methane rates at baseline temperature are taken from Appendix D, Table D-1. The initial methane release rate at baseline temperature plus 5 °C is calculated in the same ratio as the hydrogen release rate increases as shown in Equation 4-3:

$$MGR^{i}_{baseline+T} = MGR^{i}_{baseline} \cdot \frac{HGR^{i}_{baseline+T}}{HGR^{i}_{baseline}} \tag{4-3}$$

where:

$MGR^{i}_{baseline+T}$	=	methane initial release rate at baseline temperature plus T (ft^3/min)
$MGR^{i}_{baseline}$	=	methane initial release rate at baseline temperature (ft^3/min)
$HGR^{i}_{baseline+T}$	=	hydrogen initial release rate at baseline temperature plus T (ft^3/min)
$HGR^{i}_{baseline}$	=	hydrogen initial release rate at baseline temperature (ft^3/min).

Ammonia concentrations are calculated using Equation 3-25. Although ammonia concentration is also a function of temperature, to simplify the flammability evaluation the intention was to obtain one set of ammonia transport properties at the highest temperature for each tank and use it throughout the whole calculation. Calculations (Appendix H of Revision 3 of this document) show that the equilibrium ammonia vapor concentration at its highest temperatures due to temperature increase contributes to flammability is not too far from the contributions calculated at baseline temperature. In this calculation, the ammonia transport coefficients g_1 and g_2 derived at the initial temperature are used for the flammability calculations.

In the flammability calculations, there are several tanks that the N_2O concentration has increased to the model limit of 8% before the total flammability reached 100% of the LFL due to zero ventilation assumption. As mentioned in Section 3.2, the flammability level for individual flammable gas is 4%, 15%, and 5% for hydrogen, ammonia, and methane, respectively if the N_2O is less than 8%. When the mixture has more than 8% of N_2O, the individual flammable gas required less concentration than listed above to reach the flammability level of the LFL. For those tanks having high N_2O concentration, the calculations of "the time to reach 100% of the LFL" simply represents the time for the N_2O reach 8% while the total flammability is still less than 100% of the LFL.

Table 4-4 summarizes the flammability calculation for DSTs under off-normal ventilation condition at zero ventilation scenarios with 10 kgal water addition and 5 °C temperature increase. Under the zero ventilation the ratio of time to 100% to 25% of the LFL should be roughly four (some that are higher than four means the ammonia contribution is more significant and the ammonia concentration is not linearly increasing by time but governs by the liquid-vapor equilibrium mechanism). Those tanks with ratio less than four means the "time to reach 100% of the LFL" is the time to reach the 8% N_2O model limit but the flammability has not reached 100% of the LFL. As shown in Table 4-4, the five tanks with the shortest time to 25% of the LFL are 12, 14, 15, 15,and 20 days for tanks 241-AY1-102, 241-AZ-102, 241-AN-102, 241-AZ-101, and 241-AN-107, respectively. The minimum vent rates to keep the dome space below 100% of the LFL ranges between 0.98 to 0.01 ft^3/min.

Table 4-4. The Hydrogen Generation Rates, Time To 25% and 100% of the LFL and Minimum Vent Rate With 10 kgal Water Addition and 5 °C Temperature Increase Under Zero Ventilation for Double-shell Tanks (2 sheets)

Tank	Hydrogen generation rate $Rr(H_2)$ (ft^3/min)	Time[1] to Reach 25% of the LFL (days)	Time[1] to Reach 100% of the LFL (days)	Minimum Vent Rate to Keep below 25% LFL (ft^3/min)	Minimum Vent Rate to Keep below 100% LFL (ft^3/min)
241-AN-101	5.20E-03	74	285	0.54	0.13
241-AN-102	1.56E-02	15	44	1.62	0.40
241-AN-103	3.77E-03	92	314	0.41	0.10
241-AN-104	5.13E-03	54	194	0.55	0.13
241-AN-105	3.31E-03	66	249	0.36	0.09
241-AN-106	1.06E-03	457	1,500	0.11	0.03
241-AN-107	1.23E-02	20	79	1.30	0.32
241-AP-101	9.59E-04	234	322	0.11	0.03
241-AP-102	1.92E-03	120	342	0.22	0.05
241-AP-103	2.18E-03	198	719	0.23	0.06
241-AP-104	2.07E-03	130	494	0.21	0.05
241-AP-105	8.05E-04	690	1,159	0.10	0.02
241-AP-106	1.82E-03	129	499	0.18	0.05

Table 4-4. The Hydrogen Generation Rates, Time To 25% and 100% of the LFL and Minimum Vent Rate With 10 kgal Water Addition and 5 °C Temperature Increase Under Zero Ventilation for Double-shell Tanks (2 sheets)

Tank	Hydrogen generation rate $Rr(H_2)$ (ft^3/min)	Time[1] to Reach 25% of the LFL (days)	Time[1] to Reach 100% of the LFL (days)	Minimum Vent Rate to Keep below 25% LFL (ft^3/min)	Minimum Vent Rate to Keep below 100% LFL (ft^3/min)
241-AP-107	1.20E-03	175	343	0.14	0.03
241-AP-108	5.22E-03	98	390	0.53	0.13
241-AW-101	3.22E-03	71	252	0.33	0.08
241-AW-102	2.82E-04	1,500	1,500	0.03	0.01
241-AW-103	1.07E-03	219	890	0.13	0.03
241-AW-104	4.42E-03	57	225	0.51	0.13
241-AW-105	3.09E-04	1,500	1,500	0.04	0.01
241-AW-106	2.86E-03	149	618	0.31	0.07
241-AY-101	4.95E-03	150	270	0.51	0.13
241-AY-102	3.90E-02	12	43	3.94	0.98
241-AZ-101	2.47E-02	15	51	2.54	0.63
241-AZ-102	2.39E-02	14	56	2.48	0.62
241-SY-101	6.29E-04	1,160	1,500	0.08	0.02
241-SY-102	1.64E-03	199	839	0.20	0.05
241-SY-103	3.52E-03	126	464	0.43	0.10

Note:
[1]1500 in the column of Time to 25% and 100% of the LFL means equal or longer than 1,500 days.
LFL = lower flammability limit.

Table 4-5 summarizes the flammability calculation for SSTs under off-normal ventilation condition at zero ventilation scenarios with 10 kgal and 1 kgal water addition for 100- and 200-series tanks. The gas diffusion mechanism through the concrete dome are included in the calculations. Due the gas diffusion effect, there are 20 tanks will not reach 100% of the LFL including tank 241-A-104, four AX farm tanks, and fifteen SX farm tanks. The diffusion rates of these tanks are two orders of magnititude larger than the rest of tanks because their concrete tank domes are not coated with a coating such as Asphatic or Gunite. These coating materials increase the gas diffusion resistance. Asphatic coating is particularly hard for gas to pass through because its diffusivity is four orders of magnitude smaller than concrete's diffusivity. For the remaining tanks, the shortest time to 25% of the LFL are 29, 31, and 62 days from tanks 241-B-203, 241-B-204, and 241-C-103, respectively. There are thirteen tanks which have the time to 25% of the LFL shorter than 365 days.

Table 4-5. The Hydrogen Generation Rates, Time To 25% and 100% of the LFL and Minimum Vent Rate with Water Addition Under Zero Ventilation (Except Gas Diffusion Mechanism Through The Dome) for Single-shell Tanks. (5 sheets)

Tank	Hydrogen generation rate $Rr(H_2)$ (ft^3/min)	Time[2,3] to Reach 25% of the LFL (days)	Time[2,3] to Reach 100% of the LFL (days)	Minimum Vent Rate to Keep below 25% LFL (ft^3/min)	Minimum Vent Rate to Keep below 100% LFL (ft^3/min)
241-A-101	2.78E-03	226	1,165	0.31	0.07
241-A-102	8.22E-04	1,056	1,500	0.13	0.03
241-A-103	2.60E-03	301	1,355	0.29	0.07
241-A-104	2.32E-04	1,500	not occur	0.03	0.01
241-A-105	na	na	na	na	na
241-A-106	2.08E-03	387	1,500	0.29	0.07
241-AX-101	1.01E-03	not occur	not occur	0.11	0.03
241-AX-102	6.70E-04	not occur	not occur	0.08	0.02
241-AX-103	9.67E-04	not occur	not occur	0.13	0.03
241-AX-104	5.20E-03	not occur	not occur	0.52	0.13
241-B-101	4.16E-04	1,500	1,500	0.05	0.01
241-B-102	2.31E-04	1,500	1,500	0.02	0.01
241-B-103	2.33E-04	1,500	1,500	0.03	0.01
241-B-104	3.52E-04	1,091	1,500	0.04	0.01
241-B-105	3.15E-04	1,500	1,500	0.04	0.01
241-B-106	2.96E-04	1,500	1,500	0.04	0.01
241-B-107	2.74E-04	1,500	1,500	0.04	0.01
241-B-108	2.46E-04	1,500	1,500	0.03	0.01
241-B-109	2.56E-04	1,500	1,500	0.04	0.01
241-B-110	5.33E-04	795	1,500	0.07	0.02
241-B-111	7.66E-04	610	1,500	0.09	0.02
241-B-112	2.50E-04	1,500	1,500	0.03	0.01
241-B-201	6.02E-05	331	1,454	0.01	0.002
241-B-202	5.73E-05	381	1,500	0.01	0.00
241-B-203	2.01E-04	29	128	0.02	0.005
241-B-204	2.06E-04	31	139	0.02	0.005
241-BX-101	2.44E-04	1,500	1,500	0.04	0.01
241-BX-102	2.43E-04	1,500	1,500	0.03	0.01
241-BX-103	3.24E-04	1,443	1,500	0.05	0.01
241-BX-104	3.64E-04	1,236	1,500	0.09	0.02
241-BX-105	2.75E-04	1,500	1,500	0.06	0.02
241-BX-106	2.94E-04	1,500	1,500	0.04	0.01
241-BX-107	3.99E-04	825	1,500	0.06	0.01

Table 4-5. The Hydrogen Generation Rates, Time To 25% and 100% of the LFL and Minimum Vent Rate with Water Addition Under Zero Ventilation (Except Gas Diffusion Mechanism Through The Dome) for Single-shell Tanks. (5 sheets)

Tank	Hydrogen generation rate $Rr(H_2)$ (ft^3/min)	Time[2,3] to Reach 25% of the LFL (days)	Time[2,3] to Reach 100% of the LFL (days)	Minimum Vent Rate to Keep below 25% LFL (ft^3/min)	Minimum Vent Rate to Keep below 100% LFL (ft^3/min)
241-BX-108	2.52E-04	1,500	1,500	0.03	0.01
241-BX-109	5.07E-04	989	1,500	0.06	0.02
241-BX-110	3.65E-04	1,163	1,500	0.05	0.01
241-BX-111	2.82E-04	1,500	1,500	0.04	0.01
241-BX-112	3.30E-04	1,250	1,500	0.06	0.02
241-BY-101	7.73E-04	671	1,500	0.09	0.02
241-BY-102	3.43E-04	1,483	1,500	0.07	0.02
241-BY-103	4.24E-04	1,084	1,500	0.06	0.01
241-BY-104	6.49E-04	679	1,500	0.12	0.03
241-BY-105	5.79E-04	612	1,500	0.10	0.02
241-BY-106	7.58E-04	664	1,500	0.08	0.02
241-BY-107	4.62E-04	1,062	1,500	0.18	0.05
241-BY-108	4.37E-04	1,196	1,500	0.20	0.05
241-BY-109	3.38E-04	1,481	1,500	0.05	0.01
241-BY-110	1.29E-03	346	1,500	0.27	0.07
241-BY-111	3.39E-04	1,500	1,500	0.04	0.01
241-BY-112	3.38E-04	1,500	1,500	0.06	0.01
241-C-101	3.33E-04	1,500	1,500	0.05	0.01
241-C-102	4.77E-04	662	1,500	0.11	0.03
241-C-103	9.54E-03	62	285	1.02	0.25
241-C-104	1.65E-03	213	1,068	0.27	0.07
241-C-105	9.20E-04	490	1,500	0.14	0.03
241-C-106	9.92E-04	668	1,500	0.12	0.03
241-C-107	3.05E-03	130	688	0.31	0.08
241-C-108	3.39E-04	1,500	1,500	0.03	0.01
241-C-109	7.95E-04	879	1,259	0.08	0.02
241-C-110	7.15E-04	569	1,500	0.11	0.03
241-C-111	1.55E-03	463	1,500	0.16	0.04
241-C-112	1.68E-03	389	934	0.18	0.04
241-C-201	1.98E-05	1,500	1,500	0.002	0.0006
241-C-202	2.02E-05	1,500	1,500	0.002	0.0005
241-C-203	1.89E-05	1,500	1,500	0.003	0.0006
241-C-204	1.84E-05	1,500	1,500	0.00	0.0005

Table 4-5. The Hydrogen Generation Rates, Time To 25% and 100% of the LFL and Minimum Vent Rate with Water Addition Under Zero Ventilation (Except Gas Diffusion Mechanism Through The Dome) for Single-shell Tanks. (5 sheets)

Tank	Hydrogen generation rate $Rr(H_2)$ (ft^3/min)	Time[2,3] to Reach 25% of the LFL (days)	Time[2,3] to Reach 100% of the LFL (days)	Minimum Vent Rate to Keep below 25% LFL (ft^3/min)	Minimum Vent Rate to Keep below 100% LFL (ft^3/min)
241-S-101	1.05E-03	498	1,500	0.13	0.03
241-S-102	7.46E-04	645	1,500	0.09	0.02
241-S-103	5.00E-04	1,271	1,500	0.06	0.01
241-S-104	6.10E-04	955	1,500	0.07	0.02
241-S-105	3.67E-04	1,133	1,500	0.06	0.01
241-S-106	5.21E-04	920	1,500	0.06	0.02
241-S-107	7.23E-04	655	1,500	0.10	0.02
241-S-108	4.27E-04	991	1,500	0.05	0.01
241-S-109	4.25E-04	894	1,500	0.05	0.01
241-S-110	5.75E-04	734	1,500	0.10	0.03
241-S-111	6.53E-04	849	1,500	0.07	0.02
241-S-112	3.17E-04	1,500	1,500	0.04	0.01
241-SX-101	1.37E-03	not occur	not occur	0.14	0.04
241-SX-102	2.15E-03	not occur	not occur	0.22	0.06
241-SX-103	7.69E-03	178	not occur	0.81	0.20
241-SX-104	2.19E-03	not occur	not occur	0.22	0.06
241-SX-105	5.66E-03	not occur	not occur	0.57	0.14
241-SX-106	7.82E-04	not occur	not occur	0.09	0.02
241-SX-107	1.06E-03	not occur	not occur	0.13	0.03
241-SX-108	1.61E-03	not occur	not occur	0.17	0.04
241-SX-109	1.94E-03	not occur	not occur	0.21	0.05
241-SX-110	7.43E-04	not occur	not occur	0.09	0.02
241-SX-111	1.81E-03	not occur	not occur	0.21	0.05
241-SX-112	5.47E-04	not occur	not occur	0.08	0.02
241-SX-113	2.45E-04	not occur	not occur	0.03	0.01
241-SX-114	1.63E-03	not occur	not occur	0.21	0.05
241-SX-115	1.75E-03	not occur	not occur	0.18	0.04
241-T-101	2.91E-04	1,500	1,500	0.04	0.01
241-T-102	2.42E-04	1,500	1,500	0.03	0.01
241-T-103	2.26E-04	1,500	1,500	0.03	0.01
241-T-104	3.49E-04	1,003	1,500	0.06	0.01
241-T-105	3.15E-04	1,442	1,500	0.05	0.01
241-T-106	2.24E-04	1,500	1,500	0.04	0.01

Table 4-5. The Hydrogen Generation Rates, Time To 25% and 100% of the LFL and Minimum Vent Rate with Water Addition Under Zero Ventilation (Except Gas Diffusion Mechanism Through The Dome) for Single-shell Tanks. (5 sheets)

Tank	Hydrogen generation rate $Rr(H_2)$ (ft^3/min)	Time[2,3] to Reach 25% of the LFL (days)	Time[2,3] to Reach 100% of the LFL (days)	Minimum Vent Rate to Keep below 25% LFL (ft^3/min)	Minimum Vent Rate to Keep below 100% LFL (ft^3/min)
241-T-107	4.26E-04	943	1,500	0.07	0.02
241-T-108	2.19E-04	1,500	1,500	0.03	0.01
241-T-109	2.34E-04	1,500	1,500	0.03	0.01
241-T-110	8.55E-04	494	1,500	0.09	0.02
241-T-111	4.17E-04	566	1,500	0.08	0.02
241-T-112	2.40E-04	1,500	1,500	0.03	0.01
241-T-201	1.45E-04	149	488	0.02	0.004
241-T-202	4.49E-05	618	931	0.01	0.001
241-T-203	6.62E-05	254	315	0.01	0.002
241-T-204	6.73E-05	240	284	0.01	0.002
241-TX-101	3.81E-04	1,500	1,500	0.05	0.01
241-TX-102	3.34E-04	1,500	1,500	0.09	0.02
241-TX-103	2.92E-04	1,500	1,500	0.05	0.01
241-TX-104	3.04E-04	1,500	1,500	0.03	0.01
241-TX-105	4.79E-04	784	1,500	0.06	0.01
241-TX-106	4.14E-04	1,076	1,500	0.09	0.02
241-TX-107	2.47E-04	1,500	1,500	0.06	0.02
241-TX-108	2.70E-04	1,500	1,500	0.03	0.01
241-TX-109	5.46E-04	736	1,111	0.14	0.03
241-TX-110	4.11E-04	943	1,500	0.22	0.06
241-TX-111	3.67E-04	1,253	1,500	0.20	0.05
241-TX-112	4.64E-04	567	1,500	0.07	0.02
241-TX-113	4.43E-04	741	1,500	0.05	0.01
241-TX-114	4.05E-04	846	1,500	0.09	0.02
241-TX-115	4.29E-04	978	1,500	0.05	0.01
241-TX-116	4.21E-04	924	1,500	0.05	0.01
241-TX-117	3.80E-04	1,307	1,500	0.04	0.01
241-TX-118	4.59E-04	1,210	1,500	0.06	0.02
241-TY-101	2.55E-04	1,500	1,500	0.03	0.01
241-TY-102	2.44E-04	1,500	1,500	0.03	0.01
241-TY-103	3.70E-04	1,500	1,500	0.05	0.01
241-TY-104	2.75E-04	1,500	1,500	0.05	0.01
241-TY-105	5.05E-04	1,316	1,500	0.06	0.01

Table 4-5. The Hydrogen Generation Rates, Time To 25% and 100% of the LFL and Minimum Vent Rate with Water Addition Under Zero Ventilation (Except Gas Diffusion Mechanism Through The Dome) for Single-shell Tanks. (5 sheets)

Tank	Hydrogen generation rate $Rr(H_2)$ (ft^3/min)	Time[2,3] to Reach 25% of the LFL (days)	Time[2,3] to Reach 100% of the LFL (days)	Minimum Vent Rate to Keep below 25% LFL (ft^3/min)	Minimum Vent Rate to Keep below 100% LFL (ft^3/min)
241-TY-106	2.50E-04	1,500	1,500	0.03	0.01
241-U-101	3.20E-04	1,500	1,500	0.05	0.01
241-U-102	9.09E-04	472	1,500	0.10	0.02
241-U-103	1.06E-03	308	1,500	0.13	0.03
241-U-104	4.80E-04	1,357	1,500	0.05	0.01
241-U-105	9.50E-04	331	554	0.14	0.03
241-U-106	8.46E-04	621	1,500	0.09	0.02
241-U-107	5.19E-04	801	801	0.06	0.02
241-U-108	8.02E-04	480	1,500	0.10	0.02
241-U-109	5.78E-04	680	1,500	0.06	0.02
241-U-110	5.01E-04	886	1,500	0.07	0.02
241-U-111	4.83E-04	841	1,500	0.08	0.02
241-U-112	3.04E-04	1,500	1,500	0.04	0.01
241-U-201	2.14E-05	1,500	1,500	0.003	0.0007
241-U-202	2.09E-05	1,500	1,500	0.003	0.0006
241-U-203	2.06E-05	1,500	1,500	0.002	0.0006
241-U-204	2.38E-05	1,500	1,500	0.003	0.0007

Notes:

[1]Water addition of 10 kgal and 1 kgal for 100- and 200-series, respectively.

[2]1,500 in the column of Time to 25% and 100% of the LFL means equal or longer than 1,500 days.

[3]For those tanks labeled as "not occurred" means the gas generation rate is so low such that the tank will not reach 25% or 100% of the LFL through the gas diffusion mechanism.

LFL = lower flammability limit.

4.6 DISCUSSION

In Revision 4 of this report, the flammability calculations show that the time to 25% of the LFL has become shorter for several tanks compared to the calculations in Revision 3. One of the dramatic changes is from tank 241-C-103, where the time to 25% of the LFL drops from 239 days (in Revision 3) to 62 days. The decrease in time to 25% of the LFL is because the HGR is increased by a factor of four due to large value of G_{H2O}. Using the newly developed water radiolysis equation (Equation 2-1) the low concentration of NO_3 and NO_2 in tank 241-C-103 results in the value of 0.224 for G_{H2O} in Revision 4 rather then the default value of 0.005 used in Revision 3, which is based on the old HGR model. Similarly, in tank 241-C-107 the G_{H2O} value used is 0.069 versus the default value of 0.005. Apparently the water radiolysis term has been underestimated for given intermediate salt condition in Revision 3 of this document.

This newly developed water radiolysis equation is more sensitive to the salt concentrations in wide range. The development of water radiolysis equation is based on a large set of laboratory data with a wide range of salt condition (0-12 moles of salts). Thus, it calculates the value of G_{H2O} more accurately for intermediate and dilute NO_3 and NO_2 conditions. Most of the values of G_{H2O} have gone up from the default value of 0.005 for given intermediate or low NO_3 and NO_2 conditions. The G_{H2O} value used for tanks 241-B-203, 241-B-204 and 241-T-201 are 0.099, 0.131, and 0.114, respectively, rather than the default value of 0.005 in Revision 3. However, the water radiolysis change effect dramatically impacts the final HGR only when the radiation dose or heat load is also large. The total radiation dose for beta/gamma is about 10 Kw and 14 Kw for 241-C-103 and 241-C-107, respectively, which are enormously large for SSTs, while the total radiation dose for tank 241-B-203, 241-B-204, and 241-T-201 are only one tenth watt or less. In other words, the change of G_{H2O} in 241-C-103 and 241-C-107 are amplified by their huge radiation dose. This is not the case for 241-B-203, 241-B-204 and 241-T-201.

In Revision 1, the dome space ammonia concentration in DST 241-SY-101 increased from 4 ppm (before-transfer data) to 400 ppm (January 2001 data), even though the liquid concentration decreased by a factor of 4 comparing data from before and after the waste was transferred out of the tank. The concentration increased because the thick crust had greatly reduced the ammonia transport from the waste to the dome space. After the waste had been transferred from DST 241-SY-101, most of the crust layer was removed and the effective area, A, for mass transport increased; therefore, the concentration in the dome space increased even though the concentration of the ammonia in the liquid decreased. Some thin crust has formed in DST 241-SY-101. Breaks in this crust appear periodically.

Following the transfer of waste from DST 241-SY-101, the dome space ammonia concentration increased from 50 to 400 ppm from July 2000 to January 2001, while the hydrogen concentration remained constant. This may be explained by changes in the effective surface area of mass transport. For example, calculations show that an effective surface area increase from 1.5% to 7% of the total tank waste surface area would account for the dome space concentration increase from 100 to 400 ppm. This effective area of 1.5% and 7% is roughly 70 and 300 ft^2, respectively, and is consistent with the estimated liquid pool of 10 ft (RPP-6517) and 20 ft or more in diameter, respectively, observed on the surface in the corresponding time period. Calculations also indicated that most of the SSTs for which calculations were done had effective surface areas as small as several tenths of 1% of the total tank waste surface. Caution should be taken in using the results of the calculated product of h and A from Appendix C, Table C-3 because the accuracy is limited by the accuracy of the input data. Whether these data, such as dome space ammonia concentration, ventilation rate, and liquid concentration, were collected at the same time also introduces uncertainty. DST 241-SY-101 is an example that shows that the model calculations agree reasonably with field observations when the input data are accurate and are taken in the same time frame.

Another observation is that the area of liquid surface in DST 241-SY-101 seems to be changing continuously and, therefore, the ammonia transport rate will change accordingly. Calculations show that the steady-state dome space ammonia concentration under normal ventilation conditions would reach 2,573 ppm if the effective area were 100% for a given liquid ammonia concentration of 1,040 μg/mL. Using this concentration, the equilibrium vapor concentration of 3,895 ppm is calculated. For the scenario of the waste surface being fully open with a 100%

effective mass transport area, the total flammable gas concentration is calculated to be 1.73% under normal ventilation conditions, and the total mass transport product of h and A is 2.09 ft^3/min. Therefore the calculated time to reach 25% of the LFL under the off-normal ventilation condition would become 145 days rather than the 146 days predicted by the previous methods. Monitoring data from July 2001 show that the ammonia concentration in the dome space went up to 1,700 ppm. This is a factor of four increase compared to the January 2001 data. The increase of ammonia concentration could result from the increase of open surface area as discussed earlier. It also is possible that the results are from the reduced ventilation flow rate because a similar increase also was observed for both hydrogen and nitrous oxide. In any case, the ammonia concentration of 1,700 ppm is still within the range of the ammonia calculation, which shows that the time to 25% would be around 146 days whether the ammonia concentration is 400 ppm or 2,573 ppm under the off-normal ventilation condition.

These HGR models assume that hydrogen generation occurs in the liquid phase. This model uses the liquid layer composition data when calculating generation rates. However, many SSTs do not have a supernatant liquid layer. The liquid information for these tanks is determined from the drainable liquid sample data or statistically from the other tanks in the same waste group. The liquid composition data are used to estimate the gas generation rate from the interstitial liquid portion of the solid layer. The liquid fraction is estimated based on the weight-percent-water data of the solid layer.

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5.0 SUMMARY AND CONCLUSIONS

The results of this report may be used to establish technical safety requirements for ventilation in tanks, establish maximum permissible down times for active ventilation systems, develop procedures for operations that require closing vent valves to HEPA filters on passively ventilated tanks, and support the technical basis for flammable gas control strategies.

The methodology for HGR calculation has been updated with the newly upgraded HGR model (HNF-3851) as summarized in Chapter 2.0. The main thrust of the new model to current HGR calculation is correctly calculate the water radiolysis term for the tanks has intermediate/dilute salt conditions. HGRs were calculated for the 177 SSTs and DSTs using this updated rate equation model and latest tank waste data. For tanks that do not have complete information was default to the values used in Revision 3. Flammable gas concentrations, in terms of percent of the LFL in the tank dome space, were evaluated under both normal and off-normal conditions for all 177 tanks. For normal ventilation conditions, all tanks are computed to remain well below 25% of the LFL with the highest flammable gas concentration level at 2.6% of the LFL in SST 241-C-103. With barometric breathing rate, the shortest time to reach 25% of the LFL for current tank waste is 31 days for SST 241-B-203 and 12 days for DST 241-AY-102; with zero ventilation scenario, the shortest time to reach 25% of the LFL for water addition is 29 days for SST 241-B-203 and 12 days for DST 241-AY-102.

Calculated HGRs of current raw waste for DSTs ranged from 3.6 E-2 to 2.2E-4 ft^3/min with the highest rate found in DST 241-AY-102. For SSTs, the rate ranged from 9.5 E-3 to 1.6 E-5 ft^3/min, with SST 241-C-103 having the highest rate. For most DSTs, the tank data are sample based. For quite a few SSTs, the tanks were stabilized and no liquid samples were available.

The steady-state flammability level in the tank dome space was evaluated based on the steady-state gas concentrations of hydrogen, ammonia, and methane using Le Chatelier's rule. Overall, the calculations under off-normal conditions show that 22 DSTs and 8 SSTs will reach 25% of the LFL and 7 tanks will reach 100% of the LFL if allowed to reach steady state with the off-normal ventilation rates of barometric breathing.

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6.0 REFERENCES

24590-WTP-RPT-RT-04-0002, 2004, *Modifying the Hu Correlation to Predict Hydrogen Formation in the Hanford Waste Treatment and Immobilization Plant*, Bechtel National, Richland, Washington.

Coward, H. F., and G. W. Jones, 1952, *Limits of Flammability of Gases and Vapors*, Bumines B. 503, 155 pp.

HNF-3294, 1998, *Adequacy of Ventilation Rates to Remediate Flammable Gas Levels in Headspace of Hanford Tanks – Status Report*, Rev. 0, Lockheed Martin Hanford Corporation, Richland, Washington.

HNF-3851, 2004, *Empirical Rate Equation Model and Rate Calculations of Hydrogen Generation for Hanford Tank Waste*, Rev.1, CH2M HILL Hanford Group, Inc., Richland, Washington.

HNF-SD-WM-CN-116, 1997, *Calculation Note Hydrogen Generation Rates At Steady State Flammable Gas Concentrations For Single-Shell Tanks*, Rev. 0A, Lockheed Martin Hanford Corporation, Richland, Washington.

HNF-SD-WM-CN-117, 1997, *Calculations of Hydrogen Release Rate at Steady State for Double-Shell Tanks*, Rev. 0A, Lockheed Martin Hanford Corporation, Richland, Washington.

HNF-SP-1193, 1997, *Flammable Gas Project Topical Report*, Rev. 2, Lockheed Martin Hanford Corporation, Richland, Washington.

Pfahl, U., and J. Shepherd, 1997, *Flammability and Flame Propagation in H_2-N_2O-CH_4-NH_3-O_2-N_2 Mixtures*, Explosion Dynamics Laboratory Report FM97-4, Graduate Aeronautical Laboratories, California Institute of Technology, Pasadena, California.

PNNL-11297, 1996, *Status and Integration of Studies of Gas Generation in Hanford Wastes*, Rev. 0, Pacific Northwest National Laboratory, Richland, Washington.

PNNL-11450, 1997, *Composition and Quantities of Retained Gas Measured in Hanford Waste Tanks 241-AW-101, A-101, AN-105, AN-104, and AN-103*, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington.

PNNL-11925, 1998, *Waste Tank Ventilation Rates Measured with A Tracer Gas Method, Fiscal Year 1998 Summary*, Pacific Northwest National Laboratory, Richland, Washington.

PNNL-12181, 1999, *Thermal and Radiolytic Gas Generation on Material from Tanks 241-U-103, 241-AW-101, 241-S-106, and 241-S-102: Status Report*, Pacific Northwest National Laboratory, Richland, Washington.

PNNL-13000, 1999, *Retained Gas Sampling Results for the Flammable Gas Program*, Rev. 0, Pacific Northwest National Laboratory, Richland, Washington.

RPP-4941, 2000, *Methodology for Predicting Flammable Gas Mixtures in Double-Contained Receiver Tanks*, Rev. 0B, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-5660, 2000, *Collection And Analysis Of Selected Tank Headspace Parameter Data*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-6069, 2000, *Input Data for Hydrogen Generation Rate Model Calculation*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-6213, 2003, *Hanford Waste Tank Bump Accident and Consequence Analysis*, Rev. 3, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-6517, 2000, *Evaluation of Hanford High-Level Waste Tank 241-SY-101*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-18491, 2003, *Flammable Gas Diffusion Through Single-Shell Tank Domes*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

SACS, 2001, Surveillance Analysis Computer System, Queried 11/1/01 through 11/1/02, SACSPROD database; also available at http://twins.pnl.gov:8001.

SNL-000198, 1999, *Flammable Gas Safety Analysis Data Review*, Sandia National Laboratory, Albuquerque, New Mexico.

TFC-ENG-DESIGN-C-10, 2004, *Engineering Calculations*, Rev. A-6, CH2M HILL Hanford Group, Inc., Richland, Washington.

TWINS, 2004, *Tank Waste Information Network System*, internet address: http://twins.pnl.gov:8001.

Weisenberger, S., and A. Schumpe, 1996, "The Estimation of Gas Solubility in Salt Solutions at Temperature from 273 K to 363 K," AICHE Journal, Vol 42, 299.

WHC-EP-0651, 1993, *Barometric Pressure Variations*, Westinghouse Hanford Company, Richland, Washington.

WHC-EP-0702, 1994, *Criteria for Flammable Gas Watch List Tanks*, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-WM-ES-219, 1992, *Laboratory Flammability Studies of Mixtures of Hydrogen, Nitrous Oxide, and Air*, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-WM-SARR-015, 1994, *Topical Report on Flammable Gases in Non-Burping Waste Tanks*, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-WM-TI-724, 1996, *Methodology for Flammable Gas Evaluations*, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

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APPENDIX A

INPUT DATA FOR HYDROGEN GENERATION RATE CALCULATIONS FROM BEST BASIS INVENTORY DETAIL CALCULATION REPORT AND DERIVATION DOCUMENT (QUERIED ON SEPTEMBER 27, 2004)

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Table A-1. Best Basis Inventory - Density and Weight Percent Water by Tank, Waste Phase, and Waste Type A-3

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations A-15

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Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-A-101	Salt Cake (Liquids)	A1-SltCk (Liquid)	192	1.49	46.9
241-A-101	Salt Cake (Solids)	A1-SltCk (Solid)	1147	1.74	29.2
241-A-101	Sludge	P2 (Solid)	11	1.36	9.1
241-A-101	Retained Gas - Salt Cake	NA	144		
241-A-102	Salt Cake (Solids)	A1-SltCk (Solid)	106	1.7	34.3
241-A-102	Supernatant	A1-SltCk (Liquid)	12	1.57	46.2
241-A-102	Salt Cake (Liquids)	A1-SltCk (Liquid)	33	1.57	46.2
241-A-103	Sludge	AR (Solid)	8	1.34	68.6
241-A-103	Salt Cake (Solids)	A1-SltCk (Solid)	1049	1.35	40.2
241-A-103	Supernatant	A1-SltCk (Liquid)	17	1.45	53.5
241-A-103	Salt Cake (Liquids)	A1-SltCk (Liquid)	331	1.45	53.5
241-A-104	Sludge	AR (Solid)	102	1.64	0
241-A-104	Sludge	P1 (Solid)	4	1.64	0
241-A-105	Sludge	P2 (Solid)	139	1.54	0
241-A-106	Sludge	SRR (Solid)	110	1.7	34.3
241-A-106	Salt Cake (Solids)	A1-SltCk (Solid)	110	1.7	34.3
241-A-106	Sludge	AR (Solid)	79	1.7	34.3
241-AN-101	Supernatant	NA	3507	1.41	51.5
241-AN-101	Salt Cake (Liquids)	A1-SltCk (Liquid)	28	1.45	49.1
241-AN-101	Salt Cake (Solids)	A1-SltCk (Solid)	90	1.58	37.8
241-AN-102	Salt Cake	A2-SltSlr (Solid)	507	1.53	39.9
241-AN-102	Supernatant	NA	3550	1.4	47.5
241-AN-103	Supernatant	A2-SltSlr (Liquid)	1890	1.48	46.7
241-AN-103	Salt Cake	A2-SltSlr (Solid)	1529	1.72	34.9
241-AN-103	Retained Gas - Salt Cake	NA	208		
241-AN-104	Supernatant	A2-SltSlr (Liquid)	2299	1.4	51.1
241-AN-104	Salt Cake	A2-SltSlr (Solid)	1566	1.59	45.7
241-AN-104	Retained Gas - Salt Cake	NA	119		
241-AN-105	Supernatant	A2-SltSlr (Liquid)	2227	1.42	49.9
241-AN-105	Salt Cake	A2-SltSlr (Solid)	1925	1.57	44.4
241-AN-105	Retained Gas - Salt Cake	NA	109		
241-AN-106	Salt Cake	NA	65	1.58	37.8
241-AN-106	Supernatant	NA	3103	1.12	80.7
241-AN-106	Sludge	NA	109	1.52	37
241-AN-107	Supernatant	A2-SltSlr (Liquid)	3297	1.43	51.5
241-AN-107	Salt Cake	A2-SltSlr (Solid)	872	1.48	44.3
241-AP-101	Supernatant	A1-SltCk (Liquid)	4199	1.31	61.5
241-AP-102	Supernatant	Waste Transfer	4067	1.39	58.7
241-AP-102	Sludge	NA	88	1.75	31.1
241-AP-103	Supernatant	NA	3389	1.35	56.9
241-AP-104	Supernatant	NA	4164	1.28	66.4
241-AP-105	Supernatant	Waste Transfer	2262	1.27	70.9
241-AP-105	Salt Cake	A2-SltSlr (Solid)	337	1.61	47.7
241-AP-106	Supernatant	NA	4301	1.21	72.4
241-AP-107	Supernatant	NA	4271	1.28	65.7

Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-AP-108	Supernatant	NA	3110	1.43	53.7
241-AW-101	Retained Gas - Salt Cake	NA	95		
241-AW-101	Supernatant	A2-SltSlr (Liquid)	2770	1.47	43.8
241-AW-101	Salt Cake	A2-SltSlr (Solid)	1403	1.59	43.9
241-AW-102	Sludge	CWP1 (Solid)	25	1.32	38.6
241-AW-102	Supernatant	Waste Transfer	428	1.26	68.3
241-AW-103	Supernatant	NA	2975	1.24	59.6
241-AW-103	Sludge	CWZr2 (Solid)	1033	1.47	55.8
241-AW-103	Salt Cake (Solids)	A1-SltCk (Solid)	115	1.69	45.2
241-AW-103	Salt Cake (Liquids)	A1-SltCk (Liquid)	36	1.45	49.1
241-AW-104	Salt Cake (Liquids)	A2-SltSlr (Liquid)	136	1.45	52
241-AW-104	Salt Cake (Solids)	A2-SltSlr (Solid)	457	1.6	42
241-AW-104	Supernatant	NA	3221	1.35	66.6
241-AW-104	Sludge (Solids)	PL2 (Solid)	188	1.28	65.8
241-AW-104	Sludge (Liquids)	PL2 (Liquid)	62	1.33	63.8
241-AW-105	Sludge (Solids)	CWZr2 (Solid)	660	1.47	49.7
241-AW-105	Supernatant		594	1.05	93.3
241-AW-105	Sludge (Solids)	PL2 (Solid)	61	1.41	37.8
241-AW-105	Sludge (Liquids)	CWZr2 (Liquid)	266	1.1	84.3
241-AW-105	Sludge (Liquids)	PL2 (Liquid)	12	1.17	76.5
241-AW-106	Supernatant	Waste Transfer	2340	1.3	72
241-AW-106	Salt Cake	A2-SltSlr (Solid)	1072	1.61	43.1
241-AX-101	Salt Cake (Solids)	A1-SltCk (Solid)	1164	1.73	32.5
241-AX-101	Sludge	SRR (Solid)	11	1.51	62.2
241-AX-101	Salt Cake (Liquids)	A1-SltCk (Liquid)	178	1.53	43.1
241-AX-102	Salt Cake	A1-SltCk (Solid)	90	1.58	33.9
241-AX-102	Sludge	B (Solid)	23	1.57	42.5
241-AX-103	Salt Cake (Solids)	A1-SltCk (Solid)	298	1.61	43.2
241-AX-103	Sludge	P2 (Solid)	30	1.61	44.2
241-AX-103	Salt Cake (Liquids)	A1-SltCk (Liquid)	75	1.45	49.1
241-AX-104	Sludge	P2 (Solid)	28	1.8	8.27
241-AY-101	Supernatant	NA	325	1.19	79.7
241-AY-101	Sludge (Solids)	NA	309	1.78	35.1
241-AY-101	Sludge (Liquids)	NA	55	1.14	81.4
241-AY-102	Sludge (Solids)	BL (Solid)	75	1.65	38.4
241-AY-102	Supernatant	NA	2662	1.18	82.2
241-AY-102	Sludge (Liquids)	BL (Liquid)	120	1.16	78.5
241-AY-102	Sludge (Solids)	NA	376	1.65	38.4
241-AZ-101	Supernatant	P3AZ1 (Liquid)	3334	1.24	73.2
241-AZ-101	Sludge	P3AZ1 (Solid)	167	1.63	43.1
241-AZ-101	Sludge	NA	30	1.63	43.1
241-AZ-102	Supernatant	P3AZ2 (Liquid)	3327	1.11	83.2
241-AZ-102	Sludge	P3AZ2 (Solid)	275	1.41	42.9
241-AZ-102	Sludge	Z (Solid)	4	1.41	42.9
241-AZ-102	Sludge	PL2 (Solid)	11	1.41	42.9

Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-AZ-102	Sludge	SRR (Solid)	98	1.41	42.9
241-AZ-102	Sludge	A1-SltCk (Solid)	8	1.41	42.9
241-B-101	Sludge	MW1 (Solid)	11	1.48	32
241-B-101	Sludge	B (Solid)	19	1.48	32
241-B-101	Sludge	BL (Solid)	76	1.48	32
241-B-101	Salt Cake (Liquids)	B-SltCk (Liquid)	73	1.53	50
241-B-101	Salt Cake (Solids)	B-SltCk (Solid)	232	1.48	32
241-B-102	Salt Cake (Solids)	B-SltCk (Solid)	81	1.72	39.7
241-B-102	Salt Cake (Liquids)	B-SltCk (Liquid)	25	1.26	69.6
241-B-102	Supernatant	B-SltCk (Liquid)	15	1.26	69.6
241-B-103	Salt Cake (Solids)	B-SltCk (Solid)	157	1.72	44.9
241-B-103	Salt Cake (Liquids)	B-SltCk (Liquid)	50	1.26	69.6
241-B-103	Sludge	MW1 (Solid)	4	1.8	43.8
241-B-104	Sludge	1C (Solid)	473	1.39	46.7
241-B-104	Salt Cake (Liquids)	B-SltCk (Liquid)	55	1.26	69.6
241-B-104	Salt Cake (Solids)	B-SltCk (Solid)	192	1.39	46.7
241-B-104	Sludge	2C (Solid)	697	1.39	46.7
241-B-105	Salt Cake (Solids)	B-SltCk (Solid)	919	1.72	40.2
241-B-105	Salt Cake (Liquids)	B-SltCk (Liquid)	73	1.26	69.6
241-B-105	Sludge	2C (Solid)	61	1.28	66.6
241-B-105	Sludge	1C (Solid)	45	1.43	54.1
241-B-106	Sludge	TBP (Solid)	297	1.36	61.6
241-B-106	Supernatant	B-SltCk (Liquid)	4	1.26	69.6
241-B-106	Sludge	1C (Solid)	163	1.42	56.8
241-B-107	Salt Cake (Liquids)	B-SltCk (Liquid)	68	1.34	57.5
241-B-107	Sludge	1C (Solid)	285	1.63	42.1
241-B-107	Salt Cake (Solids)	B-SltCk (Solid)	216	1.7	33.1
241-B-107	Sludge	CWP2 (Solid)	42	1.68	5.78
241-B-108	Salt Cake (Solids)	B-SltCk (Solid)	186	1.7	31.6
241-B-108	Sludge	CWP2 (Solid)	104	1.8	27.1
241-B-108	Salt Cake (Liquids)	B-SltCk (Liquid)	59	1.38	78.9
241-B-109	Sludge	CWP2 (Solid)	189	1.85	36.2
241-B-109	Salt Cake (Solids)	B-SltCk (Solid)	216	1.89	38.4
241-B-109	Salt Cake (Liquids)	B-SltCk (Liquid)	68	1.26	69.6
241-B-110	Sludge	B (Solid)	11	1.36	58.3
241-B-110	Sludge	2C (Solid)	914	1.36	58.3
241-B-110	Supernatant	CSR	4	1.19	76.2
241-B-111	Sludge	2C (Solid)	809	1.27	63.1
241-B-111	Sludge	B (Solid)	101	1.27	63.1
241-B-111	Supernatant	CSR	4	1.19	98.3
241-B-112	Supernatant	BY-SltCk (Liquid)	11	1.51	46.2
241-B-112	Sludge	2C (Solid)	56	1.49	40.2
241-B-112	Salt Cake (Solids)	BY-SltCk (Solid)	49	1.49	40.2
241-B-112	Salt Cake (Liquids)	BY-SltCk (Liquid)	16	1.51	46.2
241-B-201	Sludge	224-1 (Solid)	115	1.26	64.2

Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-B-202	Sludge	224-2 (Solid)	111	1.22	75.9
241-B-203	Sludge	224-2 (Solid)	193	1.19	75.7
241-B-203	Supernatant	224-2 (Liquid)	2	1.05	89.4
241-B-204	Sludge	224-2 (Solid)	189	1.19	77.3
241-B-204	Supernatant	224-1 (Liquid)	3	1.05	91.4
241-BX-101	Sludge	TBP (Solid)	47	1.47	15.5
241-BX-101	Sludge	CWP2 (Solid)	133	1.68	15.5
241-BX-102	Sludge	CWP2 (Solid)	151	1.68	40.9
241-BX-102	Sludge	DE (Solid)	147	0.384	0
241-BX-103	Supernatant	CWP2 (Liquid)	47	1.07	77.8
241-BX-103	Sludge	TBP (Solid)	78	1.47	49.6
241-BX-103	Sludge	CWP2 (Solid)	157	1.68	49.6
241-BX-104	Supernatant	CWR1 (Liquid)	11	1.28	59.1
241-BX-104	Sludge	CWP2 (Solid)	51	1.68	26.9
241-BX-104	Sludge	MW1 (Solid)	155	1.68	26.9
241-BX-104	Sludge	CWR1 (Solid)	163	1.68	26.9
241-BX-105	Supernatant	CWP1 (Liquid)	18	1.29	68.7
241-BX-105	Sludge	TBP (Solid)	74	1.69	12.6
241-BX-105	Sludge	MW1 (Solid)	33	1.8	43.8
241-BX-105	Sludge	CWP1 (Solid)	147	1.58	12.6
241-BX-106	Sludge	TBP (Solid)	71	1.64	38.7
241-BX-106	Sludge	CWP1 (Solid)	71	1.64	38.7
241-BX-107	Sludge	1C (Solid)	1313	1.44	50.5
241-BX-108	Sludge	1C (Solid)	38	1.43	17.2
241-BX-108	Sludge	TBP (Solid)	81	1.47	17.2
241-BX-109	Sludge	TBP (Solid)	730	1.52	50.6
241-BX-110	Salt Cake (Solids)	BY-SltCk (Solid)	405	1.79	36.6
241-BX-110	Supernatant	BY-SltCk (Liquid)	5	1.44	53.1
241-BX-110	Sludge	NA	94	1.79	36.6
241-BX-110	Sludge	1C (Solid)	151	1.43	54.1
241-BX-110	Salt Cake (Liquids)	BY-SltCk (Liquid)	121	1.44	53.1
241-BX-111	Salt Cake (Solids)	BY-SltCk (Solid)	532	1.45	15.6
241-BX-111	Sludge	1C (Solid)	121	1.43	54.1
241-BX-111	Salt Cake (Liquids)	BY-SltCk (Liquid)	60	1.45	51.2
241-BX-112	Supernatant	1C2 (Liquid)	5	1.18	67.6
241-BX-112	Sludge	1C (Solid)	617	1.31	63.3
241-BY-101	Salt Cake (Solids)	BY-SltCk (Solid)	1184	1.87	20.4
241-BY-101	Sludge	TFeCN (Solid)	140	1.6	46.8
241-BY-101	Salt Cake (Liquids)	BY-SltCk (Liquid)	76	1.51	46.2
241-BY-102	Salt Cake (Liquids)	BY-SltCk (Liquid)	151	1.46	50.8
241-BY-102	Salt Cake (Solids)	BY-SltCk (Solid)	903	1.59	27.9
241-BY-103	Sludge	CWP2 (Solid)	34	1.68	40.9
241-BY-103	Salt Cake (Solids)	BY-SltCk (Solid)	1327	1.72	23.7
241-BY-103	Salt Cake (Liquids)	BY-SltCk (Liquid)	214	1.29	59
241-BY-104	Salt Cake (Solids)	BY-SltCk (Solid)	1022	1.75	23

Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-BY-104	Salt Cake (Liquids)	BY-SltCk (Liquid)	162	1.51	48.9
241-BY-104	Sludge	PFeCN (Solid)	172	1.64	29
241-BY-105	Salt Cake (Solids)	BY-SltCk (Solid)	1489	1.85	14.6
241-BY-105	Sludge	PFeCN (Solid)	151	1.68	25.5
241-BY-105	Salt Cake (Liquids)	BY-SltCk (Liquid)	151	1.44	51.3
241-BY-105	Sludge	Portland Cement (Solid)	30	1.9	8
241-BY-106	Sludge	PFeCN (Solid)	120	1.68	37.3
241-BY-106	Salt Cake (Solids)	BY-SltCk (Solid)	1599	1.68	23.3
241-BY-106	Salt Cake (Liquids)	BY-SltCk (Liquid)	31	1.31	59.4
241-BY-107	Salt Cake (Liquids)	BY-SltCk (Liquid)	143	1.46	48.6
241-BY-107	Salt Cake (Solids)	BY-SltCk (Solid)	827	1.72	36.3
241-BY-107	Sludge	PFeCN (Solid)	58	1.78	37.6
241-BY-108	Salt Cake (Solids)	BY-SltCk (Solid)	575	1.5	25.5
241-BY-108	Salt Cake (Liquids)	BY-SltCk (Liquid)	115	1.33	32.7
241-BY-108	Sludge	PFeCN (Solid)	151	1.53	31
241-BY-109	Salt Cake (Solids)	BY-SltCk (Solid)	851	1.71	42
241-BY-109	Sludge	CWP2 (Solid)	89	2	28.4
241-BY-109	Salt Cake (Liquids)	BY-SltCk (Liquid)	146	1.5	53
241-BY-110	Salt Cake (Solids)	BY-SltCk (Solid)	1120	1.54	27.3
241-BY-110	Sludge	PFeCN (Solid)	162	1.82	28.7
241-BY-110	Salt Cake (Liquids)	BY-SltCk (Liquid)	102	1.44	39.9
241-BY-111	Salt Cake (Solids)	BY-SltCk (Solid)	985	1.7	33.6
241-BY-111	Salt Cake (Liquids)	BY-SltCk (Liquid)	154	1.42	53.8
241-BY-112	Salt Cake (Solids)	BY-SltCk (Solid)	983	1.76	28.3
241-BY-112	Salt Cake (Liquids)	BY-SltCk (Liquid)	92	1.47	48.5
241-BY-112	Sludge	MW2 (Solid)	8	1.85	41.4
241-C-101	Sludge	TBP (Solid)	125	1.78	23.4
241-C-101	Sludge	CWP1 (Solid)	208	1.78	23.4
241-C-102	Sludge	MW1 (Solid)	19	1.8	43.8
241-C-102	Sludge	TBP (Solid)	61	1.47	50.5
241-C-102	Sludge	CWP1 (Solid)	125	1.63	33.4
241-C-102	Sludge	TH1 (Solid)	98	1.32	63.5
241-C-102	Sludge	CWZr1 (Solid)	38	1.74	65.3
241-C-102	Sludge	CWP2 (Solid)	855	1.74	40.9
241-C-103	Sludge	CWP1 (Solid)	163	1.63	57.8
241-C-103	Sludge	AR (Solid)	108	1.54	61.1
241-C-103	Supernatant	SRR	2	1.07	88.9
241-C-104	Sludge	CWZr1 (Solid)	90	1.68	47.9
241-C-104	Sludge	OWW3 (Solid)	103	1.68	47.9
241-C-104	Sludge	CWP2 (Solid)	229	1.68	47.9
241-C-104	Sludge	TH2 (Solid)	80	1.68	47.9
241-C-104	Sludge	CWP1 (Solid)	326	1.68	47.9
241-C-104	Sludge	NA	152	1.68	47.9
241-C-105	Sludge	CWP1 (Solid)	450	1.55	25.8
241-C-105	Sludge	TBP (Solid)	50	1.55	50.5

Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-C-106	Sludge	NA	10.166	1.56	41.9
241-C-106	Supernatant	NA	0.322	1.02	97.8
241-C-107	Sludge	1C (Solid)	507	1.55	47.5
241-C-107	Sludge	SRR (Solid)	339	1.55	47.5
241-C-107	Sludge	CWP2 (Solid)	89	1.55	47.5
241-C-108	Sludge	TBP (Solid)	95	1.48	38.2
241-C-108	Sludge	TFeCN (Solid)	45	1.48	38.2
241-C-108	Sludge	1C (Solid)	110	1.48	38.2
241-C-109	Sludge	CWP1 (Solid)	55	1.57	36.1
241-C-109	Sludge	HS (Solid)	26	1.57	36.1
241-C-109	Sludge	TFeCN (Solid)	121	1.57	36.1
241-C-109	Sludge	1C (Solid)	38	1.43	54.1
241-C-110	Sludge	1C (Solid)	670	1.34	60.2
241-C-110	Supernatant	1C1 (Liquid)	4	1.1	82.9
241-C-111	Sludge	CWP1 (Solid)	60	1.58	31.4
241-C-111	Sludge	HS (Solid)	17	1.58	31.4
241-C-111	Sludge	TFeCN (Solid)	91	1.58	31.4
241-C-111	Sludge	1C (Solid)	49	1.43	54.1
241-C-112	Sludge	CWP1 (Solid)	64	1.6	51.5
241-C-112	Sludge	TFeCN (Solid)	272	1.6	51.5
241-C-112	Sludge	1C (Solid)	57	1.6	51.5
241-C-201	Sludge	HS (Solid)	2.2	1.44	13.8
241-C-202	Sludge	HS (Solid)	1.9	1.44	16.2
241-C-203	Sludge	HS (Solid)	6	1.62	26.5
241-C-204	Sludge	HS (Solid)	6.4	1.62	41.2
241-S-101	Sludge	NA	890	1.7	37.5
241-S-101	Salt Cake (Solids)	S1-SltCk (Solid)	214	1.56	42.4
241-S-101	Salt Cake (Solids)	S2-SltSlr (Solid)	146	1.56	42.4
241-S-101	Salt Cake (Liquids)	S1-SltCk (Liquid)	46	1.47	50.7
241-S-101	Salt Cake (Liquids)	S2-SltSlr (Liquid)	31	1.47	50.7
241-S-102	Salt Cake (Solids)	S2-SltSlr (Solid)	491	1.63	26.1
241-S-102	Salt Cake (Liquids)	S2-SltSlr (Liquid)	237	1.46	48.5
241-S-102	Sludge	R1 (Solid)	61	1.88	22.2
241-S-102	Retained Gas - Salt Cake	NA	410		
241-S-102	Salt Cake (Solids)	S1-SltCk (Solid)	294	1.63	26.1
241-S-102	Salt Cake (Liquids)	S1-SltCk (Liquid)	141	1.46	48.5
241-S-102	Retained Gas - Sludge	NA	22		
241-S-103	Sludge	R1 (Solid)	34	1.77	22.7
241-S-103	Salt Cake (Solids)	S1-SltCk (Solid)	347	1.68	30.2
241-S-103	Salt Cake (Solids)	S2-SltSlr (Solid)	300	1.63	34.9
241-S-103	Salt Cake (Liquids)	S2-SltSlr (Liquid)	95	1.45	49.8
241-S-103	Salt Cake (Liquids)	S1-SltCk (Liquid)	116	1.45	49.8
241-S-103	Supernatant	S2-SltSlr (Liquid)	4	1.45	49.8
241-S-104	Sludge	R1 (Solid)	409	1.77	33.5
241-S-104	Salt Cake (Liquids)	R-SltCk (Liquid)	139	1.37	55.1

Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-S-104	Salt Cake (Solids)	R-SltCk (Solid)	451	1.64	41
241-S-104	Sludge	CWR1 (Solid)	91	1.8	33.5
241-S-105	Salt Cake (Solids)	S1-SltCk (Solid)	1371	1.68	3.57
241-S-105	Sludge	R1 (Solid)	8	1.77	22.7
241-S-105	Salt Cake (Liquids)	S1-SltCk (Liquid)	157	1.45	49.1
241-S-106	Salt Cake (Solids)	S1-SltCk (Solid)	1624	1.74	33.5
241-S-106	Salt Cake (Liquids)	S1-SltCk (Liquid)	99	1.43	54.2
241-S-107	Salt Cake (Solids)	T2-SltCk (Solid)	52	1.57	44.895
241-S-107	Sludge	CWR1 (Solid)	447	1.8	33
241-S-107	Sludge	CWZr1 (Solid)	91	1.8	33
241-S-107	Sludge	CWR2 (Solid)	211	1.8	33
241-S-107	Salt Cake (Solids)	S1-SltCk (Solid)	63	1.57	44.895
241-S-107	Salt Cake (Solids)	S2-SltSlr (Solid)	30	1.57	44.895
241-S-107	Sludge	R1 (Solid)	462	1.8	33
241-S-108	Sludge	R1 (Solid)	19	1.77	22.7
241-S-108	Salt Cake (Solids)	S1-SltCk (Solid)	2032	1.68	30.2
241-S-108	Salt Cake (Liquids)	S1-SltCk (Liquid)	31	1.45	49.1
241-S-109	Salt Cake (Solids)	S1-SltCk (Solid)	1905	1.66	9.1
241-S-109	Salt Cake (Liquids)	S1-SltCk (Liquid)	63	1.49	53.1
241-S-109	Sludge	R1 (Solid)	49	1.77	22.7
241-S-110	Salt Cake (Liquids)	S1-Sltck (Liquid)	115	1.43	49.3
241-S-110	Salt Cake (Solids)	S1-Sltck (Solid)	994	1.65	12.5
241-S-110	Sludge	R1 (Solid)	288	1.77	31.5
241-S-110	Sludge	CWR1 (Solid)	76	1.77	31.5
241-S-111	Sludge	R1 (Solid)	207	1.67	19.4
241-S-111	Sludge	CWR1 (Solid)	38	1.67	19.4
241-S-111	Salt Cake (Liquids)	S1-SltCk (Liquid)	189	1.45	51
241-S-111	Salt Cake (Solids)	S1-SltCk (Solid)	962	1.53	29
241-S-111	Retained Gas - Salt Cake	NA	118		
241-S-111	Retained Gas - Sludge	NA	43		
241-S-112	Salt Cake	S1-SltCk (Solid)	416	1.69	40.9
241-S-112	Sludge	R1 (Solid)	23	1.77	22.7
241-SX-101	Salt Cake (Solids)	R-SltCk (Solid)	497	1.69	25.55209
241-SX-101	Salt Cake (Liquids)	R-SltCk (Liquid)	41	1.48	49.1015
241-SX-101	Salt Cake (Solids)	S1-SltCk (Solid)	296	1.69	25.55209
241-SX-101	Salt Cake (Liquids)	S1-SltCk (Liquid)	25	1.48	49.1015
241-SX-101	Salt Cake (Solids)	S2-SltSlr (Solid)	166	1.69	25.55209
241-SX-101	Salt Cake (Liquids)	S2-SltSlr (Liquid)	14	1.48	49.1015
241-SX-101	Sludge	R1 (Solid)	545	1.69	25.55209
241-SX-102	Salt Cake (Liquids)	S1-SltCk (Liquid)	162	1.46	48.1
241-SX-102	Salt Cake (Solids)	S1-SltCk (Solid)	1046	1.72	38.52
241-SX-102	Salt Cake (Liquids)	S2-SltSlr (Liquid)	17	1.46	48.1
241-SX-102	Salt Cake (Solids)	S2-SltSlr (Solid)	110	1.72	38.52
241-SX-102	Sludge	R1 (Solid)	209	1.72	38.52
241-SX-103	Salt Cake (Liquids)	S1-SltCk (Liquid)	94	1.47	46.6

Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-SX-103	Sludge	R1 (Solid)	294	1.88	21.9
241-SX-103	Salt Cake (Solids)	S1-Sltck (Solid)	1439	1.72	30.9
241-SX-103	Salt Cake (Solids)	R-SltCk (Solid)	77	1.72	37.3
241-SX-103	Salt Cake (Liquids)	R-SltCk (Liquid)	22	1.47	46.6
241-SX-104	Salt Cake (Solids)	S1-SltCk (Solid)	903	1.68	30.2
241-SX-104	Sludge	R1 (Solid)	515	1.77	22.7
241-SX-104	Salt Cake (Liquids)	S1-SltCk (Liquid)	17	1.47	45.3291
241-SX-104	Salt Cake (Solids)	R-SltCk (Solid)	142	1.72	23.4
241-SX-104	Salt Cake (Liquids)	R-SltCk (Liquid)	111	1.47	45.3291
241-SX-105	Salt Cake (Solids)	S1-SltCk (Solid)	1061	1.64	37.1
241-SX-105	Sludge	R1 (Solid)	238	1.67	22.7
241-SX-105	Salt Cake (Liquids)	S1-SltCk (Liquid)	123	1.47	42.9
241-SX-106	Salt Cake (Solids)	S2-SltSlr (Solid)	1107	1.61	39
241-SX-106	Salt Cake (Liquids)	S2-SltSlr (Liquid)	122	1.29	49.4
241-SX-106	Salt Cake (Solids)	S1-SltCk (Solid)	245	1.61	39
241-SX-106	Salt Cake (Liquids)	S1-SltCk (Liquid)	27	1.29	49.4
241-SX-107	Sludge	R1 (Solid)	298	1.77	22.7
241-SX-107	Salt Cake (Solids)	R-SltCk (Solid)	44	1.72	23.4
241-SX-107	Salt Cake (Liquids)	R-SltCk (Liquid)	14	1.5	51.9
241-SX-108	Sludge	R1 (Solid)	280	1.77	2.03
241-SX-109	Sludge	R1 (Solid)	219	1.77	22.7
241-SX-109	Salt Cake (Solids)	R-SltCk (Solid)	694	1.72	23.4
241-SX-110	Sludge	R1 (Solid)	109	1.77	22.7
241-SX-110	Salt Cake (Solids)	R-SltCk (Solid)	103	1.72	23.4
241-SX-111	Sludge	R1 (Solid)	289	1.77	22.7
241-SX-111	Salt Cake (Liquids)	R-SltCk (Liquid)	35	1.5	51.9
241-SX-111	Salt Cake (Solids)	R-SltCk (Solid)	112	1.72	23.4
241-SX-112	Sludge	R1 (Solid)	212	1.77	22.7
241-SX-112	Salt Cake (Solids)	R-SltCk (Solid)	54	1.72	23.4
241-SX-112	Salt Cake (Liquids)	R-SltCk (Liquid)	17	1.5	51.9
241-SX-113	Sludge	R1 (Solid)	8	1.09	46
241-SX-113	Sludge	DE (Solid)	64	1.09	46
241-SX-114	Sludge	R1 (Solid)	156	1.77	22.7
241-SX-114	Salt Cake (Solids)	R-SltCk (Solid)	328	1.72	23.4
241-SX-114	Salt Cake (Liquids)	R-SltCk (Liquid)	104	1.5	51.9
241-SX-115	Sludge	R2 (Solid)	14	1.79	10.1
241-SY-101	Supernatant	NA	399	1.3	62.7
241-SY-101	Retained Gas - Salt Cake	NA	93		
241-SY-101	Salt Cake	S2-SltSlr (Solid)	948	1.52	50.4
241-SY-102	Sludge (Solids)	Z (Solid)	186	1.65	41.3
241-SY-102	Sludge (Solids)	NA	194	1.65	41.3
241-SY-102	Sludge (Liquids)	Z (Liquid)	83	1.36	63.2
241-SY-102	Sludge (Liquids)	NA	87	1.36	63.2
241-SY-102	Supernatant	Waste Transfer	3108	1.300285	70.39116
241-SY-103	Supernatant	S2-SltSlr (Liquid)	1543	1.47	43.2

Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-SY-103	Retained Gas - Salt Cake		91		
241-SY-103	Salt Cake	S2-SltSlr (Solid)	1204	1.61	36.5
241-T-101	Sludge	CWR2 (Solid)	140	1.46	51.7
241-T-101	Salt Cake (Solids)	T2-SltCk (Solid)	179	1.64	28.3
241-T-101	Salt Cake (Liquids)	T2-SltCk (Liquid)	57	1.45	49.1
241-T-102	Sludge	CWP2 (Solid)	64	1.79	28.075
241-T-102	Supernatant	CSR (Liquid)	48	1.14	79.77
241-T-102	Sludge	MW2 (Solid)	8	1.85	41.4
241-T-103	Supernatant	CSR (Liquid)	15	1.19	71.6
241-T-103	Sludge	CWR1 (Solid)	19	1.8	24.5
241-T-103	Sludge	CWP2 (Solid)	64	1.68	40.9
241-T-103	Sludge	MW2 (Solid)	4	1.85	41.4
241-T-104	Sludge	1C (Solid)	1199	1.29	70.525
241-T-105	Sludge	2C (Solid)	273	1.51	53.4675
241-T-105	Sludge	1C (Solid)	9	1.32	61.77333
241-T-105	Sludge	CWR1 (Solid)	89	1.32	61.77333
241-T-106	Sludge	1C (Solid)	38	1.43	16.7
241-T-106	Sludge	CWR1 (Solid)	34	1.8	16.7
241-T-106	Sludge	CWR2 (Solid)	10	1.46	16.7
241-T-107	Sludge	CWP2 (Solid)	32	1.56	45.7
241-T-107	Sludge	1C (Solid)	559	1.56	45.7
241-T-107	Sludge	TBP (Solid)	64	1.56	45.7
241-T-108	Sludge	1C (Solid)	20	1.43	54.1
241-T-108	Salt Cake (Solids)	T1-SltCk (Solid)	30	1.72	15.1
241-T-108	Salt Cake (Liquids)	T1-SltCk (Liquid)	10	1.26	69.6
241-T-109	Salt Cake (Solids)	T1-SltCk (Solid)	179	1.72	47.90833
241-T-109	Salt Cake (Liquids)	T1-SltCk (Liquid)	56	1.26	69.6
241-T-110	Sludge	224-2 (Solid)	37	1.25	75.5
241-T-110	Sludge	2C (Solid)	1360	1.25	75.5
241-T-110	Supernatant	2C1 (Liquid)	3	1.05	86.8
241-T-111	Sludge	2C (Solid)	787	1.24	75.3
241-T-111	Sludge	224-2 (Solid)	904	1.24	75.3
241-T-112	Sludge	2C (Solid)	135	1.28	73.90875
241-T-112	Supernatant	2C2 (Liquid)	26	1.1	85.05
241-T-112	Sludge	224-2 (Solid)	91	1.28	73.9
241-T-201	Sludge	224-1 (Solid)	110	1.31	67.5
241-T-201	Supernatant	224-1 (Liquid)	9	1.06	91.2
241-T-202	Sludge	224-2 (Solid)	81	1.18	75.8
241-T-203	Sludge	224-2 (Solid)	140	1.22	76.2
241-T-204	Sludge	224-2 (Solid)	143	1.18	75
241-TX-101	Sludge	R1 (Solid)	265	1.77	22.7
241-TX-101	Salt Cake (Solids)	T2-SltCk (Solid)	49	1.64	28.3
241-TX-101	Salt Cake (Liquids)	T2-SltCk (Liquid)	15	1.45	49.1
241-TX-101	Sludge	MW2 (Solid)	11	1.85	41.4
241-TX-101	Sludge	Z (Solid)	4	1.76	29.1

Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-TX-102	Salt Cake (Liquids)	T2-SltCk (Liquid)	121	1.45	49.1
241-TX-102	Salt Cake (Solids)	T2-SltCk (Solid)	692	1.64	28.3
241-TX-102	Sludge	MW2 (Solid)	8	1.85	41.4
241-TX-103	Salt Cake (Solids)	T1-SltCk (Solid)	9	1.72	23.5
241-TX-103	Salt Cake (Liquids)	T2-SltCk (Liquid)	66	1.45	49.1
241-TX-103	Salt Cake (Solids)	T2-SltCk (Solid)	470	1.64	28.3
241-TX-103	Salt Cake (Liquids)	T1-SltCk (Liquid)	3	1.26	69.6
241-TX-104	Sludge	R1 (Solid)	130	1.89	44.56167
241-TX-104	Salt Cake (Liquids)	T2-SltCk (Liquid)	30	1.44	51.895
241-TX-104	Supernatant	T2-SltCk (Liquid)	9	1.44	51.895
241-TX-104	Salt Cake (Solids)	T2-SltCk (Solid)	93	1.62	45.1875
241-TX-105	Salt Cake (Solids)	T2-SltCk (Solid)	2044	1.64	28.3
241-TX-105	Salt Cake (Liquids)	T2-SltCk (Liquid)	106	1.45	49.1
241-TX-105	Sludge	MW2 (Solid)	31	1.85	41.4
241-TX-106	Salt Cake (Solids)	T2-SltCk (Solid)	1147	1.64	28.3
241-TX-106	Salt Cake (Liquids)	T2-SltCk (Liquid)	152	1.45	49.1
241-TX-106	Sludge	MW2 (Solid)	4	1.85	41.4
241-TX-106	Sludge	R1 (Solid)	15	1.77	22.7
241-TX-107	Salt Cake (Liquids)	T2-SltCk (Liquid)	19	1.45	49.1
241-TX-107	Salt Cake (Liquids)	R-SltCk (Liquid)	7	1.5	51.9
241-TX-107	Salt Cake (Solids)	T2-SltCk (Solid)	62	1.94	22.2
241-TX-107	Salt Cake (Solids)	R-SltCk (Solid)	24	1.72	23.4
241-TX-108	Sludge	MW2 (Solid)	8	1.85	41.4
241-TX-108	Salt Cake (Solids)	T2-SltCk (Solid)	415	1.64	28.3
241-TX-108	Salt Cake (Liquids)	T2-SltCk (Liquid)	40	1.45	49.1
241-TX-108	Sludge	TBP (Solid)	15	1.47	50.5
241-TX-109	Sludge	1C (Solid)	1375	1.43	54.1
241-TX-110	Sludge	1C (Solid)	140	1.43	54.1
241-TX-110	Salt Cake (Solids)	T2-SltCk (Solid)	1580	1.64	28.3
241-TX-110	Salt Cake (Liquids)	T2-SltCk (Liquid)	49	1.45	49.1
241-TX-111	Sludge	1C (Solid)	163	1.43	54.1
241-TX-111	Salt Cake (Solids)	T2-SltCk (Solid)	1194	1.64	28.3
241-TX-111	Salt Cake (Liquids)	T2-SltCk (Liquid)	24	1.45	49.1
241-TX-112	Salt Cake (Liquids)	T1-SltCk (Liquid)	15	1.26	69.6
241-TX-112	Salt Cake (Solids)	T2-SltCk (Solid)	2215	1.64	28.3
241-TX-112	Salt Cake (Solids)	T1-SltCk (Solid)	75	1.72	23.5
241-TX-112	Salt Cake (Liquids)	T2-SltCk (Liquid)	93	1.45	49.1
241-TX-113	Salt Cake (Solids)	T2-SltCk (Solid)	2045	1.64	9.43
241-TX-113	Salt Cake (Liquids)	T2-SltCk (Liquid)	20	1.45	49.1
241-TX-113	Sludge	1C (Solid)	351	1.43	54.1
241-TX-114	Salt Cake (Solids)	T2-SltCk (Solid)	1750	1.64	28.3
241-TX-114	Sludge	1C (Solid)	15	1.43	54.1
241-TX-114	Salt Cake (Solids)	T1-SltCk (Solid)	173	1.72	23.5
241-TX-114	Salt Cake (Liquids)	T1-SltCk (Liquid)	46	1.26	69.6
241-TX-114	Salt Cake (Liquids)	T2-SltCk (Liquid)	28	1.45	49.1

Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-TX-115	Sludge	TBP (Solid)	30	1.47	50.5
241-TX-115	Salt Cake (Solids)	T2-SltCk (Solid)	1960	1.64	28.3
241-TX-115	Salt Cake (Liquids)	T2-SltCk (Liquid)	103	1.45	49.1
241-TX-116	Salt Cake (Solids)	T2-SltCk (Solid)	926	1.64	28.5
241-TX-116	Salt Cake (Solids)	T1-SltCk (Solid)	977	1.72	7.5
241-TX-116	Salt Cake (Liquids)	T1-SltCk (Liquid)	113	1.39	53
241-TX-116	Sludge	DE (Solid)	248	1.6	38.8
241-TX-117	Salt Cake (Solids)	T1-SltCk (Solid)	626	1.72	23.5
241-TX-117	Salt Cake (Solids)	T2-SltCk (Solid)	1033	1.64	28.3
241-TX-117	Sludge	DE (Solid)	110	0.384	0
241-TX-117	Salt Cake (Liquids)	T1-SltCk (Liquid)	48	1.26	69.6
241-TX-118	Salt Cake (Solids)	T2-SltCk (Solid)	671	1.77	43.6
241-TX-118	Salt Cake (Solids)	NA	125	1.54	46.8
241-TX-118	Salt Cake (Liquids)	T2-SltCk (Liquid)	139	1.45	49.1
241-TY-101	Sludge	1CFeCN (Solid)	273	1.64	43.5
241-TY-101	Salt Cake (Solids)	T1-SltCk (Solid)	172	1.64	43.5
241-TY-101	Salt Cake (Liquids)	T1-SltCk (Liquid)	2	1.26	69.6
241-TY-102	Salt Cake (Solids)	T1-SltCk (Solid)	90	1.88	23.5
241-TY-102	Salt Cake (Solids)	T2-SltCk (Solid)	109	1.88	28.3
241-TY-102	Salt Cake (Liquids)	T1-SltCk (Liquid)	29	1.26	69.6
241-TY-102	Salt Cake (Liquids)	T2-SltCk (Liquid)	34	1.45	49.1
241-TY-103	Sludge	TBP (Solid)	220	1.7	51.9
241-TY-103	Salt Cake (Solids)	T2-SltCk (Solid)	150	1.7	51.9
241-TY-103	Salt Cake (Liquids)	T2-SltCk (Liquid)	45	1.45	49.1
241-TY-103	Sludge	1CFeCN (Solid)	170	1.7	51.9
241-TY-104	Sludge	1CFeCN (Solid)	114	1.65	51.9
241-TY-104	Sludge	TBP (Solid)	49	1.65	51.9
241-TY-104	Supernatant	DW (Liquid)	5	1.18	77.5
241-TY-105	Sludge	TBP (Solid)	874	1.53	39.4
241-TY-106	Sludge	DE (Solid)	47	1.4	38.1
241-TY-106	Sludge	TBP (Solid)	15	1.4	38.1
241-U-101	Sludge	R1 (Solid)	87	1.77	29.8
241-U-102	Salt Cake (Liquids)	T2-SltCk (Liquid)	117	1.48	47.5
241-U-102	Salt Cake (Solids)	T2-SltCk (Solid)	647	1.68	34.7
241-U-102	Salt Cake (Solids)	S2-SltSlr (Solid)	307	1.68	34.7
241-U-102	Sludge	R1 (Solid)	163	1.77	22.7
241-U-102	Supernatant	T2-SltCk (Liquid)	4	1.48	47.5
241-U-103	Retained Gas - Salt Cake	NA	163		
241-U-103	Salt Cake (Solids)	S2-SltSlr (Solid)	356	1.72	38.4
241-U-103	Salt Cake (Solids)	S1-SltCk (Solid)	891	1.72	38.4
241-U-103	Sludge	R1 (Solid)	42	1.9	47.4
241-U-103	Salt Cake (Liquids)	S1-SltCk (Liquid)	119	1.44	49.92
241-U-103	Supernatant	S1-SltCk (Liquid)	2	1.44	49.9
241-U-103	Retained Gas - Sludge	NA	5		
241-U-104	Sludge	R1 (Solid)	151	1.77	22.7

Table A-1. Best Basis Inventory - Density and Weight Percent Water By Tank, Waste Phase, and Waste Type. (12 sheets)

Tank Name	Waste Phase	Waste Type	Volume (kL)	Density (g/mL)	Wt% Water
241-U-104	Sludge	DE (Solid)	311	1.26	50.7
241-U-105	Salt Cake (Solids)	S2-SltSlr (Solid)	827	1.7	28.4
241-U-105	Salt Cake (Solids)	T2-SltCk (Solid)	223	1.7	28.4
241-U-105	Salt Cake (Liquids)	T2-SltCk (Liquid)	35	1.46	51.6
241-U-105	Sludge	CWR1 (Solid)	121	1.7	22.4
241-U-105	Salt Cake (Liquids)	S2-SltSlr (Liquid)	130	1.46	51.6
241-U-106	Salt Cake (Liquids)	S1-SltCk (Liquid)	154	1.34	48.6
241-U-106	Salt Cake (Solids)	S1-SltCk (Solid)	484	1.62	39.8
241-U-106	Supernatant	S1-SltCk (Liquid)	6	1.34	48.6
241-U-107	Sludge	CWR1 (Solid)	57	1.8	24.5
241-U-107	Salt Cake (Solids)	S2-SltSlr (Solid)	902	1.77	31.5
241-U-107	Salt Cake (Solids)	T2-SltCk (Solid)	44	1.77	31.5
241-U-107	Salt Cake (Liquids)	S2-SltSlr (Liquid)	105	1.43	49.6
241-U-107	Salt Cake (Liquids)	T2-SltCk (Liquid)	5	1.43	49.6
241-U-108	Salt Cake (Solids)	S1-SltCk (Solid)	628	1.73	34.7
241-U-108	Salt Cake (Solids)	S2-SltSlr (Solid)	500	1.73	34.7
241-U-108	Sludge	CWR2 (Solid)	110	1.46	51.7
241-U-108	Salt Cake (Liquids)	S2-SltSlr (Liquid)	43	1.4	49.9
241-U-108	Salt Cake (Liquids)	S1-SltCk (Liquid)	55	1.4	49.9
241-U-109	Salt Cake (Solids)	S1-SltCk (Solid)	600	1.67	27
241-U-109	Salt Cake (Liquids)	S1-SltCk (Liquid)	137	1.47	50.7
241-U-109	Sludge	CWR1 (Solid)	103	1.71	22.7
241-U-109	Retained Gas - Salt Cake	NA	137		
241-U-109	Salt Cake (Solids)	S2-SltSlr (Solid)	512	1.67	27
241-U-109	Retained Gas - Sludge	NA	29		
241-U-110	Sludge	CWR1 (Solid)	149	1.8	3.08
241-U-110	Sludge	R1 (Solid)	396	1.77	38.8
241-U-110	Sludge	1C (Solid)	120	1.43	39.7
241-U-111	Salt Cake (Solids)	S1-SltCk (Solid)	228	1.68	30.2
241-U-111	Salt Cake (Solids)	S2-SltSlr (Solid)	401	1.63	34.9
241-U-111	Sludge	R1 (Solid)	49	1.77	22.7
241-U-111	Sludge	1C (Solid)	49	1.43	54.1
241-U-111	Salt Cake (Liquids)	S1-SltCk (Liquid)	41	1.4	52.6
241-U-111	Salt Cake (Liquids)	S2-SltSlr (Liquid)	72	1.4	52.6
241-U-112	Sludge	CWR1 (Solid)	58	1.86	26
241-U-112	Sludge	1C (Solid)	47	1.43	54.1
241-U-112	Sludge	R1 (Solid)	67	1.86	26
241-U-201	Sludge (Solids)	CWR1 (Solid)	11	1.63	27.1
241-U-201	Supernatant	CWR1 (Liquid)	4	1.26	69.3
241-U-202	Sludge	CWR1 (Solid)	10	1.51	27.8
241-U-202	Supernatant	CWR1 (Liquid)	4	1.28	69.1
241-U-203	Sludge	CWR1 (Solid)	9	1.59	40.2
241-U-203	Supernatant	CWR1 (Liquid)	4	1.28	68.7
241-U-204	Sludge	CWR1 (Solid)	7	1.47	26.2
241-U-204	Supernatant	CWR1 (Liquid)	4	1.11	87

Note: TWINS, 2004, Tank Waste Information Network System, internet address: http://twins.pnl.gov:8001, Data from prefer density and weight percent water queried September 27, 2004

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-A-101	Total			1.65E+04	3.19E+05	1.73E+05	5.88E+04	5.04E+05	1.62E+05	4.80E+00	1.08E+02	2.58E+01	5.12E+02	3.94E+05
241-A-101	Sludge	P2 (Solid)	11	0.00E+00	1.08E+03	4.24E+01	2.95E+03	1.26E+03	8.12E+04	3.02E+00	6.43E+01	1.58E+01	3.57E+02	1.57E+03
241-A-101	Salt Cake (Solids)	A1-SltCk (Solid)	1147	1.58E+04	2.73E+05	1.42E+05	4.59E+04	4.49E+05	8.08E+04	1.77E+00	4.31E+01	1.00E+01	1.52E+02	3.26E+05
241-A-101	Salt Cake (Liquids)	A1-SltCk (Liquid)	192	7.19E+02	4.48E+04	3.17E+04	9.94E+03	5.33E+04	1.33E+01	5.17E-03	1.26E-01	2.93E-02	2.93E+00	6.70E+04
241-A-102	Total			3.12E+03	2.21E+04	1.51E+04	7.56E+03	3.22E+04	7.76E+04	1.28E+01	3.12E+02	7.25E+01	2.48E+02	4.06E+04
241-A-102	Supernatant	A1-SltCk (Liquid)	12	1.50E+02	1.55E+03	2.38E+01	4.92E+02	2.40E+03	1.33E+01	1.81E-03	4.41E-02	1.02E-02	1.29E-02	5.95E+03
241-A-102	Salt Cake (Solids)	A1-SltCk (Solid)	106	2.56E+03	1.63E+04	1.50E+04	5.71E+03	2.32E+04	7.75E+04	1.28E+01	3.12E+02	7.24E+01	2.48E+02	1.83E+04
241-A-102	Salt Cake (Liquids)	A1-SltCk (Liquid)	33	4.13E+02	4.26E+03	6.53E+01	1.35E+03	6.60E+03	3.66E+01	4.97E-03	1.21E-01	2.82E-02	3.54E-02	1.64E+04
241-A-103	Total			1.39E+04	2.28E+05	1.52E+05	4.38E+04	3.77E+05	1.14E+05	7.62E+00	1.93E+02	4.42E+01	1.99E+02	2.88E+05
241-A-103	Supernatant	A1-SltCk (Liquid)	17	1.34E+02	3.26E+03	1.90E+03	9.89E+02	3.91E+03	3.12E+01	1.44E-02	3.52E-01	8.16E-02	5.03E-02	4.36E+03
241-A-103	Sludge	AR (Solid)	8	0.00E+00	5.11E-07	2.35E+02	1.53E+01	1.11E+03	6.78E+04	1.19E+00	3.64E+01	7.91E+00	2.47E+01	5.32E+03
241-A-103	Salt Cake (Solids)	A1-SltCk (Solid)	1049	1.12E+04	1.61E+05	1.13E+05	2.35E+04	2.96E+05	4.59E+04	6.14E+00	1.49E+02	3.46E+01	1.74E+02	1.94E+05
241-A-103	Salt Cake (Liquids)	A1-SltCk (Liquid)	331	2.61E+03	6.36E+04	3.69E+04	1.93E+04	7.61E+04	6.08E+02	2.81E-01	6.85E+00	1.59E+00	9.80E-01	8.48E+04
241-A-104	Total			0.00E+00	2.87E+02	3.00E+03	8.07E+03	1.45E+04	2.29E+06	2.18E+01	6.58E+02	1.44E+02	4.09E+02	6.20E+04
241-A-104	Sludge	P1 (Solid)	4	0.00E+00	6.52E-06	2.99E+03	7.76E+03	1.42E+04	2.21E+06	2.07E+01	6.34E+02	1.38E+02	3.15E+02	5.96E+04
241-A-104	Sludge	AR (Solid)	102	0.00E+00	2.87E+02	1.12E+01	3.04E+02	3.32E+02	8.66E+04	1.14E+00	2.43E+01	5.96E+00	9.44E+01	2.34E+03
241-A-105	Total			0.00E+00	1.71E+04	6.67E+02	8.28E+03	5.50E+04	2.88E+06	2.61E+01	5.56E+02	1.36E+02	5.62E+03	1.07E+05
241-A-105	Sludge	P2 (Solid)	139	0.00E+00	1.71E+04	6.67E+02	8.28E+03	5.50E+04	2.88E+06	2.61E+01	5.56E+02	1.36E+02	5.62E+03	1.07E+05
241-A-106	Total			4.31E+03	5.03E+04	4.57E+04	1.47E+04	7.86E+04	4.90E+05	4.03E+01	1.03E+03	2.36E+02	5.81E+02	6.43E+04
241-A-106	Sludge	SRR (Solid)	110	1.59E+03	1.33E+04	1.21E+04	3.87E+03	2.08E+04	1.29E+05	8.99E+00	2.75E+02	5.99E+01	1.49E+02	1.70E+04
241-A-106	Sludge	AR (Solid)	79	1.14E+03	1.85E+04	1.68E+04	5.40E+03	2.89E+04	1.80E+05	1.57E+01	3.79E+02	8.79E+01	2.15E+02	2.36E+04
241-A-106	Salt Cake (Solids)	A1-SltCk (Solid)	110	1.59E+03	1.85E+04	1.68E+04	5.40E+03	2.89E+04	1.80E+05	1.56E+01	3.79E+02	8.79E+01	2.17E+02	2.36E+04
241-AN-101	Total			1.89E+04	5.91E+05	4.22E+05	7.07E+04	7.87E+05	1.08E+04	8.26E-02	2.13E+00	4.74E-01	9.74E+00	1.01E+06
241-AN-101	Supernatant	NA	3507	1.79E+04	5.68E+05	4.07E+05	6.64E+04	7.51E+05	6.28E+03	7.61E-03	3.07E-01	5.10E-02	3.25E+00	9.80E+05
241-AN-101	Salt Cake (Solids)	A1-SltCk (Solid)	90	8.52E+02	1.82E+04	1.18E+04	3.20E+03	2.96E+04	4.46E+03	7.48E-02	1.82E+00	4.22E-01	6.41E+00	2.36E+04
241-AN-101	Salt Cake (Liquids)	A1-SltCk (Liquid)	28	1.13E+02	5.32E+03	3.42E+03	1.06E+03	6.61E+03	2.79E+01	1.39E-04	3.39E-03	7.87E-04	7.89E-02	9.96E+03
241-AN-102	Total			1.14E+05	8.88E+05	3.71E+05	5.73E+04	9.69E+05	3.82E+05	3.48E+00	4.79E+01	1.25E+01	1.03E+03	1.57E+06
241-AN-102	Supernatant	NA	3550	9.64E+04	7.15E+05	2.98E+05	4.79E+04	8.42E+05	2.76E+05	1.20E+00	1.65E+01	4.30E+00	5.65E+02	1.36E+06
241-AN-102	Salt Cake	A2-SltSlr (Solid)	507	1.80E+04	1.72E+05	7.25E+04	9.36E+03	1.27E+05	1.06E+05	2.28E+00	3.14E+01	8.16E+00	4.65E+02	2.05E+05
241-AN-103	Total			1.05E+04	6.50E+05	4.30E+05	2.18E+05	1.06E+06	5.87E+03	2.98E-01	4.11E+00	1.07E+00	2.08E+01	1.73E+06
241-AN-103	Supernatant	A2-SltSlr (Liquid)	1890	5.76E+03	2.43E+05	2.46E+05	5.66E+04	5.10E+05	3.34E+01	3.50E-02	4.82E-01	1.25E-01	1.15E+01	1.19E+06
241-AN-103	Salt Cake	A2-SltSlr (Solid)	1529	4.76E+03	4.07E+05	1.84E+05	1.61E+05	5.49E+05	5.84E+03	2.63E-01	3.63E+00	9.44E-01	9.23E+00	5.40E+05
241-AN-104	Total			1.93E+04	7.32E+05	4.32E+05	1.41E+05	1.07E+06	7.18E+04	5.40E-01	7.44E+00	1.94E+00	4.79E+01	1.88E+06
241-AN-104	Supernatant	A2-SltSlr (Liquid)	2299	7.22E+03	4.36E+05	2.74E+05	8.96E+04	5.94E+05	1.88E+02	2.34E-02	3.22E-01	8.39E-02	8.16E-01	1.13E+06
241-AN-104	Salt Cake	A2-SltSlr (Solid)	1566	1.20E+04	2.96E+05	1.58E+05	5.13E+04	4.81E+05	7.16E+04	5.16E-01	7.12E+00	1.85E+00	4.71E+01	7.48E+05
241-AN-105	Total			2.23E+04	6.91E+05	4.59E+05	1.60E+05	1.10E+06	2.88E+04	4.89E-01	6.75E+00	1.76E+00	5.29E+01	1.41E+06

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-AN-105	Supernatant	A2-SltSlr (Liquid)	2227	6.15E+03	3.48E+05	2.64E+05	9.28E+04	5.50E+05	7.73E+01	9.72E-02	1.34E+00	3.48E-01	3.20E+01	6.52E+05
241-AN-105	Salt Cake	A2-SltSlr (Solid)	1925	1.62E+04	3.43E+05	1.94E+05	6.76E+04	5.52E+05	2.87E+04	3.92E-01	5.41E+00	1.41E+00	2.09E+01	7.56E+05
241-AN-106	Total			1.60E+04	9.75E+04	7.57E+04	1.94E+04	1.96E+05	4.78E+04	6.85E+00	1.44E+02	3.01E+01	4.02E+02	2.04E+05
241-AN-106	Supernatant	NA	3103	7.01E+03	8.44E+04	6.70E+04	1.38E+04	1.50E+05	2.12E+03	1.79E-01	1.13E+01	1.75E+00	1.55E+00	1.73E+05
241-AN-106	Sludge	NA	109	8.38E+03	2.97E+01	2.03E+02	3.27E+03	2.45E+04	4.25E+04	6.61E+00	1.31E+02	2.80E+01	3.96E+02	1.43E+04
241-AN-106	Salt Cake	NA	65	6.15E+02	1.31E+04	8.53E+03	2.31E+03	2.14E+04	3.22E+03	5.41E-02	1.31E+00	3.05E-01	4.63E+00	1.71E+04
241-AN-107	Total			1.47E+05	8.37E+05	2.74E+05	2.60E+04	8.72E+05	4.67E+05	1.59E+01	2.20E+02	5.71E+01	3.62E+03	1.29E+06
241-AN-107	Supernatant	A2-SltSlr (Liquid)	3297	1.07E+05	6.89E+05	2.20E+05	3.70E+03	6.85E+05	2.53E+05	1.08E+01	1.49E+02	3.87E+01	2.41E+03	9.85E+05
241-AN-107	Salt Cake	A2-SltSlr (Solid)	872	4.03E+04	1.47E+05	5.38E+04	2.23E+04	1.88E+05	2.14E+05	5.14E+00	7.08E+01	1.84E+01	1.20E+03	3.01E+05
241-AP-101	Total			8.26E+03	5.56E+05	1.77E+05	2.93E+04	5.45E+05	3.37E+02	6.02E-02	4.31E-01	1.00E-01	7.13E-01	5.57E+05
241-AP-101	Supernatant	A1-SltCk (Liquid)	4199	8.26E+03	5.56E+05	1.77E+05	2.93E+04	5.45E+05	3.37E+02	6.02E-02	4.31E-01	1.00E-01	7.13E-01	5.57E+05
241-AP-102	Total			1.24E+04	6.86E+05	4.03E+05	1.41E+05	7.98E+05	1.62E+03	3.43E-02	1.32E+00	2.23E-01	7.11E+00	9.80E+05
241-AP-102	Supernatant	Waste Transfer	4067	1.22E+04	6.78E+05	3.98E+05	1.25E+05	7.89E+05	1.56E+03	3.24E-02	1.25E+00	2.11E-01	7.00E+00	9.68E+05
241-AP-102	Sludge	NA	88	2.16E+02	7.58E+03	4.67E+03	1.57E+04	9.18E+03	5.66E+01	1.85E-03	7.21E-02	1.22E-02	1.07E-01	1.25E+04
241-AP-103	Total			2.46E+04	5.05E+05	2.72E+05	6.20E+04	6.03E+05	8.15E+03	9.77E-02	3.16E+00	5.28E-01	3.74E+01	7.75E+05
241-AP-103	Supernatant	NA	3389	2.46E+04	5.05E+05	2.72E+05	6.20E+04	6.03E+05	8.15E+03	9.77E-02	3.16E+00	5.28E-01	3.74E+01	7.75E+05
241-AP-104	Total			1.73E+04	4.19E+05	2.66E+05	6.98E+04	5.35E+05	6.95E+03	1.65E-01	6.22E+00	1.06E+00	9.64E+01	7.72E+05
241-AP-104	Supernatant	NA	4164	1.73E+04	4.19E+05	2.66E+05	6.98E+04	5.35E+05	6.95E+03	1.65E-01	6.22E+00	1.06E+00	9.64E+01	7.72E+05
241-AP-105	Total			7.51E+03	3.13E+05	1.36E+05	4.58E+04	4.00E+05	1.04E+04	1.92E-01	2.70E+00	6.22E-01	4.71E+00	4.45E+05
241-AP-105	Supernatant	Waste Transfer	2262	4.57E+03	2.50E+05	1.20E+05	4.11E+04	2.96E+05	7.01E+02	5.74E-02	8.45E-01	1.39E-01	1.89E+00	3.23E+05
241-AP-105	Salt Cake	A2-SltSlr (Solid)	337	2.94E+03	6.31E+04	1.62E+04	4.73E+03	1.04E+05	9.69E+03	1.35E-01	1.86E+00	4.83E-01	2.83E+00	1.22E+05
241-AP-106	Total			1.49E+04	3.04E+05	1.78E+05	5.81E+04	4.45E+05	5.12E+03	8.93E-03	3.18E-01	5.47E-02	2.61E+00	7.54E+05
241-AP-106	Supernatant	NA	4301	1.49E+04	3.04E+05	1.78E+05	5.81E+04	4.45E+05	5.12E+03	8.93E-03	3.18E-01	5.47E-02	2.61E+00	7.54E+05
241-AP-107	Total			1.00E+04	4.83E+05	2.22E+05	5.97E+04	5.26E+05	4.32E+03	1.05E-01	3.37E-01	5.39E-02	2.24E+00	5.70E+05
241-AP-107	Supernatant	NA	4271	1.00E+04	4.83E+05	2.22E+05	5.97E+04	5.26E+05	4.32E+03	1.05E-01	3.37E-01	5.39E-02	2.24E+00	5.70E+05
241-AP-108	Total			1.35E+04	5.45E+05	2.48E+05	7.59E+04	6.27E+05	1.31E+03	3.61E-01	1.22E+00	2.54E-01	5.31E-01	6.13E+05
241-AP-108	Supernatant	NA	3110	1.35E+04	5.45E+05	2.48E+05	7.59E+04	6.27E+05	1.31E+03	3.61E-01	1.22E+00	2.54E-01	5.31E-01	6.13E+05
241-AW-101	Total			2.04E+04	8.19E+05	4.22E+05	1.15E+05	1.02E+06	8.30E+04	7.29E+00	1.00E+02	2.61E+01	1.05E+02	1.52E+06
241-AW-101	Supernatant	A2-SltSlr (Liquid)	2770	7.24E+03	4.74E+05	2.92E+05	8.17E+04	6.45E+05	1.04E+03	8.25E-02	1.14E+00	2.96E-01	7.21E-01	1.05E+06
241-AW-101	Salt Cake	A2-SltSlr (Solid)	1403	1.32E+04	3.46E+05	1.30E+05	3.34E+04	3.77E+05	8.20E+04	7.20E+00	9.93E+01	2.58E+01	1.04E+02	4.75E+05
241-AW-102	Total			1.31E+03	4.34E+04	2.05E+04	1.36E+04	5.10E+04	1.80E+04	2.91E-01	1.48E+01	3.08E+00	6.05E+01	5.21E+04
241-AW-102	Supernatant	Waste Transfer	428	1.12E+03	4.31E+04	2.02E+04	6.04E+03	4.94E+04	1.04E+02	3.79E-02	1.25E-01	2.62E-02	3.43E-02	4.97E+04
241-AW-102	Sludge	CWP1 (Solid)	25	1.89E+02	2.20E+02	3.01E+02	7.54E+03	1.67E+03	1.79E+04	2.53E-01	1.47E+01	3.05E+00	6.05E+01	2.35E+03
241-AW-103	Total			1.01E+04	4.49E+05	1.57E+05	4.73E+04	5.64E+05	1.24E+04	3.79E+01	3.84E+02	1.08E+02	1.60E+02	4.01E+05
241-AW-103	Supernatant	NA	2975	6.36E+03	3.70E+05	1.19E+05	3.52E+04	3.49E+05	3.66E+02	1.53E-01	5.32E-01	1.22E-01	4.67E-01	3.51E+05
241-AW-103	Sludge	CWZr2 (Solid)	1033	1.89E+03	4.22E+04	2.01E+04	3.59E+03	1.75E+05	1.08E+04	3.76E+01	3.79E+02	1.07E+02	1.46E+02	3.32E+04

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-AW-103	Salt Cake (Solids)	A1-SltCk (Solid)	115	1.76E+03	2.95E+04	1.41E+04	7.05E+03	3.04E+04	1.20E+03	1.51E-01	3.66E+00	8.49E-01	1.29E+01	3.69E+03
241-AW-103	Salt Cake (Liquids)	A1-SltCk (Liquid)	36	1.45E+02	6.84E+03	4.39E+03	1.36E+03	8.50E+03	3.58E+01	1.79E-04	4.36E-03	1.01E-03	1.01E-01	1.28E+04
241-AW-104	Total			2.19E+04	4.56E+05	3.03E+05	1.06E+05	7.82E+05	5.98E+03	5.16E+01	5.18E+02	1.46E+02	6.78E+01	9.81E+05
241-AW-104	Supernatant	NA	3221	1.39E+04	3.62E+05	2.40E+05	8.19E+04	5.47E+05	5.24E+03	1.46E-02	4.58E-01	8.17E-02	5.05E+00	7.69E+05
241-AW-104	Sludge (Solids)	PL2 (Solid)	188	2.84E+03	1.02E+04	5.82E+03	2.57E+03	2.31E+04	1.20E+01	4.95E+01	4.90E+02	1.38E+02	1.83E+01	1.37E+01
241-AW-104	Sludge (Liquids)	PL2 (Liquid)	62	1.63E+02	4.38E+03	2.72E+03	8.37E+02	1.17E+04	4.02E+01	7.81E-04	1.08E-02	2.80E-03	2.57E-01	1.44E+04
241-AW-104	Salt Cake (Solids)	A2-SltSlr (Solid)	457	4.51E+03	5.97E+04	4.17E+04	1.46E+04	1.65E+05	5.56E+02	2.04E+00	2.81E+01	7.32E+00	4.29E+01	1.52E+05
241-AW-104	Salt Cake (Liquids)	A2-SltSlr (Liquid)	136	5.14E+02	1.89E+04	1.32E+04	5.67E+03	3.50E+04	1.28E+02	4.21E-03	5.80E-02	1.51E-02	1.38E+00	4.56E+04
241-AW-105	Total			4.86E+03	5.53E+04	1.36E+04	4.11E+03	1.46E+05	3.13E+04	4.51E+01	4.54E+02	1.28E+02	3.74E+02	5.03E+04
241-AW-105	Supernatant		594	2.02E+02	1.63E+04	1.39E+03	8.10E+01	1.31E+04	1.31E+01	1.35E-02	1.36E-01	3.83E-02	3.79E-02	5.92E+03
241-AW-105	Sludge (Solids)	PL2 (Solid)	61	1.89E+03	2.05E+04	6.28E+03	2.10E+03	1.09E+05	2.27E+04	4.02E+01	4.05E+02	1.14E+02	2.24E+02	2.23E+04
241-AW-105	Sludge (Solids)	CWZr2 (Solid)	660	2.66E+03	2.89E+03	1.10E+03	1.49E+03	9.29E+03	7.52E+03	4.55E+00	4.49E+01	1.27E+01	1.45E+02	5.10E+03
241-AW-105	Sludge (Liquids)	PL2 (Liquid)	12	3.40E+01	1.49E+04	2.68E+02	3.95E+02	1.33E+04	1.11E+03	3.46E-01	3.50E+00	9.84E-01	4.84E+00	1.69E+04
241-AW-105	Sludge (Liquids)	CWZr2 (Liquid)	266	7.98E+01	6.15E+02	4.55E+03	4.93E+01	9.78E+02	4.72E+00	3.47E-02	3.44E-01	9.68E-02	3.59E-02	5.39E+00
241-AW-106	Total			1.27E+04	4.80E+05	2.27E+05	7.89E+04	6.73E+05	3.46E+04	1.59E+00	2.23E+01	5.75E+00	3.49E+01	7.83E+05
241-AW-106	Supernatant	Waste Transfer	2340	4.12E+03	2.66E+05	1.28E+05	4.90E+04	3.37E+05	1.08E+03	1.16E-02	5.52E-01	8.71E-02	1.76E+00	3.61E+05
241-AW-106	Salt Cake	A2-SltSlr (Solid)	1072	8.54E+03	2.14E+05	9.89E+04	2.99E+04	3.37E+05	3.36E+04	1.58E+00	2.17E+01	5.66E+00	3.31E+01	4.22E+05
241-AX-101	Total			1.13E+04	3.35E+05	1.65E+05	5.12E+04	4.90E+05	2.21E+05	4.78E+00	1.16E+02	2.68E+01	3.93E+02	4.07E+05
241-AX-101	Sludge	SRR (Solid)	11	3.79E-02	1.23E-08	2.57E+02	0.00E+00	2.03E+03	1.45E+05	3.44E+00	8.30E+01	1.93E+01	2.78E+02	1.51E+03
241-AX-101	Salt Cake (Solids)	A1-SltCk (Solid)	1164	1.06E+04	2.87E+05	1.34E+05	4.23E+04	4.38E+05	7.59E+04	1.34E+00	3.25E+01	7.54E+00	1.15E+02	3.44E+05
241-AX-101	Salt Cake (Liquids)	A1-SltCk (Liquid)	178	7.08E+02	4.84E+04	3.08E+04	8.95E+03	5.02E+04	4.06E+01	1.04E-03	2.54E-02	5.90E-03	7.02E-02	6.09E+04
241-AX-102	Total			6.05E+03	2.58E+04	5.07E+03	2.37E+03	2.43E+04	2.30E+05	1.41E+01	1.52E+02	4.87E+01	2.14E+03	2.45E+04
241-AX-102	Sludge	B (Solid)	23	8.71E+00	5.08E-08	1.57E+02	8.10E+02	6.96E+03	2.02E+05	1.25E+01	1.14E+02	3.98E+01	1.87E+03	8.12E+03
241-AX-102	Salt Cake	A1-SltCk (Solid)	90	6.04E+03	2.58E+04	4.91E+03	1.56E+03	1.73E+04	2.87E+04	1.58E+00	3.84E+01	8.90E+00	2.76E+02	1.64E+04
241-AX-103	Total			2.54E+03	6.83E+04	5.39E+04	1.51E+04	1.07E+05	4.45E+05	4.33E+00	9.26E+01	2.34E+01	7.28E+02	1.16E+05
241-AX-103	Sludge	P2 (Solid)	30	0.00E+00	2.25E+03	8.40E+01	1.53E+03	1.74E+03	4.31E+05	4.18E+00	8.90E+01	2.18E+01	7.07E+02	1.60E+04
241-AX-103	Salt Cake (Solids)	A1-SltCk (Solid)	298	2.23E+03	5.18E+04	4.47E+04	1.07E+04	8.72E+04	1.37E+04	1.48E-01	3.60E+00	1.52E+00	2.00E+01	7.28E+04
241-AX-103	Salt Cake (Liquids)	A1-SltCk (Liquid)	75	3.02E+02	1.43E+04	9.15E+03	2.84E+03	1.77E+04	7.47E+01	3.72E-04	9.07E-03	2.11E-03	2.11E-01	2.67E+04
241-AX-104	Total			0.00E+00	2.30E+03	1.13E+02	2.67E+03	2.17E+03	2.05E+06	1.27E+01	2.69E+02	6.61E+01	9.49E+02	4.98E+04
241-AX-104	Sludge	P2 (Solid)	28	0.00E+00	2.30E+03	1.13E+02	2.67E+03	2.17E+03	2.05E+06	1.27E+01	2.69E+02	6.61E+01	9.49E+02	4.98E+04
241-AY-101	Total			7.86E+03	3.59E+03	2.69E+04	3.65E+04	1.04E+05	1.94E+06	5.94E+01	6.98E+02	2.14E+02	1.32E+04	8.01E+04
241-AY-101	Supernatant	NA	325	4.39E+02	1.51E+03	1.09E+04	1.54E+03	3.77E+04	3.02E+02	2.32E-01	5.57E+00	1.30E+00	8.57E-01	1.51E+04
241-AY-101	Sludge (Solids)	NA	309	7.26E+03	1.71E+03	1.24E+04	3.49E+04	6.19E+04	1.94E+06	5.83E+01	6.72E+02	2.08E+02	1.32E+04	6.02E+04
241-AY-101	Sludge (Liquids)	NA	55	1.62E+02	3.71E+02	3.59E+03	2.91E+01	4.29E+03	4.24E+01	8.75E-01	2.05E+01	4.79E+00	2.82E+00	4.82E+03
241-AY-102	Total			5.68E+03	1.34E+03	8.92E+04	5.49E+04	2.36E+05	5.82E+06	6.33E+01	1.63E+03	3.77E+02	4.97E+03	2.96E+05
241-AY-102	Supernatant	NA	2662	2.34E+03	1.12E+03	8.57E+04	3.30E+03	1.63E+05	3.23E+03	7.28E-01	4.51E+00	9.77E-01	6.02E-01	5.71E+04

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-AY-102	Sludge (Solids)	BL (Solid)	75	5.22E+02	2.93E+01	4.23E+02	8.58E+03	1.05E+04	9.67E+05	1.46E+01	2.66E+02	6.78E+01	8.28E+02	3.92E+04
241-AY-102	Sludge (Solids)	NA	376	2.61E+03	1.47E+02	2.12E+03	4.30E+04	5.29E+04	4.85E+06	4.80E+01	1.36E+03	3.08E+02	4.14E+03	1.96E+05
241-AY-102	Sludge (Liquids)	BL (Liquid)	120	1.99E+02	4.57E+01	9.99E+02	3.23E+01	8.80E+03	2.05E+02	1.54E-02	2.82E-01	7.20E-02	3.81E-02	3.70E+03
241-AZ-101	Total			1.92E+03	1.78E+05	2.08E+05	5.95E+04	3.83E+05	5.59E+06	1.15E+02	1.18E+03	3.32E+02	2.56E+04	5.31E+06
241-AZ-101	Supernatant	P3AZ1 (Liquid)	3334	1.65E+03	1.71E+05	1.99E+05	1.96E+04	3.60E+05	2.81E+03	4.70E-01	4.55E+00	1.30E+00	4.67E-01	5.06E+06
241-AZ-101	Sludge	NA	30	4.00E+01	1.21E+03	1.44E+03	3.38E+04	3.52E+03	8.51E+05	1.32E+01	1.81E+02	4.72E+01	2.17E+04	3.74E+04
241-AZ-101	Sludge	P3AZ1 (Solid)	167	2.23E+02	6.72E+03	8.01E+03	6.06E+03	1.96E+04	4.73E+06	1.02E+02	9.89E+02	2.84E+02	3.89E+03	2.08E+05
241-AZ-102	Total			7.59E+03	3.42E+04	1.51E+05	2.12E+04	2.31E+05	2.78E+06	1.31E+02	1.60E+03	4.21E+02	1.87E+04	3.59E+06
241-AZ-102	Supernatant	P3AZ2 (Liquid)	3327	6.61E+03	2.73E+04	1.35E+05	1.13E+03	2.04E+05	6.51E+03	2.34E+00	2.42E+01	6.61E+00	2.07E+00	3.13E+06
241-AZ-102	Sludge	A1-SltCk (Solid)	8	1.97E+01	1.91E+02	1.69E+02	4.06E+02	6.62E+03	5.60E+04	1.34E+00	3.27E+01	7.58E+00	1.30E+04	1.28E+04
241-AZ-102	Sludge	P3AZ2 (Solid)	275	6.79E+02	1.70E+03	3.37E+02	1.40E+04	5.40E+02	1.93E+06	1.05E+02	1.09E+03	2.98E+02	5.20E+02	1.14E+05
241-AZ-102	Sludge	PL2 (Solid)	11	2.71E+01	6.94E+01	1.16E+04	5.58E+02	1.86E+04	7.71E+04	4.37E+00	4.32E+01	1.22E+01	4.62E+03	4.64E+03
241-AZ-102	Sludge	SRR (Solid)	98	2.42E+02	1.39E+02	4.64E+02	4.97E+03	7.43E+02	6.86E+05	1.66E+01	4.00E+02	9.29E+01	1.89E+02	9.28E+03
241-AZ-102	Sludge	Z (Solid)	4	9.87E+00	4.77E+03	4.13E+03	2.03E+02	2.70E+02	2.80E+04	6.77E-01	1.63E+01	3.79E+00	3.77E+02	3.19E+05
241-B-101	Total			9.47E+02	1.18E+05	3.30E+04	1.71E+04	1.33E+05	2.48E+05	1.86E+01	1.04E+03	1.48E+02	8.20E+01	2.20E+03
241-B-101	Sludge	B (Solid)	19	5.32E+01	5.15E+03	1.31E+03	7.46E+02	2.93E+04	2.41E+05	9.03E-01	3.04E+01	2.87E+00	5.90E+01	2.15E+02
241-B-101	Sludge	BL (Solid)	76	2.13E+02	2.06E+04	5.25E+03	6.15E+03	1.33E+03	5.10E+03	1.03E-01	8.18E+00	5.46E+01	1.12E+01	0.00E+00
241-B-101	Sludge	MW1 (Solid)	11	3.08E+01	2.98E+03	7.60E+02	0.00E+00	6.41E+03	7.60E+02	1.17E+01	2.14E+02	2.05E+00	6.31E+00	3.87E+01
241-B-101	Salt Cake (Solids)	B-SltCk (Solid)	232	6.50E+02	6.28E+04	1.60E+04	1.01E+04	7.92E+04	1.34E+02	5.81E+00	7.83E+02	8.86E+01	5.23E+00	6.37E+02
241-B-101	Salt Cake (Liquids)	B-SltCk (Liquid)	73	4.94E-01	2.60E+04	9.60E+03	5.28E+01	1.65E+04	3.10E+02	5.67E-03	7.64E-01	8.64E-02	2.26E-01	1.31E+03
241-B-102	Total			8.12E+02	2.22E+04	1.35E+03	3.64E+03	3.28E+04	1.33E+02	3.77E-02	5.08E+00	5.75E-01	9.45E-02	5.84E+02
241-B-102	Supernatant	B-SltCk (Liquid)	15	5.07E-02	3.25E+03	1.27E+02	5.42E+00	1.69E+03	3.18E+01	5.82E-04	7.83E-02	8.86E-03	2.32E-02	1.34E+02
241-B-102	Salt Cake (Solids)	B-SltCk (Solid)	81	8.12E+02	1.36E+04	1.01E+03	3.62E+03	2.83E+04	4.80E+01	3.62E-02	4.88E+00	5.52E-01	3.25E-02	2.28E+02
241-B-102	Salt Cake (Liquids)	B-SltCk (Liquid)	25	8.45E-02	5.43E+03	2.13E+02	9.03E+00	2.82E+03	5.30E+01	9.69E-04	1.30E-01	1.48E-02	3.87E-02	2.23E+02
241-B-103	Total			1.83E+02	3.71E+04	2.38E+03	7.04E+03	6.10E+04	4.76E+02	3.80E-01	5.12E+01	5.79E+00	4.18E-01	9.01E+02
241-B-103	Sludge	MW1 (Solid)	4	0.00E+00	8.28E+00	3.92E+00	0.00E+00	4.85E+02	2.77E+02	1.47E-05	4.36E-03	2.94E-04	9.04E-04	1.41E+01
241-B-103	Salt Cake (Solids)	B-SltCk (Solid)	157	1.83E+02	2.63E+04	1.96E+03	7.02E+03	5.48E+04	9.30E+01	3.78E-01	5.09E+01	5.76E+00	3.40E-01	4.41E+02
241-B-103	Salt Cake (Liquids)	B-SltCk (Liquid)	50	1.69E-01	1.09E+04	4.25E+02	1.81E+01	5.65E+03	1.06E+02	1.94E-03	2.61E-01	2.95E-02	7.74E-02	4.46E+02
241-B-104	Total			2.55E+03	5.59E+05	5.16E+03	3.50E+03	2.28E+05	3.88E+03	5.99E-01	8.71E+01	9.32E+00	4.83E+00	1.30E+04
241-B-104	Sludge	1C (Solid)	473	4.02E+02	1.90E+05	1.63E+03	1.21E+03	1.13E+05	3.68E+03	1.93E-01	2.75E+01	2.99E+00	4.56E+00	1.21E+04
241-B-104	Sludge	2C (Solid)	697	1.91E+03	2.80E+05	2.40E+03	1.78E+03	7.69E+04	2.61E+00	3.09E-01	4.66E+01	4.86E+00	9.50E-02	3.04E+00
241-B-104	Salt Cake (Solids)	B-SltCk (Solid)	192	2.40E+02	7.72E+04	6.62E+02	4.91E+02	3.12E+04	8.18E+01	9.44E-02	1.27E+01	1.44E+00	8.49E-02	3.88E+02
241-B-104	Salt Cake (Liquids)	B-SltCk (Liquid)	55	1.86E-01	1.19E+04	4.67E+02	1.99E+01	6.21E+03	1.17E+02	2.13E-03	2.87E-01	3.25E-02	8.51E-02	4.91E+02
241-B-105	Total			1.73E+03	1.84E+05	1.43E+04	4.22E+04	3.41E+05	1.01E+03	4.60E-01	6.23E+01	7.02E+00	1.37E+00	4.25E+03
241-B-105	Sludge	1C (Solid)	45	3.38E+01	8.11E+03	6.25E+02	9.59E+02	5.72E+03	3.10E+02	8.39E-03	1.26E+00	5.83E-01	8.89E-01	1.02E+03
241-B-105	Sludge	2C (Solid)	61	9.68E+01	6.39E+03	1.64E+03	1.55E+02	6.39E+03	1.32E-01	3.77E-02	5.36E+00	1.32E-01	2.58E-03	1.54E-01

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-B-105	Salt Cake (Solids)	B-SltCk (Solid)	919	1.60E+03	1.54E+05	1.14E+04	4.11E+04	3.21E+05	5.44E+02	4.11E-01	5.53E+01	6.26E+00	3.69E-01	2.58E+03
241-B-105	Salt Cake (Liquids)	B-SltCk (Liquid)	73	2.47E-01	1.58E+04	6.21E+02	2.64E+01	8.25E+03	1.55E+02	2.83E-03	3.81E-01	4.31E-02	1.13E-01	6.51E+02
241-B-106	Total			2.67E+02	1.15E+05	4.63E+03	3.79E+03	7.07E+04	3.12E+04	1.30E-01	1.85E+01	2.00E+00	6.33E+00	9.90E+03
241-B-106	Supernatant	B-SltCk (Liquid)	4	1.35E-02	8.68E+02	3.40E+01	1.44E+00	4.52E+02	8.48E+00	1.55E-04	2.09E-02	2.36E-03	6.19E-03	3.57E+01
241-B-106	Sludge	1C (Solid)	163	4.81E+01	3.94E+04	1.54E+03	3.18E+03	2.81E+04	1.14E+03	5.89E-02	1.01E+01	1.09E+00	1.67E+00	2.35E+03
241-B-106	Sludge	TBP (Solid)	297	2.18E+02	7.48E+04	3.06E+03	6.11E+02	4.22E+04	3.01E+04	7.07E-02	8.46E+00	9.06E-01	4.65E+00	7.52E+03
241-B-107	Total			7.77E+02	1.56E+05	3.46E+03	1.61E+04	1.50E+05	3.22E+03	3.57E-01	4.14E+01	5.03E+00	4.72E+00	1.09E+04
241-B-107	Sludge	1C (Solid)	285	3.08E+02	1.73E+03	2.10E+03	9.77E+03	6.63E+04	2.82E+03	1.78E-01	2.53E+01	2.76E+00	4.20E+00	9.30E+03
241-B-107	Sludge	CWP2 (Solid)	42	5.36E+01	9.65E+04	5.45E+01	1.09E+03	1.19E+03	3.69E+01	8.66E-02	3.67E+00	8.66E-01	4.36E-01	4.35E+01
241-B-107	Salt Cake (Solids)	B-SltCk (Solid)	216	4.15E+02	3.56E+04	8.62E+02	5.26E+03	7.22E+04	1.41E+02	9.20E-02	1.24E+01	1.40E+00	8.27E-02	6.71E+02
241-B-107	Salt Cake (Liquids)	B-SltCk (Liquid)	68	3.43E-01	2.25E+04	4.43E+02	1.37E+00	9.96E+03	2.15E+02	6.11E-05	8.23E-03	9.32E-04	2.44E-03	9.05E+02
241-B-108	Total			5.20E+02	4.60E+04	7.96E+03	3.30E+04	1.11E+05	9.16E+02	2.26E-02	1.87E+00	2.78E-01	1.21E-01	7.13E+03
241-B-108	Sludge	CWP2 (Solid)	104	1.54E+02	9.09E+03	2.42E+03	2.55E+04	2.35E+04	6.96E+02	1.28E-02	5.42E-01	1.28E-01	6.45E-02	3.17E+03
241-B-108	Salt Cake (Solids)	B-SltCk (Solid)	186	3.65E+02	1.47E+04	2.38E+03	7.50E+03	7.75E+04	1.25E+02	8.62E-03	1.16E+00	1.31E-01	7.75E-03	3.56E+03
241-B-108	Salt Cake (Liquids)	B-SltCk (Liquid)	59	1.52E-01	2.22E+04	3.17E+03	5.30E+01	1.03E+04	9.55E+01	1.21E-03	1.63E-01	1.85E-02	4.84E-02	4.02E+02
241-B-109	Total			1.07E+03	9.10E+04	4.96E+03	4.21E+04	1.59E+05	4.13E+02	2.06E-01	1.95E+01	2.67E+00	6.55E-01	1.44E+03
241-B-109	Sludge	CWP2 (Solid)	189	9.18E+02	1.21E+04	2.13E+03	3.63E+04	5.50E+04	1.24E+02	8.87E-02	3.76E+00	8.87E-01	4.47E-01	1.46E+02
241-B-109	Salt Cake (Solids)	B-SltCk (Solid)	216	1.53E+02	6.42E+04	2.26E+03	5.81E+03	9.59E+04	1.45E+02	1.14E-01	1.54E+01	1.74E+00	1.03E-01	6.87E+02
241-B-109	Salt Cake (Liquids)	B-SltCk (Liquid)	68	2.30E-01	1.48E+04	5.78E+02	2.45E+01	7.68E+03	1.44E+02	2.64E-03	3.55E-01	4.02E-02	1.05E-01	6.07E+02
241-B-110	Total			5.01E+02	2.36E+05	1.31E+04	1.46E+03	1.23E+05	9.77E+04	3.94E+00	1.27E+02	1.35E+01	9.11E+01	1.37E+04
241-B-110	Supernatant	CSR	4	2.22E+01	3.11E+02	1.58E+02	4.16E+01	3.82E+02	9.23E+00	8.44E-04	2.02E-02	4.68E-03	2.70E-02	5.60E+01
241-B-110	Sludge	2C (Solid)	914	4.74E+02	2.32E+05	1.28E+04	1.40E+03	1.21E+05	9.66E+04	3.90E+00	1.26E+02	1.31E+01	8.98E+01	1.63E+02
241-B-110	Sludge	B (Solid)	11	5.70E+00	2.80E+03	1.54E+02	1.69E+01	1.46E+03	1.16E+03	4.31E-02	1.24E+00	4.35E-01	1.28E+00	1.35E+04
241-B-111	Total			1.26E+03	9.51E+04	5.22E+04	1.08E+03	1.02E+05	2.22E+05	3.42E+00	9.98E+01	1.26E+01	9.85E+01	1.43E+05
241-B-111	Supernatant	CSR	4	2.22E+01	3.11E+02	1.58E+02	4.16E+01	3.82E+02	9.23E+00	8.44E-04	2.02E-02	4.68E-03	2.70E-02	5.60E+01
241-B-111	Sludge	2C (Solid)	809	1.10E+03	8.42E+04	4.62E+04	9.23E+02	9.03E+04	1.97E+05	3.60E-01	9.06E+01	3.24E+00	8.66E+01	1.59E+04
241-B-111	Sludge	B (Solid)	101	1.38E+02	1.05E+04	5.77E+03	1.15E+02	1.13E+04	2.46E+04	3.06E+00	9.23E+00	9.40E+00	1.18E+01	1.27E+05
241-B-112	Total			9.30E+02	3.34E+04	7.90E+03	3.10E+03	3.17E+04	7.88E+02	9.11E-03	5.11E-01	7.76E-02	2.84E-01	7.90E+03
241-B-112	Supernatant	BY-SltCk (Liquid)	11	2.00E+02	2.39E+03	1.29E+03	5.20E+02	2.80E+03	2.54E+01	2.14E-03	5.54E-02	1.33E-02	7.42E-02	1.68E+03
241-B-112	Sludge	2C (Solid)	56	1.85E+02	1.22E+04	3.13E+03	2.96E+02	1.09E+04	2.52E-01	2.20E-03	3.32E-01	3.46E-02	6.78E-04	2.93E-01
241-B-112	Salt Cake (Solids)	BY-SltCk (Solid)	49	2.54E+02	1.54E+04	1.61E+03	1.53E+03	1.40E+04	7.26E+02	1.66E-03	4.31E-02	1.03E-02	1.01E-01	3.77E+03
241-B-112	Salt Cake (Liquids)	BY-SltCk (Liquid)	16	2.91E+02	3.47E+03	1.87E+03	7.57E+02	4.08E+03	3.69E+01	3.11E-03	8.06E-02	1.94E-02	1.08E-01	2.45E+03
241-B-201	Total			3.43E+02	7.32E+03	1.28E+02	1.57E+02	4.96E+03	2.47E+02	9.11E-01	1.09E+02	6.27E+00	4.11E+00	1.97E+01
241-B-201	Sludge	224-1 (Solid)	115	3.43E+02	7.32E+03	1.28E+02	1.57E+02	4.96E+03	2.47E+02	9.11E-01	1.09E+02	6.27E+00	4.11E+00	1.97E+01
241-B-202	Total			4.00E+02	8.32E+03	1.48E+02	2.32E+02	5.32E+03	4.06E+02	2.75E-01	1.73E+01	2.93E+00	9.03E+00	1.03E+01
241-B-202	Sludge	224-2 (Solid)	111	4.00E+02	8.32E+03	1.48E+02	2.32E+02	5.32E+03	4.06E+02	2.75E-01	1.73E+01	2.93E+00	9.03E+00	1.03E+01

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-B-203	Total			1.24E+02	1.44E+04	1.66E+02	1.19E+01	6.70E+03	1.59E+01	4.64E-01	5.36E+01	6.76E+00	7.94E+00	1.52E+00
241-B-203	Supernatant	224-2 (Liquid)	2	1.92E-01	1.13E+02	3.14E+00	0.00E+00	6.23E+01	1.63E-04	6.96E-05	8.04E-03	1.02E-03	8.54E-05	1.89E-04
241-B-203	Sludge	224-2 (Solid)	193	1.24E+02	1.43E+04	1.62E+02	1.19E+01	6.64E+03	1.59E+01	4.64E-01	5.36E+01	6.76E+00	7.94E+00	1.52E+00
241-B-204	Total			1.03E+02	1.12E+04	1.34E+02	1.31E+01	5.99E+03	5.88E-01	3.88E-01	4.48E+01	5.65E+00	8.64E+00	5.89E+00
241-B-204	Supernatant	224-1 (Liquid)	3	2.26E-01	1.04E+02	4.09E+00	0.00E+00	8.35E+01	1.09E-04	7.43E-07	2.20E-04	1.48E-05	4.92E-07	1.25E-04
241-B-204	Sludge	224-2 (Solid)	189	1.03E+02	1.11E+04	1.29E+02	1.31E+01	5.91E+03	5.88E-01	3.88E-01	4.48E+01	5.65E+00	8.64E+00	5.89E+00
241-BX-101	Total			2.33E+02	2.93E+04	3.84E+03	5.33E+04	2.18E+04	1.31E+04	3.92E+00	1.97E+02	4.09E+01	4.25E+01	1.52E+03
241-BX-101	Sludge	CWP2 (Solid)	133	1.52E+02	7.35E+03	2.33E+03	5.30E+04	8.98E+03	1.05E+02	3.61E+00	1.53E+02	3.61E+01	1.82E+01	1.23E+02
241-BX-101	Sludge	TBP (Solid)	47	8.02E+01	2.19E+04	1.51E+03	2.12E+02	1.29E+04	1.29E+04	3.07E-01	4.41E+01	4.72E+00	2.43E+01	1.40E+03
241-BX-102	Total			1.21E+02	5.83E+03	1.85E+03	4.27E+04	7.13E+03	8.33E+01	1.95E-01	8.27E+00	1.95E+00	9.84E-01	9.80E+01
241-BX-102	Sludge	CWP2 (Solid)	151	1.21E+02	5.83E+03	1.85E+03	4.21E+04	7.13E+03	0.00E+00	1.95E-01	8.27E+00	1.95E+00	9.84E-01	9.80E+01
241-BX-102	Sludge	DE (Solid)	147	0.00E+00	0.00E+00	0.00E+00	5.54E+02	0.00E+00	8.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
241-BX-103	Total			3.50E+03	2.91E+04	3.82E+03	3.84E+04	2.10E+04	1.29E+04	1.48E+01	7.87E+02	1.57E+02	1.92E+02	1.50E+03
241-BX-103	Supernatant	CWP2 (Liquid)	47	1.82E+02	2.22E+03	6.82E+02	8.85E+02	1.94E+03	2.61E+01	6.20E-03	2.63E-01	6.20E-02	2.90E-01	3.07E+01
241-BX-103	Sludge	CWP2 (Solid)	157	2.22E+03	5.17E+03	1.64E+03	3.73E+04	6.32E+03	7.39E+01	1.32E+01	2.26E+02	1.32E+02	6.67E+01	1.38E+03
241-BX-103	Sludge	TBP (Solid)	78	1.10E+03	2.17E+04	1.49E+03	2.10E+02	1.27E+04	1.28E+04	1.58E+00	5.60E+02	2.43E+01	1.25E+02	8.69E+01
241-BX-104	Total			2.72E+03	3.00E+04	1.48E+04	8.33E+04	4.27E+04	1.20E+05	2.38E+00	2.14E+02	3.02E+01	3.32E+02	3.90E+04
241-BX-104	Supernatant	CWR1 (Liquid)	11	3.51E+01	1.47E+03	7.01E+02	3.12E+01	1.54E+03	1.86E+01	3.67E-05	2.36E-03	4.49E-04	2.96E-03	1.36E+03
241-BX-104	Sludge	CWP2 (Solid)	51	3.72E+02	3.94E+03	1.94E+03	1.15E+04	5.68E+03	1.66E+04	6.45E-01	2.73E+01	6.45E+00	3.39E+01	1.58E+04
241-BX-104	Sludge	CWR1 (Solid)	163	1.19E+03	1.26E+04	6.21E+03	3.68E+04	1.82E+04	5.31E+04	1.41E+00	9.07E+01	1.72E+01	1.53E+02	5.21E+03
241-BX-104	Sludge	MW1 (Solid)	155	1.13E+03	1.20E+04	5.91E+03	3.50E+04	1.73E+04	5.05E+04	3.24E-01	9.61E+01	6.48E+00	1.46E+02	1.66E+04
241-BX-105	Total			7.65E+02	1.46E+04	6.53E+03	8.24E+03	5.30E+04	4.99E+04	8.34E-01	5.77E+01	1.04E+01	9.83E+00	1.69E+04
241-BX-105	Supernatant	CWP1 (Liquid)	18	1.70E+02	2.11E+03	1.42E+03	1.07E+02	2.23E+03	1.35E+02	4.39E-03	2.55E-01	5.32E-02	4.37E-01	2.14E+03
241-BX-105	Sludge	CWP1 (Solid)	147	3.96E+02	4.16E+03	3.23E+01	3.90E+03	4.00E+03	3.59E+04	7.21E-01	4.18E+01	8.69E+00	7.46E-03	1.00E+04
241-BX-105	Sludge	MW1 (Solid)	33	0.00E+00	8.22E+03	2.25E+03	0.00E+00	1.37E+04	2.29E+03	1.09E-01	3.59E-02	2.42E-03	8.59E+00	1.16E+02
241-BX-105	Sludge	TBP (Solid)	74	1.99E+02	6.83E+01	2.83E+03	4.23E+03	3.30E+04	1.16E+04	1.21E-04	1.56E+01	1.67E+00	7.90E-01	4.68E+03
241-BX-106	Total			9.23E+02	1.10E+04	4.43E+03	1.12E+04	3.65E+04	3.08E+04	1.24E+00	9.63E+01	1.59E+01	2.35E+01	1.24E+04
241-BX-106	Sludge	CWP1 (Solid)	71	4.61E+02	5.52E+03	2.22E+03	5.62E+03	1.82E+04	1.54E+04	9.56E-01	5.54E+01	1.15E+01	1.05E+00	6.21E+03
241-BX-106	Sludge	TBP (Solid)	71	4.61E+02	5.52E+03	2.22E+03	5.62E+03	1.82E+04	1.54E+04	2.84E-01	4.08E+01	4.37E+00	2.25E+01	6.21E+03
241-BX-107	Total			1.13E+03	2.59E+05	1.54E+04	2.70E+04	1.92E+05	1.42E+04	6.86E-01	9.75E+01	1.06E+01	2.45E+01	2.54E+04
241-BX-107	Sludge	1C (Solid)	1313	1.13E+03	2.59E+05	1.54E+04	2.70E+04	1.92E+05	1.42E+04	6.86E-01	9.75E+01	1.06E+01	2.45E+01	2.54E+04
241-BX-108	Total			1.87E+02	4.94E+04	3.50E+03	1.82E+03	3.14E+04	2.23E+04	5.80E-02	8.30E+00	8.95E-01	3.25E+00	3.92E+03
241-BX-108	Sludge	1C (Solid)	38	5.16E+01	1.24E+04	9.52E+02	1.46E+03	9.73E+03	4.72E+02	2.41E-02	3.43E+00	3.74E-01	5.69E-01	2.36E+03
241-BX-108	Sludge	TBP (Solid)	81	1.35E+02	3.71E+04	2.55E+03	3.59E+02	2.17E+04	2.19E+04	3.39E-02	4.87E+00	5.21E-01	2.68E+00	1.56E+03
241-BX-109	Total			7.83E+02	2.17E+05	2.00E+04	2.21E+03	1.17E+05	1.19E+05	7.53E-02	1.08E+01	1.16E+00	5.95E+00	1.20E+04
241-BX-109	Sludge	TBP (Solid)	730	7.83E+02	2.17E+05	2.00E+04	2.21E+03	1.17E+05	1.19E+05	7.53E-02	1.08E+01	1.16E+00	5.95E+00	1.20E+04

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-BX-110	Total			3.66E+03	4.22E+05	1.79E+04	2.48E+04	2.58E+05	1.00E+04	1.91E-01	2.03E+01	2.41E+00	6.19E+00	6.28E+04
241-BX-110	Supernatant	BY-SltCk (Liquid)	5	7.58E+01	2.06E+03	2.61E+02	2.20E+01	1.12E+03	9.61E+00	8.09E-04	2.10E-02	5.04E-03	2.81E-02	6.37E+02
241-BX-110	Sludge	1C (Solid)	151	1.14E+02	2.72E+04	2.10E+03	3.22E+03	3.93E+04	1.04E+03	1.27E-01	1.80E+01	1.96E+00	2.98E+00	3.43E+03
241-BX-110	Sludge	NA	94	3.08E+02	6.45E+04	1.74E+03	3.96E+03	2.14E+04	1.12E+03	5.58E-03	7.93E-01	8.63E-02	1.31E-01	3.69E+03
241-BX-110	Salt Cake (Solids)	BY-SltCk (Solid)	405	1.33E+03	2.78E+05	7.48E+03	1.71E+04	1.69E+05	7.63E+03	3.88E-02	1.01E+00	2.41E-01	2.37E+00	3.97E+04
241-BX-110	Salt Cake (Liquids)	BY-SltCk (Liquid)	121	1.83E+03	4.99E+04	6.30E+03	5.32E+02	2.70E+04	2.33E+02	1.96E-02	5.08E-01	1.22E-01	6.80E-01	1.54E+04
241-BX-111	Total			1.13E+03	4.03E+05	1.80E+04	1.64E+04	2.48E+05	1.18E+04	1.22E-01	1.49E+01	1.69E+00	3.54E+00	6.69E+04
241-BX-111	Sludge	1C (Solid)	121	9.10E+01	2.18E+04	1.68E+03	2.58E+03	1.72E+04	8.34E+02	1.01E-01	1.44E+01	1.57E+00	2.39E+00	2.74E+03
241-BX-111	Salt Cake (Solids)	BY-SltCk (Solid)	532	9.41E+02	3.70E+05	9.98E+03	1.09E+04	2.17E+05	1.08E+04	1.71E-02	4.44E-01	1.06E-01	1.04E+00	5.62E+04
241-BX-111	Salt Cake (Liquids)	BY-SltCk (Liquid)	60	1.02E+02	1.11E+04	6.37E+03	2.93E+03	1.36E+04	1.21E+02	3.18E-03	8.25E-02	1.98E-02	1.10E-01	8.01E+03
241-BX-112	Total			4.70E+02	6.19E+04	2.24E+04	1.00E+04	6.77E+04	4.70E+03	8.26E-01	1.17E+02	1.28E+01	1.95E+01	3.28E+04
241-BX-112	Supernatant	1C2 (Liquid)	5	0.00E+00	4.93E+02	1.76E+02	2.39E-01	3.89E+02	3.67E+00	7.90E-05	7.96E-03	1.13E-03	8.06E-04	4.31E+00
241-BX-112	Sludge	1C (Solid)	617	4.70E+02	6.14E+04	2.22E+04	1.00E+04	6.73E+04	4.70E+03	8.26E-01	1.17E+02	1.28E+01	1.95E+01	3.28E+04
241-BY-101	Total			7.33E+03	8.65E+05	2.18E+04	5.49E+04	6.04E+05	1.88E+05	1.59E-01	1.47E+01	1.85E+00	1.24E+02	3.05E+05
241-BY-101	Sludge	TFeCN (Solid)	140	7.86E+02	1.22E+04	1.05E+04	6.34E+03	2.06E+04	1.59E+05	9.49E-02	1.30E+01	1.45E+00	1.20E+02	1.42E+05
241-BY-101	Salt Cake (Solids)	BY-SltCk (Solid)	1184	5.17E+03	8.37E+05	2.43E+03	4.50E+04	5.64E+05	2.93E+04	4.98E-02	1.29E+00	3.09E-01	3.04E+00	1.52E+05
241-BY-101	Salt Cake (Liquids)	BY-SltCk (Liquid)	76	1.38E+03	1.65E+04	8.89E+03	3.59E+03	1.94E+04	1.75E+02	1.48E-02	3.83E-01	9.19E-02	5.13E-01	1.16E+04
241-BY-102	Total			9.28E+03	1.83E+05	3.59E+04	5.02E+04	4.32E+05	1.75E+04	1.38E+00	3.59E+01	8.58E+00	8.42E+01	1.10E+05
241-BY-102	Salt Cake (Solids)	BY-SltCk (Solid)	903	9.05E+03	1.60E+05	2.32E+04	4.17E+04	3.96E+05	1.72E+04	1.38E+00	3.57E+01	8.53E+00	8.39E+01	8.94E+04
241-BY-102	Salt Cake (Liquids)	BY-SltCk (Liquid)	151	2.34E+02	2.23E+04	1.27E+04	8.54E+03	3.54E+04	3.09E+02	7.60E-03	1.97E-01	4.73E-02	2.64E-01	2.05E+04
241-BY-103	Total			3.27E+04	5.68E+05	2.78E+04	7.93E+04	6.04E+05	2.90E+04	5.24E-01	1.43E+01	3.42E+00	2.96E+01	1.75E+05
241-BY-103	Sludge	CWP2 (Solid)	34	2.72E+01	1.31E+03	4.17E+02	9.48E+03	1.61E+03	1.88E+01	4.40E-02	1.86E+00	4.40E-01	2.22E-01	2.21E+01
241-BY-103	Salt Cake (Solids)	BY-SltCk (Solid)	1327	3.22E+04	5.31E+05	1.59E+04	6.10E+04	5.56E+05	2.89E+04	4.80E-01	1.25E+01	2.98E+00	2.93E+01	1.50E+05
241-BY-103	Salt Cake (Liquids)	BY-SltCk (Liquid)	214	4.08E+02	3.62E+04	1.15E+04	8.86E+03	4.60E+04	1.94E+01	6.98E-04	1.81E-02	4.34E-03	1.46E-01	2.46E+04
241-BY-104	Total			1.56E+04	5.08E+05	9.49E+04	6.54E+04	4.70E+05	3.31E+05	1.92E+00	6.91E+01	1.34E+01	1.26E+02	2.00E+05
241-BY-104	Sludge	PFeCN (Solid)	172	3.23E+03	3.58E+04	1.20E+04	1.70E+04	4.35E+04	1.59E+05	1.65E-01	2.36E+01	2.55E+00	2.01E+01	1.59E+04
241-BY-104	Salt Cake (Solids)	BY-SltCk (Solid)	1022	1.20E+04	4.38E+05	6.48E+04	3.67E+04	3.86E+05	1.72E+05	1.72E+00	4.47E+01	1.07E+01	1.05E+02	1.60E+05
241-BY-104	Salt Cake (Liquids)	BY-SltCk (Liquid)	162	3.84E+02	3.34E+04	1.80E+04	1.17E+04	4.02E+04	3.55E+02	2.99E-02	7.76E-01	1.86E-01	1.04E+00	2.36E+04
241-BY-105	Total			9.25E+03	1.40E+06	4.12E+04	7.14E+04	6.97E+05	1.40E+05	1.61E+00	7.81E+01	1.29E+01	1.19E+02	1.52E+05
241-BY-105	Sludge	PFeCN (Solid)	151	3.90E+03	4.11E+04	6.75E+03	5.61E+03	3.99E+04	1.25E+05	0.00E+00	4.43E+01	4.79E+00	3.77E+01	4.06E+04
241-BY-105	Sludge	Portland Cement (	30	0.00E+00	0.00E+00	0.00E+00	1.57E+03	0.00E+00	0.00E+00	3.09E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
241-BY-105	Salt Cake (Solids)	BY-SltCk (Solid)	1489	4.99E+03	1.33E+06	2.41E+04	5.83E+04	6.25E+05	1.48E+04	1.30E+00	3.38E+01	8.07E+00	7.94E+01	8.25E+04
241-BY-105	Salt Cake (Liquids)	BY-SltCk (Liquid)	151	3.67E+02	3.01E+04	1.04E+04	5.92E+03	3.14E+04	1.46E+01	1.12E-03	2.90E-02	6.95E-03	1.54E+00	2.84E+04
241-BY-106	Total			1.10E+04	9.30E+05	8.12E+04	5.74E+04	5.79E+05	1.37E+05	3.63E-01	2.43E+01	3.43E+00	4.06E+01	3.15E+05
241-BY-106	Sludge	PFeCN (Solid)	120	4.11E+03	2.54E+04	6.30E+03	6.21E+03	2.61E+04	1.28E+05	1.26E-01	1.81E+01	1.96E+00	2.62E+01	8.56E+04
241-BY-106	Salt Cake (Solids)	BY-SltCk (Solid)	1599	6.78E+03	9.01E+05	7.25E+04	4.99E+04	5.48E+05	9.66E+03	2.36E-01	6.14E+00	1.47E+00	1.44E+01	2.24E+05

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-BY-106	Salt Cake (Liquids)	BY-SltCk (Liquid)	31	8.28E+01	3.42E+03	2.42E+03	1.23E+03	5.11E+03	9.71E-01	7.75E-06	2.01E-04	4.83E-05	1.44E-03	5.38E+03
241-BY-107	Total			6.74E+03	3.23E+05	7.53E+04	6.08E+04	4.24E+05	7.43E+04	2.88E-01	1.40E+01	2.30E+00	2.05E+01	1.99E+05
241-BY-107	Sludge	PFeCN (Solid)	58	8.54E+02	9.85E+03	4.21E+03	4.83E+03	2.29E+04	4.75E+04	5.59E-02	8.02E+00	8.67E-01	6.82E+00	2.83E+04
241-BY-107	Salt Cake (Solids)	BY-SltCk (Solid)	827	5.55E+03	2.94E+05	5.43E+04	4.86E+04	3.66E+05	2.64E+04	2.13E-01	5.53E+00	1.32E+00	1.30E+01	1.50E+05
241-BY-107	Salt Cake (Liquids)	BY-SltCk (Liquid)	143	3.43E+02	1.88E+04	1.68E+04	7.31E+03	3.47E+04	3.05E+02	1.88E-02	4.87E-01	1.17E-01	6.53E-01	2.02E+04
241-BY-108	Total			5.55E+03	2.29E+05	3.86E+04	8.38E+04	2.32E+05	1.29E+05	4.87E-01	2.81E+01	4.24E+00	3.76E+01	5.43E+04
241-BY-108	Sludge	PFeCN (Solid)	151	2.32E+03	1.94E+04	9.87E+03	5.41E+03	3.39E+04	1.18E+05	1.31E-01	1.88E+01	2.03E+00	1.60E+01	2.01E+04
241-BY-108	Salt Cake (Solids)	BY-SltCk (Solid)	575	2.95E+03	1.76E+05	1.97E+04	7.42E+04	1.66E+05	1.07E+04	3.52E-01	9.15E+00	2.18E+00	2.15E+01	1.48E+04
241-BY-108	Salt Cake (Liquids)	BY-SltCk (Liquid)	115	2.72E+02	3.38E+04	9.04E+03	4.18E+03	3.24E+04	2.93E+02	3.83E-03	9.94E-02	2.39E-02	1.33E-01	1.94E+04
241-BY-109	Total			1.01E+04	1.33E+05	5.20E+04	7.37E+04	3.38E+05	1.44E+04	1.23E+00	3.38E+01	8.07E+00	6.84E+01	9.23E+04
241-BY-109	Sludge	CWP2 (Solid)	89	1.03E+02	9.08E+03	3.03E+03	3.52E+04	1.16E+04	7.08E+01	1.10E-01	4.66E+00	1.10E+00	5.54E-01	8.33E+01
241-BY-109	Salt Cake (Solids)	BY-SltCk (Solid)	851	9.72E+03	9.64E+04	3.69E+04	3.29E+04	2.96E+05	1.40E+04	1.10E+00	2.85E+01	6.81E+00	6.70E+01	7.28E+04
241-BY-109	Salt Cake (Liquids)	BY-SltCk (Liquid)	146	2.75E+02	2.78E+04	1.21E+04	5.66E+03	3.06E+04	2.93E+02	2.47E-02	6.39E-01	1.53E-01	8.56E-01	1.94E+04
241-BY-110	Total			1.41E+04	2.41E+05	8.29E+04	4.83E+04	4.62E+05	1.57E+05	1.07E+00	4.80E+01	8.25E+00	5.97E+01	1.90E+05
241-BY-110	Sludge	PFeCN (Solid)	162	2.64E+03	3.04E+04	1.19E+04	8.81E+03	4.42E+04	1.09E+05	1.71E-01	2.46E+01	2.66E+00	1.84E+01	3.43E+04
241-BY-110	Salt Cake (Solids)	BY-SltCk (Solid)	1120	9.51E+03	1.98E+05	5.84E+04	3.28E+04	3.92E+05	4.85E+04	9.00E-01	2.34E+01	5.58E+00	4.12E+01	1.39E+05
241-BY-110	Salt Cake (Liquids)	BY-SltCk (Liquid)	102	1.98E+03	1.27E+04	1.26E+04	6.70E+03	2.59E+04	2.51E+02	1.96E-03	5.08E-02	1.22E-02	6.80E-02	1.67E+04
241-BY-111	Total			1.04E+04	2.61E+05	3.13E+04	4.58E+04	4.31E+05	1.87E+04	1.85E+00	4.80E+01	1.15E+01	1.12E+02	1.15E+05
241-BY-111	Salt Cake (Solids)	BY-SltCk (Solid)	985	1.02E+04	2.43E+05	2.62E+04	4.18E+04	4.11E+05	1.85E+04	1.83E+00	4.76E+01	1.14E+01	1.12E+02	9.59E+04
241-BY-111	Salt Cake (Liquids)	BY-SltCk (Liquid)	154	1.97E+02	1.87E+04	5.08E+03	3.97E+03	2.01E+04	2.87E+02	1.62E-02	4.19E-01	1.01E-01	5.61E-01	1.91E+04
241-BY-112	Total			1.48E+04	1.44E+05	5.36E+04	3.95E+04	5.87E+05	2.19E+04	1.32E+00	3.44E+01	8.20E+00	8.01E+01	1.20E+05
241-BY-112	Sludge	MW2 (Solid)	8	0.00E+00	6.99E+00	5.82E+00	0.00E+00	1.21E+03	1.12E+03	7.26E-04	8.38E-02	1.06E-02	5.47E-03	2.86E+01
241-BY-112	Salt Cake (Solids)	BY-SltCk (Solid)	983	1.47E+04	1.27E+05	4.07E+04	3.44E+04	5.64E+05	2.06E+04	1.30E+00	3.39E+01	8.08E+00	7.95E+01	1.07E+05
241-BY-112	Salt Cake (Liquids)	BY-SltCk (Liquid)	92	1.58E+02	1.75E+04	1.29E+04	5.10E+03	2.25E+04	1.98E+02	1.67E-02	4.33E-01	1.04E-01	5.79E-01	1.31E+04
241-C-101	Total			1.66E+03	6.63E+04	7.55E+03	7.94E+04	5.50E+04	3.80E+04	6.57E+00	4.67E+02	8.26E+01	8.50E+01	3.00E+04
241-C-101	Sludge	TBP (Solid)	125	2.34E+02	2.30E+03	4.41E+03	7.88E+04	3.75E+04	2.40E+02	5.58E+00	3.23E+02	6.73E+01	6.11E+00	2.59E+04
241-C-101	Sludge	CWP1 (Solid)	208	1.43E+03	6.40E+04	3.15E+03	6.20E+02	1.75E+04	3.78E+04	9.98E-01	1.43E+02	1.54E+01	7.89E+01	4.08E+03
241-C-102	Total			1.86E+03	6.52E+04	1.90E+04	9.40E+04	1.06E+05	2.80E+04	8.80E+01	3.40E+03	8.15E+02	1.02E+03	2.59E+04
241-C-102	Sludge	CWP1 (Solid)	125	6.83E+02	1.10E+03	1.51E+03	3.77E+04	8.35E+03	1.15E+02	6.99E-03	2.26E+02	7.21E+02	4.28E+00	1.24E+04
241-C-102	Sludge	CWP2 (Solid)	855	1.02E+03	3.66E+04	1.20E+04	5.21E+04	7.35E+04	4.72E+02	3.34E-06	3.05E+03	4.68E+01	9.50E+02	1.11E+04
241-C-102	Sludge	CWZr1 (Solid)	38	4.54E+01	1.63E+03	5.31E+02	2.31E+03	3.27E+03	9.74E+02	3.90E+00	1.21E+02	1.39E-03	6.73E+01	4.92E+02
241-C-102	Sludge	MW1 (Solid)	19	0.00E+00	3.93E+01	1.86E+01	0.00E+00	2.30E+03	1.32E+03	7.21E+01	2.07E-02	1.08E-01	4.29E-03	6.70E+01
241-C-102	Sludge	TBP (Solid)	61	6.10E+01	1.67E+04	1.15E+03	1.61E+02	9.77E+03	9.84E+03	1.20E+01	1.00E+00	1.19E-11	5.52E-01	1.06E+03
241-C-102	Sludge	TH1 (Solid)	98	4.73E+01	9.18E+03	3.83E+03	1.80E+03	9.16E+03	1.53E+04	6.98E-05	1.73E-10	4.71E+01	6.81E-12	8.05E+02
241-C-103	Total			6.24E+03	7.48E+02	7.65E+03	5.37E+04	1.55E+04	1.46E+06	4.94E+01	2.50E+03	5.25E+02	1.14E+03	4.32E+04
241-C-103	Supernatant	SRR	2	1.12E+01	1.64E+00	2.94E+01	0.00E+00	6.42E+01	6.54E+00	1.62E-03	3.92E-02	9.09E-03	2.90E-03	6.96E+01

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-C-103	Sludge	AR (Solid)	108	2.48E+03	4.59E+02	2.93E+03	2.41E+03	8.40E+03	5.63E+05	1.32E+01	4.06E+02	4.37E+02	1.10E+03	1.66E+04
241-C-103	Sludge	CWP1 (Solid)	163	3.75E+03	2.87E+02	4.68E+03	5.13E+04	7.01E+03	8.99E+05	3.62E+01	2.10E+03	8.83E+01	3.97E+01	2.65E+04
241-C-104	Total			1.41E+04	1.95E+04	3.63E+04	8.96E+04	1.77E+05	4.47E+05	2.29E+02	5.18E+03	1.33E+03	6.34E+03	8.86E+04
241-C-104	Sludge	CWP1 (Solid)	326	4.68E+03	6.47E+03	1.21E+04	7.31E+03	5.89E+04	1.49E+05	3.09E+01	1.79E+03	3.73E+02	2.07E+03	2.95E+04
241-C-104	Sludge	CWP2 (Solid)	229	3.29E+03	4.55E+03	8.48E+03	2.98E+04	4.14E+04	1.04E+05	2.90E+01	1.23E+03	2.91E+02	1.47E+03	2.07E+04
241-C-104	Sludge	CWZr1 (Solid)	90	1.29E+03	1.79E+03	3.33E+03	2.09E+04	1.63E+04	4.11E+04	6.28E+01	4.31E+02	1.67E+02	6.07E+02	8.14E+03
241-C-104	Sludge	NA	152	2.18E+03	3.02E+03	5.63E+03	8.23E+03	2.75E+04	6.93E+04	5.59E+01	7.76E+02	2.34E+02	6.88E+02	1.37E+04
241-C-104	Sludge	OWW3 (Solid)	103	1.48E+03	2.04E+03	3.81E+03	1.39E+04	1.86E+04	4.70E+04	7.59E+00	5.07E+02	1.77E+02	5.09E+02	9.31E+03
241-C-104	Sludge	TH2 (Solid)	80	1.15E+03	1.59E+03	2.96E+03	9.42E+03	1.44E+04	3.65E+04	4.28E+01	4.40E+02	9.15E+01	1.00E+03	7.23E+03
241-C-105	Total			4.31E+03	8.14E+03	6.73E+03	1.55E+05	3.81E+04	4.41E+05	3.19E+01	1.98E+03	3.90E+02	1.19E+03	7.64E+04
241-C-105	Sludge	CWP1 (Solid)	450	4.26E+03	7.32E+03	5.74E+03	1.55E+05	2.97E+04	3.97E+05	3.04E+01	1.77E+03	3.67E+02	1.08E+03	6.87E+04
241-C-105	Sludge	TBP (Solid)	50	5.27E+01	8.14E+02	9.92E+02	1.39E+02	8.44E+03	4.41E+04	1.49E+00	2.14E+02	2.29E+01	1.15E+02	7.64E+03
241-C-106	Total			9.07E+01	4.60E+01	4.14E+01	3.82E+02	1.88E+02	6.61E+04	2.70E+00	1.67E+01	3.57E+00	6.52E+01	1.45E+03
241-C-106	Supernatant	NA	0.322	1.07E-01	1.94E-02	1.75E-02	3.02E-02	3.15E+00	1.42E-02	1.73E-06	1.31E-06	2.79E-07	1.35E-06	1.40E-01
241-C-106	Sludge	NA	10.166	9.06E+01	4.60E+01	4.14E+01	3.82E+02	1.85E+02	6.61E+04	2.70E+00	1.67E+01	3.57E+00	6.52E+01	1.45E+03
241-C-107	Total			7.32E+02	4.75E+04	3.51E+04	5.83E+04	9.47E+04	2.08E+06	4.43E+01	2.18E+03	3.55E+02	6.69E+03	5.89E+04
241-C-107	Sludge	1C (Solid)	507	3.97E+02	3.43E+04	2.05E+04	1.89E+04	5.85E+04	3.40E+05	3.09E+01	1.95E+02	1.35E+02	3.63E+03	2.14E+04
241-C-107	Sludge	CWP2 (Solid)	89	6.97E+01	3.21E+03	2.58E+03	1.64E+04	7.88E+03	5.97E+04	8.73E+00	7.47E+02	4.62E+01	6.37E+02	3.20E+04
241-C-107	Sludge	SRR (Solid)	339	2.66E+02	1.00E+04	1.21E+04	2.29E+04	2.83E+04	1.68E+06	4.61E+00	1.24E+03	1.73E+02	2.43E+03	5.61E+03
241-C-108	Total			3.50E+02	1.61E+04	8.92E+03	1.93E+04	3.48E+04	8.00E+03	2.20E-02	3.12E+00	3.39E-01	1.07E+01	7.77E+04
241-C-108	Sludge	1C (Solid)	110	1.54E+02	7.07E+03	3.92E+03	8.48E+03	1.53E+04	3.52E+03	9.66E-03	1.37E+00	1.50E-01	4.73E+00	3.42E+04
241-C-108	Sludge	TBP (Solid)	95	1.33E+02	6.10E+03	3.39E+03	7.32E+03	1.32E+04	3.04E+03	8.27E-03	1.19E+00	1.27E-01	4.08E+00	2.95E+04
241-C-108	Sludge	TFeCN (Solid)	45	6.30E+01	2.89E+03	1.61E+03	3.47E+03	6.27E+03	1.44E+03	4.10E-03	5.60E-01	6.25E-02	1.93E+00	1.40E+04
241-C-109	Total			8.15E+02	1.96E+04	1.32E+04	2.52E+04	3.76E+04	2.53E+05	1.65E+00	6.54E+01	1.12E+01	5.01E+01	1.73E+05
241-C-109	Sludge	1C (Solid)	38	2.86E+01	1.64E+03	5.28E+02	8.10E+02	5.40E+03	2.62E+02	3.18E-02	1.66E+01	4.93E-01	7.51E-01	8.62E+02
241-C-109	Sludge	CWP1 (Solid)	55	2.14E+02	7.65E+03	3.45E+03	6.65E+03	8.78E+03	6.87E+04	4.40E-01	7.83E+00	6.43E+00	1.34E+01	4.67E+04
241-C-109	Sludge	HS (Solid)	26	1.01E+02	6.85E+03	1.63E+03	3.14E+03	4.15E+03	3.25E+04	2.08E-01	3.65E+01	2.92E+00	6.36E+00	2.21E+04
241-C-109	Sludge	TFeCN (Solid)	121	4.71E+02	3.48E+03	7.60E+03	1.46E+04	1.93E+04	1.51E+05	9.68E-01	4.53E+00	1.38E+00	2.96E+01	1.03E+05
241-C-110	Total			4.12E+02	9.80E+04	6.53E+03	1.31E+04	7.53E+04	3.45E+03	4.56E-01	6.48E+01	7.05E+00	3.86E+01	1.35E+04
241-C-110	Supernatant	1C1 (Liquid)	4	2.32E+00	2.41E+02	1.84E+01	8.34E-01	1.22E+02	8.46E-02	2.23E-05	6.59E-03	4.44E-04	7.58E-05	1.50E+01
241-C-110	Sludge	1C (Solid)	670	4.10E+02	9.77E+04	6.51E+03	1.31E+04	7.51E+04	3.45E+03	4.56E-01	6.48E+01	7.05E+00	3.86E+01	1.35E+04
241-C-111	Total			2.58E+02	2.05E+04	1.06E+04	3.13E+04	1.38E+04	9.07E+05	3.07E+00	1.67E+02	3.25E+01	1.90E+02	1.98E+04
241-C-111	Sludge	1C (Solid)	49	3.69E+01	1.32E+03	6.80E+02	1.04E+03	3.68E+03	3.24E+05	4.11E-02	1.10E+02	6.35E-01	9.68E-01	1.89E+03
241-C-111	Sludge	CWP1 (Solid)	60	7.91E+01	9.87E+03	7.03E+02	1.08E+04	6.96E+03	9.17E+04	1.90E+00	3.09E+01	2.29E+01	2.08E+00	1.01E+04
241-C-111	Sludge	HS (Solid)	17	2.24E+01	8.83E+03	7.95E+02	3.06E+03	2.43E+03	4.91E+05	9.83E-01	2.01E+01	6.68E+00	1.24E+00	1.11E+03
241-C-111	Sludge	TFeCN (Solid)	91	1.20E+02	5.14E+02	8.46E+03	1.64E+04	6.88E+02	3.38E+02	1.47E-01	5.84E+00	2.24E+00	1.86E+02	6.66E+03

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-C-112	Total			2.42E+03	3.72E+04	2.78E+04	1.24E+04	5.01E+04	6.02E+05	7.84E+00	8.43E+01	1.06E+01	4.71E+02	2.66E+05
241-C-112	Sludge	TFeCN (Solid)	272	1.67E+03	2.57E+04	4.53E+03	1.79E+03	7.27E+03	9.80E+04	1.28E+00	1.24E+01	1.35E+00	6.83E+01	1.84E+05
241-C-112	Sludge	1C (Solid)	57	3.51E+02	5.39E+03	1.92E+04	2.01E+03	8.16E+03	8.73E+04	1.14E+00	1.28E+01	2.66E+00	7.69E+01	3.86E+04
241-C-112	Sludge	CWP1 (Solid)	64	3.94E+02	6.05E+03	4.03E+03	8.55E+03	3.47E+04	4.16E+05	5.42E+00	5.91E+01	6.59E+00	3.26E+02	4.33E+04
241-C-201	Total			6.32E+01	2.20E+02	7.76E+01	8.82E+00	4.50E+02	2.76E+02	7.27E-01	2.29E+01	4.94E+00	3.62E+00	3.22E+01
241-C-201	Sludge	HS (Solid)	2.2	6.32E+01	2.20E+02	7.76E+01	8.82E+00	4.50E+02	2.76E+02	7.27E-01	2.29E+01	4.94E+00	3.62E+00	3.22E+01
241-C-202	Total			5.68E+01	1.72E+02	5.63E+01	1.54E+01	3.55E+02	4.51E+02	5.57E-01	1.75E+01	3.78E+00	1.48E+00	2.40E+01
241-C-202	Sludge	HS (Solid)	1.9	5.68E+01	1.72E+02	5.63E+01	1.54E+01	3.55E+02	4.51E+02	5.57E-01	1.75E+01	3.78E+00	1.48E+00	2.40E+01
241-C-203	Total			1.43E+02	1.12E+03	5.54E+01	8.29E+00	1.07E+03	1.93E+02	3.42E-01	1.08E+01	2.32E+00	5.48E-01	1.41E+01
241-C-203	Sludge	HS (Solid)	6	1.43E+02	1.12E+03	5.54E+01	8.29E+00	1.07E+03	1.93E+02	3.42E-01	1.08E+01	2.32E+00	5.48E-01	1.41E+01
241-C-204	Total			1.07E+03	2.31E+02	1.60E+02	1.25E+02	5.17E+02	1.13E+02	1.88E-03	5.90E-02	1.27E-02	1.44E-02	4.89E+01
241-C-204	Sludge	HS (Solid)	6.4	1.07E+03	2.31E+02	1.60E+02	1.25E+02	5.17E+02	1.13E+02	1.88E-03	5.90E-02	1.27E-02	1.44E-02	4.89E+01
241-S-101	Total			5.29E+03	3.12E+05	1.08E+05	1.85E+05	3.22E+05	4.34E+05	6.60E+00	3.18E+02	6.25E+01	2.14E+02	2.46E+05
241-S-101	Sludge	NA	890	2.93E+03	2.35E+05	6.61E+04	1.70E+05	1.99E+05	3.09E+05	5.91E+00	2.98E+02	5.82E+01	1.68E+02	1.42E+05
241-S-101	Salt Cake (Solids)	S1-SltCk (Solid)	214	1.32E+03	3.65E+04	1.98E+04	7.70E+03	6.34E+04	7.42E+04	3.67E-01	9.42E+00	2.06E+00	3.04E+01	4.97E+04
241-S-101	Salt Cake (Solids)	S2-SltSlr (Solid)	146	9.02E+02	2.49E+04	1.35E+04	5.25E+03	4.32E+04	5.06E+04	3.32E-01	1.05E+01	2.25E+00	1.57E+01	3.39E+04
241-S-101	Salt Cake (Liquids)	S1-SltCk (Liquid)	46	8.23E+01	9.83E+03	5.19E+03	1.38E+03	1.02E+04	1.74E+00	3.77E-05	1.07E-03	2.34E-04	3.83E-03	1.25E+04
241-S-101	Salt Cake (Liquids)	S2-SltSlr (Liquid)	31	5.55E+01	6.63E+03	3.50E+03	9.28E+02	6.87E+03	1.18E+00	2.53E-05	7.24E-04	1.55E-04	2.58E-03	8.45E+03
241-S-102	Total			7.32E+03	4.67E+05	9.72E+04	4.22E+04	3.71E+05	7.20E+04	2.57E+00	7.69E+01	1.64E+01	1.40E+02	2.75E+05
241-S-102	Sludge	R1 (Solid)	61	9.12E+02	5.55E+03	4.09E+03	4.79E+03	1.22E+04	4.72E+04	1.31E-01	7.09E+00	1.38E+00	3.58E+00	7.28E+03
241-S-102	Salt Cake (Solids)	S1-SltCk (Solid)	294	1.87E+03	1.51E+05	1.68E+04	6.03E+03	1.56E+05	9.25E+03	6.59E-01	1.87E+01	1.10E+01	6.03E+01	8.21E+04
241-S-102	Salt Cake (Solids)	S2-SltSlr (Solid)	491	3.12E+03	2.52E+05	2.81E+04	1.01E+04	9.32E+04	1.55E+04	1.78E+00	5.11E+01	4.08E+00	7.64E+01	4.92E+04
241-S-102	Salt Cake (Liquids)	S1-SltCk (Liquid)	141	5.31E+02	2.19E+04	1.79E+04	7.93E+03	4.08E+04	9.59E+00	2.24E-04	3.81E-03	8.30E-04	3.93E-02	5.07E+04
241-S-102	Salt Cake (Liquids)	S2-SltSlr (Liquid)	237	8.92E+02	3.68E+04	3.02E+04	1.33E+04	6.86E+04	1.61E+01	1.34E-04	6.42E-03	1.38E-03	6.61E-02	8.53E+04
241-S-103	Total			5.74E+03	3.64E+05	8.30E+04	3.66E+04	2.75E+05	4.15E+04	2.80E+00	9.40E+01	1.96E+01	1.35E+02	1.95E+05
241-S-103	Supernatant	S2-SltSlr (Liquid)	4	1.87E+01	8.64E+02	5.88E+02	1.28E+02	9.12E+02	1.48E+00	7.98E-06	2.29E-04	4.90E-05	4.72E-03	1.29E+03
241-S-103	Sludge	R1 (Solid)	34	6.32E+01	6.74E+03	1.90E+03	1.13E+04	6.08E+03	2.46E+04	5.52E-01	2.98E+01	5.78E+00	1.51E+01	3.80E+03
241-S-103	Salt Cake (Solids)	S1-SltCk (Solid)	347	2.09E+03	1.79E+05	2.48E+04	9.21E+03	1.25E+05	1.01E+04	4.86E-01	1.38E+01	3.01E+00	4.45E+01	5.49E+04
241-S-103	Salt Cake (Solids)	S2-SltSlr (Solid)	300	2.58E+03	1.32E+05	2.47E+04	9.29E+03	9.49E+04	6.64E+03	1.76E+00	5.04E+01	1.08E+01	7.53E+01	6.71E+04
241-S-103	Salt Cake (Liquids)	S1-SltCk (Liquid)	116	5.43E+02	2.51E+04	1.70E+04	3.72E+03	2.64E+04	4.29E+01	1.90E-04	6.61E-03	1.44E-03	1.37E-01	3.75E+04
241-S-103	Salt Cake (Liquids)	S2-SltSlr (Liquid)	95	4.44E+02	2.05E+04	1.40E+04	3.04E+03	2.17E+04	3.51E+01	2.33E-04	5.43E-03	1.16E-03	1.12E-01	3.07E+04
241-S-104	Total			2.62E+03	3.94E+05	4.23E+04	1.99E+05	2.26E+05	4.02E+05	9.99E+00	3.48E+02	7.09E+01	2.01E+02	7.75E+04
241-S-104	Sludge	CWR1 (Solid)	91	2.45E+02	3.72E+04	3.70E+03	1.88E+04	2.00E+04	3.85E+04	4.61E-01	2.96E+01	5.63E+00	1.91E+01	3.10E+04
241-S-104	Sludge	R1 (Solid)	409	1.10E+03	1.67E+05	1.66E+04	8.47E+04	9.00E+04	1.73E+05	2.46E+00	1.33E+02	2.58E+01	8.56E+01	6.90E+03
241-S-104	Salt Cake (Solids)	R-SltCk (Solid)	451	1.21E+03	1.52E+05	1.66E+04	9.34E+04	8.80E+04	1.91E+05	7.07E+00	1.86E+02	3.95E+01	9.68E+01	3.08E+04
241-S-104	Salt Cake (Liquids)	R-SltCk (Liquid)	139	5.51E+01	3.73E+04	5.31E+03	1.66E+03	2.75E+04	5.57E-01	3.92E-04	1.03E-02	2.19E-03	1.04E-02	8.77E+03

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-S-105	Total			2.08E+03	1.38E+06	2.92E+04	1.71E+04	6.32E+05	6.51E+03	1.05E+00	9.24E+00	1.85E+00	7.77E+00	8.70E+04
241-S-105	Sludge	R1 (Solid)	8	1.49E+01	1.59E+03	4.47E+02	2.65E+03	1.43E+03	5.80E+03	1.30E-01	7.01E+00	1.36E+00	3.54E+00	8.93E+02
241-S-105	Salt Cake (Solids)	S1-SltCk (Solid)	1371	1.43E+03	1.35E+06	9.61E+03	8.55E+03	5.94E+05	5.59E+02	9.20E-01	2.21E+00	4.82E-01	3.78E+00	3.03E+04
241-S-105	Salt Cake (Liquids)	S1-SltCk (Liquid)	157	6.33E+02	2.98E+04	1.92E+04	5.93E+03	3.71E+04	1.56E+02	6.75E-04	1.92E-02	4.17E-03	4.42E-01	5.58E+04
241-S-106	Total			6.33E+03	9.84E+05	7.75E+04	5.15E+04	6.01E+05	3.64E+04	6.30E-01	1.79E+01	3.91E+00	5.82E+01	2.71E+05
241-S-106	Salt Cake (Solids)	S1-SltCk (Solid)	1624	6.13E+03	9.61E+05	6.73E+04	4.78E+04	5.76E+05	3.64E+04	6.30E-01	1.79E+01	3.90E+00	5.77E+01	2.48E+05
241-S-106	Salt Cake (Liquids)	S1-SltCk (Liquid)	99	1.96E+02	2.34E+04	1.03E+04	3.76E+03	2.42E+04	4.85E+00	8.26E-04	2.34E-02	5.11E-03	5.42E-01	2.30E+04
241-S-107	Total			4.43E+03	1.41E+05	7.40E+04	3.61E+05	2.22E+05	3.12E+05	2.94E+01	1.21E+03	2.54E+02	7.46E+02	1.63E+05
241-S-107	Sludge	CWR1 (Solid)	447	1.13E+03	4.83E+04	2.57E+04	1.65E+05	7.05E+04	1.09E+05	6.08E+00	3.84E+02	8.29E+01	2.47E+02	2.67E+04
241-S-107	Sludge	CWR2 (Solid)	211	5.33E+02	2.28E+04	1.21E+04	5.70E+04	3.33E+04	5.14E+04	7.92E+00	2.54E+02	5.57E+01	2.29E+01	5.65E+04
241-S-107	Sludge	CWZr1 (Solid)	91	2.30E+02	9.84E+03	5.23E+03	0.00E+00	1.43E+04	2.22E+04	5.97E+00	6.12E+01	2.37E+01	5.87E+01	1.15E+04
241-S-107	Sludge	R1 (Solid)	462	1.17E+03	5.00E+04	2.65E+04	1.35E+05	7.29E+04	1.13E+05	6.33E+00	4.27E+02	7.29E+01	2.16E+02	5.84E+04
241-S-107	Salt Cake (Solids)	T2-SltCk (Solid)	52	4.93E+02	4.17E+03	1.94E+03	2.04E+03	1.36E+04	7.31E+03	1.21E+00	3.01E+01	6.57E+00	9.72E+01	4.27E+03
241-S-107	Salt Cake (Solids)	S1-SltCk (Solid)	63	5.97E+02	1.99E+03	9.22E+02	9.73E+02	6.47E+03	3.48E+03	8.20E-01	2.35E+01	5.04E+00	3.51E+01	2.03E+03
241-S-107	Salt Cake (Solids)	S2-SltSlr (Solid)	30	2.84E+02	3.44E+03	1.60E+03	1.69E+03	1.12E+04	6.04E+03	1.06E+00	3.43E+01	7.19E+00	6.91E+01	3.53E+03
241-S-108	Total			1.24E+04	1.06E+06	1.50E+05	6.14E+04	7.45E+05	7.32E+04	3.16E+00	9.75E+01	2.09E+01	2.69E+02	3.35E+05
241-S-108	Sludge	R1 (Solid)	19	3.53E+01	3.77E+03	1.06E+03	6.29E+03	3.40E+03	1.38E+04	3.09E-01	1.66E+01	3.23E+00	8.42E+00	2.12E+03
241-S-108	Salt Cake (Solids)	S1-SltCk (Solid)	2032	1.23E+04	1.05E+06	1.45E+05	5.39E+04	7.34E+05	5.94E+04	2.85E+00	8.09E+01	1.76E+01	2.61E+02	3.22E+05
241-S-108	Salt Cake (Liquids)	S1-SltCk (Liquid)	31	1.25E+02	5.89E+03	3.78E+03	1.17E+03	7.32E+03	3.09E+01	1.33E-04	3.78E-03	8.24E-04	8.73E-02	1.10E+04
241-S-109	Total			2.32E+03	1.92E+06	2.27E+04	2.45E+04	7.70E+05	4.96E+04	9.77E-01	4.81E+01	9.45E+00	3.83E+01	4.36E+04
241-S-109	Sludge	R1 (Solid)	49	9.11E+01	9.71E+03	2.74E+03	1.62E+04	8.76E+03	3.55E+04	7.96E-01	4.29E+01	8.33E+00	2.17E+01	5.47E+03
241-S-109	Salt Cake (Solids)	S1-SltCk (Solid)	1905	2.16E+03	1.90E+06	1.46E+04	5.44E+03	7.48E+05	1.40E+04	1.81E-01	5.14E+00	1.12E+00	1.66E+01	2.02E+04
241-S-109	Salt Cake (Liquids)	S1-SltCk (Liquid)	63	7.02E+01	8.29E+03	5.35E+03	2.89E+03	1.38E+04	1.53E+01	9.77E-05	2.77E-03	6.04E-04	1.69E-02	1.79E+04
241-S-110	Total			5.49E+03	9.05E+05	5.41E+04	1.25E+05	4.82E+05	2.30E+05	6.43E+00	3.10E+02	6.11E+01	3.02E+02	1.78E+05
241-S-110	Sludge	CWR1 (Solid)	76	4.92E+01	1.35E+04	3.71E+03	2.26E+04	1.25E+04	3.90E+04	7.93E-01	2.08E+02	9.69E+00	3.28E+01	1.02E+04
241-S-110	Sludge	R1 (Solid)	288	1.86E+02	5.10E+04	1.40E+04	8.57E+04	4.73E+04	1.48E+05	3.86E+00	5.10E+01	4.04E+01	1.05E+02	3.86E+04
241-S-110	Salt Cake (Solids)	S1-Sltck (Solid)	994	4.99E+03	8.15E+05	2.65E+04	1.28E+04	3.98E+05	4.32E+04	1.78E+00	5.07E+01	1.11E+01	1.63E+02	8.91E+04
241-S-110	Salt Cake (Liquids)	S1-Sltck (Liquid)	115	2.62E+02	2.50E+04	9.87E+03	3.56E+03	2.43E+04	1.12E+02	1.26E-03	3.58E-02	7.81E-03	8.28E-01	4.02E+04
241-S-111	Total			3.94E+03	4.85E+05	6.88E+04	1.24E+05	3.77E+05	3.80E+05	4.03E-01	1.43E+01	2.98E+00	3.02E+01	2.31E+05
241-S-111	Sludge	R1 (Solid)	207	3.17E+02	1.38E+04	8.48E+03	1.37E+04	3.76E+03	1.26E+02	1.34E-02	8.62E-01	1.64E-01	2.56E+00	4.72E+03
241-S-111	Sludge	CWR1 (Solid)	38	5.81E+01	2.53E+03	1.56E+03	7.45E+04	2.05E+04	1.48E+05	9.38E-02	5.06E+00	9.82E-01	5.55E-01	2.57E+04
241-S-111	Salt Cake (Solids)	S1-SltCk (Solid)	962	3.28E+03	4.33E+05	4.30E+04	2.85E+04	3.11E+05	2.32E+05	2.95E-01	8.39E+00	1.83E+00	2.70E+01	1.44E+05
241-S-111	Salt Cake (Liquids)	S1-SltCk (Liquid)	189	2.83E+02	3.64E+04	1.58E+04	6.88E+03	4.21E+04	2.14E+01	7.82E-04	2.22E-02	4.84E-03	2.91E-02	5.67E+04
241-S-112	Total			3.30E+03	4.56E+03	1.29E+03	7.61E+03	1.90E+05	9.57E+04	1.10E+00	4.85E+01	8.61E+00	7.99E+01	2.57E+03
241-S-112	Sludge	R1 (Solid)	23	4.27E+01	4.56E+03	1.29E+03	7.61E+03	4.11E+03	1.67E+04	3.74E-01	2.01E+01	3.91E+00	1.02E+01	2.57E+03
241-S-112	Salt Cake	S1-SltCk (Solid)	416	3.26E+03	0.00E+00	0.00E+00	0.00E+00	1.86E+05	7.90E+04	7.23E-01	2.84E+01	4.70E+00	6.97E+01	0.00E+00

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-SX-101	Total			5.13E+03	7.76E+05	6.50E+04	1.62E+05	5.28E+05	3.02E+05	1.22E+01	4.42E+02	9.02E+01	5.08E+02	2.67E+05
241-SX-101	Sludge	R1 (Solid)	545	1.85E+03	2.78E+05	2.14E+04	5.63E+04	1.84E+05	1.09E+05	4.13E+00	2.23E+02	4.32E+01	1.13E+02	8.66E+04
241-SX-101	Salt Cake (Solids)	R-SltCk (Solid)	497	1.69E+03	2.54E+05	1.95E+04	3.06E+04	1.68E+05	9.98E+04	4.99E+00	1.31E+02	2.78E+01	6.31E+01	7.89E+04
241-SX-101	Salt Cake (Solids)	S1-SltCk (Solid)	296	1.00E+03	1.51E+05	1.16E+04	1.71E+04	1.00E+05	5.94E+04	1.62E+00	4.61E+01	1.00E+01	1.84E+02	4.70E+04
241-SX-101	Salt Cake (Solids)	S2-SltSlr (Solid)	166	5.63E+02	8.47E+04	6.51E+03	5.13E+04	5.61E+04	3.33E+04	1.47E+00	4.22E+01	9.05E+00	1.49E+02	2.64E+04
241-SX-101	Salt Cake (Liquids)	R-SltCk (Liquid)	41	1.37E+01	4.42E+03	3.07E+03	3.28E+03	9.93E+03	2.87E+00	1.50E-04	3.94E-03	5.21E-04	2.24E-02	1.45E+04
241-SX-101	Salt Cake (Liquids)	S1-SltCk (Liquid)	25	8.37E+00	2.70E+03	1.87E+03	2.00E+03	6.06E+03	1.75E+00	8.43E-05	2.39E-03	2.88E-04	1.37E-02	8.85E+03
241-SX-101	Salt Cake (Liquids)	S2-SltSlr (Liquid)	14	4.69E+00	1.51E+03	1.05E+03	1.12E+03	3.39E+03	9.81E-01	4.69E-05	1.34E-03	8.38E-04	7.67E-03	4.96E+03
241-SX-102	Total			9.91E+03	5.74E+05	1.92E+05	6.82E+04	4.80E+05	2.09E+05	4.28E+00	1.43E+02	3.00E+01	3.16E+02	3.74E+05
241-SX-102	Sludge	R1 (Solid)	209	1.48E+03	8.35E+04	2.53E+04	9.19E+03	6.71E+04	3.19E+04	8.17E-01	4.41E+01	8.55E+00	2.23E+01	4.65E+04
241-SX-102	Salt Cake (Solids)	S1-SltCk (Solid)	1046	7.39E+03	4.18E+05	1.27E+05	4.60E+04	3.36E+05	1.60E+05	2.96E+00	8.41E+01	1.83E+01	2.71E+02	2.45E+04
241-SX-102	Salt Cake (Solids)	S2-SltSlr (Solid)	110	7.77E+02	4.39E+04	1.33E+04	4.84E+03	3.53E+04	1.68E+04	5.04E-01	1.44E+01	3.10E+00	2.16E+01	2.33E+05
241-SX-102	Salt Cake (Liquids)	S1-SltCk (Liquid)	162	2.45E+02	2.55E+04	2.45E+04	7.39E+03	3.81E+04	3.36E+00	2.06E-03	5.86E-02	1.28E-02	1.35E+00	6.32E+04
241-SX-102	Salt Cake (Liquids)	S2-SltSlr (Liquid)	17	2.57E+01	2.68E+03	2.57E+03	7.75E+02	4.00E+03	3.53E-01	2.16E-04	6.20E-03	1.33E-03	1.42E-01	6.64E+03
241-SX-103	Total			1.29E+04	9.89E+05	1.80E+05	1.52E+05	6.42E+05	5.13E+05	6.82E+00	2.54E+02	5.20E+01	7.20E+02	4.12E+05
241-SX-103	Sludge	R1 (Solid)	294	1.83E+03	8.90E+04	2.26E+04	1.02E+05	5.67E+04	3.50E+05	2.48E+00	1.33E+02	2.59E+01	6.75E+01	4.45E+04
241-SX-103	Salt Cake (Solids)	R-SltCk (Solid)	77	7.26E+02	2.22E+04	9.34E+03	5.57E+03	2.40E+04	6.29E+04	1.47E+00	8.18E+01	8.20E+00	5.42E+01	2.07E+04
241-SX-103	Salt Cake (Solids)	S1-Sltck (Solid)	1439	9.91E+03	8.60E+05	1.30E+05	3.96E+04	5.34E+05	1.00E+05	2.88E+00	3.86E+01	1.78E+01	5.98E+02	2.99E+05
241-SX-103	Salt Cake (Liquids)	R-SltCk (Liquid)	22	7.44E+01	3.45E+03	3.46E+03	9.77E+02	2.26E+04	1.81E+00	6.78E-05	1.78E-03	3.79E-04	1.02E-02	8.92E+03
241-SX-103	Salt Cake (Liquids)	S1-SltCk (Liquid)	94	3.18E+02	1.47E+04	1.48E+04	4.17E+03	5.28E+03	7.75E+00	2.67E-04	7.58E-03	1.65E-03	4.37E-02	3.81E+04
241-SX-104	Total			7.04E+03	7.13E+05	1.13E+05	2.10E+05	5.05E+05	4.05E+05	1.01E+01	4.98E+02	9.78E+01	3.60E+02	2.49E+05
241-SX-104	Sludge	R1 (Solid)	515	9.57E+02	1.02E+05	2.88E+04	1.70E+05	9.21E+04	3.73E+05	8.37E+00	4.51E+02	8.76E+01	2.28E+02	5.75E+04
241-SX-104	Salt Cake (Solids)	S1-SltCk (Solid)	903	5.45E+03	1.08E+05	4.49E+03	1.10E+04	5.47E+04	5.68E+03	4.32E-01	3.60E+01	2.41E+00	1.59E+01	1.91E+04
241-SX-104	Salt Cake (Solids)	R-SltCk (Solid)	142	3.66E+02	4.66E+05	6.45E+04	2.40E+04	3.26E+05	2.64E+04	1.27E+00	1.13E+01	7.84E+00	1.16E+02	1.43E+05
241-SX-104	Salt Cake (Liquids)	R-SltCk (Liquid)	111	2.36E+02	3.22E+04	1.30E+04	3.95E+03	2.78E+04	8.79E+00	5.47E-04	1.44E-02	3.05E-03	3.15E-02	2.55E+04
241-SX-104	Salt Cake (Liquids)	S1-SltCk (Liquid)	17	3.61E+01	4.93E+03	1.99E+03	6.04E+02	4.26E+03	1.35E+00	7.72E-05	2.19E-03	4.78E-04	4.83E-03	3.90E+03
241-SX-105	Total			6.64E+03	4.84E+05	1.60E+05	1.01E+05	4.28E+05	1.90E+05	1.48E+01	7.71E+02	1.50E+02	4.80E+02	2.15E+05
241-SX-105	Sludge	R1 (Solid)	238	6.68E+02	5.64E+04	2.17E+04	5.64E+04	5.29E+04	1.63E+05	1.37E+01	7.38E+02	1.43E+02	3.73E+02	2.51E+04
241-SX-105	Salt Cake (Solids)	S1-SltCk (Solid)	1061	5.57E+03	4.07E+05	1.21E+05	3.88E+04	3.46E+05	2.73E+04	1.16E+00	3.30E+01	7.19E+00	1.06E+02	1.48E+05
241-SX-105	Salt Cake (Liquids)	S1-SltCk (Liquid)	123	4.01E+02	2.02E+04	1.76E+04	5.42E+03	2.90E+04	1.73E+01	5.66E-04	1.61E-02	3.50E-03	6.12E-01	4.17E+04
241-SX-106	Total			8.24E+03	5.52E+05	1.69E+05	4.93E+04	4.44E+05	2.87E+04	7.17E+00	2.05E+02	4.41E+01	3.49E+02	3.11E+05
241-SX-106	Salt Cake (Solids)	S1-SltCk (Solid)	245	1.41E+03	9.35E+04	2.67E+04	8.32E+03	7.46E+04	6.00E+03	8.62E-01	2.45E+01	5.34E+00	2.70E+02	2.29E+05
241-SX-106	Salt Cake (Solids)	S2-SltSlr (Solid)	1107	6.36E+03	4.22E+05	1.20E+05	3.76E+04	3.37E+05	2.27E+04	6.31E+00	1.81E+02	3.88E+01	7.89E+01	3.25E+04
241-SX-106	Salt Cake (Liquids)	S1-SltCk (Liquid)	27	8.48E+01	6.61E+03	4.02E+03	6.12E+02	5.87E+03	8.06E+00	3.94E-05	1.12E-03	2.44E-04	8.47E-03	8.99E+03
241-SX-106	Salt Cake (Liquids)	S2-SltSlr (Liquid)	122	3.83E+02	2.99E+04	1.82E+04	2.76E+03	2.65E+04	3.64E+01	1.77E-04	5.07E-03	1.09E-03	3.83E-02	4.06E+04
241-SX-107	Total			6.81E+02	9.55E+04	1.94E+04	1.03E+05	7.37E+04	2.18E+05	4.98E+00	2.65E+02	5.14E+01	1.37E+02	4.31E+04

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-SX-107	Sludge	R1 (Solid)	298	5.54E+02	5.91E+04	1.67E+04	9.86E+04	5.33E+04	2.16E+05	4.84E+00	2.61E+02	5.07E+01	1.32E+02	3.33E+04
241-SX-107	Salt Cake (Solids)	R-SltCk (Solid)	44	1.14E+02	3.34E+04	1.39E+03	3.41E+03	1.70E+04	1.76E+03	1.34E-01	3.51E+00	7.47E-01	4.94E+00	5.91E+03
241-SX-107	Salt Cake (Liquids)	R-SltCk (Liquid)	14	1.41E+01	3.04E+03	1.38E+03	6.61E+02	3.51E+03	3.23E+01	2.71E-03	7.11E-02	1.51E-02	9.42E-02	3.91E+03
241-SX-108	Total			3.16E+02	1.84E+05	7.76E+03	1.89E+04	9.14E+04	1.27E+06	1.76E+01	9.49E+02	1.84E+02	4.80E+02	8.17E+04
241-SX-108	Sludge	R1 (Solid)	280	3.16E+02	1.84E+05	7.76E+03	1.89E+04	9.14E+04	1.27E+06	1.76E+01	9.49E+02	1.84E+02	4.80E+02	8.17E+04
241-SX-109	Total			2.20E+03	5.70E+05	3.42E+04	1.26E+05	3.07E+05	1.86E+05	5.67E+00	2.47E+02	4.90E+01	1.75E+02	1.18E+05
241-SX-109	Sludge	R1 (Solid)	219	4.07E+02	4.34E+04	1.22E+04	7.25E+04	3.92E+04	1.59E+05	3.56E+00	1.92E+02	3.72E+01	9.70E+01	2.45E+04
241-SX-109	Salt Cake (Solids)	R-SltCk (Solid)	694	1.79E+03	5.26E+05	2.20E+04	5.38E+04	2.67E+05	2.78E+04	2.11E+00	5.54E+01	1.18E+01	7.79E+01	9.32E+04
241-SX-110	Total			4.68E+02	9.97E+04	9.36E+03	4.41E+04	5.92E+04	8.31E+04	2.08E+00	1.04E+02	2.03E+01	5.98E+01	2.60E+04
241-SX-110	Sludge	R1 (Solid)	109	2.03E+02	2.16E+04	6.10E+03	3.61E+04	1.95E+04	7.90E+04	1.77E+00	9.55E+01	1.85E+01	4.83E+01	1.22E+04
241-SX-110	Salt Cake (Solids)	R-SltCk (Solid)	103	2.66E+02	7.81E+04	3.26E+03	7.99E+03	3.97E+04	4.12E+03	3.13E-01	8.22E+00	1.75E+00	1.16E+01	1.38E+04
241-SX-111	Total			8.61E+02	1.50E+05	2.32E+04	1.06E+05	1.04E+05	2.14E+05	5.04E+00	2.62E+02	5.11E+01	1.41E+02	5.71E+04
241-SX-111	Sludge	R1 (Solid)	289	5.37E+02	5.73E+04	1.62E+04	9.57E+04	5.17E+04	2.09E+05	4.70E+00	2.53E+02	4.91E+01	1.28E+02	3.23E+04
241-SX-111	Salt Cake (Solids)	R-SltCk (Solid)	112	2.89E+02	8.50E+04	3.54E+03	8.69E+03	4.32E+04	4.48E+03	3.41E-01	8.94E+00	1.90E+00	1.26E+01	1.50E+04
241-SX-111	Salt Cake (Liquids)	R-SltCk (Liquid)	35	3.54E+01	7.59E+03	3.46E+03	1.65E+03	8.79E+03	8.07E+01	6.77E-03	1.78E-01	3.78E-02	2.35E-01	9.77E+03
241-SX-112	Total			5.50E+02	8.67E+04	1.52E+04	7.52E+04	6.30E+04	1.56E+05	3.61E+00	1.90E+02	3.70E+01	1.00E+02	3.57E+04
241-SX-112	Sludge	R1 (Solid)	212	3.94E+02	4.20E+04	1.19E+04	7.02E+04	3.79E+04	1.54E+05	3.44E+00	1.86E+02	3.60E+01	9.39E+01	2.37E+04
241-SX-112	Salt Cake (Solids)	R-SltCk (Solid)	54	1.39E+02	4.10E+04	1.71E+03	4.19E+03	2.08E+04	2.16E+03	1.64E-01	4.31E+00	9.16E-01	6.06E+00	7.25E+03
241-SX-112	Salt Cake (Liquids)	R-SltCk (Liquid)	17	1.72E+01	3.69E+03	1.68E+03	8.02E+02	4.27E+03	3.92E+01	3.29E-03	8.64E-02	1.84E-02	1.14E-01	4.74E+03
241-SX-113	Total			1.49E+01	1.59E+03	4.47E+02	1.66E+03	1.34E+02	4.01E+03	1.32E-01	7.10E+00	1.38E+00	4.65E+00	2.93E+03
241-SX-113	Sludge	DE (Solid)	64	0.00E+00	0.00E+00	0.00E+00	1.85E+02	1.19E+02	3.56E+03	1.17E-01	6.31E+00	1.22E+00	4.13E+00	2.61E+03
241-SX-113	Sludge	R1 (Solid)	8	1.49E+01	1.59E+03	4.47E+02	1.48E+03	1.49E+01	4.45E+02	1.46E-02	7.88E-01	1.53E-01	5.16E-01	3.26E+02
241-SX-114	Total			1.24E+03	3.02E+05	2.94E+04	8.20E+04	1.80E+05	1.26E+05	3.55E+00	1.63E+02	3.22E+01	1.07E+02	9.05E+04
241-SX-114	Sludge	R1 (Solid)	156	2.90E+02	3.09E+04	8.73E+03	5.16E+04	2.79E+04	1.13E+05	2.53E+00	1.37E+02	2.65E+01	6.91E+01	1.74E+04
241-SX-114	Salt Cake (Solids)	R-SltCk (Solid)	328	8.46E+02	2.49E+05	1.04E+04	2.54E+04	1.26E+05	1.31E+04	9.97E-01	2.62E+01	5.57E+00	3.68E+01	4.41E+04
241-SX-114	Salt Cake (Liquids)	R-SltCk (Liquid)	104	1.05E+02	2.26E+04	1.03E+04	4.91E+03	2.61E+04	2.40E+02	2.01E-02	5.28E-01	1.12E-01	6.99E-01	2.90E+04
241-SX-115	Total			2.81E+01	8.19E-07	5.15E+01	1.19E+03	6.18E+02	3.35E+05	2.69E+01	4.03E+02	9.44E+01	3.55E+02	5.08E+02
241-SX-115	Sludge	R2 (Solid)	14	2.81E+01	8.19E-07	5.15E+01	1.19E+03	6.18E+02	3.35E+05	2.69E+01	4.03E+02	9.44E+01	3.55E+02	5.08E+02
241-SY-101	Total			2.76E+04	1.52E+05	9.10E+04	8.16E+04	2.59E+05	5.64E+04	1.34E+00	3.84E+01	8.23E+00	4.39E+02	2.47E+05
241-SY-101	Supernatant	NA	399	1.09E+03	4.88E+04	1.96E+04	4.47E+03	5.05E+04	1.04E+03	1.45E-03	6.81E-02	1.08E-02	2.69E-01	5.58E+04
241-SY-101	Salt Cake	S2-SltSlr (Solid)	948	2.65E+04	1.04E+05	7.15E+04	7.71E+04	2.09E+05	5.54E+04	1.34E+00	3.83E+01	8.22E+00	4.39E+02	1.91E+05
241-SY-102	Total			1.76E+04	4.12E+05	1.75E+05	9.48E+04	5.74E+05	6.33E+04	2.26E+02	4.71E+03	1.09E+03	2.03E+04	5.37E+05
241-SY-102	Supernatant	Waste Transfer	3108	2.94E+03	3.47E+05	1.40E+05	7.08E+04	4.73E+05	7.84E+02	1.39E-02	6.00E-01	9.74E-02	1.82E+00	4.39E+05
241-SY-102	Sludge (Solids)	NA	194	7.10E+03	1.90E+04	1.25E+04	1.39E+04	4.06E+04	3.18E+04	8.50E+01	2.44E+03	5.23E+02	1.04E+04	3.34E+04
241-SY-102	Sludge (Solids)	Z (Solid)	186	6.80E+03	2.36E+04	1.06E+04	8.87E+03	3.40E+04	3.05E+04	1.41E+02	2.27E+03	5.67E+02	9.94E+03	3.20E+04
241-SY-102	Sludge (Liquids)	NA	87	4.04E+02	1.11E+04	6.07E+03	6.60E+02	1.32E+04	1.30E+02	2.69E-03	7.70E-02	1.65E-02	1.14E+00	1.62E+04

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-SY-102	Sludge (Liquids)	Z (Liquid)	83	3.86E+02	1.16E+04	6.36E+03	6.29E+02	1.26E+04	1.24E+02	2.57E-03	7.34E-02	1.58E-02	1.09E+00	1.55E+04
241-SY-103	Total			2.66E+04	5.07E+05	3.98E+05	1.29E+05	7.07E+05	6.77E+04	3.97E+00	1.14E+02	2.44E+01	1.24E+03	1.09E+06
241-SY-103	Supernatant	S2-SltSlr (Liquid)	1543	9.50E+03	2.59E+05	2.35E+05	5.80E+04	3.31E+05	4.07E+03	2.94E-03	8.42E-02	1.81E-02	3.24E+00	6.67E+05
241-SY-103	Salt Cake	S2-SltSlr (Solid)	1204	1.71E+04	2.48E+05	1.63E+05	7.10E+04	3.76E+05	6.36E+04	3.97E+00	1.14E+02	2.44E+01	1.23E+03	4.26E+05
241-T-101	Total			1.31E+03	1.20E+05	1.56E+04	2.98E+04	7.54E+04	3.85E+02	5.44E+00	2.08E+02	4.54E+01	6.65E+01	3.92E+04
241-T-101	Sludge	CWR2 (Solid)	140	0.00E+00	5.74E+03	1.41E+03	2.21E+04	4.42E+03	1.10E+02	4.57E+00	1.83E+02	4.03E+01	1.65E+01	1.28E+02
241-T-101	Salt Cake (Solids)	T2-SltCk (Solid)	179	1.08E+03	1.04E+05	7.22E+03	5.55E+03	5.75E+04	2.18E+02	8.72E-01	2.47E+01	5.19E+00	4.99E+01	1.88E+04
241-T-101	Salt Cake (Liquids)	T2-SltCk (Liquid)	57	2.30E+02	1.08E+04	6.95E+03	2.15E+03	1.35E+04	5.67E+01	2.48E-04	7.01E-03	1.47E-03	1.61E-01	2.03E+04
241-T-102	Total			7.62E+01	8.16E+03	1.78E+03	2.44E+04	6.83E+03	1.66E+04	9.90E-02	4.06E+00	9.48E-01	2.14E+01	4.59E+03
241-T-102	Supernatant	CSR (Liquid)	48	2.16E+01	5.23E+03	1.10E+03	4.06E+02	3.10E+03	4.68E+01	1.03E-02	2.45E-01	5.68E-02	2.05E-01	2.47E+03
241-T-102	Sludge	CWP2 (Solid)	64	5.46E+01	6.99E+00	5.82E+00	2.39E+04	2.52E+03	1.55E+04	8.80E-02	3.73E+00	8.81E-01	5.47E-03	2.09E+03
241-T-102	Sludge	MW2 (Solid)	8	0.00E+00	2.92E+03	6.67E+02	0.00E+00	1.21E+03	1.12E+03	7.26E-04	8.38E-02	1.06E-02	2.12E+01	2.86E+01
241-T-103	Total			1.56E+02	4.48E+03	1.75E+03	2.59E+04	6.38E+03	6.95E+02	8.95E-02	3.76E+00	8.79E-01	6.39E-01	4.00E+02
241-T-103	Supernatant	CSR (Liquid)	15	8.33E+01	1.17E+03	5.94E+02	1.56E+02	1.43E+03	3.46E+01	4.78E-03	1.14E-01	2.65E-02	1.53E-01	2.10E+02
241-T-103	Sludge	CWP2 (Solid)	64	5.13E+01	2.47E+03	7.85E+02	1.78E+04	3.02E+03	5.62E+02	8.27E-02	3.50E+00	8.28E-01	2.73E-03	1.34E+02
241-T-103	Sludge	CWR1 (Solid)	19	2.18E+01	8.38E+02	3.66E+02	7.90E+03	1.32E+03	3.53E+01	1.61E-03	1.04E-01	1.97E-02	4.17E-01	1.43E+01
241-T-103	Sludge	MW2 (Solid)	4	0.00E+00	3.49E+00	2.91E+00	0.00E+00	6.06E+02	6.36E+01	3.63E-04	4.19E-02	5.31E-03	6.67E-02	4.15E+01
241-T-104	Total			5.23E+02	8.97E+04	6.55E+03	2.51E+04	9.98E+04	3.14E+03	2.51E+00	1.93E+02	2.33E+01	2.80E+01	2.40E+02
241-T-104	Sludge	1C (Solid)	1199	5.23E+02	8.97E+04	6.55E+03	2.51E+04	9.98E+04	3.14E+03	2.51E+00	1.93E+02	2.33E+01	2.80E+01	2.40E+02
241-T-105	Total			1.30E+03	1.25E+04	1.76E+04	2.43E+04	3.95E+04	2.81E+04	8.88E+00	1.50E+02	1.59E+01	3.15E+01	5.00E+03
241-T-105	Sludge	1C (Solid)	9	5.46E+01	2.70E+02	1.34E+04	1.39E+03	6.24E+02	2.58E+03	7.34E-01	1.46E+00	1.80E-01	2.87E+00	4.59E+02
241-T-105	Sludge	2C (Solid)	273	7.09E+02	9.52E+03	3.80E+03	9.17E+03	3.27E+04	9.69E-01	8.87E-01	1.34E+02	1.39E+01	2.73E-01	1.13E+00
241-T-105	Sludge	CWR1 (Solid)	89	5.40E+02	2.67E+03	3.84E+02	1.38E+04	6.17E+03	2.55E+04	7.26E+00	1.44E+01	1.78E+00	2.84E+01	4.54E+03
241-T-106	Total			9.49E+01	1.48E+04	1.85E+03	1.98E+04	1.29E+04	6.14E+02	2.39E-01	1.98E+01	2.96E+00	6.29E+00	1.85E+03
241-T-106	Sludge	1C (Solid)	38	5.19E+01	1.24E+04	9.58E+02	1.47E+03	9.79E+03	1.26E+02	7.53E-02	6.68E+00	1.17E+00	1.78E+00	1.56E+03
241-T-106	Sludge	CWR1 (Solid)	34	4.31E+01	1.65E+03	7.22E+02	1.56E+04	2.61E+03	1.35E+01	1.04E-01	2.38E+00	5.22E-01	4.30E+00	2.65E+02
241-T-106	Sludge	CWR2 (Solid)	10	0.00E+00	7.09E+02	1.74E+02	2.72E+03	5.45E+02	4.75E+02	5.93E-02	1.07E+01	1.27E+00	2.14E-01	1.58E+01
241-T-107	Total			8.82E+02	7.21E+04	1.13E+04	3.83E+04	9.45E+04	1.03E+05	2.42E+00	3.11E+02	3.56E+01	6.01E+01	1.51E+04
241-T-107	Sludge	1C (Solid)	559	7.53E+02	6.15E+04	9.65E+03	3.27E+04	8.06E+04	8.77E+04	1.92E+00	2.73E+02	2.97E+01	4.53E+01	1.47E+03
241-T-107	Sludge	CWP2 (Solid)	32	4.31E+01	3.52E+03	5.52E+02	1.87E+03	4.61E+03	5.02E+03	3.33E-01	1.41E+01	3.33E+00	1.68E+00	1.28E+04
241-T-107	Sludge	TBP (Solid)	64	8.62E+01	7.04E+03	1.10E+03	3.74E+03	9.23E+03	1.00E+04	1.67E-01	2.40E+01	2.57E+00	1.32E+01	7.35E+02
241-T-108	Total			1.51E+01	2.60E+04	6.82E+02	5.48E+02	1.55E+04	1.64E+02	4.08E-02	5.62E+00	6.26E-01	4.32E-01	6.28E+02
241-T-108	Sludge	1C (Solid)	20	1.50E+01	3.60E+03	2.78E+02	4.26E+02	2.84E+03	1.38E+02	1.68E-02	2.38E+00	2.59E-01	3.95E-01	4.54E+02
241-T-108	Salt Cake (Solids)	T1-SltCk (Solid)	30	4.54E-02	2.02E+04	3.19E+02	1.18E+02	1.15E+04	5.15E+00	2.37E-02	3.18E+00	3.61E-01	2.13E-02	8.50E+01
241-T-108	Salt Cake (Liquids)	T1-SltCk (Liquid)	10	3.38E-02	2.17E+03	8.50E+01	3.61E+00	1.13E+03	2.12E+01	3.88E-04	5.22E-02	5.91E-03	1.55E-02	8.92E+01
241-T-109	Total			3.56E-01	1.68E+04	6.28E+02	3.89E+02	6.36E+04	1.38E+02	2.47E-02	3.32E+00	3.76E-01	1.07E-01	9.40E+02

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-T-109	Salt Cake (Solids)	T1-SltCk (Solid)	179	1.66E-01	4.61E+03	1.52E+02	3.69E+02	5.73E+04	1.88E+01	2.25E-02	3.03E+00	3.43E-01	2.03E-02	4.40E+02
241-T-109	Salt Cake (Liquids)	T1-SltCk (Liquid)	56	1.89E-01	1.22E+04	4.76E+02	2.02E+01	6.33E+03	1.19E+02	2.17E-03	2.92E-01	3.31E-02	8.67E-02	5.00E+02
241-T-110	Total			1.56E+03	1.05E+05	2.61E+04	2.48E+03	9.26E+04	4.76E+01	6.55E-01	9.79E+01	1.03E+01	8.63E+00	2.60E+01
241-T-110	Supernatant	2C1 (Liquid)	3	1.35E-01	5.49E+01	1.77E-01	0.00E+00	1.11E+02	1.35E-03	5.97E-06	4.66E-04	3.14E-05	9.00E-06	8.79E-03
241-T-110	Sludge	224-2 (Solid)	37	1.37E+01	2.72E+03	2.41E+01	2.89E+00	1.53E+03	1.26E+00	2.20E-02	2.55E+00	3.21E-01	8.40E+00	6.88E-01
241-T-110	Sludge	2C (Solid)	1360	1.54E+03	1.02E+05	2.61E+04	2.47E+03	9.10E+04	4.64E+01	6.33E-01	9.54E+01	9.95E+00	2.29E-01	2.53E+01
241-T-111	Total			7.26E+03	1.22E+05	1.57E+03	7.36E+02	6.76E+04	8.56E+03	1.30E+00	2.61E+02	3.02E+01	9.85E+01	2.13E+02
241-T-111	Sludge	224-2 (Solid)	904	3.88E+03	6.50E+04	8.40E+02	3.93E+02	3.15E+04	4.57E+03	1.19E+00	1.38E+02	1.74E+01	5.28E+01	1.14E+02
241-T-111	Sludge	2C (Solid)	787	3.38E+03	5.66E+04	7.31E+02	3.42E+02	3.61E+04	3.98E+03	1.08E-01	1.23E+02	1.28E+01	4.57E+01	9.93E+01
241-T-112	Total			2.15E+02	5.62E+03	9.13E+03	1.48E+03	2.09E+04	8.28E-01	4.61E-01	6.25E+01	7.02E+00	4.41E+00	1.41E+00
241-T-112	Supernatant	2C2 (Liquid)	26	1.14E+01	6.06E+02	1.01E+03	0.00E+00	1.49E+03	2.50E-01	4.44E-03	5.12E-01	6.49E-02	9.32E-03	2.92E-01
241-T-112	Sludge	2C (Solid)	135	1.67E+02	2.02E+03	3.27E+03	5.96E+02	7.83E+03	3.50E-01	1.94E-01	2.24E+01	2.83E+00	4.32E+00	8.50E-01
241-T-112	Sludge	224-2 (Solid)	91	3.66E+01	3.00E+03	4.85E+03	8.84E+02	1.16E+04	2.28E-01	2.63E-01	3.96E+01	4.13E+00	8.08E-02	2.65E-01
241-T-201	Total			5.11E+01	6.72E+03	6.09E+01	1.18E+01	4.21E+03	9.70E+00	3.27E-01	9.67E+01	6.52E+00	5.71E+00	3.19E+00
241-T-201	Supernatant	224-1 (Liquid)	9	7.00E-01	4.16E+02	3.02E+00	0.00E+00	2.27E+02	3.37E-04	8.02E-07	2.37E-04	1.60E-05	5.31E-07	3.89E-04
241-T-201	Sludge	224-1 (Solid)	110	5.04E+01	6.30E+03	5.79E+01	1.18E+01	3.98E+03	9.70E+00	3.27E-01	9.67E+01	6.52E+00	5.71E+00	3.19E+00
241-T-202	Total			3.48E+01	5.89E+03	6.11E+01	7.02E+00	3.30E+03	2.14E-01	1.38E-01	1.60E+01	2.02E+00	3.08E+00	6.47E-01
241-T-202	Sludge	224-2 (Solid)	81	3.48E+01	5.89E+03	6.11E+01	7.02E+00	3.30E+03	2.14E-01	1.38E-01	1.60E+01	2.02E+00	3.08E+00	6.47E-01
241-T-203	Total			7.24E+01	1.00E+04	5.71E+01	9.69E+00	5.89E+03	3.78E-01	3.30E-01	3.81E+01	4.81E+00	6.40E+00	1.14E+00
241-T-203	Sludge	224-2 (Solid)	140	7.24E+01	1.00E+04	5.71E+01	9.69E+00	5.89E+03	3.78E-01	3.30E-01	3.81E+01	4.81E+00	6.40E+00	1.14E+00
241-T-204	Total			6.28E+01	9.54E+03	4.91E+01	9.27E+00	5.50E+03	6.80E-01	2.77E-01	3.20E+01	4.04E+00	3.82E+00	1.16E+00
241-T-204	Sludge	224-2 (Solid)	143	6.28E+01	9.54E+03	4.91E+01	9.27E+00	5.50E+03	6.80E-01	2.77E-01	3.20E+01	4.04E+00	3.82E+00	1.16E+00
241-TX-101	Total			8.49E+02	8.41E+04	1.86E+04	9.10E+04	6.85E+04	1.94E+05	1.17E+01	3.53E+02	7.51E+01	2.52E+02	4.01E+04
241-TX-101	Sludge	MW2 (Solid)	11	0.00E+00	9.61E+00	8.00E+00	0.00E+00	1.67E+03	1.54E+03	9.98E-04	1.15E-01	1.46E-02	7.52E-03	0.00E+00
241-TX-101	Sludge	R1 (Solid)	265	4.93E+02	5.25E+04	1.48E+04	8.77E+04	4.74E+04	1.92E+05	4.31E+00	2.32E+02	4.51E+01	1.17E+02	3.93E+01
241-TX-101	Sludge	Z (Solid)	4	0.00E+00	3.38E+02	1.37E+00	1.19E+03	1.72E+02	0.00E+00	7.15E+00	1.14E+02	2.86E+01	1.21E+02	2.96E+04
241-TX-101	Salt Cake (Solids)	T2-SltCk (Solid)	49	2.97E+02	2.84E+04	1.98E+03	1.52E+03	1.58E+04	5.98E+01	2.39E-01	6.77E+00	1.42E+00	1.36E+01	5.16E+03
241-TX-101	Salt Cake (Liquids)	T2-SltCk (Liquid)	15	6.05E+01	2.85E+03	1.83E+03	5.67E+02	3.54E+03	1.49E+01	6.52E-05	1.84E-03	3.87E-04	4.23E-02	5.33E+03
241-TX-102	Total			4.68E+03	4.24E+05	4.27E+04	2.60E+04	2.52E+05	2.09E+03	3.37E+00	9.58E+01	2.01E+01	1.92E+02	1.16E+05
241-TX-102	Sludge	MW2 (Solid)	8	0.00E+00	6.99E+00	5.82E+00	0.00E+00	1.21E+03	1.12E+03	7.26E-04	8.38E-02	1.06E-02	5.36E-03	2.86E+01
241-TX-102	Salt Cake (Solids)	T2-SltCk (Solid)	692	4.19E+03	4.01E+05	2.79E+04	2.14E+04	2.22E+05	8.45E+02	3.37E+00	9.57E+01	2.01E+01	1.92E+02	7.29E+04
241-TX-102	Salt Cake (Liquids)	T2-SltCk (Liquid)	121	4.88E+02	2.30E+04	1.48E+04	4.57E+03	2.86E+04	1.20E+02	5.26E-04	1.49E-02	3.12E-03	3.41E-01	4.30E+04
241-TX-103	Total			3.11E+03	2.90E+05	2.71E+04	1.71E+04	1.70E+05	6.47E+02	2.29E+00	6.55E+01	1.37E+01	1.31E+02	7.30E+04
241-TX-103	Salt Cake (Solids)	T1-SltCk (Solid)	9	1.23E-02	5.02E+03	3.08E+01	2.83E+01	3.39E+03	1.39E+00	4.11E-03	5.53E-01	6.27E-02	3.70E-03	3.25E+01
241-TX-103	Salt Cake (Solids)	T2-SltCk (Solid)	470	2.84E+03	2.72E+05	1.90E+04	1.46E+04	1.51E+05	5.74E+02	2.29E+00	6.50E+01	1.36E+01	1.31E+02	4.95E+04
241-TX-103	Salt Cake (Liquids)	T1-SltCk (Liquid)	3	1.01E-02	6.51E+02	2.55E+01	1.08E+00	3.39E+02	6.57E+01	2.87E-04	1.57E-02	1.77E-03	4.64E-03	2.68E+01

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-TX-103	Salt Cake (Liquids)	T2-SltCk (Liquid)	66	2.66E+02	1.25E+04	8.05E+03	2.49E+03	1.56E+04	6.36E+00	1.16E-04	8.12E-03	1.70E-03	1.86E-01	2.35E+04
241-TX-104	Total			5.68E+02	1.07E+05	1.15E+04	4.15E+04	5.22E+04	7.22E+04	1.38E+00	4.67E+01	9.55E+00	7.04E+01	3.15E+04
241-TX-104	Supernatant	T2-SltCk (Liquid)	9	1.22E+01	3.19E+03	8.48E+02	2.87E+01	1.85E+03	8.40E+00	1.77E-04	5.00E-03	1.05E-03	1.15E-01	3.00E+03
241-TX-104	Sludge	R1 (Solid)	130	1.77E+02	4.92E+04	3.05E+03	3.84E+04	2.07E+04	7.21E+04	2.97E-01	1.60E+01	3.11E+00	8.11E+00	1.11E+04
241-TX-104	Salt Cake (Solids)	T2-SltCk (Solid)	93	3.38E+02	4.42E+04	4.80E+03	2.92E+03	2.36E+04	8.57E+01	1.08E+00	3.07E+01	6.43E+00	6.18E+01	7.39E+03
241-TX-104	Salt Cake (Liquids)	T2-SltCk (Liquid)	30	4.07E+01	1.06E+04	2.83E+03	9.57E+01	6.15E+03	2.80E+01	5.89E-04	1.67E-02	3.50E-03	3.82E-01	1.00E+04
241-TX-105	Total			1.28E+04	1.20E+06	9.54E+04	6.74E+04	6.87E+05	6.95E+03	9.96E+00	2.83E+02	5.94E+01	5.70E+02	2.53E+05
241-TX-105	Sludge	MW2 (Solid)	31	0.00E+00	2.71E+01	2.25E+01	0.00E+00	4.70E+03	4.35E+03	2.81E-03	3.25E-01	4.12E-02	2.12E-02	1.11E+02
241-TX-105	Salt Cake (Solids)	T2-SltCk (Solid)	2044	1.24E+04	1.18E+06	8.25E+04	6.34E+04	6.57E+05	2.49E+03	9.95E+00	2.83E+02	5.93E+01	5.69E+02	2.15E+05
241-TX-105	Salt Cake (Liquids)	T2-SltCk (Liquid)	106	4.27E+02	2.01E+04	1.29E+04	4.01E+03	2.50E+04	1.06E+02	4.61E-04	1.30E-02	2.73E-03	2.99E-01	3.77E+04
241-TX-106	Total			7.58E+03	6.96E+05	6.57E+04	4.63E+04	4.08E+05	1.30E+04	5.83E+00	1.72E+02	3.58E+01	3.27E+02	1.77E+05
241-TX-106	Sludge	MW2 (Solid)	4	0.00E+00	2.97E+03	2.91E+00	0.00E+00	6.06E+02	5.62E+02	3.63E-04	1.31E+01	5.31E-03	2.73E-03	1.43E+01
241-TX-106	Sludge	R1 (Solid)	15	2.79E+01	3.49E+00	8.39E+02	4.96E+03	2.68E+03	1.09E+04	2.44E-01	4.19E-02	2.55E+00	6.65E+00	1.67E+03
241-TX-106	Salt Cake (Solids)	T2-SltCk (Solid)	1147	6.94E+03	6.64E+05	4.63E+04	3.56E+04	3.69E+05	1.40E+03	5.58E+00	1.59E+02	3.33E+01	3.19E+02	1.21E+05
241-TX-106	Salt Cake (Liquids)	T2-SltCk (Liquid)	152	6.13E+02	2.89E+04	1.85E+04	5.75E+03	3.59E+04	1.51E+02	6.61E-04	1.87E-02	3.92E-03	4.28E-01	5.40E+04
241-TX-107	Total			6.27E+02	6.94E+04	6.98E+03	5.38E+03	4.11E+04	1.09E+03	5.93E+00	1.68E+02	3.53E+01	3.38E+02	2.03E+04
241-TX-107	Salt Cake (Solids)	R-SltCk (Solid)	24	6.19E+01	1.82E+04	7.60E+02	1.86E+03	9.25E+03	9.60E+02	7.30E-02	1.92E+00	4.07E-01	2.69E+00	3.22E+03
241-TX-107	Salt Cake (Solids)	T2-SltCk (Solid)	62	4.82E+02	4.61E+04	3.21E+03	2.47E+03	2.56E+04	9.72E+01	5.85E+00	1.66E+02	3.49E+01	3.35E+02	8.38E+03
241-TX-107	Salt Cake (Liquids)	R-SltCk (Liquid)	7	7.07E+00	3.61E+03	6.92E+02	3.30E+02	1.76E+03	1.61E+01	1.35E-03	3.56E-02	7.56E-03	4.71E-02	1.95E+03
241-TX-107	Salt Cake (Liquids)	T2-SltCk (Liquid)	19	7.66E+01	1.52E+03	2.32E+03	7.18E+02	4.48E+03	1.89E+01	8.26E-05	2.34E-03	4.90E-04	5.35E-02	6.76E+03
241-TX-108	Total			2.69E+03	2.52E+05	2.19E+04	1.44E+04	1.46E+05	4.09E+03	2.02E+00	5.77E+01	1.21E+01	1.16E+02	5.82E+04
241-TX-108	Sludge	MW2 (Solid)	8	0.00E+00	6.99E+00	5.82E+00	0.00E+00	2.40E+03	1.12E+03	1.72E-03	2.47E-01	1.06E-02	1.36E-01	2.86E+01
241-TX-108	Sludge	TBP (Solid)	15	1.50E+01	4.10E+03	2.82E+02	3.97E+01	1.21E+03	2.42E+03	7.26E-04	8.38E-02	2.65E-02	5.47E-03	2.61E+02
241-TX-108	Salt Cake (Solids)	T2-SltCk (Solid)	415	2.51E+03	2.40E+05	1.67E+04	1.29E+04	1.33E+05	5.07E+02	2.02E+00	5.74E+01	1.20E+01	1.16E+02	4.37E+04
241-TX-108	Salt Cake (Liquids)	T2-SltCk (Liquid)	40	1.61E+02	7.60E+03	4.88E+03	1.51E+03	9.44E+03	3.98E+01	1.74E-04	4.92E-03	1.03E-03	1.13E-01	1.42E+04
241-TX-109	Total			1.03E+03	2.48E+05	1.91E+04	2.93E+04	1.95E+05	9.48E+03	1.15E+00	1.64E+02	1.78E+01	2.72E+01	3.12E+04
241-TX-109	Sludge	1C (Solid)	1375	1.03E+03	2.48E+05	1.91E+04	2.93E+04	1.95E+05	9.48E+03	1.15E+00	1.64E+02	1.78E+01	2.72E+01	3.12E+04
241-TX-110	Total			9.86E+03	9.49E+05	7.17E+04	5.38E+04	5.39E+05	2.94E+03	7.81E+00	2.35E+02	4.77E+01	4.43E+02	1.87E+05
241-TX-110	Sludge	1C (Solid)	140	1.05E+02	2.52E+04	1.94E+03	2.98E+03	1.99E+04	9.65E+02	1.17E-01	1.67E+01	1.82E+00	2.77E+00	3.18E+03
241-TX-110	Salt Cake (Solids)	T2-SltCk (Solid)	1580	9.56E+03	9.15E+05	6.37E+04	4.90E+04	5.08E+05	1.93E+03	7.69E+00	2.18E+02	4.58E+01	4.40E+02	1.66E+05
241-TX-110	Salt Cake (Liquids)	T2-SltCk (Liquid)	49	1.97E+02	9.31E+03	5.98E+03	1.85E+03	1.16E+04	4.88E+01	2.13E-04	6.03E-03	1.26E-03	1.38E-01	1.74E+04
241-TX-111	Total			7.44E+03	7.25E+05	5.34E+04	4.14E+04	4.13E+05	2.60E+03	5.95E+00	1.84E+02	3.68E+01	3.36E+02	1.38E+05
241-TX-111	Sludge	1C (Solid)	163	1.23E+02	2.94E+04	2.26E+03	3.47E+03	2.31E+04	1.12E+03	1.37E-01	1.94E+01	2.11E+00	3.22E+00	3.70E+03
241-TX-111	Salt Cake (Solids)	T2-SltCk (Solid)	1194	7.23E+03	6.91E+05	4.82E+04	3.70E+04	3.84E+05	1.46E+03	5.81E+00	1.65E+02	3.46E+01	3.33E+02	1.26E+05
241-TX-111	Salt Cake (Liquids)	T2-SltCk (Liquid)	24	9.67E+01	4.56E+03	2.93E+03	9.07E+02	5.66E+03	2.39E+01	1.04E-04	2.95E-03	6.19E-04	6.76E-02	8.53E+03
241-TX-112	Total			1.38E+04	1.35E+06	1.01E+05	7.24E+04	7.64E+05	2.84E+03	1.08E+01	3.11E+02	6.48E+01	6.17E+02	2.67E+05

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-TX-112	Salt Cake (Solids)	T1-SltCk (Solid)	75	1.02E-01	1.28E+06	8.94E+04	2.36E+02	7.12E+05	1.16E+01	3.43E-02	4.60E+00	5.22E-01	3.09E-02	2.71E+02
241-TX-112	Salt Cake (Solids)	T2-SltCk (Solid)	2215	1.34E+04	4.18E+04	2.57E+02	6.87E+04	2.83E+04	2.70E+03	1.08E+01	3.06E+02	6.43E+01	6.17E+02	2.33E+05
241-TX-112	Salt Cake (Liquids)	T1-SltCk (Liquid)	15	5.07E-02	3.25E+03	1.27E+02	5.42E+00	1.69E+03	9.26E+01	5.82E-04	7.83E-02	8.86E-03	2.32E-02	1.34E+02
241-TX-112	Salt Cake (Liquids)	T2-SltCk (Liquid)	93	3.75E+02	1.77E+04	1.13E+04	3.52E+03	2.19E+04	3.18E+01	4.04E-04	1.14E-02	2.40E-03	2.62E-01	3.31E+04
241-TX-113	Total			2.07E+03	1.66E+06	1.55E+04	1.66E+04	9.06E+05	5.42E+03	6.28E-01	5.13E+01	6.54E+00	2.61E+01	3.18E+04
241-TX-113	Sludge	1C (Solid)	351	2.64E+02	6.32E+04	4.87E+03	7.48E+03	4.98E+04	2.42E+03	2.94E-01	4.18E+01	4.55E+00	6.93E+00	7.96E+03
241-TX-113	Salt Cake (Solids)	T2-SltCk (Solid)	2045	1.73E+03	1.59E+06	8.21E+03	8.41E+03	8.51E+05	2.98E+03	3.34E-01	9.49E+00	1.99E+00	1.91E+01	1.67E+04
241-TX-113	Salt Cake (Liquids)	T2-SltCk (Liquid)	20	8.06E+01	3.80E+03	2.44E+03	7.56E+02	4.72E+03	1.99E+01	8.69E-05	2.46E-03	5.16E-04	5.63E-02	7.11E+03
241-TX-114	Total			1.07E+04	1.13E+06	7.52E+04	5.62E+04	6.42E+05	2.39E+03	8.61E+00	2.55E+02	5.22E+01	4.88E+02	1.96E+05
241-TX-114	Sludge	1C (Solid)	15	1.13E+01	2.70E+03	2.08E+02	3.20E+02	2.13E+03	1.03E+02	1.26E-02	1.79E+00	1.94E-01	2.96E-01	3.40E+02
241-TX-114	Salt Cake (Solids)	T1-SltCk (Solid)	173	2.36E-01	9.64E+04	5.92E+02	5.45E+02	6.52E+04	2.67E+01	7.90E-02	1.06E+01	1.20E+00	7.12E-02	6.25E+02
241-TX-114	Salt Cake (Solids)	T2-SltCk (Solid)	1750	1.06E+04	1.01E+06	7.06E+04	5.42E+04	5.63E+05	2.14E+03	8.52E+00	2.42E+02	5.08E+01	4.87E+02	1.84E+05
241-TX-114	Salt Cake (Liquids)	T1-SltCk (Liquid)	46	1.55E-01	9.98E+03	3.91E+02	1.66E+01	5.20E+03	9.76E+01	1.78E-03	2.40E-01	2.72E-02	7.12E-02	4.10E+02
241-TX-114	Salt Cake (Liquids)	T2-SltCk (Liquid)	28	1.13E+02	5.32E+03	3.42E+03	1.06E+03	6.61E+03	2.79E+01	1.22E-04	3.44E-03	7.22E-04	7.89E-02	9.96E+03
241-TX-115	Total			1.23E+04	1.16E+06	9.22E+04	6.47E+04	6.59E+05	7.34E+03	9.55E+00	2.71E+02	5.69E+01	5.46E+02	2.44E+05
241-TX-115	Sludge	TBP (Solid)	30	3.00E+01	8.20E+03	5.64E+02	7.94E+01	4.81E+03	4.84E+03	3.44E-03	4.94E-01	5.29E-02	2.72E-01	5.23E+02
241-TX-115	Salt Cake (Solids)	T2-SltCk (Solid)	1960	1.19E+04	1.13E+06	7.91E+04	6.08E+04	6.30E+05	2.39E+03	9.54E+00	2.71E+02	5.69E+01	5.46E+02	2.06E+05
241-TX-115	Salt Cake (Liquids)	T2-SltCk (Liquid)	103	4.15E+02	1.96E+04	1.26E+04	3.89E+03	2.43E+04	1.03E+02	4.48E-04	1.27E-02	2.66E-03	2.90E-01	3.66E+04
241-TX-116	Total			6.45E+03	1.56E+06	4.31E+04	6.25E+04	7.64E+05	1.28E+03	5.04E+00	2.00E+02	3.50E+01	2.58E+02	1.32E+05
241-TX-116	Sludge	DE (Solid)	248	8.25E+02	3.89E+04	2.50E+04	5.54E+02	4.83E+04	2.04E+02	8.89E-04	2.52E-02	5.28E-03	5.76E-01	7.27E+04
241-TX-116	Salt Cake (Solids)	T1-SltCk (Solid)	977	1.61E+00	9.48E+05	4.04E+03	3.34E+03	4.15E+05	1.51E+02	5.39E-01	7.25E+01	8.22E+00	2.57E+02	4.27E+03
241-TX-116	Salt Cake (Solids)	T2-SltCk (Solid)	926	5.59E+03	5.30E+05	1.30E+04	5.86E+04	2.84E+05	9.27E+02	4.49E+00	1.28E+02	2.68E+01	4.86E-01	5.25E+04
241-TX-116	Salt Cake (Liquids)	T1-SltCk (Liquid)	113	3.60E+01	4.28E+04	1.19E+03	9.93E-01	1.71E+04	2.14E-01	1.06E-05	1.43E-03	1.62E-04	5.50E-02	2.33E+03
241-TX-117	Total			6.25E+03	9.57E+05	4.42E+04	3.43E+04	5.73E+05	1.46E+03	5.32E+00	1.81E+02	3.44E+01	2.88E+02	1.11E+05
241-TX-117	Sludge	DE (Solid)	110	0.00E+00	0.00E+00	0.00E+00	2.46E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
241-TX-117	Salt Cake (Solids)	T2-SltCk (Solid)	1033	6.25E+03	3.49E+05	2.14E+03	1.97E+03	2.36E+05	9.68E+01	2.86E-01	3.84E+01	4.36E+00	2.58E-01	2.26E+03
241-TX-117	Salt Cake (Solids)	T1-SltCk (Solid)	626	8.54E-01	5.98E+05	4.17E+04	3.20E+04	3.32E+05	1.26E+03	5.03E+00	1.43E+02	3.00E+01	2.88E+02	1.09E+05
241-TX-117	Salt Cake (Liquids)	T1-SltCk (Liquid)	48	1.62E-01	1.04E+04	4.08E+02	1.73E+01	5.42E+03	1.02E+02	1.86E-03	2.51E-01	2.84E-02	7.43E-02	4.28E+02
241-TX-118	Total			8.05E+03	1.21E+05	3.57E+04	1.28E+04	3.08E+05	1.92E+05	1.31E+02	3.71E+03	7.79E+02	5.71E+03	8.52E+04
241-TX-118	Salt Cake (Solids)	T2-SltCk (Solid)	671	3.45E+03	1.59E+03	3.51E+03	1.84E+03	3.27E+04	5.24E+04	1.13E+02	3.21E+03	6.74E+02	4.71E+03	1.31E+03
241-TX-118	Salt Cake (Solids)	NA	125	4.04E+03	9.33E+04	1.52E+04	5.70E+03	2.42E+05	1.39E+05	1.76E+01	4.99E+02	1.05E+02	1.01E+03	3.45E+04
241-TX-118	Salt Cake (Liquids)	T2-SltCk (Liquid)	139	5.60E+02	2.64E+04	1.70E+04	5.25E+03	3.28E+04	1.38E+02	6.04E-04	1.71E-02	3.59E-03	3.92E-01	4.94E+04
241-TY-101	Total			4.84E+02	1.06E+05	8.27E+03	2.12E+04	8.88E+04	7.12E+03	6.43E-01	1.28E+02	1.09E+01	9.44E+00	1.82E+02
241-TY-101	Sludge	1CFeCN (Solid)	273	2.97E+02	6.49E+04	7.84E+03	1.30E+04	5.43E+04	4.36E+03	2.83E-01	8.01E+01	5.43E+00	5.72E+00	1.01E+02
241-TY-101	Salt Cake (Solids)	T1-SltCk (Solid)	172	1.87E+02	4.09E+04	4.14E+02	8.21E+03	3.42E+04	2.75E+03	3.60E-01	4.84E+01	5.49E+00	3.72E+00	6.36E+01
241-TY-101	Salt Cake (Liquids)	T1-SltCk (Liquid)	2	6.76E-03	4.34E+02	1.70E+01	7.22E-01	2.26E+02	4.24E+00	7.75E-05	1.04E-02	1.18E-03	3.10E-03	1.78E+01

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-TY-102	Total			2.59E+02	1.98E+05	9.77E+03	1.45E+03	8.84E+04	1.21E+03	1.13E-02	6.12E-01	9.29E-02	1.15E+00	1.32E+04
241-TY-102	Salt Cake (Solids)	T1-SltCk (Solid)	90	5.53E+01	8.36E+04	3.37E+02	6.94E+01	3.49E+04	5.02E+02	8.46E-03	2.16E-01	2.45E-02	3.46E-02	3.73E+02
241-TY-102	Salt Cake (Solids)	T2-SltCk (Solid)	109	6.70E+01	1.01E+05	5.04E+03	8.40E+01	4.22E+04	6.08E+02	1.60E-03	2.40E-01	5.04E-02	9.74E-01	4.51E+02
241-TY-102	Salt Cake (Liquids)	T1-SltCk (Liquid)	29	9.80E-02	6.46E+03	2.46E+02	1.05E+01	3.28E+03	6.15E+01	1.12E-03	1.51E-01	8.77E-04	4.49E-02	2.59E+02
241-TY-102	Salt Cake (Liquids)	T2-SltCk (Liquid)	34	1.37E+02	6.29E+03	4.15E+03	1.29E+03	8.02E+03	3.38E+01	1.48E-04	4.18E-03	1.71E-02	9.58E-02	1.21E+04
241-TY-103	Total			1.24E+03	1.49E+05	1.30E+04	4.45E+03	1.17E+05	6.89E+04	2.07E+00	1.58E+02	1.90E+01	2.38E+01	2.73E+04
241-TY-103	Sludge	1CFeCN (Solid)	170	3.35E+02	4.42E+04	2.37E+03	8.65E+02	3.35E+04	2.17E+04	1.84E-01	5.21E+01	3.53E+00	9.95E+00	3.56E+03
241-TY-103	Sludge	TBP (Solid)	220	4.33E+02	5.71E+04	3.07E+03	1.12E+03	4.34E+04	2.80E+04	4.53E-01	6.50E+01	6.97E+00	2.41E+00	4.61E+03
241-TY-103	Salt Cake (Solids)	T2-SltCk (Solid)	150	2.95E+02	3.90E+04	2.09E+03	7.63E+02	2.96E+04	1.91E+04	1.43E+00	4.06E+01	8.52E+00	1.13E+01	3.14E+03
241-TY-103	Salt Cake (Liquids)	T2-SltCk (Liquid)	45	1.81E+02	8.55E+03	5.49E+03	1.70E+03	1.06E+04	4.48E+01	1.96E-04	5.53E-03	1.16E-03	1.27E-01	1.60E+04
241-TY-104	Total			2.43E+02	1.40E+04	3.58E+03	2.39E+03	2.95E+04	2.33E+04	2.11E-01	4.63E+01	3.68E+00	2.14E+01	9.50E+03
241-TY-104	Supernatant	DW (Liquid)	5	1.06E+01	4.95E+02	5.65E+01	2.85E+00	4.17E+02	3.02E-01	3.70E-04	6.53E-03	1.56E-03	2.16E-03	5.73E+01
241-TY-104	Sludge	1CFeCN (Solid)	114	1.63E+02	9.46E+03	2.46E+03	1.67E+03	2.03E+04	1.63E+04	9.45E-02	3.27E+01	2.22E+00	1.50E+01	6.61E+03
241-TY-104	Sludge	TBP (Solid)	49	7.00E+01	4.07E+03	1.06E+03	7.18E+02	8.73E+03	7.02E+03	1.16E-01	1.36E+01	1.45E+00	6.45E+00	2.84E+03
241-TY-105	Total			1.08E+03	2.38E+05	2.10E+04	2.55E+03	1.54E+05	1.98E+05	1.97E-01	2.84E+01	3.04E+00	1.01E+01	8.35E+03
241-TY-105	Sludge	TBP (Solid)	874	1.08E+03	2.38E+05	2.10E+04	2.55E+03	1.54E+05	1.98E+05	1.97E-01	2.84E+01	3.04E+00	1.01E+01	8.35E+03
241-TY-106	Total			2.48E+02	1.43E+04	7.24E+02	1.91E+02	6.90E+03	1.05E+04	1.15E-02	1.65E+00	1.77E-01	1.44E+00	4.90E+03
241-TY-106	Sludge	DE (Solid)	47	1.88E+02	1.09E+04	5.48E+02	1.45E+02	5.23E+03	7.97E+03	8.70E-03	1.25E+00	4.27E-02	1.09E+00	3.72E+03
241-TY-106	Sludge	TBP (Solid)	15	5.99E+01	3.46E+03	1.75E+02	4.62E+01	1.67E+03	2.54E+03	2.78E-03	3.99E-01	1.34E-01	3.49E-01	1.19E+03
241-U-101	Total			1.47E+02	1.57E+04	4.42E+03	2.61E+04	1.41E+04	5.72E+04	1.16E-01	6.25E+00	1.21E+00	3.16E+00	8.82E+03
241-U-101	Sludge	R1 (Solid)	87	1.47E+02	1.57E+04	4.42E+03	2.61E+04	1.41E+04	5.72E+04	1.16E-01	6.25E+00	1.21E+00	3.16E+00	8.82E+03
241-U-102	Total			1.40E+04	5.29E+05	9.94E+04	8.23E+04	3.54E+05	1.75E+05	5.92E+00	2.36E+02	4.75E+01	2.44E+02	2.91E+05
241-U-102	Supernatant	T2-SltCk (Liquid)	4	4.48E+01	7.92E+02	5.84E+02	1.33E+02	8.92E+02	2.69E+01	6.58E-05	1.86E-03	3.90E-04	4.65E-02	1.80E+03
241-U-102	Sludge	R1 (Solid)	163	3.03E+02	3.23E+04	9.12E+03	5.40E+04	2.91E+04	1.18E+05	2.65E+00	1.43E+02	2.77E+01	7.22E+01	1.82E+04
241-U-102	Salt Cake (Solids)	S2-SltSlr (Solid)	307	3.97E+03	1.52E+05	2.34E+04	7.84E+03	9.59E+04	1.79E+04	1.17E+00	3.36E+01	7.21E+00	5.03E+01	7.02E+04
241-U-102	Salt Cake (Solids)	T2-SltCk (Solid)	647	8.37E+03	3.21E+05	4.92E+04	1.65E+04	2.02E+05	3.78E+04	2.10E+00	5.96E+01	1.25E+01	1.20E+02	1.48E+05
241-U-102	Salt Cake (Liquids)	T2-SltCk (Liquid)	117	1.31E+03	2.32E+04	1.71E+04	3.88E+03	2.61E+04	7.88E+02	1.92E-03	5.44E-02	1.14E-02	1.36E+00	5.27E+04
241-U-103	Total			1.91E+04	5.04E+05	1.24E+05	4.86E+04	4.72E+05	5.48E+04	3.13E+00	1.03E+02	2.17E+01	2.04E+02	2.64E+05
241-U-103	Supernatant	S1-SltCk (Liquid)	2	2.48E+01	3.04E+02	2.74E+02	8.18E+01	4.61E+02	1.87E+01	2.78E-05	7.88E-04	1.72E-04	3.70E-02	8.91E+02
241-U-103	Sludge	R1 (Solid)	42	6.66E+02	6.21E+03	3.17E+03	8.46E+03	9.10E+03	2.22E+04	5.50E-01	2.97E+01	5.76E+00	1.50E+01	3.42E+03
241-U-103	Salt Cake (Solids)	S2-SltSlr (Solid)	356	4.84E+03	1.37E+05	7.45E+04	2.52E+04	3.11E+05	2.35E+04	1.57E+00	4.45E+01	9.71E+00	1.44E+02	1.28E+05
241-U-103	Salt Cake (Solids)	S1-SltCk (Solid)	891	1.21E+04	3.42E+05	2.98E+04	1.01E+04	1.24E+05	7.87E+03	1.02E+00	2.91E+01	6.24E+00	4.35E+01	7.94E+04
241-U-103	Salt Cake (Liquids)	S1-SltCk (Liquid)	119	1.48E+03	1.81E+04	1.63E+04	4.87E+03	2.74E+04	1.12E+03	1.65E-03	4.69E-02	1.02E-02	2.20E+00	5.30E+04
241-U-104	Total			2.81E+02	6.49E+04	1.73E+04	5.57E+04	5.90E+04	1.10E+05	2.48E+00	1.34E+02	2.59E+01	6.86E+01	3.44E+04
241-U-104	Sludge	R1 (Solid)	151	2.81E+02	3.50E+04	8.85E+03	5.73E+03	2.70E+04	5.77E+02	2.37E-02	1.28E+00	2.57E+01	1.68E+00	1.69E+04
241-U-104	Sludge	DE (Solid)	311	0.00E+00	2.99E+04	8.45E+03	5.00E+04	3.20E+04	1.09E+05	2.45E+00	1.32E+02	2.48E-01	6.69E+01	1.75E+04

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-U-105	Total			4.03E+04	6.42E+05	1.01E+05	6.25E+04	4.12E+05	2.54E+04	1.78E+01	5.79E+02	1.21E+02	8.10E+02	3.05E+05
241-U-105	Sludge	CWR1 (Solid)	121	2.02E+03	3.33E+04	4.09E+03	3.17E+04	2.05E+04	3.93E+02	1.98E+00	1.27E+02	2.42E+01	8.20E+01	1.45E+04
241-U-105	Salt Cake (Solids)	T2-SltCk (Solid)	223	7.54E+03	4.56E+05	6.24E+04	2.04E+04	2.79E+05	2.10E+04	2.94E+00	3.68E+02	7.89E+01	1.68E+02	1.84E+05
241-U-105	Salt Cake (Solids)	S2-SltSlr (Solid)	827	2.80E+04	1.23E+05	1.68E+04	5.50E+03	7.53E+04	2.82E+02	1.28E+01	8.35E+01	1.75E+01	5.50E+02	4.95E+04
241-U-105	Salt Cake (Liquids)	S2-SltSlr (Liquid)	130	2.13E+03	2.35E+04	1.40E+04	3.87E+03	2.95E+04	2.93E+03	6.73E-03	1.93E-01	4.13E-02	7.67E+00	4.53E+04
241-U-105	Salt Cake (Liquids)	T2-SltCk (Liquid)	35	5.74E+02	6.34E+03	3.78E+03	1.04E+03	7.95E+03	7.89E+02	1.84E-03	5.21E-02	1.09E-02	2.06E+00	1.22E+04
241-U-106	Total			2.20E+04	2.04E+05	5.26E+04	1.11E+04	1.77E+05	5.92E+04	6.96E+00	1.98E+02	4.31E+01	6.81E+02	1.45E+05
241-U-106	Supernatant	S1-SltCk (Liquid)	6	2.03E+02	1.49E+03	5.94E+02	7.22E+01	1.34E+03	3.30E+02	1.19E-03	3.39E-02	7.39E-03	1.74E+00	1.69E+03
241-U-106	Salt Cake (Solids)	S1-SltCk (Solid)	484	1.65E+04	1.64E+05	3.68E+04	9.22E+03	1.41E+05	5.04E+04	6.93E+00	1.97E+02	4.29E+01	6.34E+02	9.98E+04
241-U-106	Salt Cake (Liquids)	S1-SltCk (Liquid)	154	5.21E+03	3.83E+04	1.52E+04	1.85E+03	3.43E+04	8.47E+03	3.07E-02	8.71E-01	1.90E-01	4.45E+01	4.35E+04
241-U-107	Total			3.17E+03	6.37E+05	7.15E+04	5.13E+04	3.67E+05	4.05E+03	9.58E+00	2.75E+02	5.89E+01	4.16E+02	1.46E+05
241-U-107	Sludge	CWR1 (Solid)	57	6.55E+01	2.51E+03	1.10E+03	2.37E+04	3.96E+03	1.91E+02	4.84E-03	3.11E-01	5.91E-02	2.00E-01	4.03E+02
241-U-107	Salt Cake (Solids)	S2-SltSlr (Solid)	902	2.30E+03	5.90E+05	2.62E+03	2.20E+04	3.25E+05	1.77E+02	3.81E-01	2.64E+02	5.65E+01	2.18E+01	1.03E+05
241-U-107	Salt Cake (Solids)	T2-SltCk (Solid)	44	1.12E+02	2.88E+04	5.38E+04	1.07E+03	1.58E+04	3.63E+03	9.20E+00	1.08E+01	2.27E+00	3.94E+02	5.04E+03
241-U-107	Salt Cake (Liquids)	S2-SltSlr (Liquid)	105	6.59E+02	1.49E+04	1.34E+04	4.30E+03	2.15E+04	4.67E+01	1.47E-04	4.21E-03	9.03E-04	2.89E-01	3.59E+04
241-U-107	Salt Cake (Liquids)	T2-SltCk (Liquid)	5	3.14E+01	7.11E+02	6.37E+02	2.05E+02	1.02E+03	2.22E+00	7.11E-06	2.01E-04	4.22E-05	1.38E-02	1.71E+03
241-U-108	Total			1.06E+04	5.90E+05	1.14E+05	5.14E+04	5.00E+05	1.71E+04	4.63E+00	1.74E+02	3.80E+01	7.97E+01	2.68E+05
241-U-108	Sludge	CWR2 (Solid)	110	0.00E+00	4.51E+03	1.11E+03	1.73E+04	3.47E+03	8.62E+01	3.59E+00	1.44E+02	3.16E+01	1.30E+01	1.01E+02
241-U-108	Salt Cake (Solids)	S1-SltCk (Solid)	628	5.51E+03	3.16E+05	5.53E+04	1.73E+04	2.64E+05	9.44E+03	4.53E-01	1.29E+01	2.81E+00	4.15E+01	1.30E+05
241-U-108	Salt Cake (Solids)	S2-SltSlr (Solid)	500	4.39E+03	2.52E+05	4.40E+04	1.38E+04	2.10E+05	7.52E+03	5.85E-01	1.68E+01	3.59E+00	2.50E+01	1.04E+05
241-U-108	Salt Cake (Liquids)	S1-SltCk (Liquid)	55	3.89E+02	1.01E+04	7.37E+03	1.68E+03	1.25E+04	1.54E+01	1.29E-04	3.65E-03	7.96E-04	1.30E-01	1.88E+04
241-U-108	Salt Cake (Liquids)	S2-SltSlr (Liquid)	43	3.04E+02	7.91E+03	5.76E+03	1.31E+03	9.80E+03	1.21E+01	1.00E-04	2.86E-03	6.14E-04	1.02E-01	1.47E+04
241-U-109	Total			8.81E+03	5.98E+05	1.07E+05	5.77E+04	4.31E+05	1.55E+04	8.20E-01	2.49E+01	5.30E+00	5.27E+01	2.52E+05
241-U-109	Sludge	CWR1 (Solid)	103	4.84E+02	7.78E+03	5.20E+03	2.99E+04	1.55E+04	1.70E+03	4.06E-02	2.61E+00	4.95E-01	1.68E+00	1.14E+04
241-U-109	Salt Cake (Solids)	S2-SltSlr (Solid)	512	3.42E+03	3.05E+05	4.57E+04	1.28E+04	2.07E+05	7.40E+03	3.26E-01	9.27E+00	2.02E+00	2.99E+01	1.06E+05
241-U-109	Salt Cake (Solids)	S1-SltCk (Solid)	600	4.01E+03	2.60E+05	3.90E+04	1.09E+04	1.77E+05	6.31E+03	4.51E-01	1.29E+01	2.77E+00	1.93E+01	9.04E+04
241-U-109	Salt Cake (Liquids)	S1-SltCk (Liquid)	137	8.95E+02	2.53E+04	1.75E+04	4.00E+03	3.12E+04	1.13E+02	2.74E-03	7.77E-02	1.69E-02	1.79E+00	4.45E+04
241-U-110	Total			1.28E+03	4.10E+04	1.18E+04	9.24E+04	7.13E+04	1.85E+05	3.23E+00	2.10E+02	3.60E+01	8.38E+01	2.07E+04
241-U-110	Sludge	1C (Solid)	120	1.43E+02	3.38E+04	1.27E+03	8.45E+03	2.22E+04	1.09E+03	3.87E-01	5.50E+01	5.99E+00	9.13E+00	5.68E+03
241-U-110	Sludge	CWR1 (Solid)	149	1.45E+02	2.76E+01	1.24E+01	2.04E+04	1.66E+02	1.63E+02	1.27E-01	8.14E+00	1.55E+00	5.24E+00	7.68E+01
241-U-110	Sludge	R1 (Solid)	396	9.93E+02	7.13E+03	1.05E+04	6.35E+04	4.90E+04	1.84E+05	2.72E+00	1.46E+02	2.84E+01	6.94E+01	1.49E+04
241-U-111	Total			5.57E+03	3.31E+05	6.63E+04	3.99E+04	2.52E+05	5.16E+04	3.51E+00	1.25E+02	2.54E+01	1.53E+02	1.71E+05
241-U-111	Sludge	1C (Solid)	49	3.69E+01	8.83E+03	6.80E+02	1.04E+03	6.96E+03	3.38E+02	4.11E-02	5.84E+00	6.35E-01	9.68E-01	1.11E+03
241-U-111	Sludge	R1 (Solid)	49	9.11E+01	9.71E+03	2.74E+03	1.62E+04	8.76E+03	3.55E+04	7.96E-01	4.29E+01	8.33E+00	2.17E+01	5.47E+03
241-U-111	Salt Cake (Solids)	S1-SltCk (Solid)	228	1.38E+03	1.76E+05	1.63E+04	6.05E+03	8.24E+04	6.66E+03	3.19E-01	9.08E+00	1.98E+00	2.93E+01	3.61E+04
241-U-111	Salt Cake (Solids)	S2-SltSlr (Solid)	401	3.45E+03	1.18E+05	3.31E+04	1.24E+04	1.27E+05	8.88E+03	2.35E+00	6.73E+01	1.44E+01	1.01E+02	8.97E+04

Table A-2. Tank Waste Inventory from BBI Detail Report (September 2004) for Hydrogen Generation Rate Calculations. (20 sheets)

Tank Name	Waste Phase	Waste Type	Vol (kL)	TOC (Kg)	NO_3 (Kg)	NO_2 (Kg)	Al (Kg)	Na (Kg)	90Sr (Ci)	238Pu (Ci)	239Pu (Ci)	240Pu (Ci)	241Am (Ci)	137Cs (Ci)
241-U-111	Salt Cake (Liquids)	S1-SltCk (Liquid)	41	2.22E+02	6.82E+03	4.92E+03	1.50E+03	9.78E+03	6.90E+01	3.47E-04	9.86E-03	2.15E-03	1.70E-01	1.41E+04
241-U-111	Salt Cake (Liquids)	S2-SltSlr (Liquid)	72	3.89E+02	1.20E+04	8.64E+03	2.64E+03	1.72E+04	1.21E+02	6.07E-04	1.74E-02	3.73E-03	2.98E-01	2.48E+04
241-U-112	Total			2.28E+02	1.89E+04	9.92E+02	4.12E+04	2.29E+04	4.94E+04	4.13E-02	5.72E+00	6.33E-01	1.01E+00	9.01E+03
241-U-112	Sludge	1C (Solid)	47	3.54E+01	8.47E+03	6.53E+02	1.00E+03	6.67E+03	3.24E+02	3.94E-02	5.60E+00	6.09E-01	9.28E-01	1.07E+03
241-U-112	Sludge	CWR1 (Solid)	58	6.75E+01	4.86E+03	1.58E+02	1.86E+04	7.53E+03	1.97E+02	1.92E-03	1.23E-01	2.35E-02	7.94E-02	4.15E+02
241-U-112	Sludge	R1 (Solid)	67	1.25E+02	5.61E+03	1.82E+02	2.15E+04	8.70E+03	4.88E+04	1.08E-05	5.85E-04	1.14E-04	2.96E-04	7.53E+03
241-U-201	Total			2.26E+00	8.79E+02	1.29E+02	3.52E+03	1.61E+03	2.64E+00	5.32E-04	3.42E-02	6.50E-03	2.97E-02	1.93E+02
241-U-201	Supernatant	CWR1 (Liquid)	4	0.00E+00	5.71E+02	8.28E+01	5.65E-01	4.63E+02	5.10E-02	1.42E-05	9.16E-04	1.74E-04	2.18E-03	1.09E+02
241-U-201	Sludge (Solids)	CWR1 (Solid)	11	2.26E+00	3.08E+02	4.64E+01	3.52E+03	1.14E+03	2.59E+00	5.18E-04	3.33E-02	6.32E-03	2.75E-02	8.47E+01
241-U-202	Total			2.09E+00	8.43E+02	1.37E+02	3.04E+03	1.42E+03	9.34E-01	6.10E-04	3.92E-02	7.45E-03	2.87E-02	1.41E+02
241-U-202	Supernatant	CWR1 (Liquid)	4	5.64E-01	6.07E+02	9.81E+01	9.54E-01	4.78E+02	2.47E-03	3.66E-07	2.35E-05	4.47E-06	3.70E-05	7.83E+01
241-U-202	Sludge	CWR1 (Solid)	10	1.52E+00	2.36E+02	3.89E+01	3.03E+03	9.38E+02	9.32E-01	6.10E-04	3.92E-02	7.44E-03	2.87E-02	6.24E+01
241-U-203	Total			1.14E+00	8.08E+02	1.12E+02	1.37E+03	2.08E+03	1.80E+00	3.39E-04	2.18E-02	4.14E-03	2.21E-02	1.29E+02
241-U-203	Supernatant	CWR1 (Liquid)	4	0.00E+00	5.76E+02	7.74E+01	7.50E-01	4.01E+02	2.17E-03	1.55E-06	9.98E-05	1.90E-05	3.55E-05	7.34E+01
241-U-203	Sludge	CWR1 (Solid)	9	1.14E+00	2.32E+02	3.49E+01	1.37E+03	1.68E+03	1.80E+00	3.37E-04	2.17E-02	4.12E-03	2.21E-02	5.57E+01
241-U-204	Total			6.35E+00	3.54E+02	4.74E+01	2.27E+03	2.91E+02	3.92E+01	1.02E-02	6.53E-01	1.24E-01	2.27E-01	7.85E+01
241-U-204	Supernatant	CWR1 (Liquid)	4	3.24E-01	2.21E+02	2.81E+01	5.85E-02	1.57E+02	7.86E-04	2.43E-07	1.57E-05	2.98E-06	3.77E-05	2.72E+01
241-U-204	Sludge	CWR1 (Solid)	7	6.02E+00	1.34E+02	1.93E+01	2.27E+03	1.34E+02	3.92E+01	1.02E-02	6.53E-01	1.24E-01	2.27E-01	5.12E+01

TWINS, 2004, Tank Waste Information Network System, internet address: http://twins.pnl.gov:8001, Data from BBI Detail Calculation Report, queried September 27, 2004

APPENDIX B

HYDROGEN GENERATION RATE CALCULATIONS FROM EMPIRICAL RATE EQUATION MODEL FOR 177 HANFORD TANKS

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Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-AN-101	5.07E+03	1.16E+05	1.63E+05	2.15E+05	1.95E+04	2.03E+00	1.98E+02	1.41	1.41	3625	51%	51%	36	43
Supernatant	5.10E+03	1.16E+05	1.62E+05	2.14E+05	1.89E+04	1.27E+00	1.98E+02	1.41	1.41	3507	52%	52%	36	43
Solid Layer	4.04E+03	1.22E+05	1.90E+05	2.36E+05	3.79E+04	2.46E+01	1.84E+02	1.55	1.45	118	40%	49%	24	43
241-AN-102	2.72E+04	8.39E+04	2.01E+05	2.37E+05	1.35E+04	6.57E+01	2.72E+02	1.42	1.40	4057	46%	48%	31	30
Supernatant	2.72E+04	8.39E+04	2.01E+05	2.37E+05	1.35E+04	5.55E+01	2.74E+02	1.40	1.40	3550	48%	48%	31	30
Solid Layer	2.72E+04	8.39E+04	2.01E+05	2.37E+05	1.35E+04	1.37E+02	2.64E+02	1.53	1.49	507	40%	48%	30	30
241-AN-103	3.05E+03	1.30E+05	1.29E+05	2.70E+05	2.99E+04	1.00E+00	3.27E+02	1.59	1.48	3419	41%	47%	37	28
Supernatant	3.05E+03	1.30E+05	1.29E+05	2.70E+05	2.99E+04	1.19E-02	4.25E+02	1.48	1.48	1890	47%	47%	37	28
Solid Layer	3.05E+03	1.30E+05	1.29E+05	2.70E+05	2.99E+04	2.22E+00	2.05E+02	1.72	1.48	1529	35%	47%	36	28
241-AN-104	3.14E+03	1.19E+05	1.90E+05	2.58E+05	3.90E+04	1.17E+01	3.31E+02	1.48	1.40	3865	49%	51%	36	32
Supernatant	3.14E+03	1.19E+05	1.90E+05	2.58E+05	3.90E+04	5.84E-02	3.51E+02	1.40	1.40	2299	51%	51%	35	32
Solid Layer	3.14E+03	1.19E+05	1.90E+05	2.58E+05	3.90E+04	2.88E+01	3.00E+02	1.59	1.40	1566	46%	51%	38	32
241-AN-105	2.76E+03	1.19E+05	1.56E+05	2.47E+05	4.17E+04	4.42E+00	2.27E+02	1.49	1.42	4152	47%	50%	33	27
Supernatant	2.76E+03	1.19E+05	1.56E+05	2.47E+05	4.17E+04	2.44E-02	2.06E+02	1.42	1.42	2227	50%	50%	32	27
Solid Layer	2.76E+03	1.19E+05	1.56E+05	2.47E+05	4.17E+04	9.50E+00	2.50E+02	1.57	1.42	1925	44%	50%	34	27
241-AN-106	2.26E+03	2.16E+04	2.72E+04	4.83E+04	4.45E+03	9.62E+00	5.33E+01	1.14	1.12	3277	78%	81%	24	24
Supernatant	2.26E+03	2.16E+04	2.72E+04	4.83E+04	4.45E+03	6.10E-01	4.98E+01	1.12	1.12	3103	81%	81%	24	24
Solid Layer	2.26E+03	2.16E+04	2.72E+04	4.83E+04	4.45E+03	1.70E+02	1.17E+02	1.54	1.11	174	37%	81%	19	24
241-AN-107	3.25E+04	6.67E+04	2.09E+05	2.08E+05	1.12E+03	7.71E+01	2.14E+02	1.44	1.43	4169	50%	52%	33	30
Supernatant	3.25E+04	6.67E+04	2.09E+05	2.08E+05	1.12E+03	5.37E+01	2.09E+02	1.43	1.43	3297	52%	52%	33	30
Solid Layer	3.25E+04	6.67E+04	2.09E+05	2.08E+05	1.12E+03	1.66E+02	2.33E+02	1.48	1.43	872	44%	52%	34	30
241-AP-101	1.97E+03	4.22E+04	1.32E+05	1.30E+05	6.98E+03	6.13E-02	1.01E+02	1.31	1.31	4199	62%	62%	22	22
Supernatant	1.97E+03	4.22E+04	1.32E+05	1.30E+05	6.98E+03	6.13E-02	1.01E+02	1.31	1.31	4199	62%	62%	22	22
Solid Layer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0	0.0	62%	23	22
241-AP-102	3.00E+03	9.79E+04	1.67E+05	1.94E+05	3.07E+04	2.78E-01	1.69E+02	1.40	1.39	4155	58%	59%	26	24
Supernatant	3.00E+03	9.79E+04	1.67E+05	1.94E+05	3.07E+04	2.76E-01	1.71E+02	1.39	1.39	4067	59%	59%	26	24
Solid Layer	2999.8	97860.8	166707.6	194000.5	30735.2	0.4	81.2	1.75	1.15	88	31%	59%	24	24

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-AP-103	7.26E+03	8.03E+04	1.49E+05	1.78E+05	1.83E+04	1.78E+00	1.69E+02	1.35	1.35	3389	57%	57%	24	24
Supernatant	7.26E+03	8.03E+04	1.49E+05	1.78E+05	1.83E+04	1.78E+00	1.69E+02	1.35	1.35	3389	57%	57%	24	24
Solid Layer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0	0.0	57%	24	24
241-AP-104	4.15E+03	6.39E+04	1.01E+05	1.28E+05	1.68E+04	1.30E+00	1.45E+02	1.28	1.28	4164	66%	66%	24	25
Supernatant	4.15E+03	6.39E+04	1.01E+05	1.28E+05	1.68E+04	1.30E+00	1.45E+02	1.28	1.28	4164	66%	66%	24	25
Solid Layer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0	0.0	66%	25	25
241-AP-105	2.02E+03	5.31E+04	1.11E+05	1.31E+05	1.82E+04	2.53E+00	1.27E+02	1.31	1.27	2599	67%	71%	23	21
Supernatant	2.02E+03	5.31E+04	1.11E+05	1.31E+05	1.82E+04	2.44E-01	1.12E+02	1.27	1.27	2262	71%	71%	23	21
Solid Layer	2.02E+03	5.31E+04	1.11E+05	1.31E+05	1.82E+04	1.79E+01	2.25E+02	1.61	1.30	337	48%	71%	20	21
241-AP-106	3.46E+03	4.14E+04	7.07E+04	1.03E+05	1.35E+04	9.84E-01	1.45E+02	1.21	1.21	4301	72%	72%	22	22
Supernatant	3.46E+03	4.14E+04	7.07E+04	1.03E+05	1.35E+04	9.84E-01	1.45E+02	1.21	1.21	4301	72%	72%	22	22
Solid Layer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0	0.0	72%	24	22
241-AP-107	2.34E+03	5.20E+04	1.13E+05	1.23E+05	1.40E+04	7.90E-01	1.04E+02	1.28	1.28	4271	66%	66%	22	19
Supernatant	2.34E+03	5.20E+04	1.13E+05	1.23E+05	1.40E+04	7.90E-01	1.04E+02	1.28	1.28	4271	66%	66%	22	19
Solid Layer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0	0.0	66%	29	19
241-AP-108	4.34E+03	7.97E+04	1.75E+05	2.02E+05	2.44E+04	2.95E-01	1.38E+02	1.43	1.43	3110	54%	54%	39	41
Supernatant	4.34E+03	7.97E+04	1.75E+05	2.02E+05	2.44E+04	2.95E-01	1.38E+02	1.43	1.43	3110	54%	54%	39	41
Solid Layer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0	na	54%	23	41
241-AW-101	2.61E+03	1.05E+05	1.71E+05	2.33E+05	2.95E+04	1.25E+01	2.43E+02	1.51	1.47	4173	44%	44%	33	28
Supernatant	2.61E+03	1.05E+05	1.71E+05	2.33E+05	2.95E+04	2.55E-01	2.58E+02	1.47	1.47	2770	44%	44%	33	28
Solid Layer	2.61E+03	1.05E+05	1.71E+05	2.33E+05	2.95E+04	3.68E+01	2.13E+02	1.59	1.47	1403	44%	44%	33	28
241-AW-102	2.62E+03	4.72E+04	1.01E+05	1.15E+05	1.41E+04	3.01E+01	9.10E+01	1.26	1.26	453	67%	68%	31	29
Supernatant	2.62E+03	4.72E+04	1.01E+05	1.15E+05	1.41E+04	1.93E-01	9.22E+01	1.26	1.26	428	68%	68%	31	29
Solid Layer	2.62E+03	4.72E+04	1.01E+05	1.15E+05	1.41E+04	5.42E+02	7.12E+01	1.32	1.13	25	39%	68%	28	29
241-AW-103	2.68E+03	6.33E+04	1.43E+05	1.51E+05	1.92E+04	2.01E+00	7.61E+01	1.31	1.24	4159	58%	56%	21	22
Supernatant	2.14E+03	4.00E+04	1.24E+05	1.17E+05	1.18E+04	9.92E-02	9.51E+01	1.24	1.24	2975	60%	60%	21	22
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	6.82E+00	2.82E+01	1.49	1.45	1184	54%	49%	22	22

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-AW-104	4.13E+03	7.57E+04	1.13E+05	1.84E+05	2.70E+04	1.08E+00	1.75E+02	1.38	1.35	4064	54%	64%	34	30
Supernatant	4.32E+03	7.45E+04	1.12E+05	1.70E+05	2.54E+04	1.21E+00	1.77E+02	1.35	1.35	3221	55%	67%	35	30
Solid Layer	3.42E+03	8.04E+04	1.18E+05	2.36E+05	3.29E+04	5.88E-01	1.69E+02	1.48	1.41	843	50%	55%	29	30
241-AW-105	3.84E+02	1.17E+04	4.52E+04	4.04E+04	1.05E+03	1.44E+01	2.39E+01	1.25	1.05	1593	68%	87%	18	20
Supernatant	3.40E+02	2.34E+03	2.74E+04	2.21E+04	1.36E+02	2.10E-02	9.49E+00	1.05	1.05	594	93%	93%	19	20
Solid Layer	4.09E+02	1.73E+04	5.58E+04	5.14E+04	1.60E+03	2.30E+01	3.25E+01	1.36	1.10	999	57%	84%	18	20
241-AW-106	1.76E+03	5.47E+04	1.14E+05	1.44E+05	2.09E+04	6.36E+00	1.58E+02	1.40	1.30	3412	62%	72%	40	44
Supernatant	1.76E+03	5.47E+04	1.14E+05	1.44E+05	2.09E+04	3.55E-01	1.19E+02	1.30	1.30	2340	72%	72%	40	44
Solid Layer	1.76E+03	5.47E+04	1.14E+05	1.44E+05	2.09E+04	1.95E+01	2.45E+02	1.61	1.44	1072	43%	72%	40	44
241-AY-101	2.19E+03	5.03E+04	5.76E+03	9.59E+04	2.51E+03	1.67E+03	7.45E+01	1.45	1.19	689	55%	81%	37	28
Supernatant	1.35E+03	3.35E+04	4.65E+03	1.16E+05	4.74E+03	7.81E-01	3.90E+01	1.19	1.19	325	80%	80%	36	28
Solid Layer	2.95E+03	6.53E+04	6.75E+03	7.80E+04	5.29E+02	3.17E+03	1.06E+02	1.68	1.14	364	40%	81%	37	28
241-AY-102	1.02E+03	2.80E+04	4.14E+02	6.34E+04	1.07E+03	1.16E+03	6.27E+01	1.24	1.18	3233	74%	81%	53	44
Supernatant	8.79E+02	3.22E+04	4.21E+02	6.12E+04	1.24E+03	1.03E+00	1.82E+01	1.18	1.18	2662	82%	82%	48	44
Solid Layer	1.66E+03	8.33E+02	3.81E+01	7.33E+04	2.69E+02	9.85E+03	2.70E+02	1.55	1.16	571	45%	79%	70	44
241-AZ-101	4.95E+02	5.97E+04	5.13E+04	1.08E+05	5.88E+03	9.70E+02	1.20E+03	1.26	1.24	3531	71%	73%	63	64
Supernatant	4.95E+02	5.97E+04	5.13E+04	1.08E+05	5.88E+03	6.80E-01	1.22E+03	1.24	1.24	3334	73%	73%	63	64
Solid Layer	4.95E+02	5.97E+04	5.13E+04	1.08E+05	5.88E+03	1.74E+04	7.64E+02	1.63	1.24	197	43%	71%	73	64
241-AZ-102	1.99E+03	4.06E+04	8.21E+03	6.13E+04	3.40E+02	5.31E+02	8.45E+02	1.14	1.11	3723	78%	83%	47	46
Supernatant	1.99E+03	4.06E+04	8.21E+03	6.13E+04	3.40E+02	1.76E+00	8.48E+02	1.11	1.11	3327	83%	83%	46	46
Solid Layer	1.99E+03	4.06E+04	8.21E+03	6.13E+04	3.40E+02	4.97E+03	8.23E+02	1.41	1.11	396	43%	83%	60	46
241-SY-101	2.73E+03	4.91E+04	1.22E+05	1.27E+05	1.12E+04	2.77E+01	1.25E+02	1.45	1.30	1347	54%	63%	27	27
Supernatant	2.73E+03	4.91E+04	1.22E+05	1.27E+05	1.12E+04	2.01E+00	1.08E+02	1.30	1.30	399	63%	63%	27	27
Solid Layer	2.73E+03	4.91E+04	1.22E+05	1.27E+05	1.12E+04	3.84E+01	1.33E+02	1.52	1.34	948	50%	63%	27	27
241-SY-102	1.50E+03	4.93E+04	1.15E+05	1.52E+05	2.05E+04	1.11E+01	1.09E+02	1.34	1.30	3658	66%	69%	29	25
Supernatant	9.46E+02	4.50E+04	1.12E+05	1.52E+05	2.28E+04	1.94E-01	1.09E+02	1.30	1.30	3108	70%	70%	29	25
Solid Layer	4.65E+03	7.31E+04	1.34E+05	1.52E+05	7.58E+03	7.29E+01	1.13E+02	1.56	1.36	550	47%	63%	29	25

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-SY-103	6.16E+03	1.52E+05	1.68E+05	2.15E+05	3.76E+04	1.54E+01	2.61E+02	1.53	1.47	2747	40%	43%	30	24
Supernatant	6.16E+03	1.52E+05	1.68E+05	2.15E+05	3.76E+04	1.79E+00	2.94E+02	1.47	1.47	1543	43%	43%	28	24
Solid Layer	6.16E+03	1.52E+05	1.68E+05	2.15E+05	3.76E+04	3.28E+01	2.20E+02	1.61	1.47	1204	37%	43%	33	24
241-A-101	3.74E+03	1.65E+05	2.33E+05	2.78E+05	5.18E+04	7.05E+01	1.72E+02	1.70	1.49	1350	31%	47%	51	35
Supernatant	3.74E+03	1.65E+05	2.33E+05	5.18E+04	5.18E+04	5.02E-02	2.51E+02	1.49	1.49	0	53%	53%	62	35
Solid Layer	3.74E+03	1.65E+05	2.33E+05	2.78E+05	5.18E+04	7.05E+01	1.72E+02	1.70	1.49	1350	31%	47%	51	35
241-A-102	1.25E+04	1.98E+03	1.29E+05	2.00E+05	4.09E+04	3.08E+02	1.63E+02	1.66	1.57	151	38%	46%	35	34
Supernatant	1.25E+04	1.98E+03	1.29E+05	2.00E+05	4.10E+04	7.06E-01	3.16E+02	1.57	1.57	12	46%	46%	33	34
Solid Layer	1.25E+04	1.98E+03	1.29E+05	2.00E+05	4.09E+04	3.34E+02	1.50E+02	1.67	1.57	139	37%	46%	35	34
241-A-103	7.89E+03	1.11E+05	1.92E+05	2.30E+05	5.83E+04	5.92E+01	1.49E+02	1.37	1.45	1405	44%	54%	44	36
Supernatant	7.88E+03	1.12E+05	1.92E+05	2.30E+05	5.82E+04	1.27E+00	1.77E+02	1.45	1.45	17	54%	54%	50	36
Solid Layer	7.89E+03	1.11E+05	1.92E+05	2.30E+05	5.83E+04	5.99E+01	1.49E+02	1.37	1.45	1388	44%	54%	44	36
241-A-104	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.32E+04	3.56E+02	1.64	1.17	106	0%	0%	74	34
Supernatant	2.98E+03	3.60E+04	7.96E+04	4.94E+03	4.94E+03	1.43E+04	3.81E+02	1.64	1.17	0	0%	0%	76	34
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.32E+04	3.56E+02	1.64	1.17	106	0%	0%	74	34
241-A-105	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.32E+04	3.56E+02	1.54	NA	0	0%	0%	74	34
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	NA	0	0%	0%	0	na
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.35E+04	5.00E+02	1.54	1.17	0	0%	0%	74	34
241-A-106	1.10E+04	3.60E+04	7.96E+04	8.20E+04	4.94E+03	9.62E+02	1.26E+02	1.70	1.17	299	34%	75%	53	39
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	54	39
Solid Layer	1.10E+04	3.60E+04	7.96E+04	8.20E+04	4.94E+03	9.62E+02	1.26E+02	1.70	1.17	299	34%	75%	53	39
241-AX-101	3.98E+03	1.73E+05	2.72E+05	2.82E+05	5.03E+04	9.59E+01	1.76E+02	1.70	1.53	1353	34%	43%	35	25
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.53	0	48%	48%	35	25
Solid Layer	3.98E+03	1.73E+05	2.72E+05	2.82E+05	5.03E+04	9.59E+01	1.76E+02	1.70	1.53	1353	34%	43%	35	25
241-AX-102	2.30E+04	1.07E+05	1.76E+05	1.98E+05	2.75E+04	1.29E+03	1.38E+02	1.58	1.39	113	36%	51%	24	25
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.39	0	51%	51%	24	25
Solid Layer	2.30E+04	1.07E+05	1.76E+05	1.98E+05	2.75E+04	1.29E+03	1.38E+02	1.58	1.39	113	36%	51%	24	25

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-AX-103	4.03E+03	1.22E+05	1.91E+05	2.36E+05	3.79E+04	6.98E+02	1.81E+02	1.58	1.45	403	44%	49%	39	33
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	43	33
Solid Layer	4.03E+03	1.22E+05	1.91E+05	2.36E+05	3.79E+04	6.98E+02	1.81E+02	1.58	1.45	403	44%	49%	39	33
241-AX-104	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.07E+04	9.88E+02	1.80	1.17	28	8%	75%	32	32
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	32	32
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.07E+04	9.88E+02	1.80	1.17	28	8%	75%	32	32
241-B-101	6.77E+00	1.32E+05	3.56E+05	2.26E+05	7.23E+02	4.04E+02	3.60E+00	1.49	1.53	411	35%	50%	43	37
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	50%	50%	39	37
Solid Layer	6.77E+00	1.32E+05	3.56E+05	2.26E+05	7.23E+02	4.04E+02	3.60E+00	1.49	1.53	411	35%	50%	43	37
241-B-102	3.38E+00	8.51E+03	2.17E+05	1.13E+05	3.61E+02	7.27E-01	3.19E+00	1.57	1.26	121	48%	70%	18	20
Supernatant	3.38E+00	8.47E+03	2.17E+05	1.13E+05	3.61E+02	1.68E+00	7.09E+00	1.26	1.26	15	70%	70%	18	20
Solid Layer	3.38E+00	8.52E+03	2.17E+05	1.13E+05	3.61E+02	5.91E-01	2.64E+00	1.61	1.26	106	45%	70%	18	20
241-B-103	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.62E+02	1.40E+00	2.65E+00	1.61	1.26	211	49%	70%	17	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	17	20
Solid Layer	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.62E+02	1.40E+00	2.65E+00	1.61	1.26	211	49%	70%	17	20
241-B-104	3.38E+00	8.49E+03	2.16E+05	1.13E+05	3.62E+02	1.98E+00	6.62E+00	1.38	1.26	1417	48%	70%	19	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	52%	52%	20	21
Solid Layer	3.38E+00	8.49E+03	2.16E+05	1.13E+05	3.62E+02	1.98E+00	6.62E+00	1.38	1.26	1417	48%	70%	19	21
241-B-105	3.38E+00	8.51E+03	2.16E+05	1.13E+05	3.62E+02	5.56E-01	2.34E+00	1.65	1.26	1098	43%	70%	23	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	18	21
Solid Layer	3.38E+00	8.51E+03	2.16E+05	1.13E+05	3.62E+02	5.56E-01	2.34E+00	1.65	1.26	1098	43%	70%	23	21
241-B-106	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.60E+02	4.88E+01	1.55E+01	1.38	1.26	464	60%	70%	23	19
Supernatant	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.60E+02	1.68E+00	7.08E+00	1.26	1.26	4	70%	70%	18	19
Solid Layer	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.60E+02	4.92E+01	1.55E+01	1.38	1.19	460	60%	70%	23	19
241-B-107	5.04E+00	6.51E+03	3.31E+05	1.46E+05	2.01E+01	3.23E+00	1.10E+01	1.63	1.34	611	38%	58%	16	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	57%	57%	16	21
Solid Layer	5.04E+00	6.51E+03	3.31E+05	1.46E+05	2.01E+01	3.23E+00	1.10E+01	1.63	1.34	611	38%	58%	16	21

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-B-108	2.58E+00	5.37E+04	3.76E+05	1.75E+05	8.98E+02	1.57E+00	1.22E+01	1.68	1.38	349	37%	79%	18	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	79%	79%	16	21
Solid Layer	2.58E+00	5.37E+04	3.76E+05	1.75E+05	8.98E+02	1.57E+00	1.22E+01	1.68	1.38	349	37%	79%	18	21
241-B-109	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.60E+02	4.90E-01	1.71E+00	1.78	1.26	473	41%	70%	19	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	55%	55%	18	20
Solid Layer	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.60E+02	4.90E-01	1.71E+00	1.78	1.26	473	41%	70%	19	20
241-B-110	5.55E+03	3.95E+04	7.78E+04	9.55E+04	1.04E+04	7.74E+01	1.09E+01	1.36	1.19	929	58%	76%	21	23
Supernatant	5.55E+03	3.95E+04	7.78E+04	9.55E+04	1.04E+04	1.94E+00	1.18E+01	1.19	1.19	4	76%	76%	21	23
Solid Layer	5.55E+03	3.95E+04	7.78E+04	9.55E+04	1.04E+04	7.77E+01	1.09E+01	1.36	1.01	925	58%	76%	21	23
241-B-111	5.55E+03	3.95E+04	7.78E+04	9.55E+04	1.04E+04	1.91E+02	1.23E+02	1.27	1.19	914	63%	98%	24	25
Supernatant	5.55E+03	3.95E+04	7.78E+04	9.55E+04	1.04E+04	1.94E+00	1.18E+01	1.19	1.19	4	98%	98%	24	25
Solid Layer	5.55E+03	3.95E+04	7.78E+04	9.55E+04	1.04E+04	1.92E+02	1.24E+02	1.27	1.01	910	63%	98%	24	25
241-B-112	1.82E+04	1.17E+05	2.17E+05	2.55E+05	4.73E+04	4.00E+00	4.00E+01	1.49	1.51	132	41%	46%	17	21
Supernatant	1.82E+04	1.17E+05	2.17E+05	2.55E+05	4.73E+04	1.53E+00	1.01E+02	1.51	1.51	11	46%	46%	21	21
Solid Layer	1.82E+04	1.17E+05	2.17E+05	2.55E+05	4.73E+04	4.23E+00	3.44E+01	1.49	1.51	121	41%	46%	17	21
241-B-201	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.70E+00	1.36E-01	1.26	1.17	115	64%	75%	17	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	17	20
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.70E+00	1.36E-01	1.26	1.17	115	64%	75%	17	20
241-B-202	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	3.00E+00	7.61E-02	1.22	1.17	111	76%	83%	21	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	83%	83%	19	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	3.00E+00	7.61E-02	1.22	1.17	111	76%	83%	21	21
241-B-203	9.60E+01	1.57E+03	5.65E+04	3.12E+04	0.00E+00	6.85E-02	6.55E-03	1.19	1.05	195	76%	89%	18	12
Supernatant	9.60E+01	1.57E+03	5.65E+04	3.12E+04	0.00E+00	7.76E-05	9.00E-05	1.05	1.05	2	89%	89%	19	12
Solid Layer	9.60E+01	1.57E+03	5.65E+04	3.12E+04	0.00E+00	6.92E-02	6.62E-03	1.19	1.05	193	76%	89%	18	12
241-B-204	7.53E+01	1.36E+03	3.47E+04	2.78E+04	0.00E+00	2.57E-03	2.58E-02	1.19	1.05	192	77%	91%	17	23
Supernatant	7.53E+01	1.36E+03	3.47E+04	2.78E+04	0.00E+00	3.46E-05	3.97E-05	1.05	1.05	3	91%	91%	19	23
Solid Layer	7.53E+01	1.36E+03	3.47E+04	2.78E+04	0.00E+00	2.61E-03	2.62E-02	1.19	1.05	189	77%	91%	17	23

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-BX-101	4.98E+03	6.43E+04	1.21E+05	1.41E+05	5.17E+03	4.45E+01	5.21E+00	1.63	1.28	180	16%	75%	23	23
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.28	0	75%	75%	23	23
Solid Layer	4.98E+03	6.43E+04	1.21E+05	1.41E+05	5.17E+03	4.45E+01	5.21E+00	1.63	1.28	180	16%	75%	23	23
241-BX-102	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.69E-01	3.16E-01	1.04	1.17	298	33%	75%	20	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	20	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.69E-01	3.16E-01	1.04	1.17	298	33%	75%	20	21
241-BX-103	3.87E+03	1.45E+04	4.72E+04	4.13E+04	1.88E+04	2.84E+01	3.33E+00	1.52	1.07	282	53%	78%	21	22
Supernatant	3.87E+03	1.45E+04	4.72E+04	4.13E+04	1.88E+04	5.19E-01	6.10E-01	1.07	1.07	47	78%	78%	21	22
Solid Layer	3.87E+03	1.45E+04	4.72E+04	4.13E+04	1.88E+04	3.40E+01	3.88E+00	1.61	1.11	235	50%	78%	21	22
241-BX-104	3.19E+03	6.37E+04	1.34E+05	1.40E+05	2.84E+03	1.88E+02	6.17E+01	1.67	1.28	380	28%	59%	30	25
Supernatant	3.19E+03	6.37E+04	1.34E+05	1.40E+05	2.84E+03	1.32E+00	9.66E+01	1.28	1.28	11	59%	59%	30	25
Solid Layer	3.19E+03	6.37E+04	1.34E+05	1.40E+05	2.84E+03	1.94E+02	6.07E+01	1.68	1.28	369	27%	59%	30	25
241-BX-105	9.44E+03	7.89E+04	1.17E+05	1.24E+05	5.94E+03	1.12E+02	3.93E+01	1.62	1.29	272	20%	69%	20	21
Supernatant	9.44E+03	7.89E+04	1.17E+05	1.24E+05	5.94E+03	5.81E+00	9.22E+01	1.29	1.29	18	69%	69%	20	21
Solid Layer	9.44E+03	7.89E+04	1.17E+05	1.24E+05	5.94E+03	1.19E+02	3.55E+01	1.64	1.29	254	17%	69%	20	21
241-BX-106	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.32E+02	5.33E+01	1.64	1.17	142	39%	75%	20	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	21	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.32E+02	5.33E+01	1.64	1.17	142	39%	75%	20	21
241-BX-107	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	7.51E+00	1.34E+01	1.44	1.17	1313	51%	75%	19	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	21	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	7.51E+00	1.34E+01	1.44	1.17	1313	51%	75%	19	21
241-BX-108	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.29E+02	2.26E+01	1.46	1.17	119	17%	75%	20	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	20	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.29E+02	2.26E+01	1.46	1.17	119	17%	75%	20	21
241-BX-109	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.07E+02	1.08E+01	1.52	1.17	730	51%	72%	22	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	72%	72%	22	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.07E+02	1.08E+01	1.52	1.17	730	51%	72%	22	22

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-BX-110	1.51E+04	5.21E+04	4.12E+05	2.23E+05	4.40E+03	7.77E+00	4.87E+01	1.66	1.44	776	42%	53%	19	21
Supernatant	1.52E+04	5.22E+04	4.12E+05	2.24E+05	4.40E+03	1.33E+00	8.85E+01	1.44	1.44	5	53%	53%	20	21
Solid Layer	1.51E+04	5.21E+04	4.12E+05	2.23E+05	4.40E+03	7.81E+00	4.85E+01	1.66	1.44	771	42%	53%	19	21
241-BX-111	1.70E+03	1.06E+05	1.85E+05	2.27E+05	4.88E+04	1.14E+01	6.49E+01	1.45	1.45	713	25%	51%	19	18
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	19	18
Solid Layer	1.70E+03	1.06E+05	1.85E+05	2.27E+05	4.88E+04	1.14E+01	6.49E+01	1.45	1.45	713	25%	51%	19	18
241-BX-112	0.00E+00	3.52E+04	9.86E+04	7.78E+04	4.78E+01	5.77E+00	4.03E+01	1.31	1.18	622	63%	68%	20	19
Supernatant	0.00E+00	3.52E+04	9.86E+04	7.78E+04	4.78E+01	6.22E-01	7.31E-01	1.18	1.18	5	68%	68%	19	19
Solid Layer	0.00E+00	3.52E+04	9.86E+04	7.78E+04	4.78E+01	5.81E+00	4.06E+01	1.31	1.18	617	63%	68%	20	19
241-BY-101	1.82E+04	1.17E+05	2.17E+05	2.55E+05	4.72E+04	7.38E+01	1.20E+02	1.82	1.51	1400	24%	46%	27	26
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	27	26
Solid Layer	1.82E+04	1.17E+05	2.17E+05	2.55E+05	4.72E+04	7.38E+01	1.20E+02	1.82	1.51	1400	24%	46%	27	26
241-BY-102	1.55E+03	8.41E+04	1.48E+05	2.34E+05	5.66E+04	1.06E+01	6.64E+01	1.57	1.44	1054	31%	51%	22	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.44	0	51%	51%	22	22
Solid Layer	1.55E+03	8.41E+04	1.48E+05	2.34E+05	5.66E+04	1.06E+01	6.64E+01	1.57	1.46	1054	31%	51%	22	22
241-BY-103	1.91E+03	5.37E+04	1.69E+05	2.15E+05	4.14E+04	1.11E+01	6.68E+01	1.66	1.29	1575	28%	59%	24	24
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	59%	59%	26	24
Solid Layer	1.91E+03	5.37E+04	1.69E+05	2.15E+05	4.14E+04	1.11E+01	6.68E+01	1.66	1.29	1575	28%	59%	24	24
241-BY-104	2.37E+03	1.11E+05	2.06E+05	2.48E+05	7.22E+04	1.43E+02	8.62E+01	1.71	1.51	1356	26%	49%	38	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	49%	49%	50	22
Solid Layer	2.37E+03	1.11E+05	2.06E+05	2.48E+05	7.22E+04	1.43E+02	8.62E+01	1.71	1.51	1356	26%	49%	38	22
241-BY-105	2.43E+03	6.89E+04	1.99E+05	2.08E+05	3.92E+04	4.26E+01	4.62E+01	1.80	1.44	1821	18%	51%	33	25
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.44	0	52%	52%	43	25
Solid Layer	2.43E+03	6.89E+04	1.99E+05	2.08E+05	3.92E+04	4.26E+01	4.62E+01	1.80	1.44	1821	18%	51%	33	25
241-BY-106	2.67E+03	7.81E+04	1.10E+05	1.65E+05	3.97E+04	4.70E+01	1.08E+02	1.67	1.31	1750	25%	59%	34	25
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.31	0	59%	59%	49	25
Solid Layer	2.67E+03	7.81E+04	1.10E+05	1.65E+05	3.97E+04	4.70E+01	1.08E+02	1.67	1.31	1750	25%	59%	34	25

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-BY-107	2.40E+03	1.17E+05	1.31E+05	2.43E+05	5.11E+04	4.28E+01	1.14E+02	1.69	1.46	1028	38%	49%	32	24
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	49%	49%	25	24
Solid Layer	2.40E+03	1.17E+05	1.31E+05	2.43E+05	5.11E+04	4.28E+01	1.14E+02	1.69	1.46	1028	38%	49%	32	24
241-BY-108	2.37E+03	7.86E+04	2.94E+05	2.82E+05	3.63E+04	1.03E+02	4.36E+01	1.48	1.33	841	27%	33%	34	26
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	33%	33%	45	26
Solid Layer	2.37E+03	7.86E+04	2.94E+05	2.82E+05	3.63E+04	1.03E+02	4.36E+01	1.48	1.33	841	27%	33%	34	26
241-BY-109	1.88E+03	8.29E+04	1.90E+05	2.10E+05	3.88E+04	7.75E+00	4.98E+01	1.71	1.50	1086	42%	53%	18	17
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	53%	53%	18	17
Solid Layer	1.88E+03	8.29E+04	1.90E+05	2.10E+05	3.88E+04	7.75E+00	4.98E+01	1.71	1.50	1086	42%	53%	18	17
241-BY-110	1.94E+04	1.24E+05	1.25E+05	2.54E+05	6.57E+04	7.28E+01	8.77E+01	1.57	1.44	1384	28%	40%	35	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	41%	41%	45	21
Solid Layer	1.94E+04	1.24E+05	1.25E+05	2.54E+05	6.57E+04	7.28E+01	8.77E+01	1.57	1.44	1384	28%	40%	35	21
241-BY-111	1.28E+03	3.30E+04	1.21E+05	1.31E+05	2.58E+04	9.92E+00	6.07E+01	1.66	1.42	1139	36%	54%	26	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	54%	54%	30	20
Solid Layer	1.28E+03	3.30E+04	1.21E+05	1.31E+05	2.58E+04	9.92E+00	6.07E+01	1.66	1.42	1139	36%	54%	26	20
241-BY-112	1.72E+03	1.40E+05	1.90E+05	2.45E+05	5.54E+04	1.17E+01	6.39E+01	1.74	1.47	1083	30%	49%	30	24
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	49%	49%	26	24
Solid Layer	1.72E+03	1.40E+05	1.90E+05	2.45E+05	5.54E+04	1.17E+01	6.39E+01	1.74	1.47	1083	30%	49%	30	24
241-C-101	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	6.42E+01	5.06E+01	1.78	1.17	333	23%	74%	33	33
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	74%	74%	32	33
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	6.42E+01	5.06E+01	1.78	1.17	333	23%	74%	33	33
241-C-102	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.39E+01	1.29E+01	1.68	1.17	1196	43%	75%	28	26
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	26	26
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.39E+01	1.29E+01	1.68	1.17	1196	43%	75%	28	26
241-C-103	5.60E+03	1.47E+04	8.20E+02	3.21E+04	0.00E+00	3.40E+03	1.00E+02	1.57	1.07	273	60%	89%	43	41
Supernatant	5.60E+03	1.47E+04	8.20E+02	3.21E+04	0.00E+00	3.06E+00	3.25E+01	1.07	1.07	2	89%	89%	46	41
Solid Layer	5.60E+03	1.47E+04	8.20E+02	3.21E+04	0.00E+00	3.42E+03	1.01E+02	1.58	1.11	271	60%	89%	43	41

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-C-104	5.60E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.71E+02	5.38E+01	1.68	1.17	980	48%	81%	36	34
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	81%	81%	36	34
Solid Layer	5.60E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.71E+02	5.38E+01	1.68	1.17	980	48%	81%	36	34
241-C-105	2.87E+03	3.70E+04	3.43E+04	1.13E+05	9.02E+00	5.69E+02	9.85E+01	1.55	1.23	500	28%	67%	48	43
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.23	0	67%	67%	44	43
Solid Layer	2.87E+03	3.70E+04	3.43E+04	1.13E+05	9.02E+00	5.69E+02	9.85E+01	1.55	1.23	500	28%	67%	48	43
241-C-106	3.32E+02	5.43E+01	6.02E+01	9.78E+03	9.38E+01	4.04E+03	8.86E+01	1.54	1.02	10	43%	98%	30	30
Supernatant	3.32E+02	5.43E+01	6.02E+01	9.78E+03	9.38E+01	4.32E-02	4.26E-01	1.02	1.02	0	98%	98%	31	30
Solid Layer	3.32E+02	5.43E+01	6.02E+01	9.78E+03	9.38E+01	4.17E+03	9.14E+01	1.56	1.14	10	42%	98%	30	30
241-C-107	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.44E+03	4.07E+01	1.55	1.17	935	48%	79%	44	42
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	79%	79%	48	42
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.44E+03	4.07E+01	1.55	1.17	935	48%	79%	44	42
241-C-108	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.16E+01	2.10E+02	1.48	1.17	250	38%	75%	27	27
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	27	27
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.16E+01	2.10E+02	1.48	1.17	250	38%	75%	27	27
241-C-109	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	6.80E+02	4.65E+02	1.55	1.17	240	39%	75%	26	26
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	26	26
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	6.80E+02	4.65E+02	1.55	1.17	240	39%	75%	26	26
241-C-110	5.80E+02	4.60E+03	6.03E+04	3.05E+04	2.09E+02	3.82E+00	1.50E+01	1.34	1.10	674	60%	83%	21	23
Supernatant	5.80E+02	4.60E+03	6.03E+04	3.05E+04	2.09E+02	1.92E-02	3.41E+00	1.10	1.10	4	83%	83%	21	23
Solid Layer	5.80E+02	4.60E+03	6.03E+04	3.05E+04	2.09E+02	3.84E+00	1.50E+01	1.34	1.10	670	60%	83%	21	23
241-C-111	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.70E+03	5.89E+01	1.55	1.17	217	36%	75%	25	26
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	25	26
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.70E+03	5.89E+01	1.55	1.17	217	36%	75%	25	26
241-C-112	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	9.56E+02	4.23E+02	1.60	1.17	393	52%	75%	28	28
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	28	28
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	9.56E+02	4.23E+02	1.60	1.17	393	52%	75%	28	28

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-C-201	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	8.71E+01	1.02E+01	1.44	1.17	2	14%	75%	16	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	16	20
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	8.71E+01	1.02E+01	1.44	1.17	2	14%	75%	16	20
241-C-202	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.65E+02	8.77E+00	1.44	1.17	2	16%	75%	16	19
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	16	19
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.65E+02	8.77E+00	1.44	1.17	2	16%	75%	16	19
241-C-203	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.99E+01	1.45E+00	1.62	1.17	6	27%	75%	15	19
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	19	19
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.99E+01	1.45E+00	1.62	1.17	6	27%	75%	15	19
241-C-204	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.09E+01	4.72E+00	1.62	1.17	6	41%	75%	17	16
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	17	16
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.09E+01	4.72E+00	1.62	1.17	6	41%	75%	17	16
241-S-101	1.79E+03	1.13E+05	2.14E+05	2.22E+05	3.00E+04	1.98E+02	1.13E+02	1.65	1.47	1327	39%	51%	41	31
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	63%	63%	46	31
Solid Layer	1.79E+03	1.13E+05	2.14E+05	2.22E+05	3.00E+04	1.98E+02	1.13E+02	1.65	1.47	1327	39%	51%	41	31
241-S-102	3.76E+03	1.27E+05	1.55E+05	2.89E+05	5.62E+04	3.70E+01	1.41E+02	1.59	1.46	1224	32%	49%	35	23
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	38	23
Solid Layer	3.76E+03	1.27E+05	1.55E+05	2.89E+05	5.62E+04	3.70E+01	1.41E+02	1.59	1.46	1224	32%	49%	35	23
241-S-103	4.68E+03	1.47E+05	2.16E+05	2.28E+05	3.20E+04	2.87E+01	1.35E+02	1.61	1.45	896	36%	50%	27	24
Supernatant	4.68E+03	1.47E+05	2.16E+05	2.28E+05	3.20E+04	2.55E-01	2.22E+02	1.45	1.45	4	50%	50%	28	24
Solid Layer	4.68E+03	1.47E+05	2.16E+05	2.28E+05	3.20E+04	2.88E+01	1.35E+02	1.61	1.45	892	36%	50%	27	24
241-S-104	3.96E+02	3.82E+04	2.68E+05	1.98E+05	1.19E+04	2.20E+02	4.24E+01	1.68	1.37	1090	39%	55%	37	31
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	56%	56%	40	31
Solid Layer	3.96E+02	3.82E+04	2.68E+05	1.98E+05	1.19E+04	2.20E+02	4.24E+01	1.68	1.37	1090	39%	55%	37	31
241-S-105	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	2.56E+00	3.42E+01	1.66	1.45	1536	8%	49%	24	24
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	25	24
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	2.56E+00	3.42E+01	1.66	1.45	1536	8%	49%	24	24

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-S-106	1.98E+03	1.04E+05	2.36E+05	2.44E+05	3.80E+04	1.23E+01	9.13E+01	1.72	1.43	1723	34%	54%	24	23
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	24	23
Solid Layer	1.98E+03	1.04E+05	2.36E+05	2.44E+05	3.80E+04	1.23E+01	9.13E+01	1.72	1.43	1723	34%	54%	24	23
241-S-107	1.18E+03	7.11E+04	1.14E+05	1.55E+05	1.07E+04	1.30E+02	6.77E+01	1.78	1.31	1356	34%	64%	35	27
Supernatant	1.18E+03	7.11E+04	1.14E+05	1.07E+04	1.07E+04	5.23E-02	9.46E+01	1.31	1.31	0	68%	68%	40	27
Solid Layer	1.18E+03	7.11E+04	1.14E+05	1.55E+05	1.07E+04	1.30E+02	6.77E+01	1.78	1.31	1356	34%	64%	35	27
241-S-108	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.77E+04	2.10E+01	9.60E+01	1.68	1.45	2082	30%	49%	27	25
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	28	25
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.77E+04	2.10E+01	9.60E+01	1.68	1.45	2082	30%	49%	27	25
241-S-109	1.11E+03	8.49E+04	1.32E+05	2.19E+05	4.59E+04	1.48E+01	1.30E+01	1.66	1.49	2017	11%	53%	27	24
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	52%	52%	29	24
Solid Layer	1.11E+03	8.49E+04	1.32E+05	2.19E+05	4.59E+04	1.48E+01	1.30E+01	1.66	1.49	2017	11%	53%	27	24
241-S-110	2.28E+03	8.58E+04	2.17E+05	2.11E+05	3.10E+04	9.40E+01	7.27E+01	1.66	1.43	1473	20%	49%	41	27
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	50%	50%	44	27
Solid Layer	2.28E+03	8.58E+04	2.17E+05	2.11E+05	3.10E+04	9.40E+01	7.27E+01	1.66	1.43	1473	20%	49%	41	27
241-S-111	1.50E+03	8.36E+04	1.93E+05	2.23E+05	3.64E+04	1.76E+02	1.07E+02	1.54	1.45	1396	30%	51%	30	23
Supernatant	1.49E+03	8.33E+04	1.92E+05	3.64E+04	3.64E+04	8.39E-02	2.22E+02	1.45	1.45	0	53%	53%	24	23
Solid Layer	1.50E+03	8.36E+04	1.93E+05	2.23E+05	3.64E+04	1.76E+02	1.07E+02	1.54	1.45	1396	30%	51%	30	23
241-S-112	8.31E+02	6.21E+04	1.68E+05	2.29E+05	3.69E+04	1.29E+02	3.46E+00	1.69	1.45	439	40%	52%	28	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	27	21
Solid Layer	8.31E+02	6.21E+04	1.68E+05	2.29E+05	3.69E+04	1.29E+02	3.46E+00	1.69	1.45	439	40%	52%	28	21
241-SX-101	3.35E+02	7.49E+04	1.08E+05	2.42E+05	8.00E+04	1.13E+02	1.00E+02	1.68	1.48	1584	27%	49%	67	27
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	49%	49%	57	27
Solid Layer	3.35E+02	7.49E+04	1.08E+05	2.42E+05	8.00E+04	1.13E+02	1.00E+02	1.68	1.48	1584	27%	49%	67	27
241-SX-102	1.51E+03	1.51E+05	1.57E+05	2.35E+05	4.56E+04	8.00E+01	1.43E+02	1.69	1.46	1544	39%	48%	55	32
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	48%	48%	60	32
Solid Layer	1.51E+03	1.51E+05	1.57E+05	2.35E+05	4.56E+04	8.00E+01	1.43E+02	1.69	1.46	1544	39%	48%	55	32

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-SX-103	3.38E+03	1.57E+05	1.56E+05	2.40E+05	4.44E+04	1.54E+02	1.23E+02	1.73	1.47	1926	30%	47%	62	28
Supernatant	3.38E+03	1.58E+05	1.57E+05	4.44E+04	4.44E+04	1.69E+02	1.32E+02	1.47	1.47	0	47%	na	70	28
Solid Layer	3.38E+03	1.57E+05	1.56E+05	2.40E+05	4.44E+04	1.54E+02	1.23E+02	1.73	1.47	1926	30%	47%	62	28
241-SX-104	2.13E+03	1.17E+05	2.90E+05	2.50E+05	3.56E+04	1.42E+02	8.70E+01	1.69	1.47	1688	28%	45%	55	28
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	59	28
Solid Layer	2.13E+03	1.17E+05	2.90E+05	2.50E+05	3.56E+04	1.42E+02	8.70E+01	1.69	1.47	1688	28%	45%	55	28
241-SX-105	3.26E+03	1.43E+05	1.64E+05	2.36E+05	4.41E+04	8.21E+01	9.27E+01	1.63	1.47	1422	35%	43%	61	32
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.47	0	43%	43%	75	32
Solid Layer	3.26E+03	1.43E+05	1.64E+05	2.36E+05	4.41E+04	8.21E+01	9.27E+01	1.63	1.47	1422	35%	43%	61	32
241-SX-106	3.14E+03	1.49E+05	2.45E+05	2.17E+05	2.26E+04	1.21E+01	1.31E+02	1.58	1.29	1501	40%	49%	33	26
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	46%	46%	37	26
Solid Layer	3.14E+03	1.49E+05	2.45E+05	2.17E+05	2.26E+04	1.21E+01	1.31E+02	1.58	1.29	1501	40%	49%	33	26
241-SX-107	1.01E+03	9.86E+04	2.17E+05	2.51E+05	4.72E+04	3.49E+02	6.91E+01	1.75	1.50	356	24%	52%	69	51
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	75%	75%	75	51
Solid Layer	1.01E+03	9.86E+04	2.17E+05	2.51E+05	4.72E+04	3.49E+02	6.91E+01	1.75	1.50	356	24%	52%	69	51
241-SX-108	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.56E+03	1.65E+02	1.77	1.17	280	2%	75%	77	58
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	84	58
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.56E+03	1.65E+02	1.77	1.17	280	2%	75%	77	58
241-SX-109	9.20E+03	1.07E+05	1.76E+05	1.98E+05	2.75E+04	1.18E+02	7.44E+01	1.73	1.39	913	23%	51%	52	48
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.39	0	51%	51%	57	48
Solid Layer	9.20E+03	1.07E+05	1.76E+05	1.98E+05	2.75E+04	1.18E+02	7.44E+01	1.73	1.39	913	23%	51%	52	48
241-SX-110	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.25E+02	7.03E+01	1.75	1.17	212	23%	75%	68	50
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	59	50
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.25E+02	7.03E+01	1.75	1.17	212	23%	75%	68	50
241-SX-111	1.01E+03	9.89E+04	2.17E+05	2.51E+05	4.71E+04	2.82E+02	7.54E+01	1.74	1.50	436	25%	52%	74	54
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	75%	75%	85	54
Solid Layer	1.01E+03	9.89E+04	2.17E+05	2.51E+05	4.71E+04	2.82E+02	7.54E+01	1.74	1.50	436	25%	52%	74	54

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-SX-112	1.01E+03	9.88E+04	2.17E+05	2.51E+05	4.72E+04	3.16E+02	7.23E+01	1.74	1.50	283	24%	52%	60	51
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	75%	75%	54	51
Solid Layer	1.01E+03	9.88E+04	2.17E+05	2.51E+05	4.72E+04	3.16E+02	7.23E+01	1.74	1.50	283	24%	52%	60	51
241-SX-113	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	5.10E+01	3.74E+01	1.09	1.17	72	46%	75%	28	28
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	28	28
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	5.10E+01	3.74E+01	1.09	1.17	72	46%	75%	28	28
241-SX-114	1.01E+03	9.90E+04	2.17E+05	2.51E+05	4.72E+04	1.27E+02	9.08E+01	1.69	1.50	588	28%	52%	72	52
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	75%	75%	54	52
Solid Layer	1.01E+03	9.90E+04	2.17E+05	2.51E+05	4.72E+04	1.27E+02	9.08E+01	1.69	1.50	588	28%	52%	72	52
241-SX-115	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.34E+04	2.03E+01	1.79	1.17	14	10%	75%	25	25
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	25	25
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.34E+04	2.03E+01	1.79	1.17	14	10%	75%	25	25
241-T-101	4.04E+03	1.22E+05	1.89E+05	2.37E+05	3.77E+04	6.63E-01	6.76E+01	1.54	1.45	376	39%	49%	21	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	55%	55%	22	22
Solid Layer	4.04E+03	1.22E+05	1.89E+05	2.37E+05	3.77E+04	6.63E-01	6.76E+01	1.54	1.45	376	39%	49%	21	22
241-T-102	4.50E+02	2.29E+04	1.09E+05	6.46E+04	8.46E+03	7.74E+01	2.79E+01	1.53	1.14	120	45%	80%	18	18
Supernatant	4.50E+02	2.29E+04	1.09E+05	6.46E+04	8.46E+03	8.55E-01	4.51E+01	1.14	1.14	48	80%	80%	18	18
Solid Layer	4.50E+02	2.29E+04	1.09E+05	6.46E+04	8.46E+03	1.28E+02	1.64E+01	1.80	1.14	72	30%	80%	18	18
241-T-103	5.55E+03	3.96E+04	7.80E+04	9.53E+04	1.04E+04	4.07E+00	2.82E+00	1.64	1.19	102	41%	72%	19	20
Supernatant	5.55E+03	3.96E+04	7.80E+04	9.53E+04	1.04E+04	1.94E+00	1.18E+01	1.19	1.19	15	72%	72%	19	20
Solid Layer	5.55E+03	3.96E+04	7.80E+04	9.53E+04	1.04E+04	4.43E+00	1.27E+00	1.71	1.18	87	37%	72%	19	20
241-T-104	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.03E+00	1.55E-01	1.29	1.17	1199	71%	84%	18	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	84%	84%	20	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.03E+00	1.55E-01	1.29	1.17	1199	71%	84%	18	21
241-T-105	2.98E+03	5.42E+04	3.71E+04	8.72E+04	3.62E+02	5.18E+01	9.23E+00	1.46	1.18	371	55%	80%	17	16
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.18	0	80%	80%	17	16
Solid Layer	2.98E+03	5.42E+04	3.71E+04	8.72E+04	3.62E+02	5.18E+01	9.23E+00	1.46	1.18	371	55%	80%	17	16

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-T-106	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.72E+00	1.41E+01	1.59	1.17	82	17%	75%	20	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	20	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.72E+00	1.41E+01	1.59	1.17	82	17%	75%	20	21
241-T-107	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.01E+02	1.47E+01	1.56	1.17	655	46%	84%	19	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	84%	84%	20	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.01E+02	1.47E+01	1.56	1.17	655	46%	84%	19	22
241-T-108	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.61E+02	1.77E+00	6.77E+00	1.55	1.26	60	35%	70%	16	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	55%	55%	16	21
Solid Layer	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.61E+02	1.77E+00	6.77E+00	1.55	1.26	60	35%	70%	16	21
241-T-109	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.61E+02	3.64E-01	2.48E+00	1.61	1.26	235	52%	70%	19	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	19	20
Solid Layer	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.61E+02	3.64E-01	2.48E+00	1.61	1.26	235	52%	70%	19	20
241-T-110	4.50E+01	5.90E+01	1.83E+04	3.70E+04	0.00E+00	2.72E-02	1.49E-02	1.25	1.05	1400	76%	87%	18	21
Supernatant	4.50E+01	5.90E+01	1.83E+04	3.70E+04	0.00E+00	4.29E-04	2.79E-03	1.05	1.05	3	87%	87%	19	21
Solid Layer	4.50E+01	5.90E+01	1.83E+04	3.70E+04	0.00E+00	2.73E-02	1.49E-02	1.25	1.05	1397	76%	87%	18	21
241-T-111	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.08E+00	1.02E-01	1.24	1.17	1691	75%	75%	19	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	21	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.08E+00	1.02E-01	1.24	1.17	1691	75%	75%	19	22
241-T-112	4.38E+02	3.88E+04	2.33E+04	5.73E+04	0.00E+00	2.69E-03	4.51E-03	1.26	1.10	252	75%	85%	19	20
Supernatant	4.38E+02	3.88E+04	2.33E+04	5.73E+04	0.00E+00	8.74E-03	1.02E-02	1.10	1.10	26	85%	85%	19	20
Solid Layer	4.38E+02	3.88E+04	2.33E+04	5.73E+04	0.00E+00	2.00E-03	3.85E-03	1.28	1.10	226	74%	85%	19	20
241-T-201	7.78E+01	3.36E+02	4.62E+04	2.52E+04	0.00E+00	6.22E-02	2.05E-02	1.29	1.06	119	69%	91%	18	20
Supernatant	7.78E+01	3.36E+02	4.62E+04	2.52E+04	0.00E+00	3.53E-05	4.08E-05	1.06	1.06	9	91%	91%	18	20
Solid Layer	7.78E+01	3.36E+02	4.62E+04	2.52E+04	0.00E+00	6.73E-02	2.21E-02	1.31	1.06	110	68%	91%	18	20
241-T-202	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.24E-03	6.77E-03	1.18	1.17	81	76%	75%	17	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	17	20
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.24E-03	6.77E-03	1.18	1.17	81	76%	75%	17	20

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-T-203	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.21E-03	6.67E-03	1.22	1.17	140	76%	85%	18	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	85%	85%	17	20
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.21E-03	6.67E-03	1.22	1.17	140	76%	85%	18	20
241-T-204	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.03E-03	6.87E-03	1.18	1.17	143	75%	75%	18	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	17	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.03E-03	6.87E-03	1.18	1.17	143	75%	75%	18	21
241-TX-101	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	3.23E+02	6.70E+01	1.74	1.45	344	25%	49%	25	23
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	75%	75%	25	23
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	3.23E+02	6.70E+01	1.74	1.45	344	25%	49%	25	23
241-TX-102	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.57E+00	8.75E+01	1.61	1.45	821	31%	49%	27	25
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	27	25
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.57E+00	8.75E+01	1.61	1.45	821	31%	49%	27	25
241-TX-103	3.86E+03	1.17E+05	1.91E+05	2.31E+05	3.61E+04	7.31E-01	8.25E+01	1.62	1.44	548	31%	50%	22	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	22	22
Solid Layer	3.86E+03	1.17E+05	1.91E+05	2.31E+05	3.61E+04	7.31E-01	8.25E+01	1.62	1.44	548	31%	50%	22	22
241-TX-104	1.36E+03	9.43E+04	3.53E+05	2.05E+05	3.19E+03	1.59E+02	7.05E+01	1.73	1.44	262	46%	52%	21	21
Supernatant	1.36E+03	9.42E+04	3.54E+05	2.06E+05	3.19E+03	6.48E-01	2.31E+02	1.44	1.44	9	52%	52%	21	21
Solid Layer	1.36E+03	9.43E+04	3.53E+05	2.05E+05	3.19E+03	1.64E+02	6.48E+01	1.74	1.44	253	45%	52%	21	21
241-TX-105	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.95E+00	7.10E+01	1.63	1.45	2181	29%	49%	34	23
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	36	23
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.95E+00	7.10E+01	1.63	1.45	2181	29%	49%	34	23
241-TX-106	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	6.09E+00	8.27E+01	1.62	1.45	1318	30%	49%	26	26
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	27	26
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	6.09E+00	8.27E+01	1.62	1.45	1318	30%	49%	26	26
241-TX-107	3.22E+03	1.16E+05	1.97E+05	2.40E+05	4.03E+04	5.47E+00	1.02E+02	1.78	1.46	112	28%	50%	22	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	22	22
Solid Layer	3.22E+03	1.16E+05	1.97E+05	2.40E+05	4.03E+04	5.47E+00	1.02E+02	1.78	1.46	112	28%	51%	22	22

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-TX-108	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	5.27E+00	7.50E+01	1.62	1.45	478	31%	49%	20	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	19	21
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	5.27E+00	7.50E+01	1.62	1.45	478	31%	49%	20	21
241-TX-109	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.82E+00	1.59E+01	1.43	1.17	1375	54%	75%	36	45
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	39	45
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.82E+00	1.59E+01	1.43	1.17	1375	54%	75%	36	45
241-TX-110	4.02E+03	1.22E+05	1.90E+05	2.37E+05	3.78E+04	1.03E+00	6.52E+01	1.62	1.45	1769	31%	49%	28	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	28	22
Solid Layer	4.02E+03	1.22E+05	1.90E+05	2.37E+05	3.78E+04	1.03E+00	6.52E+01	1.62	1.45	1769	31%	49%	28	22
241-TX-111	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.17E+00	6.21E+01	1.61	1.45	1381	31%	49%	25	23
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	26	23
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.17E+00	6.21E+01	1.61	1.45	1381	31%	49%	25	23
241-TX-112	3.47E+03	1.06E+05	1.94E+05	2.18E+05	3.26E+04	7.24E-01	6.81E+01	1.63	1.42	2398	29%	52%	21	17
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	23	17
Solid Layer	3.47E+03	1.06E+05	1.94E+05	2.18E+05	3.26E+04	7.24E-01	6.81E+01	1.63	1.42	2398	29%	52%	21	17
241-TX-113	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.40E+00	8.18E+00	1.61	1.45	2416	15%	49%	22	23
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	55%	55%	23	23
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.40E+00	8.18E+00	1.61	1.45	2416	15%	49%	22	23
241-TX-114	1.53E+03	5.15E+04	2.07E+05	1.60E+05	1.45E+04	7.29E-01	5.94E+01	1.63	1.33	2012	29%	61%	21	18
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	21	18
Solid Layer	1.53E+03	5.15E+04	2.07E+05	1.60E+05	1.45E+04	7.29E-01	5.94E+01	1.63	1.33	2012	29%	61%	21	18
241-TX-115	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	2.15E+00	7.13E+01	1.63	1.45	2093	29%	49%	21	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	22	22
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	2.15E+00	7.13E+01	1.63	1.45	2093	29%	49%	21	22
241-TX-116	3.19E+02	1.05E+04	3.79E+05	1.51E+05	8.79E+00	3.42E-01	3.51E+01	1.66	1.39	2264	21%	53%	21	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	21	20
Solid Layer	3.19E+02	1.05E+04	3.79E+05	1.51E+05	8.79E+00	3.42E-01	3.51E+01	1.66	1.39	2264	21%	53%	21	20

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-TX-117	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.60E+02	5.08E-01	3.89E+01	1.58	1.26	1817	27%	70%	21	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	21	20
Solid Layer	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.60E+02	5.08E-01	3.89E+01	1.58	1.26	1817	27%	70%	21	20
241-TX-118	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.21E+02	5.39E+01	1.69	1.45	935	45%	49%	23	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	21	20
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.21E+02	5.39E+01	1.69	1.45	935	45%	49%	23	20
241-TY-101	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.61E+02	9.71E+00	2.49E-01	1.64	1.26	447	44%	70%	19	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	55%	55%	20	21
Solid Layer	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.61E+02	9.71E+00	2.49E-01	1.64	1.26	447	44%	70%	19	21
241-TY-102	2.18E+03	6.98E+04	2.02E+05	1.79E+05	2.06E+04	2.62E+00	2.87E+01	1.76	1.36	262	32%	58%	16	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	16	20
Solid Layer	2.18E+03	6.98E+04	2.02E+05	1.79E+05	2.06E+04	2.62E+00	2.87E+01	1.76	1.36	262	32%	58%	16	20
241-TY-103	4.02E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	7.00E+01	2.78E+01	1.68	1.45	585	52%	49%	21	21
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	75%	75%	30	21
Solid Layer	4.02E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	7.00E+01	2.78E+01	1.68	1.45	585	52%	49%	21	21
241-TY-104	2.12E+03	1.13E+04	9.90E+04	8.34E+04	5.70E+02	8.41E+01	3.44E+01	1.64	1.18	168	52%	78%	20	20
Supernatant	2.12E+03	1.13E+04	9.90E+04	8.34E+04	5.70E+02	5.12E-02	9.71E+00	1.18	1.18	5	78%	78%	20	20
Solid Layer	2.12E+03	1.13E+04	9.90E+04	8.34E+04	5.70E+02	8.67E+01	3.51E+01	1.65	1.18	163	52%	78%	20	20
241-TY-105	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.48E+02	6.24E+00	1.53	1.17	874	39%	75%	25	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	26	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.48E+02	6.24E+00	1.53	1.17	874	39%	75%	25	22
241-TY-106	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.21E+02	5.66E+01	1.40	1.17	62	38%	75%	16	20
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	16	20
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.21E+02	5.66E+01	1.40	1.17	62	38%	75%	16	20
241-U-101	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	3.71E+02	5.73E+01	1.77	1.17	87	30%	76%	22	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	76%	76%	19	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	3.71E+02	5.73E+01	1.77	1.17	87	30%	76%	22	22

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-U-102	1.12E+04	1.46E+05	1.98E+05	2.23E+05	3.32E+04	8.43E+01	1.41E+02	1.67	1.48	1238	34%	48%	27	21
Supernatant	1.12E+04	1.46E+05	1.98E+05	2.23E+05	3.33E+04	4.54E+00	3.04E+02	1.48	1.48	4	48%	48%	21	21
Solid Layer	1.12E+04	1.46E+05	1.98E+05	2.23E+05	3.32E+04	8.45E+01	1.40E+02	1.67	1.48	1234	34%	48%	27	21
241-U-103	1.24E+04	1.37E+05	1.52E+05	2.30E+05	4.09E+04	2.28E+01	1.10E+02	1.70	1.44	1410	40%	50%	28	24
Supernatant	1.24E+04	1.37E+05	1.52E+05	2.31E+05	4.09E+04	6.49E+00	3.09E+02	1.44	1.44	2	50%	50%	31	24
Solid Layer	1.24E+04	1.37E+05	1.52E+05	2.30E+05	4.09E+04	2.28E+01	1.10E+02	1.70	1.44	1408	40%	50%	28	24
241-U-104	9.58E+03	1.05E+05	2.07E+05	2.03E+05	3.21E+04	1.66E+02	5.22E+01	1.43	1.40	462	39%	55%	28	24
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.40	0	55%	55%	28	24
Solid Layer	9.58E+03	1.05E+05	2.07E+05	2.03E+05	3.21E+04	1.66E+02	5.22E+01	1.43	1.40	462	39%	55%	28	24
241-U-105	1.64E+04	1.08E+05	1.81E+05	2.27E+05	2.98E+04	1.14E+01	1.37E+02	1.67	1.46	1336	30%	52%	28	28
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	63%	63%	32	28
Solid Layer	1.64E+04	1.08E+05	1.81E+05	2.27E+05	2.98E+04	1.14E+01	1.37E+02	1.67	1.46	1336	30%	52%	28	28
241-U-106	3.38E+04	9.87E+04	2.49E+05	2.23E+05	1.20E+04	5.93E+01	1.45E+02	1.55	1.34	644	42%	49%	26	27
Supernatant	3.38E+04	9.90E+04	2.48E+05	2.23E+05	1.20E+04	4.10E+01	2.10E+02	1.34	1.34	6	49%	49%	27	27
Solid Layer	3.38E+04	9.87E+04	2.49E+05	2.23E+05	1.20E+04	5.94E+01	1.45E+02	1.55	1.34	638	42%	49%	26	27
241-U-107	6.28E+03	1.28E+05	1.42E+05	2.05E+05	4.10E+04	2.09E+00	7.55E+01	1.74	1.39	1113	33%	50%	24	25
Supernatant	4.10E+03	1.16E+05	2.11E+05	2.79E+04	2.79E+04	2.63E-01	1.95E+02	1.39	1.39	0	50%	50%	26	25
Solid Layer	6.28E+03	1.28E+05	1.42E+05	2.05E+05	4.10E+04	2.09E+00	7.55E+01	1.74	1.43	1113	33%	50%	24	25
241-U-108	7.07E+03	1.34E+05	1.84E+05	2.28E+05	3.05E+04	7.59E+00	1.19E+02	1.68	1.40	1336	37%	50%	30	27
Supernatant	7.07E+03	1.34E+05	1.84E+05	3.05E+04	3.05E+04	2.16E-01	2.61E+02	1.40	1.40	0	50%	50%	28	27
Solid Layer	7.07E+03	1.34E+05	1.84E+05	2.28E+05	3.05E+04	7.59E+00	1.19E+02	1.68	1.40	1336	37%	50%	30	27
241-U-109	6.53E+03	1.28E+05	1.85E+05	2.28E+05	2.92E+04	6.95E+00	1.13E+02	1.65	1.47	1352	29%	51%	27	19
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	21	19
Solid Layer	6.53E+03	1.28E+05	1.85E+05	2.28E+05	2.92E+04	6.95E+00	1.13E+02	1.65	1.47	1352	29%	51%	27	19
241-U-110	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.62E+02	1.81E+01	1.72	1.17	665	31%	75%	26	26
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	26	26
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.62E+02	1.81E+01	1.72	1.17	665	31%	75%	26	26

Table B-1. Input Data for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-U-111	5.41E+03	1.20E+05	1.67E+05	2.39E+05	3.66E+04	3.82E+01	1.27E+02	1.61	1.40	840	36%	53%	26	26
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	51%	51%	27	26
Solid Layer	5.41E+03	1.20E+05	1.67E+05	2.39E+05	3.66E+04	3.82E+01	1.27E+02	1.61	1.40	840	36%	53%	26	26
241-U-112	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.65E+02	3.01E+01	1.74	1.17	172	32%	75%	21	22
Supernatant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	1.17	0	75%	75%	21	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.65E+02	3.01E+01	1.74	1.17	172	32%	75%	21	22
241-U-201	0.00E+00	2.07E+04	1.43E+05	1.16E+05	1.41E+02	1.09E-01	9.23E+00	1.53	1.26	15	36%	69%	18	20
Supernatant	0.00E+00	2.07E+04	1.43E+05	1.16E+05	1.41E+02	1.01E-02	2.16E+01	1.26	1.26	4	69%	69%	19	20
Solid Layer	0.00E+00	2.07E+04	1.43E+05	1.16E+05	1.41E+02	1.44E-01	4.72E+00	1.63	1.22	11	27%	69%	18	20
241-U-202	1.41E+02	2.45E+04	1.52E+05	1.20E+05	2.39E+02	4.42E-02	7.32E+00	1.44	1.28	14	38%	69%	18	19
Supernatant	1.41E+02	2.45E+04	1.52E+05	1.20E+05	2.39E+02	4.82E-04	1.53E+01	1.28	1.28	4	69%	69%	18	19
Solid Layer	1.41E+02	2.45E+04	1.52E+05	1.20E+05	2.39E+02	6.17E-02	4.13E+00	1.51	1.22	10	28%	69%	18	19
241-U-203	0.00E+00	1.94E+04	1.44E+05	1.00E+05	1.88E+02	8.72E-02	7.11E+00	1.49	1.28	13	48%	69%	18	19
Supernatant	0.00E+00	1.94E+04	1.44E+05	1.00E+05	1.88E+02	4.24E-04	1.43E+01	1.28	1.28	4	69%	69%	19	19
Solid Layer	0.00E+00	1.94E+04	1.44E+05	1.00E+05	1.88E+02	1.26E-01	3.89E+00	1.59	1.28	9	40%	69%	18	19
241-U-204	8.10E+01	7.03E+03	5.53E+04	3.93E+04	1.46E+01	2.42E+00	5.39E+00	1.34	1.11	11	45%	87%	18	19
Supernatant	8.10E+01	7.03E+03	5.53E+04	3.93E+04	1.46E+01	1.77E-04	6.13E+00	1.11	1.11	4	87%	87%	18	19
Solid Layer	8.10E+01	7.03E+03	5.53E+04	3.93E+04	1.46E+01	3.81E+00	4.98E+00	1.47	1.11	7	26%	87%	18	19
AY102-S-14U	1.47E+03	2.08E+04	9.41E+02	9.55E+04	5.00E+02	6.59E+03	2.70E+02	1.59	1.22	120	39.2	72.2	50	44
AY102-S-14L	1.56E+03	1.14E+04	4.01E+02	9.30E+04	5.83E+02	6.59E+03	2.70E+02	1.59	1.19	89	44.1	74.3	55	44
AY102-S-15U	1.87E+03	7.01E+03	3.93E+02	7.69E+04	4.52E+01	6.59E+03	2.70E+02	1.48	1.17	36	40.1	80.6	55	44
AY102-S-15L	2.10E+03	2.36E+03	1.07E+02	5.86E+04	1.68E+02	6.59E+03	2.70E+02	1.56	1.13	125	48.9	82.7	60	44
AY-102-S-16	1.46E+03	0.00E+00	0.00E+00	4.27E+04	5.03E+01	6.59E+03	2.70E+02	1.46	1.09	109	52.0	82.8	65	44
AY102-Orig-9"	1.46E+03	0.00E+00	0.00E+00	4.27E+04	5.03E+01	1.44E+04	2.05E+02	1.46	1.09	94	52.0	82.8	70	44

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-AN-101	347.7	5.13E+06	99%	11245	9.49E-04	7.80E-08	2.63	2.53	4.19	2.06	0.36	1.39	0.20	0.036	0.125
Supernatant	336.4	4.94E+06	100%	6605	9.46E-04	2.37E-08	2.61	2.52	4.18	2.06	0.36	1.34	0.20	0.036	0.125
Solid Layer	11.3	1.83E+05	82%	4640.1	1.03E-03	1.55E-06	3.06	2.66	4.54	2.06	0.3	2.6	0.20	0.0	0.107
241-AN-102	389.2	5.75E+06	98%	12059	1.73E-03	6.19E-06	3.25	1.82	5.24	0.52	1.92	0.96	0.20	0.069	0.131
Supernatant	340.5	4.97E+06	100%	6686	1.67E-03	3.84E-06	3.25	1.82	5.24	0.52	1.94	0.96	0.20	0.070	0.132
Solid Layer	48.6	7.76E+05	84%	5373	2.16E-03	2.12E-05	3.25	1.82	5.24	0.52	1.82	0.91	0.200	0.064	0.129
241-AN-103	347.9	5.43E+06	88%	11249	1.52E-03	1.56E-07	2.07	2.83	6.83	3.95	0.21	2.02	0.20	0.023	0.139
Supernatant	181.3	2.80E+06	100%	3560	2.01E-03	1.41E-07	2.07	2.83	6.83	3.95	0.21	2.02	0.20	0.023	0.139
Solid Layer	166.6	2.63E+06	75%	7689.4	9.86E-04	1.71E-07	2.07	2.83	6.83	3.95	0.21	2.02	0.20	0.023	0.139
241-AN-104	382.2	5.71E+06	95%	11922	1.64E-03	3.27E-07	3.06	2.59	5.58	3.83	0.22	2.78	0.20	0.025	0.110
Supernatant	220.5	3.22E+06	100%	4330	1.66E-03	1.24E-08	3.06	2.59	5.58	3.83	0.22	2.78	0.20	0.024	0.109
Solid Layer	161.6	2.49E+06	89%	7591	1.61E-03	7.34E-07	3.06	2.59	5.58	3.83	0.22	2.78	0.20	0.026	0.110
241-AN-105	408.7	6.18E+06	95%	12443	1.11E-03	3.24E-07	2.52	2.58	5.64	3.52	0.19	2.93	0.20	0.024	0.124
Supernatant	213.6	3.16E+06	100%	4194	9.75E-04	3.47E-07	2.52	2.58	5.64	3.52	0.19	2.93	0.20	0.023	0.124
Solid Layer	195.1	3.02E+06	89%	8249	1.25E-03	2.99E-07	2.52	2.58	5.64	3.52	0.19	2.93	0.20	0.024	0.124
241-AN-106	314.3	3.74E+06	96%	10590	3.44E-04	4.98E-06	0.44	0.47	1.19	0.39	0.20	0.40	0.20	0.120	0.449
Supernatant	297.7	3.48E+06	100%	5844	2.40E-04	1.31E-07	0.44	0.47	1.19	0.39	0.20	0.40	0.20	0.120	0.449
Solid Layer	16.7	2.68E+05	46%	4746	1.69E-03	6.78E-05	0.44	0.47	1.19	0.39	0.20	0.40	0.20	0.119	0.449
241-AN-107	399.9	6.01E+06	97%	12270	1.53E-03	2.11E-05	3.37	1.45	4.21	1.37	2.27	0.08	0.20	0.092	0.140
Supernatant	316.3	4.71E+06	100%	6210	1.35E-03	1.80E-05	3.37	1.45	4.21	1.37	2.27	0.08	0.20	0.091	0.140
Solid Layer	83.6	1.29E+06	86%	6060	2.21E-03	3.26E-05	3.37	1.45	4.21	1.37	2.27	0.08	0.20	0.094	0.141
241-AP-101	402.8	5.50E+06	100%	12327	4.79E-04	7.54E-09	2.14	0.92	2.59	2.43	0.15	0.53	0.20	0.039	0.158
Supernatant	402.8	5.50E+06	100%	12327	4.79E-04	7.54E-09	2.14	0.92	2.59	2.43	0.15	0.53	0.20	0.039	0.158
Solid Layer	na	na	na	na	na	na	na	na	na	2.43	na	na	na	na	na
241-AP-102	398.6	5.81E+06	99%	12244	8.00E-04	4.82E-08	2.69	2.13	3.62	0.77	0.22	2.22	0.20	0.029	0.122
Supernatant	390.1	5.65E+06	100%	7660	8.12E-04	4.85E-08	2.69	2.13	3.62	0.77	0.22	2.21	0.20	0.029	0.122
Solid Layer	8.4	1.54E+05	53%	4584	3.86E-04	3.98E-08	2.69	2.13	3.62	0.77	0.26	2.67	0.20	0.030	0.122

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-AP-103	325.1	4.58E+06	100%	10801	8.13E-04	2.92E-07	2.40	1.74	3.59	1.00	0.54	1.36	0.20	0.037	0.138
Supernatant	325.1	4.58E+06	100%	10801	8.13E-04	2.92E-07	2.40	1.74	3.59	1.00	0.54	1.36	0.20	0.037	0.138
Solid Layer	na	na	na	na	na	na	na	na	na	1.00	na	na	na	na	na
241-AP-104	399.4	5.33E+06	100%	12261	6.94E-04	6.32E-07	1.62	1.39	2.57	1.15	0.32	1.31	0.20	0.047	0.185
Supernatant	399.4	5.33E+06	100%	12261	6.94E-04	6.32E-07	1.62	1.39	2.57	1.15	0.32	1.31	0.20	0.047	0.185
Solid Layer	na	na	na	na	na	na	na	na	na	1.15	na	na	na	na	na
241-AP-105	249.3	3.42E+06	95%	9313	6.37E-04	7.67E-08	1.78	1.15	2.75	1.06	0.16	1.43	0.20	0.041	0.176
Supernatant	217.0	2.87E+06	100%	4260	5.33E-04	3.26E-08	1.78	1.15	2.75	1.06	0.16	1.43	0.20	0.041	0.176
Solid Layer	32.3	5.43E+05	67%	5053	1.18E-03	3.10E-07	1.78	1.15	2.75	1.06	0.16	1.40	0.20	0.041	0.176
241-AP-106	412.6	5.20E+06	100%	12519	6.92E-04	1.86E-08	1.14	0.90	2.46	0.43	0.29	1.12	0.20	0.057	0.246
Supernatant	412.6	5.20E+06	100%	12519	6.92E-04	1.86E-08	1.14	0.90	2.46	0.43	0.29	1.12	0.20	0.057	0.246
Solid Layer	na	na	na	na	na	na	na	na	na	0.43	na	na	na	na	na
241-AP-107	409.7	5.47E+06	100%	12462	4.98E-04	1.62E-08	1.82	1.13	2.40	1.59	0.18	1.09	0.20	0.044	0.174
Supernatant	409.7	5.47E+06	100%	12462	4.98E-04	1.62E-08	1.82	1.13	2.40	1.59	0.18	1.09	0.20	0.044	0.174
Solid Layer	na	na	na	na	na	na	na	na	na	1.59	na	na	na	na	na
241-AP-108	298.3	4.45E+06	100%	10275	6.54E-04	1.67E-08	2.83	1.73	4.21	3.75	0.30	1.71	0.20	0.036	0.125
Supernatant	298.3	4.45E+06	100%	10275	6.54E-04	1.67E-08	2.83	1.73	4.21	3.75	0.30	1.71	0.20	0.036	0.125
Solid Layer	na	na	na	na	na	na	na	na	na	3.75	na	na	na	na	na
241-AW-101	409.4	6.30E+06	100%	12456	1.23E-03	1.19E-06	2.76	2.29	5.07	5.85	0.18	2.01	0.20	0.025	0.119
Supernatant	265.7	4.07E+06	100%	5217	1.22E-03	1.72E-08	2.76	2.29	5.07	5.85	0.18	2.01	0.20	0.025	0.119
Solid Layer	143.7	2.23E+06	100%	7239	1.25E-03	3.34E-06	2.76	2.29	5.07	5.85	0.18	2.01	0.20	0.024	0.119
241-AW-102	43.5	5.72E+05	97%	5271	6.41E-04	4.42E-06	1.62	1.03	2.37	2.38	0.21	1.13	0.20	0.050	0.192
Supernatant	41.1	5.39E+05	100%	806	4.37E-04	1.30E-08	1.62	1.03	2.37	2.38	0.21	1.12	0.20	0.050	0.192
Solid Layer	2.4	3.30E+04	57%	4465	3.97E-03	7.65E-05	1.62	1.03	2.37	2.38	0.23	1.25	0.20	0.050	0.192
241-AW-103	398.9	5.45E+06	104%	12251	3.63E-04	3.93E-06	2.31	1.38	2.98	0.83	0.21	1.49	0.20	0.035	0.143
Supernatant	285.4	3.69E+06	100%	5603	4.51E-04	1.09E-08	2.01	0.87	2.22	0.83	0.17	0.95	0.20	0.043	0.166
Solid Layer	113.6	1.77E+06	111%	6648	1.79E-04	1.21E-05	3.06	2.65	4.55	0.83	0.28	2.61	0.20	0.024	0.107

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-AW-104	389.8	5.60E+06	98%	12072	8.36E-04	4.32E-06	1.83	1.65	4.55	1.49	0.30	1.98	0.20	0.035	0.168
Supernatant	309.0	4.35E+06	100%	6067	8.45E-04	4.18E-08	1.81	1.62	3.95	1.49	0.32	1.88	0.20	0.040	0.170
Solid Layer	80.9	1.25E+06	89%	6006	8.05E-04	1.92E-05	1.90	1.75	6.61	1.49	0.24	2.33	0.20	0.022	0.161
241-AW-105	152.8	1.99E+06	78%	7418	2.25E-04	1.58E-05	0.73	0.26	0.80	0.28	0.04	0.10	0.20	0.104	0.361
Supernatant	57.0	6.24E+05	100%	1119	4.50E-05	1.12E-08	0.44	0.05	0.47	0.28	0.03	0.01	0.50	0.150	0.502
Solid Layer	95.8	1.36E+06	67%	6299	3.08E-04	2.31E-05	0.90	0.38	0.96	0.28	0.04	0.14	0.20	0.088	0.309
241-AW-106	327.3	4.77E+06	85%	10844	8.25E-04	4.29E-07	1.83	1.19	3.24	2.28	0.13	1.55	0.20	0.041	0.174
Supernatant	224.5	3.04E+06	100%	4407	5.64E-04	2.54E-08	1.83	1.19	3.24	2.28	0.14	1.61	0.20	0.041	0.174
Solid Layer	102.8	1.73E+06	60%	6437	1.29E-03	1.14E-06	1.83	1.19	3.24	2.28	0.12	1.45	0.20	0.040	0.174
241-AY-101	66.1	9.99E+05	69%	5716	1.34E-02	4.61E-04	0.09	1.09	2.78	2.16	0.20	0.18	0.50	0.084	0.554
Supernatant	31.2	3.87E+05	100%	612	1.90E-04	6.35E-07	0.07	0.73	4.24	2.16	0.11	0.40	0.50	0.051	0.643
Solid Layer	34.9	6.13E+05	49%	5103	2.17E-02	7.51E-04	0.11	1.42	1.86	2.16	0.26	0.05	0.20	0.111	0.493
241-AY-102	310.1	4.02E+06	91%	10507	1.48E-02	5.60E-05	0.01	0.58	2.22	0.23	0.09	0.09	0.50	0.123	0.767
Supernatant	255.3	3.14E+06	100%	5014	9.29E-05	6.73E-08	0.01	0.70	1.96	0.23	0.07	0.11	0.50	0.130	0.725
Solid Layer	54.8	8.83E+05	57%	5493	6.71E-02	2.55E-04	0.00	0.02	3.17	0.23	0.14	0.02	0.50	0.175	1.087
241-AZ-101	338.7	4.46E+06	97%	11068	1.40E-02	1.98E-04	0.83	1.30	2.57	0.64	0.04	0.47	0.20	0.062	0.280
Supernatant	319.8	4.13E+06	100%	6279	5.79E-03	5.07E-08	0.83	1.30	2.57	0.64	0.04	0.47	0.20	0.062	0.280
Solid Layer	18.9	3.21E+05	61%	4789	1.20E-01	2.75E-03	0.83	1.30	2.57	0.64	0.04	0.47	0.20	0.067	0.282
241-AZ-102	357.1	4.25E+06	94%	11430	8.37E-03	1.59E-04	0.13	0.88	1.65	0.14	0.18	0.03	0.20	0.133	0.567
Supernatant	319.1	3.69E+06	100%	6266	4.02E-03	2.94E-07	0.13	0.88	1.65	0.14	0.18	0.03	0.20	0.132	0.567
Solid Layer	38.0	5.58E+05	52%	5164	3.72E-02	1.21E-03	0.13	0.88	1.65	0.14	0.18	0.03	0.20	0.146	0.574
241-SY-101	138.1	1.96E+06	86%	7130	7.88E-04	8.06E-06	1.97	1.07	2.46	1.04	0.21	0.84	0.20	0.043	0.166
Supernatant	38.3	5.19E+05	100%	751	5.22E-04	2.17E-08	1.97	1.07	2.46	1.04	0.21	0.86	0.20	0.044	0.166
Solid Layer	99.9	1.44E+06	80%	6379	8.84E-04	1.09E-05	1.97	1.07	2.46	1.04	0.20	0.84	0.20	0.043	0.166
241-SY-102	350.9	4.90E+06	96%	11308	6.04E-04	1.73E-04	1.85	1.07	3.66	0.76	0.12	1.54	0.20	0.034	0.173
Supernatant	298.1	4.04E+06	100%	5854	5.15E-04	2.01E-08	1.80	0.98	3.84	0.76	0.07	1.75	0.20	0.033	0.178
Solid Layer	52.8	8.58E+05	75%	5454	1.02E-03	9.88E-04	2.15	1.59	2.86	0.76	0.34	0.56	0.20	0.041	0.151

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-SY-103	272.2	4.21E+06	93%	9763	1.34E-03	1.06E-05	2.71	3.31	3.31	1.86	0.42	2.56	0.20	0.036	0.115
Supernatant	148.0	2.27E+06	100%	2906	1.40E-03	4.80E-08	2.71	3.31	3.31	1.86	0.42	2.56	0.20	0.034	0.114
Solid Layer	124.2	1.94E+06	84%	6857	1.26E-03	2.29E-05	2.71	3.31	3.31	1.86	0.42	2.56	0.20	0.038	0.116
241-A-101	143.3	2.30E+06	67%	7232	1.28E-03	9.11E-06	3.76	3.59	4.72	2.51	0.25	3.47	0.20	0.028	0.091
Supernatant	na	na	na	na	na	na	na	na	na	2.51	na	na	0.20	na	na
Solid Layer	143.3	2.30E+06	67%	7232	1.28E-03	9.11E-06	3.76	3.59	4.72	2.51	0.25	3.47	0.20	0.028	0.091
241-A-102	14.5	2.51E+05	81%	4702	2.83E-03	8.08E-05	2.08	0.04	6.57	1.02	0.80	2.61	0.50	0.031	0.181
Supernatant	1.2	1.88E+04	100%	23	1.50E-03	1.14E-07	2.08	0.04	6.57	1.02	0.80	2.61	0.50	0.030	0.181
Solid Layer	13.3	2.32E+05	80%	4680	2.94E-03	8.73E-05	2.08	0.04	6.57	1.02	0.80	2.61	0.50	0.031	0.181
241-A-103	134.8	1.93E+06	82%	7064	1.10E-03	7.25E-06	3.10	2.42	4.47	2.51	0.54	4.02	0.20	0.036	0.114
Supernatant	1.6	2.47E+04	100%	32	8.45E-04	6.24E-07	3.09	2.43	4.48	2.51	0.54	4.01	0.20	0.043	0.117
Solid Layer	133.1	1.91E+06	82%	7032	1.11E-03	7.34E-06	3.10	2.42	4.47	2.51	0.54	4.02	0.20	0.036	0.114
241-A-104	10.2	1.74E+05	0%	4618	9.01E-02	2.22E-04	1.28	0.78	1.50	2.51	0.26	0.42	0.20	0.099	0.249
Supernatant	na	na	na	na	na	na	na	na	na	2.51	na	na	0.20	na	na
Solid Layer	10.2	1.74E+05	0%	4618	9.01E-02	2.22E-04	1.28	0.78	1.50	2.51	0.26	0.42	0.20	0.099	0.249
241-A-105	na	na	na	na	na	na	na	na	na	na	na	na	0.20	na	na
Supernatant	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Solid Layer	na	na	na	na	na	na	na	na	na	2.51	na	na	0.20	na	na
241-A-106	28.7	5.08E+05	46%	4981	7.03E-03	1.16E-04	1.28	0.78	1.50	2.51	0.94	0.42	0.20	0.107	0.253
Supernatant	na	na	na	na	na	na	na	na	na	2.51	na	na	0.20	na	na
Solid Layer	28.7	5.08E+05	46%	4981	7.03E-03	1.16E-04	1.28	0.78	1.50	2.51	0.94	0.42	0.20	0.107	0.253
241-AX-101	129.8	2.30E+06	79%	6966	1.48E-03	7.52E-06	4.39	3.76	4.11	2.29	0.26	3.29	0.20	0.021	0.078
Supernatant	na	na	na	na	na	na	na	na	na	2.29	na	na	0.20	na	na
Solid Layer	129.8	2.30E+06	79%	6966	1.48E-03	7.52E-06	4.39	3.76	4.11	2.29	0.26	3.29	0.20	0.021	0.078
241-AX-102	10.8	1.78E+05	70%	4631	9.31E-03	4.29E-04	2.83	2.33	3.43	2.29	1.65	1.98	0.20	0.039	0.120
Supernatant	na	na	na	na	na	na	na	na	na	2.29	na	na	0.20	na	na
Solid Layer	10.8	1.78E+05	70%	4631	9.31E-03	4.29E-04	2.83	2.33	3.43	2.29	1.65	1.98	0.20	0.039	0.120

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-AX-103	38.7	6.37E+05	90%	5177	5.53E-03	4.30E-05	3.08	2.65	4.53	2.29	0.28	2.61	0.20	0.026	0.108
Supernatant	na	na	na	na	na	na	na	na	na	2.29	na	na	0.20	na	na
Solid Layer	38.7	6.37E+05	90%	5177	5.53E-03	4.30E-05	3.08	2.65	4.53	2.29	0.28	2.61	0.20	0.026	0.108
241-AX-104	2.7	5.04E+04	11%	4471	2.77E-01	8.25E-04	1.28	0.78	1.50	2.29	0.26	0.42	0.20	0.065	0.231
Supernatant	na	na	na	na	na	na	na	na	na	2.29	na	na	0.20	na	na
Solid Layer	2.7	5.04E+04	11%	4471	2.77E-01	8.25E-04	1.28	0.78	1.50	2.29	0.26	0.42	0.20	0.065	0.231
241-B-101	39.4	6.12E+05	71%	5192	2.72E-03	6.46E-05	5.74	2.86	1.22	1.00	0.00	0.05	0.20	0.019	0.063
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	39.4	6.12E+05	71%	5192	2.72E-03	6.46E-05	5.74	2.86	1.22	1.00	0.00	0.05	0.20	0.019	0.063
241-B-102	11.6	1.90E+05	68%	4646	1.93E-05	9.36E-07	3.50	0.19	1.22	1.00	0.00	0.03	0.20	0.032	0.110
Supernatant	1.4	1.89E+04	100%	28	4.48E-05	1.82E-07	3.49	0.18	1.22	1.00	0.00	0.03	0.20	0.032	0.111
Solid Layer	10.2	1.71E+05	65%	4618	1.64E-05	1.02E-06	3.50	0.19	1.22	1.00	0.00	0.03	0.20	0.032	0.110
241-B-103	20.2	3.40E+05	71%	4815	2.19E-05	5.20E-06	3.52	0.18	1.21	1.00	0.00	0.03	0.20	0.032	0.110
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	20.2	3.40E+05	71%	4815	2.19E-05	5.20E-06	3.52	0.18	1.21	1.00	0.00	0.03	0.20	0.032	0.110
241-B-104	135.9	1.96E+06	68%	7087	4.45E-05	1.59E-06	3.49	0.18	1.23	1.00	0.00	0.03	0.20	0.032	0.111
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	135.9	1.96E+06	68%	7087	4.45E-05	1.59E-06	3.49	0.18	1.23	1.00	0.00	0.03	0.20	0.032	0.111
241-B-105	105.3	1.82E+06	62%	6486	1.48E-05	1.20E-06	3.49	0.18	1.24	1.00	0.00	0.03	0.20	0.032	0.111
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	105.3	1.82E+06	62%	6486	1.48E-05	1.20E-06	3.49	0.18	1.24	1.00	0.00	0.03	0.20	0.032	0.111
241-B-106	44.5	6.40E+05	86%	5292	4.00E-04	1.31E-06	3.50	0.18	1.23	1.00	0.00	0.03	0.20	0.032	0.110
Supernatant	0.4	5.04E+03	100%	8	4.48E-05	1.82E-07	3.50	0.18	1.23	1.00	0.00	0.03	0.20	0.032	0.110
Solid Layer	44.1	6.35E+05	86%	5284	4.02E-04	1.32E-06	3.50	0.18	1.23	1.00	0.00	0.03	0.20	0.032	0.110
241-B-107	58.6	9.93E+05	65%	5569	7.36E-05	1.60E-06	5.34	0.14	0.89	1.00	0.00	0.00	0.20	0.023	0.076
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	58.6	9.93E+05	65%	5569	7.36E-05	1.60E-06	5.34	0.14	0.89	1.00	0.00	0.00	0.20	0.023	0.076

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-B-108	33.5	5.85E+05	47%	5075	6.82E-05	1.20E-07	6.07	1.17	0.35	1.00	0.00	0.07	0.20	0.020	0.064
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	33.5	5.85E+05	47%	5075	6.82E-05	1.20E-07	6.07	1.17	0.35	1.00	0.00	0.07	0.20	0.020	0.064
241-B-109	45.4	8.44E+05	58%	5309	1.13E-05	8.38E-07	3.51	0.18	1.22	1.00	0.00	0.03	0.20	0.032	0.110
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	45.4	8.44E+05	58%	5309	1.13E-05	8.38E-07	3.51	0.18	1.22	1.00	0.00	0.03	0.20	0.032	0.110
241-B-110	89.1	1.26E+06	76%	6168	5.69E-04	5.87E-06	1.25	0.86	2.04	1.00	0.55	1.03	0.20	0.059	0.233
Supernatant	0.4	4.76E+03	100%	8	6.86E-05	3.51E-07	1.25	0.86	2.04	1.00	0.47	0.87	0.20	0.059	0.233
Solid Layer	88.7	1.26E+06	76%	6160	5.71E-04	5.89E-06	1.25	0.86	2.04	1.00	0.55	1.03	0.20	0.059	0.233
241-B-111	87.7	1.16E+06	59%	6139	1.86E-03	5.83E-06	1.25	0.86	2.04	1.00	0.55	1.03	0.20	0.060	0.233
Supernatant	0.4	4.76E+03	100%	8	6.86E-05	3.51E-07	1.25	0.86	2.04	1.00	0.47	0.87	0.20	0.059	0.233
Solid Layer	87.3	1.16E+06	59%	6132	1.87E-03	5.85E-06	1.25	0.86	2.04	1.00	0.55	1.03	0.20	0.060	0.233
241-B-112	12.7	1.97E+05	90%	4666	2.16E-04	1.40E-07	3.50	2.54	5.05	1.00	1.20	3.13	0.20	0.024	0.099
Supernatant	1.1	1.66E+04	100%	21	4.89E-04	2.76E-07	3.50	2.55	5.01	1.00	1.20	3.13	0.20	0.026	0.100
Solid Layer	11.6	1.81E+05	89%	4646	1.91E-04	1.27E-07	3.50	2.54	5.05	1.00	1.20	3.13	0.20	0.024	0.099
241-B-201	155.0	1.45E+05	86%	1126	1.20E-05	2.55E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	155.0	1.45E+05	86%	1126	1.20E-05	2.55E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-B-202	149.6	1.35E+05	91%	1098	2.04E-05	6.81E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.231
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	149.6	1.35E+05	91%	1098	2.04E-05	6.81E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.231
241-B-203	262.8	2.32E+05	85%	1690	4.90E-07	9.15E-06	0.91	0.03	0.41	1.00	0.01	0.00	0.50	0.099	0.327
Supernatant	2.7	2.10E+03	100%	14	9.45E-10	1.34E-07	0.91	0.03	0.41	1.00	0.01	0.00	0.50	0.099	0.327
Solid Layer	260.1	2.30E+05	85%	1676	4.94E-07	9.23E-06	0.91	0.03	0.41	1.00	0.01	0.00	0.50	0.099	0.327
241-B-204	258.8	2.28E+05	85%	1669	1.39E-07	8.06E-06	0.56	0.03	0.62	1.00	0.01	0.00	0.50	0.131	0.445
Supernatant	4.0	3.15E+03	100%	21	4.19E-10	2.29E-09	0.56	0.03	0.62	1.00	0.01	0.00	0.50	0.131	0.445
Solid Layer	254.7	2.25E+05	85%	1648	1.41E-07	8.17E-06	0.56	0.03	0.62	1.00	0.01	0.00	0.50	0.131	0.445

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-BX-101	17.3	2.93E+05	21%	4757	3.22E-04	3.00E-05	1.95	1.40	2.80	1.00	0.39	0.40	0.20	0.039	0.162
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	17.3	2.93E+05	21%	4757	3.22E-04	3.00E-05	1.95	1.40	2.80	1.00	0.39	0.40	0.20	0.039	0.162
241-BX-102	28.6	3.10E+05	45%	4979	3.29E-06	1.13E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	28.6	3.10E+05	45%	4979	3.29E-06	1.13E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-BX-103	27.1	4.29E+05	68%	4949	2.18E-04	8.30E-05	0.76	0.32	0.72	1.00	0.35	1.70	0.20	0.104	0.348
Supernatant	4.5	5.03E+04	100%	89	6.36E-06	3.90E-07	0.76	0.32	0.72	1.00	0.36	1.76	0.20	0.104	0.348
Solid Layer	22.5	3.78E+05	64%	4860	2.46E-04	9.40E-05	0.76	0.32	0.72	1.00	0.35	1.70	0.20	0.104	0.348
241-BX-104	36.5	6.34E+05	47%	5134	1.56E-03	2.90E-05	2.16	1.39	2.55	1.00	0.25	0.22	0.20	0.039	0.151
Supernatant	1.1	1.41E+04	100%	21	4.66E-04	1.30E-08	2.16	1.39	2.55	1.00	0.25	0.22	0.20	0.039	0.151
Solid Layer	35.4	6.20E+05	46%	5113	1.58E-03	2.97E-05	2.16	1.39	2.55	1.00	0.25	0.22	0.20	0.039	0.151
241-BX-105	26.1	4.40E+05	29%	4930	9.41E-04	5.52E-06	1.89	1.71	1.78	1.00	0.73	0.46	0.20	0.048	0.161
Supernatant	1.7	2.32E+04	100%	34	4.75E-04	1.03E-06	1.89	1.71	1.78	1.00	0.73	0.46	0.20	0.048	0.161
Solid Layer	24.4	4.17E+05	25%	4896	9.67E-04	5.78E-06	1.89	1.71	1.78	1.00	0.73	0.46	0.20	0.048	0.161
241-BX-106	13.6	2.33E+05	52%	4685	1.14E-03	1.82E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	13.6	2.33E+05	52%	4685	1.14E-03	1.82E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-BX-107	125.9	1.89E+06	67%	6891	1.14E-04	2.18E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	125.9	1.89E+06	67%	6891	1.14E-04	2.18E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-BX-108	11.4	1.73E+05	23%	4642	9.70E-04	2.24E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	11.4	1.73E+05	23%	4642	9.70E-04	2.24E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-BX-109	70.0	1.11E+06	70%	5793	7.69E-04	5.07E-07	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.231
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	70.0	1.11E+06	70%	5793	7.69E-04	5.07E-07	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.231

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid $[Al]_t$% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-BX-110	74.4	1.29E+06	79%	5879	2.82E-04	7.00E-07	6.65	1.13	1.92	1.00	1.05	0.31	0.20	0.024	0.063
Supernatant	0.5	7.20E+03	100%	9	4.27E-04	2.42E-07	6.65	1.13	1.96	1.00	1.05	0.31	0.20	0.024	0.063
Solid Layer	74.0	1.28E+06	79%	5870	2.82E-04	7.03E-07	6.65	1.13	1.92	1.00	1.05	0.31	0.20	0.024	0.063
241-BX-111	68.4	1.03E+06	10%	5761	3.83E-04	6.09E-07	2.98	2.31	4.56	1.00	0.12	3.37	0.20	0.021	0.110
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	68.4	1.03E+06	10%	5761	3.83E-04	6.09E-07	2.98	2.31	4.56	1.00	0.12	3.37	0.20	0.021	0.110
241-BX-112	59.7	8.14E+05	94%	5589	2.29E-04	5.69E-06	1.59	0.77	1.03	1.00	0.00	0.00	0.20	0.057	0.198
Supernatant	0.5	5.90E+03	100%	9	7.62E-06	5.20E-08	1.59	0.77	1.03	1.00	0.00	0.00	0.20	0.057	0.198
Solid Layer	59.2	8.08E+05	94%	5580	2.31E-04	5.73E-06	1.59	0.77	1.03	1.00	0.00	0.00	0.20	0.057	0.198
241-BY-101	134.3	2.55E+06	32%	7055	1.06E-03	1.78E-06	3.50	2.54	5.05	2.25	1.20	3.13	0.20	0.030	0.102
Supernatant	na	na	na	na	na	na	na	na	na	2.25	na	na	0.20	na	na
Solid Layer	134.3	2.55E+06	32%	7055	1.06E-03	1.78E-06	3.50	2.54	5.05	2.25	1.20	3.13	0.20	0.030	0.102
241-BY-102	101.1	1.66E+06	34%	6403	3.85E-04	2.51E-06	2.38	1.83	5.98	2.25	0.11	3.87	0.20	0.018	0.134
Supernatant	na	na	na	na	na	na	na	na	na	2.25	na	na	0.20	na	na
Solid Layer	101.1	1.66E+06	34%	6403	3.85E-04	2.51E-06	2.38	1.83	5.98	2.25	0.11	3.87	0.20	0.018	0.134
241-BY-103	151.1	2.62E+06	34%	7384	3.90E-04	5.84E-07	2.73	1.17	5.45	2.21	0.15	3.21	0.20	0.020	0.127
Supernatant	na	na	na	na	na	na	na	na	na	2.21	na	na	0.20	na	na
Solid Layer	151.1	2.62E+06	34%	7384	3.90E-04	5.84E-07	2.73	1.17	5.45	2.21	0.15	3.21	0.20	0.020	0.127
241-BY-104	130.1	2.32E+06	33%	6972	1.37E-03	2.89E-06	3.33	2.42	5.05	2.25	0.16	4.78	0.20	0.021	0.102
Supernatant	na	na	na	na	na	na	na	na	na	2.25	na	na	0.20	na	na
Solid Layer	130.1	2.32E+06	33%	6972	1.37E-03	2.89E-06	3.33	2.42	5.05	2.25	0.16	4.78	0.20	0.021	0.102
241-BY-105	174.7	3.28E+06	35%	7848	5.03E-04	2.04E-06	3.22	1.50	4.33	2.25	0.17	2.72	0.20	0.024	0.110
Supernatant	na	na	na	na	na	na	na	na	na	2.25	na	na	0.20	na	na
Solid Layer	174.7	3.28E+06	35%	7848	5.03E-04	2.04E-06	3.22	1.50	4.33	2.25	0.17	2.72	0.20	0.024	0.110
241-BY-106	167.9	2.93E+06	42%	7714	8.23E-04	7.45E-07	1.78	1.70	3.69	2.10	0.20	3.03	0.20	0.034	0.167
Supernatant	na	na	na	na	na	na	na	na	na	2.10	na	na	0.20	na	na
Solid Layer	167.9	2.93E+06	42%	7714	8.23E-04	7.45E-07	1.78	1.70	3.69	2.10	0.20	3.03	0.20	0.034	0.167

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{\beta/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-BY-107	98.6	1.73E+06	49%	6354	8.28E-04	6.78E-07	2.12	2.55	5.88	2.25	0.16	3.50	0.20	0.020	0.138
Supernatant	na	na	na	na	na	na	na	na	na	2.25	na	na	0.20	na	na
Solid Layer	98.6	1.73E+06	49%	6354	8.28E-04	6.78E-07	2.12	2.55	5.88	2.25	0.16	3.50	0.20	0.020	0.138
241-BY-108	80.7	1.25E+06	51%	6002	8.98E-04	1.79E-06	4.74	1.71	5.80	2.25	0.18	2.73	0.20	0.017	0.080
Supernatant	na	na	na	na	na	na	na	na	na	2.25	na	na	0.20	na	na
Solid Layer	80.7	1.25E+06	51%	6002	8.98E-04	1.79E-06	4.74	1.71	5.80	2.25	0.18	2.73	0.20	0.017	0.080
241-BY-109	104.2	1.85E+06	34%	6463	2.88E-04	1.92E-06	3.07	1.80	4.24	2.25	0.13	2.58	0.20	0.022	0.111
Supernatant	na	na	na	na	na	na	na	na	na	2.25	na	na	0.20	na	na
Solid Layer	104.2	1.85E+06	34%	6463	2.88E-04	1.92E-06	3.07	1.80	4.24	2.25	0.13	2.58	0.20	0.022	0.111
241-BY-110	132.8	2.17E+06	28%	7025	9.02E-04	1.71E-06	2.01	2.69	6.35	2.25	1.35	4.56	0.20	0.039	0.151
Supernatant	na	na	na	na	na	na	na	na	na	2.25	na	na	0.20	na	na
Solid Layer	132.8	2.17E+06	28%	7025	9.02E-04	1.71E-06	2.01	2.69	6.35	2.25	1.35	4.56	0.20	0.039	0.151
241-BY-111	109.3	1.89E+06	12%	6563	3.54E-04	2.93E-06	1.96	0.72	3.00	2.25	0.09	1.82	0.20	0.037	0.171
Supernatant	na	na	na	na	na	na	na	na	na	2.25	na	na	0.20	na	na
Solid Layer	109.3	1.89E+06	12%	6563	3.54E-04	2.93E-06	1.96	0.72	3.00	2.25	0.09	1.82	0.20	0.037	0.171
241-BY-112	103.9	1.88E+06	12%	6458	3.80E-04	2.10E-06	3.07	3.05	4.52	2.25	0.12	3.77	0.20	0.021	0.103
Supernatant	na	na	na	na	na	na	na	na	na	2.25	na	na	0.20	na	na
Solid Layer	103.9	1.88E+06	12%	6458	3.80E-04	2.10E-06	3.07	3.05	4.52	2.25	0.12	3.77	0.20	0.021	0.103
241-C-101	31.9	5.93E+05	32%	5045	6.69E-04	3.34E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.065	0.232
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	31.9	5.93E+05	32%	5045	6.69E-04	3.34E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.065	0.232
241-C-102	114.7	2.01E+06	37%	6670	1.54E-04	8.21E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	114.7	2.01E+06	37%	6670	1.54E-04	8.21E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231
241-C-103	26.2	4.29E+05	67%	4932	2.33E-02	3.06E-04	0.01	0.32	1.06	1.00	0.50	0.00	0.50	0.224	0.861
Supernatant	0.2	2.14E+03	100%	4	1.74E-04	7.59E-07	0.01	0.32	1.06	1.00	0.52	0.00	0.50	0.227	0.862
Solid Layer	26.0	4.27E+05	67%	4928	2.34E-02	3.08E-04	0.01	0.32	1.06	1.00	0.50	0.00	0.50	0.224	0.861

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/\tau}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-C-104	94.0	1.65E+06	59%	6264	2.07E-03	2.51E-04	1.28	0.78	1.50	1.00	0.48	0.42	0.20	0.071	0.234
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	94.0	1.65E+06	59%	6264	2.07E-03	2.51E-04	1.28	0.78	1.50	1.00	0.48	0.42	0.20	0.071	0.234
241-C-105	48.0	7.75E+05	42%	5360	4.27E-03	1.45E-04	0.55	0.80	3.58	1.00	0.23	0.00	0.20	0.057	0.375
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	48.0	7.75E+05	42%	5360	4.27E-03	1.45E-04	0.55	0.80	3.58	1.00	0.23	0.00	0.20	0.057	0.375
241-C-106	1.0	1.62E+04	44%	4438	2.77E-02	1.75E-04	0.00	0.00	0.42	1.00	0.03	0.01	0.50	0.411	1.113
Supernatant	0.0	3.28E+02	100%	1	2.31E-06	4.55E-10	0.00	0.00	0.42	1.00	0.03	0.01	0.50	0.411	1.114
Solid Layer	1.0	1.59E+04	43%	4437	2.83E-02	1.79E-04	0.00	0.00	0.42	1.00	0.03	0.01	0.50	0.411	1.113
241-C-107	89.7	1.45E+06	40%	6179	9.79E-03	2.05E-04	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.069	0.233
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	89.7	1.45E+06	40%	6179	9.79E-03	2.05E-04	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.069	0.233
241-C-108	24.0	3.70E+05	51%	4889	1.14E-03	1.23E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	24.0	3.70E+05	51%	4889	1.14E-03	1.23E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231
241-C-109	23.0	3.71E+05	52%	4870	6.75E-03	1.09E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	23.0	3.71E+05	52%	4870	6.75E-03	1.09E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231
241-C-110	64.7	9.02E+05	56%	5687	9.64E-05	3.85E-06	0.97	0.10	0.25	1.00	0.05	0.02	0.50	0.095	0.310
Supernatant	0.4	4.40E+03	100%	8	1.63E-05	4.96E-08	0.97	0.10	0.25	1.00	0.05	0.02	0.50	0.095	0.310
Solid Layer	64.3	8.98E+05	56%	5680	9.68E-05	3.87E-06	0.97	0.10	0.25	1.00	0.05	0.02	0.50	0.095	0.310
241-C-111	20.8	3.36E+05	48%	4827	1.84E-02	3.70E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	20.8	3.36E+05	48%	4827	1.84E-02	3.70E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231
241-C-112	37.7	6.29E+05	69%	5158	8.40E-03	2.95E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	37.7	6.29E+05	69%	5158	8.40E-03	2.95E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-C-201	3.0	3.17E+03	18%	330	6.31E-04	3.14E-04	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	3.0	3.17E+03	18%	330	6.31E-04	3.14E-04	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-C-202	2.6	2.74E+03	22%	328	1.14E-03	2.62E-04	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	2.6	2.74E+03	22%	328	1.14E-03	2.62E-04	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-C-203	8.1	9.72E+03	35%	357	1.40E-04	4.43E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	8.1	9.72E+03	35%	357	1.40E-04	4.43E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-C-204	8.6	1.04E+04	55%	359	9.52E-05	2.63E-07	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	8.6	1.04E+04	55%	359	9.52E-05	2.63E-07	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-S-101	127.3	2.19E+06	78%	6917	1.86E-03	8.61E-06	3.45	2.45	3.74	2.80	0.12	2.04	0.20	0.024	0.099
Supernatant	na	na	na	na	na	na	na	na	na	2.80	na	na	0.20	na	na
Solid Layer	127.3	2.19E+06	78%	6917	1.86E-03	8.61E-06	3.45	2.45	3.74	2.80	0.12	2.04	0.20	0.024	0.099
241-S-102	158.8	1.95E+06	66%	7537	9.15E-04	3.86E-06	2.50	2.77	7.31	2.21	0.26	3.85	0.20	0.017	0.122
Supernatant	na	na	na	na	na	na	na	na	na	2.21	na	na	0.20	na	na
Solid Layer	158.8	1.95E+06	66%	7537	9.15E-04	3.86E-06	2.50	2.77	7.31	2.21	0.26	3.85	0.20	0.017	0.122
241-S-103	85.9	1.44E+06	72%	6105	8.32E-04	5.52E-06	3.49	3.19	3.23	2.14	0.32	2.21	0.20	0.025	0.094
Supernatant	0.4	5.80E+03	100%	8	1.05E-03	2.80E-08	3.48	3.20	3.23	2.14	0.32	2.21	0.20	0.026	0.094
Solid Layer	85.6	1.44E+06	72%	6098	8.31E-04	5.54E-06	3.49	3.19	3.23	2.14	0.32	2.21	0.20	0.025	0.094
241-S-104	104.6	1.83E+06	70%	6471	1.67E-03	1.08E-05	4.33	0.83	3.44	0.30	0.03	0.87	0.20	0.021	0.088
Supernatant	na	na	na	na	na	na	na	na	na	0.30	na	na	0.20	na	na
Solid Layer	104.6	1.83E+06	70%	6471	1.67E-03	1.08E-05	4.33	0.83	3.44	0.30	0.03	0.87	0.20	0.021	0.088
241-S-105	147.3	2.55E+06	5%	7311	1.79E-04	2.46E-07	3.06	2.66	4.55	4.81	0.28	2.60	0.20	0.022	0.106
Supernatant	na	na	na	na	na	na	na	na	na	4.81	na	na	0.20	na	na
Solid Layer	147.3	2.55E+06	5%	7311	1.79E-04	2.46E-07	3.06	2.66	4.55	4.81	0.28	2.60	0.20	0.022	0.106

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-S-106	165.3	2.97E+06	64%	7663	5.14E-04	8.72E-07	3.81	2.26	4.55	3.26	0.14	2.66	0.20	0.019	0.091
Supernatant	na	na	na	na	na	na	na	na	na	3.26	na	na	0.20	na	na
Solid Layer	165.3	2.97E+06	64%	7663	5.14E-04	8.72E-07	3.81	2.26	4.55	3.26	0.14	2.66	0.20	0.019	0.091
241-S-107	130.1	2.41E+06	53%	6972	1.19E-03	2.92E-05	1.85	1.55	3.37	1.76	0.09	0.82	0.20	0.034	0.165
Supernatant	na	na	na	na	na	na	na	na	na	1.76	na	na	0.20	na	na
Solid Layer	130.1	2.41E+06	53%	6972	1.19E-03	2.92E-05	1.85	1.55	3.37	1.76	0.09	0.82	0.20	0.034	0.165
241-S-108	199.7	3.49E+06	3%	8339	5.94E-04	3.58E-06	3.06	2.65	4.55	4.81	0.28	2.60	0.20	0.023	0.106
Supernatant	na	na	na	na	na	na	na	na	na	4.81	na	na	0.20	na	na
Solid Layer	199.7	3.49E+06	3%	8339	5.94E-04	3.58E-06	3.06	2.65	4.55	4.81	0.28	2.60	0.20	0.023	0.106
241-S-109	193.5	3.34E+06	20%	8217	1.61E-04	9.09E-07	2.12	1.85	5.56	4.81	0.07	3.08	0.20	0.020	0.145
Supernatant	na	na	na	na	na	na	na	na	na	4.81	na	na	0.20	na	na
Solid Layer	193.5	3.34E+06	20%	8217	1.61E-04	9.09E-07	2.12	1.85	5.56	4.81	0.07	3.08	0.20	0.020	0.145
241-S-110	141.3	2.45E+06	24%	7192	9.73E-04	8.73E-06	3.51	1.87	3.82	4.81	0.16	2.16	0.20	0.026	0.101
Supernatant	na	na	na	na	na	na	na	na	na	4.81	na	na	0.20	na	na
Solid Layer	141.3	2.45E+06	24%	7192	9.73E-04	8.73E-06	3.51	1.87	3.82	4.81	0.16	2.16	0.20	0.026	0.101
241-S-111	149.4	2.16E+06	59%	7350	1.69E-03	7.08E-07	3.11	1.82	4.76	3.00	0.10	2.51	0.20	0.021	0.110
Supernatant	na	na	na	na	na	na	na	na	na	3.00	na	na	0.20	na	na
Solid Layer	149.4	2.16E+06	59%	7350	1.69E-03	7.08E-07	3.11	1.82	4.76	3.00	0.10	2.51	0.20	0.021	0.110
241-S-112	42.1	7.44E+05	77%	5245	8.77E-04	5.90E-06	2.71	1.35	5.90	2.86	0.06	2.54	0.20	0.018	0.126
Supernatant	na	na	na	na	na	na	na	na	na	2.86	na	na	0.20	na	na
Solid Layer	42.1	7.44E+05	77%	5245	8.77E-04	5.90E-06	2.71	1.35	5.90	2.86	0.06	2.54	0.20	0.018	0.126
241-SX-101	151.9	2.66E+06	54%	7401	1.23E-03	1.25E-05	1.74	1.63	7.16	2.86	0.02	5.41	0.20	0.017	0.171
Supernatant	na	na	na	na	na	na	na	na	na	2.86	na	na	0.20	na	na
Solid Layer	151.9	2.66E+06	54%	7401	1.23E-03	1.25E-05	1.74	1.63	7.16	2.86	0.02	5.41	0.20	0.017	0.171
241-SX-102	148.1	2.61E+06	82%	7326	1.21E-03	6.03E-06	2.54	3.29	4.40	2.94	0.10	3.12	0.20	0.027	0.117
Supernatant	na	na	na	na	na	na	na	na	na	2.94	na	na	0.20	na	na
Solid Layer	148.1	2.61E+06	82%	7326	1.21E-03	6.03E-06	2.54	3.29	4.40	2.94	0.10	3.12	0.20	0.027	0.117

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-SX-103	184.7	3.33E+06	65%	8045	1.61E-03	9.92E-06	2.52	3.42	4.50	3.57	0.23	3.02	0.20	0.040	0.124
Supernatant	na	na	na	na	na	na	na	na	na	3.57	na	na	0.20	na	na
Solid Layer	184.7	3.33E+06	65%	8045	1.61E-03	9.92E-06	2.52	3.42	4.50	3.57	0.23	3.02	0.20	0.040	0.124
241-SX-104	161.9	2.86E+06	62%	7597	1.36E-03	1.06E-05	4.68	2.55	3.67	1.79	0.14	2.42	0.20	0.026	0.080
Supernatant	na	na	na	na	na	na	na	na	na	1.79	na	na	0.20	na	na
Solid Layer	161.9	2.86E+06	62%	7597	1.36E-03	1.06E-05	4.68	2.55	3.67	1.79	0.14	2.42	0.20	0.026	0.080
241-SX-105	136.4	2.32E+06	82%	7096	9.87E-04	1.91E-05	2.65	3.11	4.49	2.41	0.22	3.00	0.20	0.038	0.121
Supernatant	na	na	na	na	na	na	na	na	na	2.41	na	na	0.20	na	na
Solid Layer	136.4	2.32E+06	82%	7096	9.87E-04	1.91E-05	2.65	3.11	4.49	2.41	0.22	3.00	0.20	0.038	0.121
241-SX-106	144.0	2.37E+06	81%	7245	7.02E-04	8.12E-06	3.95	3.24	2.25	1.88	0.24	1.75	0.20	0.027	0.086
Supernatant	na	na	na	na	na	na	na	na	na	1.88	na	na	0.20	na	na
Solid Layer	144.0	2.37E+06	81%	7245	7.02E-04	8.12E-06	3.95	3.24	2.25	1.88	0.24	1.75	0.20	0.027	0.086
241-SX-107	34.1	6.24E+05	46%	5088	2.66E-03	2.29E-05	3.50	2.14	5.26	3.57	0.07	3.15	0.20	0.025	0.102
Supernatant	na	na	na	na	na	na	na	na	na	3.57	na	na	0.20	na	na
Solid Layer	34.1	6.24E+05	46%	5088	2.66E-03	2.29E-05	3.50	2.14	5.26	3.57	0.07	3.15	0.20	0.025	0.102
241-SX-108	26.9	4.96E+05	3%	4945	1.79E-02	1.03E-04	1.28	0.78	1.50	3.57	0.26	0.42	0.20	0.106	0.252
Supernatant	na	na	na	na	na	na	na	na	na	3.57	na	na	0.20	na	na
Solid Layer	26.9	4.96E+05	3%	4945	1.79E-02	1.03E-04	1.28	0.78	1.50	3.57	0.26	0.42	0.20	0.106	0.252
241-SX-109	87.6	1.58E+06	28%	6137	1.14E-03	9.46E-06	2.83	2.33	3.43	3.57	0.66	1.98	0.20	0.057	0.129
Supernatant	na	na	na	na	na	na	na	na	na	3.57	na	na	0.20	na	na
Solid Layer	87.6	1.58E+06	28%	6137	1.14E-03	9.46E-06	2.83	2.33	3.43	3.57	0.66	1.98	0.20	0.057	0.129
241-SX-110	20.3	3.70E+05	31%	4817	1.83E-03	1.57E-05	1.28	0.78	1.50	3.57	0.26	0.42	0.20	0.089	0.244
Supernatant	na	na	na	na	na	na	na	na	na	3.57	na	na	0.20	na	na
Solid Layer	20.3	3.70E+05	31%	4817	1.83E-03	1.57E-05	1.28	0.78	1.50	3.57	0.26	0.42	0.20	0.089	0.244
241-SX-111	41.8	7.57E+05	48%	5239	2.24E-03	1.89E-05	3.50	2.15	5.27	3.57	0.07	3.14	0.20	0.027	0.103
Supernatant	na	na	na	na	na	na	na	na	na	3.57	na	na	0.20	na	na
Solid Layer	41.8	7.57E+05	48%	5239	2.24E-03	1.89E-05	3.50	2.15	5.27	3.57	0.07	3.14	0.20	0.027	0.103

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-SX-112	27.1	4.94E+05	47%	4951	2.46E-03	2.09E-05	3.50	2.15	5.27	3.57	0.07	3.15	0.20	0.022	0.100
Supernatant	na	na	na	na	na	na	na	na	na	3.57	na	na	0.20	na	na
Solid Layer	27.1	4.94E+05	47%	4951	2.46E-03	2.09E-05	3.50	2.15	5.27	3.57	0.07	3.15	0.20	0.022	0.100
241-SX-113	6.9	7.85E+04	61%	4553	5.18E-04	5.29E-06	1.28	0.78	1.50	3.57	0.26	0.42	0.20	0.064	0.231
Supernatant	na	na	na	na	na	na	na	na	na	3.57	na	na	0.20	na	na
Solid Layer	6.9	7.85E+04	61%	4553	5.18E-04	5.29E-06	1.28	0.78	1.50	3.57	0.26	0.42	0.20	0.064	0.231
241-SX-114	56.4	9.96E+05	53%	5525	1.28E-03	9.62E-06	3.50	2.15	5.25	3.57	0.07	3.15	0.20	0.026	0.102
Supernatant	na	na	na	na	na	na	na	na	na	3.57	na	na	0.20	na	na
Solid Layer	56.4	9.96E+05	53%	5525	1.28E-03	9.62E-06	3.50	2.15	5.25	3.57	0.07	3.15	0.20	0.026	0.102
241-SX-115	1.3	2.51E+04	13%	4444	8.95E-02	1.10E-03	1.28	0.78	1.50	3.57	0.26	0.42	0.20	0.064	0.231
Supernatant	na	na	na	na	na	na	na	na	na	3.57	na	na	0.20	na	na
Solid Layer	1.3	2.51E+04	13%	4444	8.95E-02	1.10E-03	1.28	0.78	1.50	3.57	0.26	0.42	0.20	0.064	0.231
241-T-101	36.1	5.81E+05	80%	5126	3.24E-04	1.74E-05	3.06	2.65	4.59	1.00	0.28	2.60	0.20	0.022	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	36.1	5.81E+05	80%	5126	3.24E-04	1.74E-05	3.06	2.65	4.59	1.00	0.28	2.60	0.20	0.022	0.106
241-T-102	11.5	1.84E+05	56%	4644	7.24E-04	4.64E-06	1.76	0.50	0.55	1.00	0.04	0.74	0.20	0.058	0.190
Supernatant	4.6	5.47E+04	100%	90	2.19E-04	2.97E-07	1.76	0.50	0.55	1.00	0.04	0.74	0.20	0.058	0.190
Solid Layer	6.9	1.29E+05	37%	4553	9.37E-04	6.48E-06	1.76	0.50	0.55	1.00	0.04	0.74	0.20	0.058	0.190
241-T-103	9.8	1.67E+05	57%	4610	3.92E-05	9.92E-07	1.26	0.86	2.03	1.00	0.47	0.88	0.20	0.058	0.232
Supernatant	1.4	1.79E+04	100%	28	6.86E-05	5.29E-07	1.26	0.86	2.03	1.00	0.47	0.87	0.20	0.058	0.232
Solid Layer	8.3	1.49E+05	52%	4582	3.57E-05	1.05E-06	1.26	0.86	2.03	1.00	0.47	0.88	0.20	0.058	0.232
241-T-104	115.0	1.55E+06	84%	6676	1.43E-05	4.92E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	115.0	1.55E+06	84%	6676	1.43E-05	4.92E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-T-105	35.6	5.42E+05	69%	5117	3.91E-04	1.18E-05	0.60	1.18	2.02	1.00	0.25	0.03	0.20	0.075	0.331
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	35.6	5.42E+05	69%	5117	3.91E-04	1.18E-05	0.60	1.18	2.02	1.00	0.25	0.03	0.20	0.075	0.331

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-T-106	7.9	1.30E+05	22%	4572	9.85E-05	6.98E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	7.9	1.30E+05	22%	4572	9.85E-05	6.98E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-T-107	62.8	1.02E+06	50%	5652	7.42E-04	1.24E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	62.8	1.02E+06	50%	5652	7.42E-04	1.24E-05	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-T-108	5.8	9.28E+04	50%	4531	4.39E-05	2.22E-06	3.50	0.18	1.23	1.00	0.00	0.03	0.20	0.032	0.110
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	5.8	9.28E+04	50%	4531	4.39E-05	2.22E-06	3.50	0.18	1.23	1.00	0.00	0.03	0.20	0.032	0.110
241-T-109	22.5	3.78E+05	75%	4860	1.42E-05	3.10E-07	3.51	0.18	1.22	1.00	0.00	0.03	0.20	0.032	0.110
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	22.5	3.78E+05	75%	4860	1.42E-05	3.10E-07	3.51	0.18	1.22	1.00	0.00	0.03	0.20	0.032	0.110
241-T-110	134.3	1.75E+06	87%	7055	2.53E-07	2.07E-06	0.30	0.00	1.31	1.00	0.00	0.00	0.50	0.146	0.615
Supernatant	0.3	3.15E+03	100%	6	1.61E-08	4.99E-09	0.30	0.00	1.31	1.00	0.00	0.00	0.50	0.146	0.615
Solid Layer	134.0	1.75E+06	87%	7049	2.53E-07	2.07E-06	0.30	0.00	1.31	1.00	0.00	0.00	0.50	0.146	0.615
241-T-111	162.2	2.10E+06	86%	7603	2.78E-05	5.80E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	162.2	2.10E+06	86%	7603	2.78E-05	5.80E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-T-112	24.2	3.18E+05	88%	4893	3.84E-08	7.19E-06	0.38	0.84	1.27	1.00	0.04	0.00	0.20	0.111	0.432
Supernatant	2.5	2.86E+04	100%	49	1.07E-07	6.33E-07	0.38	0.84	1.27	1.00	0.04	0.00	0.20	0.111	0.432
Solid Layer	21.7	2.89E+05	87%	4844	3.16E-08	7.84E-06	0.38	0.84	1.27	1.00	0.04	0.00	0.20	0.111	0.432
241-T-201	160.4	1.54E+05	76%	1154	5.21E-07	2.18E-05	0.75	0.01	0.34	1.00	0.01	0.00	0.50	0.114	0.376
Supernatant	12.1	9.54E+03	100%	64	4.29E-10	8.16E-10	0.75	0.01	0.34	1.00	0.01	0.00	0.50	0.114	0.376
Solid Layer	148.3	1.44E+05	74%	1090	5.55E-07	2.33E-05	0.75	0.01	0.34	1.00	0.01	0.00	0.50	0.114	0.376
241-T-202	109.2	9.56E+04	101%	886	4.70E-08	6.86E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	109.2	9.56E+04	101%	886	4.70E-08	6.86E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-T-203	188.7	1.71E+05	90%	1302	4.64E-08	8.97E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	188.7	1.71E+05	90%	1302	4.64E-08	8.97E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-T-204	192.7	1.69E+05	100%	1323	5.95E-08	7.33E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	192.7	1.69E+05	100%	1323	5.95E-08	7.33E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-TX-101	33.0	5.99E+05	51%	5066	2.48E-03	3.62E-05	3.06	2.65	4.54	1.00	0.28	2.61	0.20	0.022	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	33.0	5.99E+05	51%	5066	2.48E-03	3.62E-05	3.06	2.65	4.54	1.00	0.28	2.61	0.20	0.022	0.106
241-TX-102	78.8	1.33E+06	22%	5964	4.24E-04	7.49E-06	3.07	2.66	4.55	1.00	0.28	2.60	0.20	0.023	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	78.8	1.33E+06	22%	5964	4.24E-04	7.49E-06	3.07	2.66	4.55	1.00	0.28	2.60	0.20	0.023	0.106
241-TX-103	52.6	8.86E+05	31%	5450	3.95E-04	7.65E-06	3.07	2.54	4.43	1.00	0.27	2.50	0.20	0.022	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	52.6	8.86E+05	31%	5450	3.95E-04	7.65E-06	3.07	2.54	4.43	1.00	0.27	2.50	0.20	0.022	0.106
241-TX-104	25.1	4.53E+05	88%	4911	1.40E-03	8.97E-06	5.70	2.05	1.16	1.00	0.09	0.22	0.20	0.020	0.066
Supernatant	0.9	1.30E+04	100%	17	1.10E-03	3.04E-07	5.72	2.05	1.17	1.00	0.09	0.22	0.20	0.020	0.066
Solid Layer	24.3	4.40E+05	88%	4894	1.41E-03	9.23E-06	5.70	2.05	1.16	1.00	0.09	0.22	0.20	0.020	0.066
241-TX-105	209.2	3.56E+06	7%	8526	3.49E-04	8.24E-06	3.06	2.65	4.55	1.00	0.28	2.61	0.20	0.024	0.107
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	209.2	3.56E+06	7%	8526	3.49E-04	8.24E-06	3.06	2.65	4.55	1.00	0.28	2.61	0.20	0.024	0.107
241-TX-106	126.4	2.14E+06	28%	6900	4.32E-04	8.05E-06	3.07	2.65	4.56	1.00	0.28	2.61	0.20	0.022	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	126.4	2.14E+06	28%	6900	4.32E-04	8.05E-06	3.07	2.65	4.56	1.00	0.28	2.61	0.20	0.022	0.106
241-TX-107	10.7	2.00E+05	54%	4629	5.18E-04	8.73E-05	3.18	2.52	4.73	1.00	0.22	2.75	0.20	0.021	0.104
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	10.7	2.00E+05	54%	4629	5.18E-04	8.73E-05	3.18	2.52	4.73	1.00	0.22	2.75	0.20	0.021	0.104

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-TX-108	45.9	7.75E+05	17%	5318	3.90E-04	7.72E-06	3.06	2.65	4.54	1.00	0.28	2.60	0.20	0.022	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	45.9	7.75E+05	17%	5318	3.90E-04	7.72E-06	3.06	2.65	4.54	1.00	0.28	2.60	0.20	0.022	0.106
241-TX-109	131.9	1.97E+06	65%	7008	1.07E-04	3.30E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.066	0.232
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	131.9	1.97E+06	65%	7008	1.07E-04	3.30E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.066	0.232
241-TX-110	169.7	2.86E+06	9%	7750	3.15E-04	8.15E-06	3.06	2.65	4.58	1.00	0.28	2.60	0.20	0.023	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	169.7	2.86E+06	9%	7750	3.15E-04	8.15E-06	3.06	2.65	4.58	1.00	0.28	2.60	0.20	0.023	0.106
241-TX-111	132.5	2.23E+06	11%	7019	3.02E-04	8.05E-06	3.06	2.65	4.54	1.00	0.28	2.61	0.20	0.022	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	132.5	2.23E+06	11%	7019	3.02E-04	8.05E-06	3.06	2.65	4.54	1.00	0.28	2.61	0.20	0.022	0.106
241-TX-112	230.0	3.92E+06	13%	8934	3.27E-04	8.16E-06	3.13	2.30	4.07	1.00	0.24	2.29	0.20	0.023	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	230.0	3.92E+06	13%	8934	3.27E-04	8.16E-06	3.13	2.30	4.07	1.00	0.24	2.29	0.20	0.023	0.106
241-TX-113	231.8	3.88E+06	5%	8968	4.80E-05	6.80E-07	3.06	2.65	4.54	1.00	0.28	2.61	0.20	0.022	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	231.8	3.88E+06	5%	8968	4.80E-05	6.80E-07	3.06	2.65	4.54	1.00	0.28	2.61	0.20	0.022	0.106
241-TX-114	193.0	3.29E+06	7%	8207	2.86E-04	7.77E-06	3.33	1.12	2.48	1.00	0.11	1.09	0.20	0.029	0.109
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	193.0	3.29E+06	7%	8207	2.86E-04	7.77E-06	3.33	1.12	2.48	1.00	0.11	1.09	0.20	0.029	0.109
241-TX-115	200.8	3.41E+06	8%	8360	3.52E-04	8.27E-06	3.07	2.66	4.53	1.00	0.28	2.60	0.20	0.022	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	200.8	3.41E+06	8%	8360	3.52E-04	8.27E-06	3.07	2.66	4.53	1.00	0.28	2.60	0.20	0.022	0.106
241-TX-116	217.2	3.75E+06	8%	8682	1.68E-04	4.21E-06	6.11	0.23	0.24	1.00	0.02	0.00	0.20	0.021	0.067
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	217.2	3.75E+06	8%	8682	1.68E-04	4.21E-06	6.11	0.23	0.24	1.00	0.02	0.00	0.20	0.021	0.067

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-TX-117	174.3	2.87E+06	5%	7840	1.87E-04	5.63E-06	3.49	0.18	1.23	1.00	0.00	0.03	0.20	0.032	0.111
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	174.3	2.87E+06	5%	7840	1.87E-04	5.63E-06	3.49	0.18	1.23	1.00	0.00	0.03	0.20	0.032	0.111
241-TX-118	89.7	1.58E+06	33%	6179	1.06E-03	2.07E-04	3.06	2.66	4.54	1.00	0.28	2.60	0.20	0.022	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	89.7	1.58E+06	33%	6179	1.06E-03	2.07E-04	3.06	2.66	4.54	1.00	0.28	2.60	0.20	0.022	0.106
241-TY-101	42.9	7.32E+05	14%	5260	6.62E-05	6.27E-06	3.50	0.18	1.23	1.00	0.00	0.03	0.20	0.032	0.110
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	42.9	7.32E+05	14%	5260	6.62E-05	6.27E-06	3.50	0.18	1.23	1.00	0.00	0.03	0.20	0.032	0.110
241-TY-102	25.1	4.60E+05	55%	4911	1.53E-04	1.29E-07	3.26	1.52	3.02	1.00	0.16	1.52	0.20	0.026	0.108
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	25.1	4.60E+05	55%	4911	1.53E-04	1.29E-07	3.26	1.52	3.02	1.00	0.16	1.52	0.20	0.026	0.108
241-TY-103	56.1	9.83E+05	91%	5520	6.00E-04	6.36E-06	3.06	2.65	4.52	1.00	0.28	2.61	0.20	0.022	0.106
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	56.1	9.83E+05	91%	5520	6.00E-04	6.36E-06	3.06	2.65	4.52	1.00	0.28	2.61	0.20	0.022	0.106
241-TY-104	16.1	2.75E+05	68%	4734	7.31E-04	8.13E-06	1.60	0.25	1.78	1.00	0.18	0.05	0.20	0.055	0.211
Supernatant	0.5	5.90E+03	100%	9	4.63E-05	5.59E-08	1.60	0.25	1.78	1.00	0.18	0.05	0.20	0.055	0.211
Solid Layer	15.6	2.69E+05	67%	4725	7.46E-04	8.31E-06	1.60	0.25	1.78	1.00	0.18	0.05	0.20	0.055	0.211
241-TY-105	83.8	1.34E+06	39%	6064	1.02E-03	9.70E-07	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	83.8	1.34E+06	39%	6064	1.02E-03	9.70E-07	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.064	0.231
241-TY-106	5.9	8.68E+04	51%	4535	1.08E-03	1.19E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	1.00	na	na	0.20	na	na
Solid Layer	5.9	8.68E+04	51%	4535	1.08E-03	1.19E-06	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
241-U-101	8.3	1.54E+05	39%	4582	2.76E-03	2.18E-06	1.28	0.78	1.50	2.89	0.26	0.42	0.20	0.063	0.231
Supernatant	na	na	na	na	na	na	na	na	na	2.89	na	na	0.20	na	na
Solid Layer	8.3	1.54E+05	39%	4582	2.76E-03	2.18E-06	1.28	0.78	1.50	2.89	0.26	0.42	0.20	0.063	0.231

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-U-102	118.8	2.07E+06	72%	6750	1.23E-03	8.13E-06	3.20	3.18	3.32	1.72	0.76	2.24	0.20	0.031	0.102
Supernatant	0.4	5.92E+03	100%	8	1.47E-03	2.68E-07	3.19	3.17	3.33	1.72	0.76	2.25	0.20	0.028	0.101
Solid Layer	118.4	2.06E+06	72%	6742	1.23E-03	8.15E-06	3.20	3.18	3.32	1.72	0.76	2.24	0.20	0.031	0.102
241-U-103	151.4	2.40E+06	79%	7390	6.75E-04	4.42E-06	2.45	2.98	4.58	1.81	0.86	2.84	0.20	0.031	0.125
Supernatant	0.2	2.88E+03	100%	4	1.51E-03	4.29E-07	2.45	2.98	4.59	1.81	0.86	2.84	0.20	0.033	0.126
Solid Layer	151.2	2.40E+06	79%	7386	6.74E-04	4.42E-06	2.45	2.98	4.58	1.81	0.86	2.84	0.20	0.031	0.125
241-U-104	44.3	6.59E+05	72%	5288	1.36E-03	1.09E-05	3.34	2.29	3.20	2.89	0.68	2.29	0.20	0.031	0.104
Supernatant	na	na	na	na	na	na	na	na	na	2.89	na	na	0.20	na	na
Solid Layer	44.3	6.59E+05	72%	5288	1.36E-03	1.09E-05	3.34	2.29	3.20	2.89	0.68	2.29	0.20	0.031	0.104
241-U-105	128.2	2.23E+06	59%	6934	7.24E-04	2.17E-05	2.92	2.34	4.61	1.23	1.12	2.04	0.20	0.033	0.117
Supernatant	na	na	na	na	na	na	na	na	na	1.23	na	na	0.20	na	na
Solid Layer	128.2	2.23E+06	59%	6934	7.24E-04	2.17E-05	2.92	2.34	4.61	1.23	1.12	2.04	0.20	0.033	0.117
241-U-106	61.8	9.98E+05	86%	5631	1.08E-03	2.98E-05	4.01	2.15	3.53	0.30	2.52	0.90	0.20	0.045	0.100
Supernatant	0.6	8.04E+03	100%	11	1.27E-03	7.22E-06	4.01	2.15	3.55	0.30	2.52	0.90	0.20	0.046	0.101
Solid Layer	61.2	9.90E+05	86%	5620	1.08E-03	3.00E-05	4.01	2.15	3.53	0.30	2.52	0.90	0.20	0.045	0.100
241-U-107	106.8	1.93E+06	65%	6514	3.71E-04	1.25E-05	2.29	2.77	3.84	2.00	0.44	2.86	0.20	0.029	0.129
Supernatant	na	na	na	na	na	na	na	na	na	2.00	na	na	0.20	na	na
Solid Layer	106.8	1.93E+06	65%	6514	3.71E-04	1.25E-05	2.29	2.77	3.84	2.00	0.44	2.86	0.20	0.029	0.129
241-U-108	128.2	2.25E+06	74%	6934	6.14E-04	4.10E-06	2.96	2.91	4.02	2.89	0.51	2.18	0.20	0.028	0.109
Supernatant	na	na	na	na	na	na	na	na	na	2.89	na	na	0.20	na	na
Solid Layer	128.2	2.25E+06	74%	6934	6.14E-04	4.10E-06	2.96	2.91	4.02	2.89	0.51	2.18	0.20	0.028	0.109
241-U-109	145.6	2.23E+06	56%	7277	5.81E-04	1.19E-06	2.98	2.78	4.15	2.60	0.44	1.99	0.20	0.026	0.108
Supernatant	na	na	na	na	na	na	na	na	na	2.60	na	na	0.20	na	na
Solid Layer	145.6	2.23E+06	56%	7277	5.81E-04	1.19E-06	2.98	2.78	4.15	2.60	0.44	1.99	0.20	0.026	0.108
241-U-110	63.8	1.14E+06	41%	5670	1.17E-03	9.06E-06	1.28	0.78	1.50	2.89	0.26	0.42	0.20	0.064	0.231
Supernatant	na	na	na	na	na	na	na	na	na	2.89	na	na	0.20	na	na
Solid Layer	63.8	1.14E+06	41%	5670	1.17E-03	9.06E-06	1.28	0.78	1.50	2.89	0.26	0.42	0.20	0.064	0.231

Table B-2. Derived Data for Hydrogen Generation Rate Model Calculations for 177 Tanks (20 Sheets).

Tank	Waste level Dw (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area Awet (ft^2)	Tank Heat load $H_L^{\gamma/r}$ (watt/kg)	Tank heat load H_L^{alpha} (watt/kg)	NO_3 in liquid $[NO_3]$ (mole/L)	NO_2 in liquid $[NO_2]$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid [OH] (mole/L)	TOC in liquid [TOC]% (wt%)	Al in liquid [Al]% (wt%)	E_{H2} Efficiency of H_2 by corrosion	Total G values $G_{TOT}^{B/\gamma}$ (H_2/100eV)	Total G values G_{TOT}^{alpha} (H_2/100eV)
241-U-111	80.6	1.35E+06	68%	6000	8.55E-04	7.19E-06	2.69	2.61	5.09	1.99	0.39	2.62	0.20	0.023	0.117
Supernatant	na	na	na	na	na	na	na	na	na	1.99	na	na	0.20	na	na
Solid Layer	80.6	1.35E+06	68%	6000	8.55E-04	7.19E-06	2.69	2.61	5.09	1.99	0.39	2.62	0.20	0.023	0.117
241-U-112	16.5	3.00E+05	43%	4742	1.24E-03	7.63E-07	1.28	0.78	1.50	2.89	0.26	0.42	0.20	0.063	0.230
Supernatant	na	na	na	na	na	na	na	na	na	2.89	na	na	0.20	na	na
Solid Layer	16.5	3.00E+05	43%	4742	1.24E-03	7.63E-07	1.28	0.78	1.50	2.89	0.26	0.42	0.20	0.063	0.230
241-U-201	20.2	2.30E+04	52%	420	4.07E-05	9.71E-08	2.30	0.45	2.28	1.00	0.00	0.01	0.20	0.038	0.154
Supernatant	5.4	5.04E+03	100%	28	1.02E-04	2.08E-08	2.30	0.45	2.28	1.00	0.00	0.01	0.20	0.038	0.154
Solid Layer	14.8	1.79E+04	39%	392	2.33E-05	1.19E-07	2.30	0.45	2.28	1.00	0.00	0.01	0.20	0.038	0.154
241-U-202	18.9	2.02E+04	55%	413	3.32E-05	1.18E-07	2.45	0.53	2.21	1.00	0.01	0.02	0.20	0.037	0.146
Supernatant	5.4	5.12E+03	100%	28	7.23E-05	4.05E-10	2.45	0.53	2.21	1.00	0.01	0.02	0.20	0.037	0.146
Solid Layer	13.5	1.51E+04	40%	385	2.00E-05	1.58E-07	2.45	0.53	2.21	1.00	0.01	0.02	0.20	0.037	0.146
241-U-203	17.5	1.94E+04	69%	406	3.20E-05	7.85E-08	2.32	0.42	1.62	1.00	0.00	0.01	0.20	0.042	0.154
Supernatant	5.4	5.12E+03	100%	28	6.78E-05	9.46E-10	2.32	0.42	1.62	1.00	0.00	0.01	0.20	0.042	0.154
Solid Layer	12.1	1.43E+04	59%	378	1.93E-05	1.06E-07	2.32	0.42	1.62	1.00	0.00	0.01	0.20	0.042	0.154
241-U-204	14.8	1.47E+04	51%	392	4.30E-05	2.14E-06	0.89	0.15	0.66	1.00	0.01	0.00	0.20	0.096	0.325
Supernatant	5.4	4.44E+03	100%	28	2.90E-05	4.07E-10	0.89	0.15	0.66	1.00	0.01	0.00	0.20	0.096	0.325
Solid Layer	9.4	1.03E+04	30%	364	4.90E-05	3.06E-06	0.89	0.15	0.66	1.00	0.01	0.00	0.20	0.096	0.325
AY102-S-14U	11.5	1.90E+05	54%	4644	4.53E-02	2.55E-04	0.02	0.45	3.68	0.23	0.12	0.04	0.50	0.073	0.801
AY102-S-14L	8.5	1.41E+05	59%	4585	4.53E-02	2.55E-04	0.01	0.25	3.79	0.23	0.13	0.05	0.50	0.080	0.906
AY102-S-15U	3.5	5.41E+04	50%	4487	4.53E-02	2.55E-04	0.01	0.15	3.18	0.23	0.16	0.00	0.50	0.106	0.958
AY102-S-15L	12.0	1.95E+05	59%	4653	4.53E-02	2.55E-04	0.00	0.05	2.49	0.23	0.19	0.01	0.50	0.168	1.039
AY-102-S-16	10.5	1.60E+05	63%	4624	4.53E-02	2.55E-04	0.00	0.00	1.86	0.23	0.13	0.00	0.50	0.310	1.413
AY102-Orig-9"	9.0	1.37E+05	63%	4595	9.72E-02	2.55E-04	0.00	0.00	1.86	0.23	0.13	0.00	0.50	0.317	1.416

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-AN-101	3.03E-07	8.65E-11	6.67E-07	2.20E-07	1.19E-06	4.95E-09	1.42E-12	1.09E-08	3.60E-09	1.95E-08
Supernatant	3.08E-07	2.66E-11	7.00E-07	2.68E-08	1.04E-06	5.03E-09	4.34E-13	1.14E-08	4.37E-10	1.69E-08
Solid Layer	1.87E-07	1.22E-09	1.43E-07	5.09E-07	8.41E-07	3.36E-09	2.19E-11	2.57E-09	9.12E-09	1.51E-08
241-AN-102	1.05E-06	7.12E-09	1.69E-06	2.10E-07	2.96E-06	1.72E-08	1.17E-10	2.77E-08	3.45E-09	4.84E-08
Supernatant	1.04E-06	4.53E-09	1.77E-06	2.70E-08	2.84E-06	1.69E-08	7.35E-11	2.87E-08	4.37E-10	4.61E-08
Solid Layer	1.05E-06	2.06E-08	1.24E-06	1.39E-07	2.44E-06	1.85E-08	3.64E-10	2.19E-08	2.46E-09	4.32E-08
241-AN-103	2.71E-07	1.70E-10	4.36E-07	2.08E-07	9.14E-07	4.97E-09	3.13E-12	8.00E-09	3.81E-09	1.68E-08
Supernatant	4.13E-07	1.76E-10	5.19E-07	2.55E-08	9.59E-07	7.08E-09	3.02E-12	8.90E-09	4.37E-10	1.64E-08
Solid Layer	1.49E-07	1.59E-10	3.54E-07	5.86E-08	5.61E-07	2.96E-09	3.17E-12	7.04E-09	1.17E-09	1.12E-08
241-AN-104	3.53E-07	3.06E-10	5.72E-07	2.09E-07	1.13E-06	6.03E-09	5.24E-12	9.78E-09	3.58E-09	1.94E-08
Supernatant	3.63E-07	1.21E-11	5.02E-07	2.70E-08	8.91E-07	5.87E-09	1.96E-13	8.13E-09	4.37E-10	1.44E-08
Solid Layer	3.40E-07	6.48E-10	6.73E-07	6.11E-08	1.08E-06	6.26E-09	1.19E-11	1.24E-08	1.12E-09	1.98E-08
241-AN-105	2.21E-07	3.40E-10	3.36E-07	2.02E-07	7.59E-07	3.81E-09	5.87E-12	5.78E-09	3.47E-09	1.31E-08
Supernatant	2.04E-07	3.86E-10	3.27E-07	2.66E-08	5.58E-07	3.35E-09	6.34E-12	5.38E-09	4.37E-10	9.16E-09
Solid Layer	2.37E-07	2.96E-10	3.43E-07	5.47E-08	6.35E-07	4.30E-09	5.38E-12	6.24E-09	9.94E-10	1.15E-08
241-AN-106	3.55E-07	1.93E-08	5.21E-08	2.83E-07	7.09E-07	4.69E-09	2.55E-10	6.89E-10	3.75E-09	9.38E-09
Supernatant	2.57E-07	5.27E-10	5.66E-08	3.37E-08	3.48E-07	3.33E-09	6.83E-12	7.33E-10	4.37E-10	4.51E-09
Solid Layer	8.33E-07	1.26E-07	1.41E-08	3.54E-07	1.33E-06	1.49E-08	2.25E-09	2.53E-10	6.32E-09	2.37E-08
241-AN-107	1.22E-06	2.57E-08	9.60E-07	2.05E-07	2.41E-06	2.03E-08	4.29E-10	1.60E-08	3.41E-09	4.02E-08
Supernatant	1.10E-06	2.25E-08	9.77E-07	2.64E-08	2.12E-06	1.82E-08	3.73E-10	1.62E-08	4.37E-10	3.52E-08
Solid Layer	1.59E-06	3.55E-08	8.95E-07	9.41E-08	2.62E-06	2.73E-08	6.07E-10	1.53E-08	1.61E-09	4.49E-08
241-AP-101	1.68E-07	1.07E-11	3.84E-08	2.24E-07	4.31E-07	2.55E-09	1.62E-13	5.82E-10	3.40E-09	6.53E-09
Supernatant	1.68E-07	1.07E-11	3.84E-08	4.49E-08	2.51E-07	2.55E-09	1.62E-13	5.82E-10	6.81E-10	3.81E-09
Solid Layer	na	na	na	na	na	na	na	na	na	na
241-AP-102	2.09E-07	5.19E-11	1.54E-07	2.11E-07	5.74E-07	3.38E-09	8.39E-13	2.49E-09	3.42E-09	9.29E-09
Supernatant	2.14E-07	5.28E-11	1.56E-07	2.71E-08	3.97E-07	3.45E-09	8.49E-13	2.51E-09	4.37E-10	6.39E-09
Solid Layer	5.46E-08	2.30E-11	8.67E-08	5.96E-07	7.38E-07	1.11E-09	4.66E-13	1.76E-09	1.21E-08	1.49E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-AP-103	2.66E-07	3.61E-10	2.43E-07	2.36E-07	7.46E-07	4.16E-09	5.64E-12	3.80E-09	3.70E-09	1.17E-08
Supernatant	2.66E-07	3.61E-10	2.43E-07	4.73E-08	5.57E-07	4.16E-09	5.64E-12	3.80E-09	7.39E-10	8.70E-09
Solid Layer	not exist	na	na	na	na	na	na	na	na	na
241-AP-104	2.93E-07	1.05E-09	1.55E-07	2.30E-07	6.79E-07	4.34E-09	1.55E-11	2.29E-09	3.41E-09	1.01E-08
Supernatant	2.93E-07	1.05E-09	1.55E-07	4.61E-08	4.95E-07	4.34E-09	1.55E-11	2.29E-09	6.83E-10	7.33E-09
Solid Layer	not exist	na	na	na	na	na	na	na	na	na
241-AP-105	2.23E-07	1.15E-10	6.16E-08	2.73E-07	5.58E-07	3.40E-09	1.75E-12	9.37E-10	4.15E-09	8.49E-09
Supernatant	1.98E-07	5.14E-11	6.97E-08	2.97E-08	2.97E-07	2.91E-09	7.56E-13	1.03E-09	4.37E-10	4.37E-09
Solid Layer	2.91E-07	3.29E-10	3.00E-08	1.87E-07	5.08E-07	5.42E-09	6.13E-12	5.60E-10	3.48E-09	9.47E-09
241-AP-106	3.51E-07	4.10E-11	9.07E-08	2.41E-07	6.83E-07	4.92E-09	5.74E-13	1.27E-09	3.37E-09	9.57E-09
Supernatant	3.51E-07	4.10E-11	9.07E-08	4.82E-08	4.90E-07	4.92E-09	5.74E-13	1.27E-09	6.75E-10	6.87E-09
Solid Layer	not exist	na	na	na	na	na	na	na	na	na
241-AP-107	1.96E-07	2.52E-11	6.40E-08	2.28E-07	4.89E-07	2.91E-09	3.73E-13	9.48E-10	3.38E-09	7.24E-09
Supernatant	1.96E-07	2.52E-11	6.40E-08	4.57E-08	3.06E-07	2.91E-09	3.73E-13	9.48E-10	6.77E-10	4.53E-09
Solid Layer	not exist	na	na	na	na	na	na	na	na	na
241-AP-108	2.13E-07	1.87E-11	8.98E-07	2.31E-07	1.34E-06	3.52E-09	3.10E-13	1.49E-08	3.83E-09	2.22E-08
Supernatant	2.13E-07	1.87E-11	8.98E-07	4.63E-08	1.16E-06	3.52E-09	3.10E-13	1.49E-08	7.66E-10	1.92E-08
Solid Layer	not exist	na	na	na	na	na	na	na	na	na
241-AW-101	2.71E-07	1.27E-09	2.80E-07	1.98E-07	7.50E-07	4.74E-09	2.22E-11	4.89E-09	3.46E-09	1.31E-08
Supernatant	2.69E-07	1.83E-11	2.84E-07	2.57E-08	5.79E-07	4.58E-09	3.11E-13	4.83E-09	4.37E-10	9.85E-09
Solid Layer	2.75E-07	3.56E-09	2.73E-07	6.50E-08	6.17E-07	5.07E-09	6.54E-11	5.02E-09	1.20E-09	1.13E-08
241-AW-102	2.80E-07	7.42E-09	1.95E-07	9.23E-07	1.41E-06	4.09E-09	1.09E-10	2.85E-09	1.35E-08	2.05E-08
Supernatant	1.96E-07	2.23E-11	2.03E-07	2.99E-08	4.29E-07	2.86E-09	3.25E-13	2.95E-09	4.37E-10	6.25E-09
Solid Layer	9.95E-07	7.43E-08	9.18E-08	2.71E-06	3.87E-06	1.52E-08	1.14E-09	1.40E-09	4.14E-08	5.92E-08
241-AW-103	1.17E-07	5.23E-09	7.05E-08	2.25E-07	4.18E-07	1.78E-09	7.94E-11	1.07E-09	3.42E-09	6.34E-09
Supernatant	1.75E-07	1.62E-11	4.59E-08	3.04E-08	2.51E-07	2.51E-09	2.33E-13	6.59E-10	4.37E-10	3.61E-09
Solid Layer	4.23E-08	1.29E-08	1.37E-07	7.55E-08	2.68E-07	7.29E-10	2.22E-10	2.36E-09	1.30E-09	4.62E-09

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-AW-104	2.57E-07	6.36E-09	5.03E-07	2.16E-07	9.82E-07	4.10E-09	1.01E-10	8.02E-09	3.44E-09	1.57E-08
Supernatant	3.04E-07	6.38E-11	6.17E-07	2.80E-08	9.49E-07	4.75E-09	9.96E-13	9.65E-09	4.37E-10	1.48E-08
Solid Layer	1.43E-07	2.47E-08	2.35E-07	9.61E-08	4.99E-07	2.45E-09	4.25E-10	4.04E-09	1.65E-09	8.57E-09
241-AW-105	1.64E-07	3.98E-08	2.28E-09	3.74E-07	5.80E-07	2.36E-09	5.74E-10	3.29E-11	5.40E-09	8.37E-09
Supernatant	6.07E-08	5.05E-11	1.27E-09	8.98E-08	1.52E-07	7.38E-10	6.14E-13	1.54E-11	1.09E-09	1.85E-09
Solid Layer	1.64E-07	4.32E-08	2.26E-09	9.26E-08	3.02E-07	2.59E-09	6.81E-10	3.57E-11	1.46E-09	4.77E-09
241-AW-106	2.58E-07	5.71E-10	3.61E-07	2.28E-07	8.47E-07	4.17E-09	9.24E-12	5.83E-09	3.69E-09	1.37E-08
Supernatant	2.08E-07	3.96E-11	4.54E-07	2.90E-08	6.91E-07	3.12E-09	5.96E-13	6.83E-09	4.37E-10	1.04E-08
Solid Layer	2.78E-07	1.06E-09	2.21E-07	7.47E-08	5.75E-07	5.18E-09	1.98E-11	4.12E-09	1.39E-09	1.07E-08
241-AY-101	6.92E-06	1.57E-06	1.31E-07	5.73E-07	9.19E-06	1.16E-07	2.63E-08	2.20E-09	9.62E-09	1.54E-07
Supernatant	8.73E-08	3.66E-09	1.37E-07	7.93E-08	3.07E-07	1.20E-09	5.04E-11	1.89E-09	1.09E-09	4.23E-09
Solid Layer	1.06E-05	1.62E-06	7.16E-08	1.67E-07	1.24E-05	2.06E-07	3.16E-08	1.39E-09	3.25E-09	2.42E-07
241-AY-102	1.48E-05	3.49E-07	3.08E-07	2.62E-07	1.57E-05	2.13E-07	5.02E-09	4.44E-09	3.77E-09	2.26E-07
Supernatant	1.08E-07	4.37E-10	1.87E-07	7.99E-08	3.76E-07	1.48E-09	5.96E-12	2.56E-09	1.09E-09	5.14E-09
Solid Layer	5.99E-05	1.41E-06	9.27E-07	3.11E-07	6.26E-05	1.07E-06	2.53E-08	1.66E-08	5.58E-09	1.12E-06
241-AZ-101	7.62E-06	4.83E-07	8.19E-07	2.49E-07	9.17E-06	1.11E-07	7.05E-09	1.20E-08	3.63E-09	1.34E-07
Supernatant	3.23E-06	1.27E-10	7.87E-07	3.04E-08	4.05E-06	4.63E-08	1.82E-12	1.13E-08	4.37E-10	5.81E-08
Solid Layer	4.34E-05	4.22E-06	1.21E-06	2.99E-07	4.92E-05	8.19E-07	7.96E-08	2.28E-08	5.64E-09	9.27E-07
241-AZ-102	9.35E-06	7.57E-07	2.43E-07	2.69E-07	1.06E-05	1.24E-07	1.00E-08	3.21E-09	3.56E-09	1.40E-07
Supernatant	4.75E-06	1.49E-09	2.13E-07	3.40E-08	5.00E-06	6.10E-08	1.92E-11	2.74E-09	4.37E-10	6.42E-08
Solid Layer	2.50E-05	3.20E-06	4.60E-07	1.85E-07	2.89E-05	4.09E-07	5.23E-08	7.50E-09	3.02E-09	4.71E-07
241-SY-101	2.62E-07	1.03E-08	9.41E-08	3.64E-07	7.31E-07	4.41E-09	1.73E-10	1.58E-09	6.14E-09	1.23E-08
Supernatant	2.04E-07	3.22E-11	1.18E-07	2.90E-08	3.51E-07	3.06E-09	4.85E-13	1.77E-09	4.37E-10	5.27E-09
Solid Layer	2.75E-07	1.31E-08	8.62E-08	8.87E-08	4.63E-07	4.84E-09	2.30E-10	1.52E-09	1.56E-09	8.15E-09
241-SY-102	1.78E-07	2.56E-07	1.00E-07	2.31E-07	7.65E-07	2.76E-09	3.97E-09	1.55E-09	3.58E-09	1.19E-08
Supernatant	1.51E-07	3.20E-11	6.70E-08	2.90E-08	2.47E-07	2.27E-09	4.81E-13	1.01E-09	4.37E-10	3.71E-09
Solid Layer	2.84E-07	9.95E-07	1.47E-07	1.27E-07	1.55E-06	5.12E-09	1.80E-08	2.65E-09	2.30E-09	2.80E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-SY-103	3.98E-07	1.01E-08	4.87E-07	2.32E-07	1.13E-06	7.05E-09	1.80E-10	8.62E-09	4.12E-09	2.00E-08
Supernatant	4.32E-07	4.91E-11	4.06E-07	2.57E-08	8.64E-07	7.35E-09	8.36E-13	6.91E-09	4.37E-10	1.47E-08
Solid Layer	3.59E-07	2.01E-08	5.94E-07	7.09E-08	1.04E-06	6.69E-09	3.75E-10	1.11E-08	1.32E-09	1.95E-08
241-A-101	2.17E-07	4.96E-09	1.18E-06	2.53E-07	1.66E-06	4.27E-09	9.76E-11	2.33E-08	4.97E-09	3.26E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.17E-07	4.96E-09	1.18E-06	2.53E-07	1.66E-06	4.27E-09	9.76E-11	2.33E-08	4.97E-09	3.26E-08
241-A-102	6.33E-07	1.07E-07	6.87E-07	3.76E-06	5.19E-06	1.22E-08	2.05E-09	1.32E-08	7.23E-08	9.97E-08
Supernatant	3.96E-07	1.84E-10	7.23E-07	2.41E-07	1.36E-06	7.20E-09	3.34E-12	1.31E-08	4.37E-09	2.47E-08
Solid Layer	6.47E-07	1.13E-07	6.83E-07	4.05E-06	5.49E-06	1.25E-08	2.19E-09	1.32E-08	7.82E-08	1.06E-07
241-A-103	2.95E-07	6.04E-09	1.57E-06	2.93E-07	2.17E-06	4.69E-09	9.62E-11	2.50E-08	4.67E-09	3.45E-08
Supernatant	3.28E-07	6.54E-10	3.67E-06	1.04E-07	4.10E-06	5.51E-09	1.10E-11	6.15E-08	1.75E-09	6.88E-08
Solid Layer	2.94E-07	6.10E-09	1.55E-06	2.96E-07	2.15E-06	4.68E-09	9.69E-11	2.47E-08	4.70E-09	3.42E-08
241-A-104	0.00E+00	0.00E+00	0.00E+00	2.13E-06	2.13E-06	0.00E+00	0.00E+00	0.00E+00	4.05E-08	4.05E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	0.00E+00	0.00E+00	0.00E+00	2.13E-06	2.13E-06	0.00E+00	0.00E+00	0.00E+00	4.05E-08	4.05E-08
241-A-105	na	na	na	na	na	na	na	na	na	na
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	na	na	na	na	na	na	na	na	na	na
241-A-106	3.10E-06	1.20E-07	1.50E-06	7.86E-07	5.51E-06	6.09E-08	2.37E-09	2.96E-08	1.55E-08	1.08E-07
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.10E-06	1.20E-07	1.50E-06	7.86E-07	5.51E-06	6.09E-08	2.37E-09	2.96E-08	1.55E-08	1.08E-07
241-AX-101	2.24E-07	4.14E-09	2.46E-07	2.43E-07	7.17E-07	4.41E-09	8.15E-11	4.86E-09	4.78E-09	1.41E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.24E-07	4.14E-09	2.46E-07	2.43E-07	7.17E-07	4.41E-09	8.15E-11	4.86E-09	4.78E-09	1.41E-08
241-AX-102	2.29E-06	3.24E-07	3.07E-07	2.08E-06	5.00E-06	4.18E-08	5.92E-09	5.60E-09	3.81E-08	9.14E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.29E-06	3.24E-07	3.07E-07	2.08E-06	5.00E-06	4.18E-08	5.92E-09	5.60E-09	3.81E-08	9.14E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-AX-103	1.16E-06	3.74E-08	4.29E-07	6.52E-07	2.28E-06	2.12E-08	6.84E-10	7.85E-09	1.19E-08	4.17E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.16E-06	3.74E-08	4.29E-07	6.52E-07	2.28E-06	2.12E-08	6.84E-10	7.85E-09	1.19E-08	4.17E-08
241-AX-104	1.78E-05	1.89E-07	1.01E-08	7.12E-06	2.51E-05	3.70E-07	3.93E-09	2.11E-10	1.48E-07	5.23E-07
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.78E-05	1.89E-07	1.01E-08	7.12E-06	2.51E-05	3.70E-07	3.93E-09	2.11E-10	1.48E-07	5.23E-07
241-B-101	3.26E-07	2.58E-08	1.71E-10	6.81E-07	1.03E-06	5.62E-09	4.45E-10	2.95E-12	1.17E-08	1.78E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.26E-07	2.58E-08	1.71E-10	6.81E-07	1.03E-06	5.62E-09	4.45E-10	2.95E-12	1.17E-08	1.78E-08
241-B-102	3.82E-09	6.33E-10	4.39E-12	1.96E-06	1.97E-06	6.93E-11	1.15E-11	7.96E-14	3.57E-08	3.57E-08
Supernatant	1.30E-08	1.80E-10	6.41E-12	1.20E-07	1.33E-07	1.89E-10	2.63E-12	9.35E-14	1.75E-09	1.94E-09
Solid Layer	3.09E-09	6.54E-10	4.16E-12	2.17E-06	2.17E-06	5.77E-11	1.22E-11	7.77E-14	4.05E-08	4.05E-08
241-B-103	4.49E-09	3.64E-09	4.13E-12	1.14E-06	1.14E-06	8.38E-11	6.79E-11	7.71E-14	2.12E-08	2.13E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.49E-09	3.64E-09	4.13E-12	1.14E-06	1.14E-06	8.38E-11	6.79E-11	7.71E-14	2.12E-08	2.13E-08
241-B-104	8.82E-09	1.08E-09	4.82E-12	2.90E-07	3.00E-07	1.41E-10	1.73E-11	7.72E-14	4.64E-09	4.80E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	8.82E-09	1.08E-09	4.82E-12	2.90E-07	3.00E-07	1.41E-10	1.73E-11	7.72E-14	4.64E-09	4.80E-09
241-B-105	2.67E-09	7.41E-10	7.78E-12	2.87E-07	2.90E-07	5.11E-11	1.42E-11	1.49E-13	5.49E-09	5.55E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.67E-09	7.41E-10	7.78E-12	2.87E-07	2.90E-07	5.11E-11	1.42E-11	1.49E-13	5.49E-09	5.55E-09
241-B-106	9.96E-08	1.12E-09	1.09E-11	6.63E-07	7.64E-07	1.59E-09	1.78E-11	1.73E-13	1.06E-08	1.22E-08
Supernatant	1.30E-08	1.80E-10	6.01E-12	1.20E-07	1.33E-07	1.89E-10	2.63E-12	8.76E-14	1.75E-09	1.94E-09
Solid Layer	1.00E-07	1.12E-09	1.09E-11	6.67E-07	7.69E-07	1.60E-09	1.79E-11	1.74E-13	1.07E-08	1.23E-08
241-B-107	9.84E-09	7.06E-10	1.39E-12	4.50E-07	4.60E-07	1.85E-10	1.33E-11	2.61E-14	8.46E-09	8.66E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.84E-09	7.06E-10	1.39E-12	4.50E-07	4.60E-07	1.85E-10	1.33E-11	2.61E-14	8.46E-09	8.66E-09

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-B-108	5.61E-09	3.22E-11	2.98E-12	6.96E-07	7.02E-07	1.09E-10	6.25E-13	5.79E-14	1.35E-08	1.36E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.61E-09	3.22E-11	2.98E-12	6.96E-07	7.02E-07	1.09E-10	6.25E-13	5.79E-14	1.35E-08	1.36E-08
241-B-109	1.92E-09	4.82E-10	4.04E-12	5.05E-07	5.07E-07	3.96E-11	9.96E-12	8.35E-14	1.04E-08	1.05E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.92E-09	4.82E-10	4.04E-12	5.05E-07	5.07E-07	3.96E-11	9.96E-12	8.35E-14	1.04E-08	1.05E-08
241-B-110	2.31E-07	9.32E-09	6.37E-08	3.92E-07	6.96E-07	3.64E-09	1.47E-10	1.00E-09	6.17E-09	1.10E-08
Supernatant	3.62E-08	7.30E-10	6.65E-08	1.27E-07	2.30E-07	4.98E-10	1.01E-11	9.16E-10	1.75E-09	3.17E-09
Solid Layer	2.32E-07	9.35E-09	6.37E-08	3.93E-07	6.98E-07	3.65E-09	1.47E-10	1.00E-09	6.18E-09	1.10E-08
241-B-111	5.91E-07	7.16E-09	6.74E-08	4.24E-07	1.09E-06	8.68E-09	1.05E-10	9.90E-10	6.24E-09	1.60E-08
Supernatant	3.65E-08	7.31E-10	8.68E-08	1.27E-07	2.51E-07	5.03E-10	1.01E-11	1.20E-09	1.75E-09	3.46E-09
Solid Layer	5.91E-07	7.17E-09	6.72E-08	4.26E-07	1.09E-06	8.69E-09	1.05E-10	9.88E-10	6.26E-09	1.60E-08
241-B-112	4.13E-08	1.11E-10	1.51E-07	1.90E-06	2.09E-06	7.14E-10	1.92E-12	2.60E-09	3.28E-08	3.61E-08
Supernatant	1.14E-07	2.47E-10	2.84E-07	1.00E-07	4.98E-07	1.99E-09	4.31E-12	4.96E-09	1.75E-09	8.71E-09
Solid Layer	3.58E-08	9.98E-11	1.42E-07	2.06E-06	2.24E-06	6.19E-10	1.72E-12	2.45E-09	3.57E-08	3.87E-08
241-B-201	5.80E-09	4.50E-08	1.37E-08	6.23E-07	6.88E-07	8.46E-11	6.56E-10	2.01E-10	9.09E-09	1.00E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.80E-09	4.50E-08	1.37E-08	6.23E-07	6.88E-07	8.46E-11	6.56E-10	2.01E-10	9.09E-09	1.00E-08
241-B-202	1.06E-08	1.29E-08	2.44E-08	6.50E-07	6.98E-07	1.49E-10	1.82E-10	3.45E-10	9.18E-09	9.86E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.06E-08	1.29E-08	2.44E-08	6.50E-07	6.98E-07	1.49E-10	1.82E-10	3.45E-10	9.18E-09	9.86E-09
241-B-203	3.69E-10	2.28E-08	0.00E+00	1.46E-06	1.49E-06	5.08E-12	3.13E-10	0.00E+00	2.01E-08	2.04E-08
Supernatant	8.40E-13	3.94E-10	0.00E+00	1.35E-06	1.35E-06	1.02E-14	4.79E-12	0.00E+00	1.64E-08	1.64E-08
Solid Layer	3.72E-10	2.29E-08	0.00E+00	1.46E-06	1.49E-06	5.12E-12	3.16E-10	0.00E+00	2.02E-08	2.05E-08
241-B-204	1.38E-10	2.72E-08	0.00E+00	1.47E-06	1.50E-06	1.90E-12	3.74E-10	0.00E+00	2.02E-08	2.06E-08
Supernatant	4.91E-13	9.14E-12	0.00E+00	1.35E-06	1.35E-06	5.96E-15	1.11E-13	0.00E+00	1.64E-08	1.64E-08
Solid Layer	1.40E-10	2.75E-08	0.00E+00	1.47E-06	1.50E-06	1.93E-12	3.79E-10	0.00E+00	2.02E-08	2.06E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-BX-101	2.33E-08	8.99E-09	1.00E-08	1.30E-06	1.35E-06	4.39E-10	1.69E-10	1.89E-10	2.45E-08	2.53E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.33E-08	8.99E-09	1.00E-08	1.30E-06	1.35E-06	4.39E-10	1.69E-10	1.89E-10	2.45E-08	2.53E-08
241-BX-102	8.30E-10	1.04E-09	1.06E-08	1.29E-06	1.30E-06	1.00E-11	1.26E-11	1.28E-10	1.55E-08	1.57E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	8.30E-10	1.04E-09	1.06E-08	1.29E-06	1.30E-06	1.00E-11	1.26E-11	1.28E-10	1.55E-08	1.57E-08
241-BX-103	1.38E-07	1.76E-07	4.30E-08	9.26E-07	1.28E-06	2.43E-09	3.10E-09	7.56E-10	1.63E-08	2.26E-08
Supernatant	5.93E-09	1.22E-09	6.54E-08	1.41E-07	2.14E-07	7.35E-11	1.51E-11	8.10E-10	1.75E-09	2.65E-09
Solid Layer	1.46E-07	1.87E-07	4.01E-08	1.03E-06	1.40E-06	2.72E-09	3.48E-09	7.47E-10	1.92E-08	2.62E-08
241-BX-104	2.53E-07	1.83E-08	2.54E-08	6.50E-07	9.47E-07	4.89E-09	3.53E-10	4.91E-10	1.25E-08	1.83E-08
Supernatant	1.62E-07	1.76E-11	5.44E-08	1.18E-07	3.35E-07	2.40E-09	2.61E-13	8.06E-10	1.75E-09	4.96E-09
Solid Layer	2.51E-07	1.82E-08	2.48E-08	6.62E-07	9.56E-07	4.88E-09	3.54E-10	4.82E-10	1.29E-08	1.86E-08
241-BX-105	1.15E-07	2.30E-09	2.04E-08	8.99E-07	1.04E-06	2.16E-09	4.30E-11	3.82E-10	1.68E-08	1.94E-08
Supernatant	2.02E-07	1.48E-09	7.00E-08	1.17E-07	3.91E-07	3.02E-09	2.21E-11	1.05E-09	1.75E-09	5.83E-09
Solid Layer	1.02E-07	2.07E-09	1.76E-08	9.43E-07	1.06E-06	1.94E-09	3.93E-11	3.34E-10	1.79E-08	2.02E-08
241-BX-106	3.32E-07	1.94E-08	1.23E-08	1.61E-06	1.98E-06	6.30E-09	3.68E-10	2.34E-10	3.06E-08	3.75E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.32E-07	1.94E-08	1.23E-08	1.61E-06	1.98E-06	6.30E-09	3.68E-10	2.34E-10	3.06E-08	3.75E-08
241-BX-107	4.32E-08	3.03E-09	1.33E-08	2.92E-07	3.52E-07	7.20E-10	5.06E-11	2.22E-10	4.87E-09	5.87E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.32E-08	3.03E-09	1.33E-08	2.92E-07	3.52E-07	7.20E-10	5.06E-11	2.22E-10	4.87E-09	5.87E-09
241-BX-108	1.26E-07	1.06E-09	5.14E-09	2.15E-06	2.28E-06	2.12E-09	1.79E-11	8.66E-11	3.62E-08	3.84E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.26E-07	1.06E-09	5.14E-09	2.15E-06	2.28E-06	2.12E-09	1.79E-11	8.66E-11	3.62E-08	3.84E-08
241-BX-109	3.06E-07	7.35E-10	2.00E-08	4.19E-07	7.46E-07	5.39E-09	1.29E-11	3.53E-10	7.37E-09	1.31E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.06E-07	7.35E-10	2.00E-08	4.19E-07	7.46E-07	5.39E-09	1.29E-11	3.53E-10	7.37E-09	1.31E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-BX-110	4.74E-08	3.10E-10	5.92E-08	3.66E-07	4.72E-07	9.12E-10	5.97E-12	1.14E-09	7.04E-09	9.09E-09
Supernatant	9.20E-08	1.36E-10	8.13E-08	1.05E-07	2.78E-07	1.53E-09	2.27E-12	1.35E-09	1.75E-09	4.64E-09
Solid Layer	4.72E-08	3.11E-10	5.91E-08	3.67E-07	4.74E-07	9.09E-10	5.99E-12	1.14E-09	7.07E-09	9.12E-09
241-BX-111	7.11E-09	5.92E-11	2.11E-09	4.48E-07	4.57E-07	1.19E-10	9.91E-13	3.53E-11	7.50E-09	7.66E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.11E-09	5.92E-11	2.11E-09	4.48E-07	4.57E-07	1.19E-10	9.91E-13	3.53E-11	7.50E-09	7.66E-09
241-BX-112	1.11E-07	9.47E-09	0.00E+00	5.51E-07	6.71E-07	1.67E-09	1.43E-10	0.00E+00	8.34E-09	1.02E-08
Supernatant	3.92E-09	9.24E-11	0.00E+00	1.28E-07	1.32E-07	5.35E-11	1.26E-12	0.00E+00	1.75E-09	1.80E-09
Solid Layer	1.11E-07	9.53E-09	0.00E+00	5.54E-07	6.75E-07	1.69E-09	1.45E-10	0.00E+00	8.40E-09	1.02E-08
241-BY-101	8.88E-08	5.11E-10	1.72E-07	2.22E-07	4.84E-07	1.87E-09	1.08E-11	3.64E-09	4.68E-09	1.02E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	8.88E-08	5.11E-10	1.72E-07	2.22E-07	4.84E-07	1.87E-09	1.08E-11	3.64E-09	4.68E-09	1.02E-08
241-BY-102	2.09E-08	1.01E-09	9.76E-09	3.10E-07	3.42E-07	3.80E-10	1.84E-11	1.77E-10	5.64E-09	6.22E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.09E-08	1.01E-09	9.76E-09	3.10E-07	3.42E-07	3.80E-10	1.84E-11	1.77E-10	5.64E-09	6.22E-09
241-BY-103	2.35E-08	2.26E-10	1.66E-08	2.27E-07	2.67E-07	4.53E-10	4.35E-12	3.20E-10	4.35E-09	5.13E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.35E-08	2.26E-10	1.66E-08	2.27E-07	2.67E-07	4.53E-10	4.35E-12	3.20E-10	4.35E-09	5.13E-09
241-BY-104	8.56E-08	8.78E-10	1.07E-07	2.42E-07	4.35E-07	1.69E-09	1.74E-11	2.12E-09	4.77E-09	8.60E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	8.56E-08	8.78E-10	1.07E-07	2.42E-07	4.35E-07	1.69E-09	1.74E-11	2.12E-09	4.77E-09	8.60E-09
241-BY-105	3.68E-08	6.97E-10	5.33E-08	1.92E-07	2.83E-07	7.68E-10	1.45E-11	1.11E-09	4.00E-09	5.90E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.68E-08	6.97E-10	5.33E-08	1.92E-07	2.83E-07	7.68E-10	1.45E-11	1.11E-09	4.00E-09	5.90E-09
241-BY-106	1.05E-07	4.69E-10	8.81E-08	2.11E-07	4.05E-07	2.04E-09	9.08E-12	1.71E-09	4.09E-09	7.85E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.05E-07	4.69E-10	8.81E-08	2.11E-07	4.05E-07	2.04E-09	9.08E-12	1.71E-09	4.09E-09	7.85E-09

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-BY-107	7.30E-08	4.11E-10	6.81E-08	2.94E-07	4.35E-07	1.43E-09	8.02E-12	1.33E-09	5.74E-09	8.50E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.30E-08	4.11E-10	6.81E-08	2.94E-07	4.35E-07	1.43E-09	8.02E-12	1.33E-09	5.74E-09	8.50E-09
241-BY-108	6.81E-08	6.51E-10	9.37E-08	3.86E-07	5.49E-07	1.17E-09	1.12E-11	1.61E-09	6.63E-09	9.41E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.81E-08	6.51E-10	9.37E-08	3.86E-07	5.49E-07	1.17E-09	1.12E-11	1.61E-09	6.63E-09	9.41E-09
241-BY-109	1.96E-08	6.51E-10	6.52E-09	2.80E-07	3.07E-07	3.87E-10	1.28E-11	1.29E-10	5.53E-09	6.05E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.96E-08	6.51E-10	6.52E-09	2.80E-07	3.07E-07	3.87E-10	1.28E-11	1.29E-10	5.53E-09	6.05E-09
241-BY-110	8.95E-08	6.51E-10	5.00E-07	2.60E-07	8.50E-07	1.62E-09	1.18E-11	9.06E-09	4.71E-09	1.54E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	8.95E-08	6.51E-10	5.00E-07	2.60E-07	8.50E-07	1.62E-09	1.18E-11	9.06E-09	4.71E-09	1.54E-08
241-BY-111	1.43E-08	5.46E-10	3.45E-09	2.78E-07	2.96E-07	2.75E-10	1.05E-11	6.63E-11	5.35E-09	5.70E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.43E-08	5.46E-10	3.45E-09	2.78E-07	2.96E-07	2.75E-10	1.05E-11	6.63E-11	5.35E-09	5.70E-09
241-BY-112	8.70E-09	2.36E-10	9.73E-09	2.76E-07	2.94E-07	1.75E-10	4.75E-12	1.96E-10	5.54E-09	5.91E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	8.70E-09	2.36E-10	9.73E-09	2.76E-07	2.94E-07	1.75E-10	4.75E-12	1.96E-10	5.54E-09	5.91E-09
241-C-101	1.24E-07	2.19E-08	3.50E-08	6.83E-07	8.64E-07	2.55E-09	4.51E-10	7.21E-10	1.41E-08	1.78E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.24E-07	2.19E-08	3.50E-08	6.83E-07	8.64E-07	2.55E-09	4.51E-10	7.21E-10	1.41E-08	1.78E-08
241-C-102	3.31E-08	6.33E-08	2.25E-08	2.66E-07	3.85E-07	6.44E-10	1.23E-09	4.37E-10	5.18E-09	7.49E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.31E-08	6.33E-08	2.25E-08	2.66E-07	3.85E-07	6.44E-10	1.23E-09	4.37E-10	5.18E-09	7.49E-09
241-C-103	3.14E-05	1.59E-06	0.00E+00	2.30E-06	3.53E-05	5.71E-07	2.90E-08	0.00E+00	4.19E-08	6.42E-07
Supernatant	3.54E-07	5.86E-09	0.00E+00	3.53E-07	7.13E-07	4.38E-09	7.26E-11	0.00E+00	4.37E-09	8.83E-09
Solid Layer	3.15E-05	1.60E-06	0.00E+00	2.31E-06	3.54E-05	5.74E-07	2.91E-08	0.00E+00	4.22E-08	6.45E-07

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-C-104	7.74E-07	3.11E-07	1.77E-07	3.05E-07	1.57E-06	1.50E-08	6.06E-09	3.44E-09	5.94E-09	3.05E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.74E-07	3.11E-07	1.77E-07	3.05E-07	1.57E-06	1.50E-08	6.06E-09	3.44E-09	5.94E-09	3.05E-08
241-C-105	9.23E-07	2.06E-07	1.72E-08	5.55E-07	1.70E-06	1.65E-08	3.69E-09	3.09E-10	9.95E-09	3.05E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.23E-07	2.06E-07	1.72E-08	5.55E-07	1.70E-06	1.65E-08	3.69E-09	3.09E-10	9.95E-09	3.05E-08
241-C-106	4.50E-05	7.68E-07	7.64E-10	5.50E-05	1.01E-04	8.03E-07	1.37E-08	1.36E-11	9.82E-07	1.80E-06
Supernatant	8.49E-09	4.54E-12	2.37E-09	3.70E-07	3.81E-07	1.00E-10	5.35E-14	2.80E-11	4.37E-09	4.50E-09
Solid Layer	4.47E-05	7.64E-07	7.38E-10	5.61E-05	1.02E-04	8.07E-07	1.38E-08	1.33E-11	1.01E-06	1.83E-06
241-C-107	2.44E-06	1.73E-07	1.44E-07	3.42E-07	3.10E-06	4.38E-08	3.11E-09	2.58E-09	6.14E-09	5.57E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.44E-06	1.73E-07	1.44E-07	3.42E-07	3.10E-06	4.38E-08	3.11E-09	2.58E-09	6.14E-09	5.57E-08
241-C-108	3.32E-07	1.30E-09	2.60E-08	1.06E-06	1.42E-06	5.69E-09	2.23E-11	4.45E-10	1.82E-08	2.43E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.32E-07	1.30E-09	2.60E-08	1.06E-06	1.42E-06	5.69E-09	2.23E-11	4.45E-10	1.82E-08	2.43E-08
241-C-109	1.99E-06	1.16E-08	2.39E-08	1.05E-06	3.08E-06	3.57E-08	2.08E-10	4.28E-10	1.88E-08	5.52E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.99E-06	1.16E-08	2.39E-08	1.05E-06	3.08E-06	3.57E-08	2.08E-10	4.28E-10	1.88E-08	5.52E-08
241-C-110	4.58E-08	5.96E-09	8.33E-10	1.26E-06	1.32E-06	7.10E-10	9.23E-11	1.29E-11	1.96E-08	2.04E-08
Supernatant	1.38E-08	1.38E-10	1.50E-09	3.43E-07	3.59E-07	1.76E-10	1.75E-12	1.91E-11	4.37E-09	4.57E-09
Solid Layer	4.59E-08	5.96E-09	8.30E-10	1.27E-06	1.32E-06	7.11E-10	9.25E-11	1.29E-11	1.97E-08	2.05E-08
241-C-111	5.05E-06	3.68E-08	2.03E-08	1.15E-06	6.27E-06	9.04E-08	6.59E-10	3.62E-10	2.07E-08	1.12E-07
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.05E-06	3.68E-08	2.03E-08	1.15E-06	6.27E-06	9.04E-08	6.59E-10	3.62E-10	2.07E-08	1.12E-07
241-C-112	3.32E-06	4.18E-08	3.90E-08	6.58E-07	4.05E-06	6.14E-08	7.75E-10	7.22E-10	1.22E-08	7.51E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.32E-06	4.18E-08	3.90E-08	6.58E-07	4.05E-06	6.14E-08	7.75E-10	7.22E-10	1.22E-08	7.51E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/r}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-C-201	6.52E-08	1.19E-07	2.55E-09	8.35E-06	8.54E-06	1.09E-09	1.98E-09	4.24E-11	1.39E-07	1.42E-07
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.52E-08	1.19E-07	2.55E-09	8.35E-06	8.54E-06	1.09E-09	1.98E-09	4.24E-11	1.39E-07	1.42E-07
241-C-202	1.39E-07	1.17E-07	2.82E-09	9.61E-06	9.86E-06	2.31E-09	1.95E-09	4.70E-11	1.60E-07	1.64E-07
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.39E-07	1.17E-07	2.82E-09	9.61E-06	9.86E-06	2.31E-09	1.95E-09	4.70E-11	1.60E-07	1.64E-07
241-C-203	2.77E-08	3.23E-08	4.35E-09	2.94E-06	3.01E-06	5.19E-10	6.05E-10	8.17E-11	5.52E-08	5.64E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.77E-08	3.23E-08	4.35E-09	2.94E-06	3.01E-06	5.19E-10	6.05E-10	8.17E-11	5.52E-08	5.64E-08
241-C-204	2.94E-08	2.98E-10	9.03E-09	2.78E-06	2.82E-06	5.52E-10	5.58E-12	1.69E-10	5.21E-08	5.29E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.94E-08	2.98E-10	9.03E-09	2.78E-06	2.82E-06	5.52E-10	5.58E-12	1.69E-10	5.21E-08	5.29E-08
241-S-101	3.17E-07	5.91E-09	1.83E-07	2.54E-07	7.59E-07	6.04E-09	1.13E-10	3.49E-09	4.84E-09	1.45E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.17E-07	5.91E-09	1.83E-07	2.54E-07	7.59E-07	6.04E-09	1.13E-10	3.49E-09	4.84E-09	1.45E-08
241-S-102	9.47E-08	2.81E-09	2.17E-07	3.11E-07	6.25E-07	1.74E-09	5.17E-11	3.99E-09	5.72E-09	1.15E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.47E-08	2.81E-09	2.17E-07	3.11E-07	6.25E-07	1.74E-09	5.17E-11	3.99E-09	5.72E-09	1.15E-08
241-S-103	1.36E-07	3.33E-09	9.11E-08	3.39E-07	5.70E-07	2.54E-09	6.22E-11	1.70E-09	6.33E-09	1.06E-08
Supernatant	2.44E-07	2.37E-11	1.49E-07	1.04E-07	4.97E-07	4.09E-09	3.97E-13	2.51E-09	1.75E-09	8.35E-09
Solid Layer	1.36E-07	3.34E-09	9.09E-08	3.40E-07	5.70E-07	2.53E-09	6.23E-11	1.70E-09	6.35E-09	1.06E-08
241-S-104	2.23E-07	5.98E-09	1.84E-08	2.84E-07	5.32E-07	4.33E-09	1.16E-10	3.58E-10	5.51E-09	1.03E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.23E-07	5.98E-09	1.84E-08	2.84E-07	5.32E-07	4.33E-09	1.16E-10	3.58E-10	5.51E-09	1.03E-08
241-S-105	1.76E-09	1.16E-11	4.35E-09	2.30E-07	2.37E-07	3.38E-11	2.23E-13	8.35E-11	4.42E-09	4.54E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.76E-09	1.16E-11	4.35E-09	2.30E-07	2.37E-07	3.38E-11	2.23E-13	8.35E-11	4.42E-09	4.54E-09

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-S-106	5.62E-08	4.54E-10	2.66E-08	2.07E-07	2.90E-07	1.12E-09	9.05E-12	5.30E-10	4.13E-09	5.79E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.62E-08	4.54E-10	2.66E-08	2.07E-07	2.90E-07	1.12E-09	9.05E-12	5.30E-10	4.13E-09	5.79E-09
241-S-107	1.95E-07	2.29E-08	3.39E-08	2.32E-07	4.84E-07	4.00E-09	4.72E-10	6.97E-10	4.77E-09	9.94E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.95E-07	2.29E-08	3.39E-08	2.32E-07	4.84E-07	4.00E-09	4.72E-10	6.97E-10	4.77E-09	9.94E-09
241-S-108	3.46E-09	9.75E-11	3.53E-09	1.92E-07	1.99E-07	6.71E-11	1.89E-12	6.85E-11	3.72E-09	3.86E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.46E-09	9.75E-11	3.53E-09	1.92E-07	1.99E-07	6.71E-11	1.89E-12	6.85E-11	3.72E-09	3.86E-09
241-S-109	5.84E-09	2.38E-10	6.92E-09	1.97E-07	2.10E-07	1.12E-10	4.56E-12	1.33E-10	3.78E-09	4.03E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.84E-09	2.38E-10	6.92E-09	1.97E-07	2.10E-07	1.12E-10	4.56E-12	1.33E-10	3.78E-09	4.03E-09
241-S-110	5.40E-08	1.92E-09	7.98E-08	2.36E-07	3.71E-07	1.04E-09	3.70E-11	1.53E-09	4.53E-09	7.14E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.40E-08	1.92E-09	7.98E-08	2.36E-07	3.71E-07	1.04E-09	3.70E-11	1.53E-09	4.53E-09	7.14E-09
241-S-111	1.85E-07	4.10E-10	3.85E-08	2.74E-07	4.98E-07	3.31E-09	7.33E-12	6.88E-10	4.89E-09	8.90E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.85E-07	4.10E-10	3.85E-08	2.74E-07	4.98E-07	3.31E-09	7.33E-12	6.88E-10	4.89E-09	8.90E-09
241-S-112	1.07E-07	5.11E-09	2.24E-08	5.66E-07	7.00E-07	2.09E-09	1.00E-10	4.40E-10	1.11E-08	1.37E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.07E-07	5.11E-09	2.24E-08	5.66E-07	7.00E-07	2.09E-09	1.00E-10	4.40E-10	1.11E-08	1.37E-08
241-SX-101	1.04E-07	1.04E-08	5.04E-07	2.23E-07	8.41E-07	2.01E-09	2.01E-10	9.79E-09	4.34E-09	1.63E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.04E-07	1.04E-08	5.04E-07	2.23E-07	8.41E-07	2.01E-09	2.01E-10	9.79E-09	4.34E-09	1.63E-08
241-SX-102	2.42E-07	5.21E-09	8.25E-07	2.25E-07	1.30E-06	4.73E-09	1.02E-10	1.61E-08	4.41E-09	2.54E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.42E-07	5.21E-09	8.25E-07	2.25E-07	1.30E-06	4.73E-09	1.02E-10	1.61E-08	4.41E-09	2.54E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-SX-103	3.79E-07	7.18E-09	3.06E-06	1.94E-07	3.64E-06	7.58E-09	1.44E-10	6.13E-08	3.88E-09	7.29E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.79E-07	7.18E-09	3.06E-06	1.94E-07	3.64E-06	7.58E-09	1.44E-10	6.13E-08	3.88E-09	7.29E-08
241-SX-104	1.97E-07	4.72E-09	8.01E-07	2.13E-07	1.22E-06	3.87E-09	9.26E-11	1.57E-08	4.18E-09	2.39E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.97E-07	4.72E-09	8.01E-07	2.13E-07	1.22E-06	3.87E-09	9.26E-11	1.57E-08	4.18E-09	2.39E-08
241-SX-105	2.72E-07	1.70E-08	3.09E-06	2.46E-07	3.62E-06	5.13E-09	3.20E-10	5.82E-08	4.63E-09	6.83E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.72E-07	1.70E-08	3.09E-06	2.46E-07	3.62E-06	5.13E-09	3.20E-10	5.82E-08	4.63E-09	6.83E-08
241-SX-106	1.36E-07	5.03E-09	1.51E-07	2.45E-07	5.37E-07	2.48E-09	9.19E-11	2.75E-09	4.48E-09	9.81E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.36E-07	5.03E-09	1.51E-07	2.45E-07	5.37E-07	2.48E-09	9.19E-11	2.75E-09	4.48E-09	9.81E-09
241-SX-107	2.70E-07	9.55E-09	1.20E-06	6.54E-07	2.14E-06	5.47E-09	1.94E-10	2.44E-08	1.33E-08	4.34E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.70E-07	9.55E-09	1.20E-06	6.54E-07	2.14E-06	5.47E-09	1.94E-10	2.44E-08	1.33E-08	4.34E-08
241-SX-108	4.62E-07	6.27E-09	2.53E-07	8.01E-07	1.52E-06	9.46E-09	1.29E-10	5.19E-09	1.64E-08	3.12E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.62E-07	6.27E-09	2.53E-07	8.01E-07	1.52E-06	9.46E-09	1.29E-10	5.19E-09	1.64E-08	3.12E-08
241-SX-109	1.61E-07	3.02E-09	1.17E-06	3.11E-07	1.64E-06	3.23E-09	6.05E-11	2.34E-08	6.24E-09	3.30E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.61E-07	3.02E-09	1.17E-06	3.11E-07	1.64E-06	3.23E-09	6.05E-11	2.34E-08	6.24E-09	3.30E-08
241-SX-110	4.51E-07	1.05E-08	1.21E-06	1.04E-06	2.72E-06	9.12E-09	2.13E-10	2.44E-08	2.11E-08	5.49E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.51E-07	1.05E-08	1.21E-06	1.04E-06	2.72E-06	9.12E-09	2.13E-10	2.44E-08	2.11E-08	5.49E-08
241-SX-111	2.58E-07	8.36E-09	1.94E-06	5.56E-07	2.76E-06	5.19E-09	1.68E-10	3.89E-08	1.12E-08	5.54E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.58E-07	8.36E-09	1.94E-06	5.56E-07	2.76E-06	5.19E-09	1.68E-10	3.89E-08	1.12E-08	5.54E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-SX-112	2.25E-07	8.81E-09	5.29E-07	8.05E-07	1.57E-06	4.54E-09	1.78E-10	1.07E-08	1.62E-08	3.16E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.25E-07	8.81E-09	5.29E-07	8.05E-07	1.57E-06	4.54E-09	1.78E-10	1.07E-08	1.62E-08	3.16E-08
241-SX-113	1.83E-07	6.71E-09	3.70E-08	4.66E-06	4.88E-06	2.31E-09	8.46E-11	4.66E-10	5.87E-08	6.16E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.83E-07	6.71E-09	3.70E-08	4.66E-06	4.88E-06	2.31E-09	8.46E-11	4.66E-10	5.87E-08	6.16E-08
241-SX-114	1.59E-07	4.69E-09	1.84E-06	4.45E-07	2.45E-06	3.11E-09	9.20E-11	3.61E-08	8.73E-09	4.80E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.59E-07	4.69E-09	1.84E-06	4.45E-07	2.45E-06	3.11E-09	9.20E-11	3.61E-08	8.73E-09	4.80E-08
241-SX-115	6.89E-06	3.07E-07	5.92E-09	1.42E-05	2.14E-05	1.43E-07	6.37E-09	1.23E-10	2.95E-07	4.44E-07
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.89E-06	3.07E-07	5.92E-09	1.42E-05	2.14E-05	1.43E-07	6.37E-09	1.23E-10	2.95E-07	4.44E-07
241-T-101	5.05E-08	1.33E-08	4.85E-08	7.08E-07	8.21E-07	9.02E-10	2.37E-10	8.66E-10	1.27E-08	1.47E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.05E-08	1.33E-08	4.85E-08	7.08E-07	8.21E-07	9.02E-10	2.37E-10	8.66E-10	1.27E-08	1.47E-08
241-T-102	2.08E-07	4.41E-09	1.86E-09	2.02E-06	2.24E-06	3.70E-09	7.83E-11	3.30E-11	3.59E-08	3.97E-08
Supernatant	1.13E-07	5.05E-10	3.33E-09	1.33E-07	2.50E-07	1.49E-09	6.67E-12	4.40E-11	1.75E-09	3.29E-09
Solid Layer	1.79E-07	4.09E-09	1.24E-09	2.82E-06	3.01E-06	3.73E-09	8.51E-11	2.57E-11	5.87E-08	6.26E-08
241-T-103	1.17E-08	1.17E-09	2.83E-08	2.22E-06	2.26E-06	2.22E-10	2.23E-11	5.36E-10	4.20E-08	4.28E-08
Supernatant	3.59E-08	1.10E-09	5.09E-08	1.27E-07	2.15E-07	4.95E-10	1.51E-11	7.00E-10	1.75E-09	2.96E-09
Solid Layer	9.69E-09	1.13E-09	2.57E-08	2.47E-06	2.50E-06	1.92E-10	2.24E-11	5.09E-10	4.89E-08	4.96E-08
241-T-104	6.77E-09	8.52E-09	1.49E-08	3.46E-07	3.77E-07	1.01E-10	1.27E-10	2.23E-10	5.17E-09	5.62E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.77E-09	8.52E-09	1.49E-08	3.46E-07	3.77E-07	1.01E-10	1.27E-10	2.23E-10	5.17E-09	5.62E-09
241-T-105	1.81E-07	2.43E-08	3.56E-09	7.58E-07	9.67E-07	3.05E-09	4.10E-10	6.01E-11	1.28E-08	1.63E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.81E-07	2.43E-08	3.56E-09	7.58E-07	9.67E-07	3.05E-09	4.10E-10	6.01E-11	1.28E-08	1.63E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-T-106	1.24E-08	3.21E-09	4.80E-09	2.82E-06	2.84E-06	2.27E-10	5.89E-11	8.82E-11	5.18E-08	5.22E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.24E-08	3.21E-09	4.80E-09	2.82E-06	2.84E-06	2.27E-10	5.89E-11	8.82E-11	5.18E-08	5.22E-08
241-T-107	2.11E-07	1.29E-08	1.05E-08	4.44E-07	6.78E-07	3.81E-09	2.32E-10	1.90E-10	8.01E-09	1.22E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.11E-07	1.29E-08	1.05E-08	4.44E-07	6.78E-07	3.81E-09	2.32E-10	1.90E-10	8.01E-09	1.22E-08
241-T-108	6.30E-09	1.09E-09	2.49E-12	3.92E-06	3.92E-06	1.13E-10	1.95E-11	4.45E-14	7.01E-08	7.03E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.30E-09	1.09E-09	2.49E-12	3.92E-06	3.92E-06	1.13E-10	1.95E-11	4.45E-14	7.01E-08	7.03E-08
241-T-109	3.06E-09	2.28E-10	5.41E-12	1.03E-06	1.03E-06	5.70E-11	4.25E-12	1.01E-13	1.92E-08	1.93E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.06E-09	2.28E-10	5.41E-12	1.03E-06	1.03E-06	5.70E-11	4.25E-12	1.01E-13	1.92E-08	1.93E-08
241-T-110	2.87E-10	9.89E-09	0.00E+00	8.09E-07	8.19E-07	4.15E-12	1.43E-10	0.00E+00	1.17E-08	1.18E-08
Supernatant	2.10E-11	2.75E-11	0.00E+00	3.60E-07	3.60E-07	2.55E-13	3.34E-13	0.00E+00	4.37E-09	4.37E-09
Solid Layer	2.87E-10	9.91E-09	0.00E+00	8.10E-07	8.20E-07	4.16E-12	1.43E-10	0.00E+00	1.17E-08	1.19E-08
241-T-111	1.34E-08	1.03E-08	1.66E-08	2.91E-07	3.31E-07	1.93E-10	1.47E-10	2.38E-10	4.18E-09	4.75E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.34E-08	1.03E-08	1.66E-08	2.91E-07	3.31E-07	1.93E-10	1.47E-10	2.38E-10	4.18E-09	4.75E-09
241-T-112	3.36E-11	2.45E-08	0.00E+00	1.23E-06	1.26E-06	4.90E-13	3.58E-10	0.00E+00	1.80E-08	1.84E-08
Supernatant	1.06E-10	2.45E-09	0.00E+00	1.37E-07	1.40E-07	1.35E-12	3.11E-11	0.00E+00	1.75E-09	1.78E-09
Solid Layer	2.73E-11	2.63E-08	0.00E+00	1.34E-06	1.37E-06	4.04E-13	3.90E-10	0.00E+00	1.99E-08	2.03E-08
241-T-201	4.03E-10	5.56E-08	0.00E+00	1.51E-06	1.56E-06	6.03E-12	8.31E-10	0.00E+00	2.25E-08	2.34E-08
Supernatant	4.40E-13	2.75E-12	0.00E+00	1.34E-06	1.34E-06	5.39E-15	3.37E-14	0.00E+00	1.64E-08	1.64E-08
Solid Layer	4.21E-10	5.80E-08	0.00E+00	1.52E-06	1.58E-06	6.38E-12	8.80E-10	0.00E+00	2.30E-08	2.39E-08
241-T-202	2.67E-11	1.43E-08	1.61E-08	7.44E-07	7.74E-07	3.65E-13	1.95E-10	2.20E-10	1.02E-08	1.06E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.67E-11	1.43E-08	1.61E-08	7.44E-07	7.74E-07	3.65E-13	1.95E-10	2.20E-10	1.02E-08	1.06E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-T-203	2.34E-11	1.66E-08	1.49E-08	6.12E-07	6.43E-07	3.30E-13	2.34E-10	2.11E-10	8.64E-09	9.08E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.34E-11	1.66E-08	1.49E-08	6.12E-07	6.43E-07	3.30E-13	2.34E-10	2.11E-10	8.64E-09	9.08E-09
241-T-204	3.35E-11	1.51E-08	1.69E-08	6.29E-07	6.61E-07	4.57E-13	2.06E-10	2.31E-10	8.59E-09	9.03E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.35E-11	1.51E-08	1.69E-08	6.29E-07	6.61E-07	4.57E-13	2.06E-10	2.31E-10	8.59E-09	9.03E-09
241-TX-101	2.54E-07	1.76E-08	5.01E-08	6.79E-07	1.00E-06	5.12E-09	3.55E-10	1.01E-09	1.37E-08	2.02E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.54E-07	1.76E-08	5.01E-08	6.79E-07	1.00E-06	5.12E-09	3.55E-10	1.01E-09	1.37E-08	2.02E-08
241-TX-102	1.87E-08	1.55E-09	2.56E-08	3.61E-07	4.07E-07	3.50E-10	2.90E-11	4.79E-10	6.75E-09	7.60E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.87E-08	1.55E-09	2.56E-08	3.61E-07	4.07E-07	3.50E-10	2.90E-11	4.79E-10	6.75E-09	7.60E-09
241-TX-103	2.45E-08	2.26E-09	2.03E-08	4.94E-07	5.41E-07	4.57E-10	4.22E-11	3.79E-10	9.24E-09	1.01E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.45E-08	2.26E-09	2.03E-08	4.94E-07	5.41E-07	4.57E-10	4.22E-11	3.79E-10	9.24E-09	1.01E-08
241-TX-104	2.24E-07	4.68E-09	6.14E-09	8.71E-07	1.11E-06	4.48E-09	9.35E-11	1.23E-10	1.74E-08	2.21E-08
Supernatant	2.00E-07	1.80E-10	6.97E-09	1.05E-07	3.12E-07	3.33E-09	2.99E-12	1.16E-10	1.75E-09	5.20E-09
Solid Layer	2.25E-07	4.79E-09	6.12E-09	8.93E-07	1.13E-06	4.52E-09	9.63E-11	1.23E-10	1.80E-08	2.27E-08
241-TX-105	5.21E-09	5.41E-10	1.97E-08	1.92E-07	2.17E-07	9.86E-11	1.02E-11	3.72E-10	3.63E-09	4.11E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.21E-09	5.41E-10	1.97E-08	1.92E-07	2.17E-07	9.86E-11	1.02E-11	3.72E-10	3.63E-09	4.11E-09
241-TX-106	2.40E-08	2.12E-09	2.91E-08	2.59E-07	3.15E-07	4.51E-10	3.97E-11	5.45E-10	4.86E-09	5.90E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.40E-08	2.12E-09	2.91E-08	2.59E-07	3.15E-07	4.51E-10	3.97E-11	5.45E-10	4.86E-09	5.90E-09
241-TX-107	5.19E-08	4.40E-08	3.00E-08	1.86E-06	1.99E-06	1.07E-09	9.08E-10	6.18E-10	3.84E-08	4.10E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.19E-08	4.40E-08	3.00E-08	1.86E-06	1.99E-06	1.07E-09	9.08E-10	6.18E-10	3.84E-08	4.10E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-TX-108	1.25E-08	1.21E-09	8.47E-09	5.50E-07	5.72E-07	2.35E-10	2.28E-11	1.59E-10	1.03E-08	1.07E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.25E-08	1.21E-09	8.47E-09	5.50E-07	5.72E-07	2.35E-10	2.28E-11	1.59E-10	1.03E-08	1.07E-08
241-TX-109	4.11E-08	4.43E-09	9.37E-08	2.86E-07	4.25E-07	6.80E-10	7.34E-11	1.55E-09	4.73E-09	7.04E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.11E-08	4.43E-09	9.37E-08	2.86E-07	4.25E-07	6.80E-10	7.34E-11	1.55E-09	4.73E-09	7.04E-09
241-TX-110	6.01E-09	7.28E-10	1.20E-08	2.17E-07	2.36E-07	1.12E-10	1.36E-11	2.25E-10	4.07E-09	4.42E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.01E-09	7.28E-10	1.20E-08	2.17E-07	2.36E-07	1.12E-10	1.36E-11	2.25E-10	4.07E-09	4.42E-09
241-TX-111	6.55E-09	8.30E-10	1.02E-08	2.53E-07	2.71E-07	1.22E-10	1.55E-11	1.89E-10	4.72E-09	5.05E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.55E-09	8.30E-10	1.02E-08	2.53E-07	2.71E-07	1.22E-10	1.55E-11	1.89E-10	4.72E-09	5.05E-09
241-TX-112	9.16E-09	1.05E-09	6.68E-09	1.83E-07	2.00E-07	1.73E-10	1.98E-11	1.26E-10	3.46E-09	3.78E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.16E-09	1.05E-09	6.68E-09	1.83E-07	2.00E-07	1.73E-10	1.98E-11	1.26E-10	3.46E-09	3.78E-09
241-TX-113	5.04E-10	3.46E-11	3.46E-09	1.85E-07	1.89E-07	9.38E-12	6.44E-13	6.45E-11	3.45E-09	3.52E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.04E-10	3.46E-11	3.46E-09	1.85E-07	1.89E-07	9.38E-12	6.44E-13	6.45E-11	3.45E-09	3.52E-09
241-TX-114	5.27E-09	5.44E-10	1.20E-09	2.00E-07	2.07E-07	9.96E-11	1.03E-11	2.27E-11	3.79E-09	3.92E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.27E-09	5.44E-10	1.20E-09	2.00E-07	2.07E-07	9.96E-11	1.03E-11	2.27E-11	3.79E-09	3.92E-09
241-TX-115	5.73E-09	6.54E-10	4.89E-09	1.97E-07	2.08E-07	1.08E-10	1.23E-11	9.22E-11	3.71E-09	3.92E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.73E-09	6.54E-10	4.89E-09	1.97E-07	2.08E-07	1.08E-10	1.23E-11	9.22E-11	3.71E-09	3.92E-09
241-TX-116	2.54E-09	2.06E-10	1.42E-11	1.86E-07	1.88E-07	4.88E-11	3.95E-12	2.72E-13	3.56E-09	3.61E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.54E-09	2.06E-10	1.42E-11	1.86E-07	1.88E-07	4.88E-11	3.95E-12	2.72E-13	3.56E-09	3.61E-09

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-TX-117	2.72E-09	2.79E-10	4.65E-13	2.19E-07	2.22E-07	4.98E-11	5.11E-12	8.51E-15	4.01E-09	4.06E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.72E-09	2.79E-10	4.65E-13	2.19E-07	2.22E-07	4.98E-11	5.11E-12	8.51E-15	4.01E-09	4.06E-09
241-TX-118	6.89E-08	6.44E-08	2.57E-08	3.13E-07	4.72E-07	1.35E-09	1.26E-09	5.03E-10	6.14E-09	9.25E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.89E-08	6.44E-08	2.57E-08	3.13E-07	4.72E-07	1.35E-09	1.26E-09	5.03E-10	6.14E-09	9.25E-09
241-TY-101	2.67E-09	8.64E-10	1.02E-12	5.76E-07	5.80E-07	5.06E-11	1.64E-11	1.94E-14	1.09E-08	1.10E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.67E-09	8.64E-10	1.02E-12	5.76E-07	5.80E-07	5.06E-11	1.64E-11	1.94E-14	1.09E-08	1.10E-08
241-TY-102	2.01E-08	6.90E-11	7.84E-09	8.57E-07	8.85E-07	4.08E-10	1.40E-12	1.59E-10	1.74E-08	1.80E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.01E-08	6.90E-11	7.84E-09	8.57E-07	8.85E-07	4.08E-10	1.40E-12	1.59E-10	1.74E-08	1.80E-08
241-TY-103	1.06E-07	5.48E-09	5.11E-08	4.50E-07	6.13E-07	2.07E-09	1.07E-10	9.94E-10	8.76E-09	1.19E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.06E-07	5.48E-09	5.11E-08	4.50E-07	6.13E-07	2.07E-09	1.07E-10	9.94E-10	8.76E-09	1.19E-08
241-TY-104	2.45E-07	1.04E-08	4.29E-09	1.38E-06	1.64E-06	4.64E-09	1.97E-10	8.12E-11	2.62E-08	3.11E-08
Supernatant	2.29E-08	1.06E-10	6.71E-09	1.28E-07	1.58E-07	3.13E-10	1.44E-12	9.17E-11	1.75E-09	2.16E-09
Solid Layer	2.48E-07	1.05E-08	4.24E-09	1.41E-06	1.67E-06	4.73E-09	2.01E-10	8.09E-11	2.69E-08	3.19E-08
241-TY-105	2.29E-07	7.86E-10	1.72E-08	3.64E-07	6.10E-07	4.05E-09	1.39E-11	3.05E-10	6.44E-09	1.08E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.29E-07	7.86E-10	1.72E-08	3.64E-07	6.10E-07	4.05E-09	1.39E-11	3.05E-10	6.44E-09	1.08E-08
241-TY-106	3.07E-07	1.24E-09	6.95E-09	4.19E-06	4.51E-06	4.98E-09	2.02E-11	1.13E-10	6.79E-08	7.30E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.07E-07	1.24E-09	6.95E-09	4.19E-06	4.51E-06	4.98E-09	2.02E-11	1.13E-10	6.79E-08	7.30E-08
241-U-101	6.12E-07	1.76E-09	1.07E-08	2.39E-06	3.01E-06	1.25E-08	3.61E-11	2.20E-10	4.89E-08	6.17E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.12E-07	1.76E-09	1.07E-08	2.39E-06	3.01E-06	1.25E-08	3.61E-11	2.20E-10	4.89E-08	6.17E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-U-102	2.45E-07	5.35E-09	2.23E-07	2.62E-07	7.35E-07	4.74E-09	1.04E-10	4.32E-09	5.06E-09	1.42E-08
Supernatant	3.75E-07	2.43E-10	1.56E-07	1.02E-07	6.33E-07	6.42E-09	4.16E-12	2.68E-09	1.75E-09	1.09E-08
Solid Layer	2.45E-07	5.36E-09	2.23E-07	2.62E-07	7.35E-07	4.73E-09	1.04E-10	4.32E-09	5.07E-09	1.42E-08
241-U-103	1.48E-07	3.91E-09	3.36E-07	2.47E-07	7.34E-07	2.91E-09	7.70E-11	6.61E-09	4.87E-09	1.45E-08
Supernatant	4.44E-07	4.84E-10	6.14E-07	1.05E-07	1.16E-06	7.41E-09	8.06E-12	1.02E-08	1.75E-09	1.94E-08
Solid Layer	1.47E-07	3.91E-09	3.35E-07	2.47E-07	7.34E-07	2.90E-09	7.71E-11	6.61E-09	4.87E-09	1.45E-08
241-U-104	2.74E-07	7.30E-09	2.27E-07	6.44E-07	1.15E-06	4.53E-09	1.20E-10	3.74E-09	1.06E-08	1.90E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.74E-07	7.30E-09	2.27E-07	6.44E-07	1.15E-06	4.53E-09	1.20E-10	3.74E-09	1.06E-08	1.90E-08
241-U-105	1.25E-07	1.34E-08	2.87E-07	2.49E-07	6.74E-07	2.41E-09	2.59E-10	5.54E-09	4.82E-09	1.30E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.25E-07	1.34E-08	2.87E-07	2.49E-07	6.74E-07	2.41E-09	2.59E-10	5.54E-09	4.82E-09	1.30E-08
241-U-106	3.78E-07	2.29E-08	5.42E-07	4.52E-07	1.39E-06	6.78E-09	4.12E-10	9.72E-09	8.12E-09	2.50E-08
Supernatant	5.25E-07	6.51E-09	6.75E-07	1.13E-07	1.32E-06	8.14E-09	1.01E-10	1.05E-08	1.75E-09	2.05E-08
Solid Layer	3.76E-07	2.31E-08	5.41E-07	4.55E-07	1.40E-06	6.76E-09	4.14E-10	9.71E-09	8.18E-09	2.51E-08
241-U-107	6.33E-08	9.42E-09	9.39E-08	2.70E-07	4.37E-07	1.27E-09	1.89E-10	1.89E-09	5.44E-09	8.79E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.33E-08	9.42E-09	9.39E-08	2.70E-07	4.37E-07	1.27E-09	1.89E-10	1.89E-09	5.44E-09	8.79E-09
241-U-108	1.14E-07	2.95E-09	2.14E-07	2.47E-07	5.78E-07	2.22E-09	5.74E-11	4.16E-09	4.82E-09	1.13E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.14E-07	2.95E-09	2.14E-07	2.47E-07	5.78E-07	2.22E-09	5.74E-11	4.16E-09	4.82E-09	1.13E-08
241-U-109	7.60E-08	6.54E-10	9.40E-08	2.61E-07	4.32E-07	1.45E-09	1.25E-11	1.80E-09	5.00E-09	8.26E-09
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.60E-08	6.54E-10	9.40E-08	2.61E-07	4.32E-07	1.45E-09	1.25E-11	1.80E-09	5.00E-09	8.26E-09
241-U-110	2.73E-07	7.63E-09	1.83E-08	3.99E-07	6.98E-07	5.42E-09	1.51E-10	3.64E-10	7.92E-09	1.39E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.73E-07	7.63E-09	1.83E-08	3.99E-07	6.98E-07	5.42E-09	1.51E-10	3.64E-10	7.92E-09	1.39E-08

Table B-3. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $RC_{rad}^{B/\gamma}$ (mole/kg-d)	HGR from radiolysis RC_{rad}^{alpha} (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC_{rad}^{b/r}$ (mole/m^3-s)	HGR from radiolysis RC_{rad}^{alpha} (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RCtot (mole/m^3-s)
241-U-111	1.18E-07	5.15E-09	9.57E-08	3.56E-07	5.75E-07	2.20E-09	9.60E-11	1.78E-09	6.63E-09	1.07E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.18E-07	5.15E-09	9.57E-08	3.56E-07	5.75E-07	2.20E-09	9.60E-11	1.78E-09	6.63E-09	1.07E-08
241-U-112	3.03E-07	6.78E-10	1.08E-08	1.27E-06	1.58E-06	6.11E-09	1.37E-11	2.18E-10	2.56E-08	3.19E-08
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.03E-07	6.78E-10	1.08E-08	1.27E-06	1.58E-06	6.11E-09	1.37E-11	2.18E-10	2.56E-08	3.19E-08
241-U-201	7.34E-09	7.04E-11	0.00E+00	1.47E-06	1.47E-06	5.92E-11	1.25E-12	0.00E+00	2.60E-08	2.61E-08
Supernatant	3.52E-08	2.87E-11	0.00E+00	4.49E-07	4.85E-07	5.13E-10	4.19E-13	0.00E+00	6.55E-09	7.07E-09
Solid Layer	3.14E-09	6.40E-11	0.00E+00	1.75E-06	1.76E-06	5.92E-11	1.21E-12	0.00E+00	3.31E-08	3.31E-08
241-U-202	6.11E-09	8.52E-11	1.33E-10	1.64E-06	1.64E-06	4.66E-11	1.42E-12	2.22E-12	2.74E-08	2.74E-08
Supernatant	2.40E-08	5.29E-13	2.24E-10	4.42E-07	4.67E-07	3.56E-10	7.83E-15	3.32E-12	6.55E-09	6.91E-09
Solid Layer	2.67E-09	8.28E-11	9.89E-11	2.04E-06	2.05E-06	4.66E-11	1.45E-12	1.73E-12	3.57E-08	3.58E-08
241-U-203	8.42E-09	7.50E-11	0.00E+00	1.68E-06	1.68E-06	7.84E-11	1.30E-12	0.00E+00	2.90E-08	2.91E-08
Supernatant	2.57E-08	1.30E-12	0.00E+00	4.42E-07	4.68E-07	3.80E-10	1.93E-14	0.00E+00	6.55E-09	6.93E-09
Solid Layer	4.26E-09	8.56E-11	0.00E+00	2.12E-06	2.12E-06	7.84E-11	1.57E-12	0.00E+00	3.90E-08	3.90E-08
241-U-204	1.89E-08	3.18E-09	2.54E-11	2.13E-06	2.16E-06	2.16E-10	4.93E-11	3.94E-13	4.82E-08	4.84E-08
Supernatant	2.49E-08	1.18E-12	5.01E-11	5.10E-07	5.35E-07	3.20E-10	1.52E-14	6.44E-13	6.55E-09	6.87E-09
Solid Layer	1.27E-08	2.68E-09	1.49E-11	2.83E-06	2.85E-06	2.16E-10	4.56E-11	2.54E-13	4.82E-08	4.84E-08
AY102-S-14U	1.61E-05	9.93E-07	1.39E-07	1.22E-06	1.84E-05	2.95E-07	1.83E-08	2.56E-09	2.25E-08	3.39E-07
AY102-S-14L	1.93E-05	1.23E-06	2.96E-07	1.63E-06	2.25E-05	3.56E-07	2.27E-08	5.46E-09	3.00E-08	4.14E-07
AY102-S-15U	2.14E-05	1.09E-06	1.10E-07	4.15E-06	2.68E-05	3.68E-07	1.87E-08	1.88E-09	7.13E-08	4.60E-07
AY102-S-15L	4.02E-05	1.40E-06	4.25E-07	1.19E-06	4.33E-05	7.28E-07	2.54E-08	7.69E-09	2.16E-08	7.82E-07
AY-102-S-16	7.91E-05	2.03E-06	3.29E-07	1.45E-06	8.30E-05	1.33E-06	3.42E-08	5.55E-09	2.45E-08	1.40E-06
AY102-Orig-9"	1.73E-04	2.03E-06	5.02E-07	1.68E-06	1.77E-04	2.93E-06	3.43E-08	8.48E-09	2.84E-08	3.00E-06

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-AN-101	9.91E-04	2.25E-07	2.22E-03	1.43E-04	29.6%	0.01%	66.1%	4.3%	3.35E-03	137
Supernatant	9.69E-04	8.36E-08	2.20E-03	8.41E-05	29.8%	0.00%	67.6%	2.6%	3.25E-03	133
Solid Layer	2.17E-05	1.42E-07	1.67E-05	5.91E-05	22.3%	0.15%	17.1%	60.5%	9.76E-05	4
241-AN-102	3.65E-03	2.34E-05	5.94E-03	1.47E-04	37.4%	0.24%	60.9%	1.5%	9.76E-03	398
Supernatant	3.16E-03	1.37E-05	5.36E-03	8.16E-05	36.7%	0.16%	62.2%	0.9%	8.61E-03	351
Solid Layer	4.94E-04	9.72E-06	5.85E-04	6.56E-05	42.8%	0.84%	50.7%	5.7%	1.15E-03	47
241-AN-103	9.38E-04	5.53E-07	1.44E-03	1.37E-04	37.2%	0.02%	57.3%	5.4%	2.52E-03	103
Supernatant	7.01E-04	2.99E-07	8.81E-04	4.32E-05	43.1%	0.02%	54.2%	2.7%	1.63E-03	66
Solid Layer	2.37E-04	2.54E-07	5.63E-04	9.34E-05	26.5%	0.03%	63.0%	10.4%	8.94E-04	36
241-AN-104	1.24E-03	1.01E-06	2.02E-03	1.47E-04	36.3%	0.03%	59.4%	4.3%	3.40E-03	139
Supernatant	7.16E-04	2.39E-08	9.91E-04	5.33E-05	40.7%	0.00%	56.3%	3.0%	1.76E-03	72
Solid Layer	5.20E-04	9.90E-07	1.03E-03	9.34E-05	31.6%	0.06%	62.6%	5.7%	1.64E-03	67
241-AN-105	8.22E-04	1.28E-06	1.25E-03	1.51E-04	36.9%	0.06%	56.3%	6.8%	2.23E-03	91
Supernatant	3.89E-04	7.37E-07	6.25E-04	5.08E-05	36.5%	0.07%	58.7%	4.8%	1.07E-03	43
Solid Layer	4.33E-04	5.40E-07	6.27E-04	9.99E-05	37.3%	0.05%	54.1%	8.6%	1.16E-03	47
241-AN-106	6.68E-04	2.13E-05	1.20E-04	1.27E-04	71.4%	2.28%	12.8%	13.6%	9.37E-04	38
Supernatant	5.35E-04	1.10E-06	1.18E-04	7.01E-05	73.9%	0.15%	16.3%	9.7%	7.23E-04	29
Solid Layer	1.34E-04	2.02E-05	2.27E-06	5.69E-05	62.8%	9.48%	1.1%	26.7%	2.13E-04	9
241-AN-107	4.42E-03	9.28E-05	3.52E-03	1.50E-04	54.0%	1.13%	43.0%	1.8%	8.18E-03	334
Supernatant	3.16E-03	6.49E-05	2.81E-03	7.60E-05	51.7%	1.06%	46.0%	1.2%	6.12E-03	249
Solid Layer	1.26E-03	2.79E-05	7.05E-04	7.41E-05	60.9%	1.35%	34.2%	3.6%	2.06E-03	84
241-AP-101	5.48E-04	3.48E-08	1.25E-04	1.46E-04	66.9%	0.00%	15.3%	17.9%	8.20E-04	33
Supernatant	5.48E-04	3.48E-08	1.25E-04	1.46E-04	66.9%	0.00%	15.3%	17.9%	8.20E-04	33
Solid Layer	na	na	na	na	na	na	na	na	na	na
241-AP-102	7.30E-04	1.81E-07	5.35E-04	1.47E-04	51.7%	0.01%	37.9%	10.4%	1.41E-03	58
Supernatant	7.25E-04	1.79E-07	5.27E-04	9.19E-05	54.0%	0.01%	39.2%	6.8%	1.34E-03	55
Solid Layer	5.04E-06	2.12E-09	7.99E-06	5.50E-05	7.4%	0.00%	11.8%	80.8%	6.80E-05	3

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-AP-103	7.27E-04	9.86E-07	6.65E-04	1.29E-04	47.8%	0.06%	43.7%	8.5%	1.52E-03	62
Supernatant	7.27E-04	9.86E-07	6.65E-04	1.29E-04	47.8%	0.06%	43.7%	8.5%	1.52E-03	62
Solid Layer	na	na	na	na	na	na	na	na	na	na
241-AP-104	9.35E-04	3.34E-06	4.93E-04	1.47E-04	59.2%	0.21%	31.2%	9.3%	1.58E-03	64
Supernatant	9.35E-04	3.34E-06	4.93E-04	1.47E-04	59.2%	0.21%	31.2%	9.3%	1.58E-03	64
Solid Layer	na	na	na	na	na	na	na	na	na	na
241-AP-105	4.30E-04	1.93E-07	1.28E-04	1.11E-04	64.3%	0.03%	19.2%	16.5%	6.69E-04	27
Supernatant	3.37E-04	8.75E-08	1.19E-04	5.06E-05	66.5%	0.02%	23.5%	10.0%	5.06E-04	21
Solid Layer	9.35E-05	1.06E-07	9.65E-06	6.00E-05	57.3%	0.06%	5.9%	36.7%	1.63E-04	7
241-AP-106	1.09E-03	1.27E-07	2.80E-04	1.49E-04	71.7%	0.01%	18.5%	9.8%	1.51E-03	62
Supernatant	1.09E-03	1.27E-07	2.80E-04	1.49E-04	71.7%	0.01%	18.5%	9.8%	1.51E-03	62
Solid Layer	na	na	na	na	na	na	na	na	na	na
241-AP-107	6.31E-04	8.10E-08	2.06E-04	1.47E-04	64.1%	0.01%	20.9%	14.9%	9.84E-04	40
Supernatant	6.31E-04	8.10E-08	2.06E-04	1.47E-04	64.1%	0.01%	20.9%	14.9%	9.84E-04	40
Solid Layer	na	na	na	na	na	na	na	na	na	na
241-AP-108	5.97E-04	5.25E-08	2.52E-03	1.30E-04	18.4%	0.00%	77.6%	4.0%	3.25E-03	132
Supernatant	5.97E-04	5.25E-08	2.52E-03	1.30E-04	18.4%	0.00%	77.6%	4.0%	3.25E-03	132
Solid Layer	na	na	na	na	na	na	na	na	na	na
241-AW-101	1.04E-03	4.85E-06	1.07E-03	1.51E-04	45.8%	0.21%	47.3%	6.7%	2.26E-03	92
Supernatant	6.64E-04	4.51E-08	7.01E-04	6.33E-05	46.5%	0.00%	49.1%	4.4%	1.43E-03	58
Solid Layer	3.72E-04	4.81E-06	3.69E-04	8.79E-05	44.7%	0.58%	44.2%	10.5%	8.34E-04	34
241-AW-102	8.43E-05	1.50E-06	6.83E-05	6.43E-05	38.6%	0.69%	31.3%	29.4%	2.18E-04	9
Supernatant	6.44E-05	7.32E-09	6.65E-05	9.83E-06	45.8%	0.01%	47.3%	7.0%	1.41E-04	6
Solid Layer	2.00E-05	1.49E-06	1.84E-06	5.44E-05	25.7%	1.92%	2.4%	70.0%	7.77E-05	3
241-AW-103	4.28E-04	1.35E-05	2.45E-04	1.46E-04	51.5%	1.63%	29.4%	17.5%	8.32E-04	34
Supernatant	3.84E-04	3.56E-08	1.01E-04	6.67E-05	69.6%	0.01%	18.3%	12.1%	5.51E-04	22
Solid Layer	4.43E-05	1.35E-05	1.44E-04	7.92E-05	15.8%	4.81%	51.2%	28.2%	2.81E-04	11

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-AW-104	9.13E-04	1.90E-05	1.81E-03	1.47E-04	31.6%	0.66%	62.7%	5.1%	2.89E-03	118
Supernatant	8.04E-04	1.69E-07	1.63E-03	7.40E-05	32.0%	0.01%	65.0%	2.9%	2.51E-03	102
Solid Layer	1.09E-04	1.88E-05	1.79E-04	7.32E-05	28.6%	4.96%	47.1%	19.3%	3.80E-04	15
241-AW-105	1.54E-04	3.47E-05	2.29E-06	1.07E-04	51.7%	11.61%	0.8%	36.0%	2.99E-04	12
Supernatant	2.23E-05	1.86E-08	4.67E-07	3.30E-05	40.0%	0.03%	0.8%	59.2%	5.59E-05	2
Solid Layer	1.32E-04	3.47E-05	1.82E-06	7.44E-05	54.3%	14.28%	0.7%	30.6%	2.43E-04	10
241-AW-106	7.09E-04	1.25E-06	1.12E-03	1.39E-04	35.9%	0.06%	57.0%	7.0%	1.97E-03	80
Supernatant	4.03E-04	7.69E-08	8.81E-04	5.63E-05	30.1%	0.01%	65.7%	4.2%	1.34E-03	55
Solid Layer	3.06E-04	1.17E-06	2.43E-04	8.22E-05	48.4%	0.18%	38.5%	13.0%	6.32E-04	26
241-AY-101	3.95E-03	6.03E-04	5.87E-05	8.05E-05	84.2%	12.86%	1.3%	1.7%	4.69E-03	191
Supernatant	2.05E-05	8.58E-07	3.21E-05	1.86E-05	28.4%	1.19%	44.6%	25.8%	7.20E-05	3
Solid Layer	3.93E-03	6.02E-04	2.66E-05	6.20E-05	85.0%	13.04%	0.6%	1.3%	4.62E-03	188
241-AY-102	3.40E-02	7.97E-04	8.97E-04	3.35E-04	94.4%	2.21%	2.5%	0.9%	3.60E-02	1467
Supernatant	2.17E-04	8.74E-07	3.75E-04	1.60E-04	28.8%	0.12%	49.8%	21.3%	7.53E-04	31
Solid Layer	3.37E-02	7.96E-04	5.22E-04	1.75E-04	95.8%	2.26%	1.5%	0.5%	3.52E-02	1437
241-AZ-101	1.85E-02	9.19E-04	2.47E-03	1.50E-04	83.9%	4.17%	11.2%	0.7%	2.21E-02	899
Supernatant	9.05E-03	3.56E-07	2.21E-03	8.53E-05	79.8%	0.00%	19.5%	0.8%	1.13E-02	463
Solid Layer	9.46E-03	9.18E-04	2.63E-04	6.51E-05	88.4%	8.58%	2.5%	0.6%	1.07E-02	437
241-AZ-102	2.02E-02	1.15E-03	6.70E-04	1.47E-04	91.1%	5.19%	3.0%	0.7%	2.22E-02	905
Supernatant	1.13E-02	3.54E-06	5.05E-04	8.06E-05	95.0%	0.03%	4.3%	0.7%	1.18E-02	483
Solid Layer	8.97E-03	1.15E-03	1.65E-04	6.64E-05	86.7%	11.09%	1.6%	0.6%	1.04E-02	422
241-SY-101	3.03E-04	1.14E-05	1.12E-04	8.63E-05	59.1%	2.22%	21.8%	16.8%	5.13E-04	21
Supernatant	6.38E-05	1.01E-08	3.69E-05	9.09E-06	58.1%	0.01%	33.6%	8.3%	1.10E-04	4
Solid Layer	2.40E-04	1.14E-05	7.50E-05	7.72E-05	59.4%	2.83%	18.6%	19.1%	4.03E-04	16
241-SY-102	5.12E-04	5.13E-04	2.38E-04	1.36E-04	36.6%	36.65%	17.0%	9.7%	1.40E-03	57
Supernatant	3.65E-04	7.75E-08	1.63E-04	7.04E-05	61.1%	0.01%	27.2%	11.8%	5.99E-04	24
Solid Layer	1.46E-04	5.12E-04	7.56E-05	6.56E-05	18.3%	64.08%	9.4%	8.2%	8.00E-04	33

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-SY-103	1.00E-03	2.34E-05	1.24E-03	1.17E-04	42.1%	0.98%	52.0%	4.9%	2.38E-03	97
Supernatant	5.86E-04	6.66E-08	5.50E-04	3.48E-05	50.0%	0.01%	47.0%	3.0%	1.17E-03	48
Solid Layer	4.16E-04	2.33E-05	6.88E-04	8.21E-05	34.4%	1.93%	56.9%	6.8%	1.21E-03	49
241-A-101	3.09E-04	7.06E-06	1.68E-03	3.60E-04	13.1%	0.30%	71.4%	15.2%	2.36E-03	96
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.09E-04	7.06E-06	1.68E-03	3.60E-04	13.1%	0.30%	71.4%	15.2%	2.36E-03	96
241-A-102	9.74E-05	1.63E-05	1.06E-04	5.83E-04	12.1%	2.03%	13.2%	72.6%	8.03E-04	33
Supernatant	4.61E-06	2.14E-09	8.42E-06	2.80E-06	29.1%	0.01%	53.2%	17.7%	1.58E-05	1
Solid Layer	9.28E-05	1.63E-05	9.78E-05	5.80E-04	11.8%	2.07%	12.4%	73.7%	7.87E-04	32
241-A-103	3.53E-04	7.22E-06	1.90E-03	3.52E-04	13.5%	0.28%	72.7%	13.5%	2.61E-03	106
Supernatant	5.02E-06	1.00E-08	5.61E-05	1.59E-06	8.0%	0.02%	89.4%	2.5%	6.27E-05	3
Solid Layer	3.48E-04	7.21E-06	1.84E-03	3.50E-04	13.7%	0.28%	72.3%	13.8%	2.55E-03	104
241-A-104	0.00E+00	0.00E+00	0.00E+00	2.29E-04	0.0%	0.00%	0.0%	100.0%	2.29E-04	9
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	0.00E+00	0.00E+00	0.00E+00	2.29E-04	0.0%	0.00%	0.0%	100.0%	2.29E-04	9
241-A-105	na	na	na	na	na	na	na	na	na	na
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	na	na	na	na	na	na	na	na	na	na
241-A-106	9.87E-04	3.83E-05	4.80E-04	2.51E-04	56.2%	2.18%	27.3%	14.3%	1.76E-03	72
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.87E-04	3.83E-05	4.80E-04	2.51E-04	56.2%	2.18%	27.3%	14.3%	1.76E-03	72
241-AX-101	3.08E-04	5.70E-06	3.40E-04	3.35E-04	31.2%	0.58%	34.4%	33.9%	9.89E-04	40
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.08E-04	5.70E-06	3.40E-04	3.35E-04	31.2%	0.58%	34.4%	33.9%	9.89E-04	40
241-AX-102	2.45E-04	3.46E-05	3.28E-05	2.23E-04	45.8%	6.47%	6.1%	41.6%	5.35E-04	22
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.45E-04	3.46E-05	3.28E-05	2.23E-04	45.8%	6.47%	6.1%	41.6%	5.35E-04	22

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-AX-103	4.54E-04	1.46E-05	1.68E-04	2.55E-04	50.9%	1.64%	18.8%	28.6%	8.92E-04	36
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.54E-04	1.46E-05	1.68E-04	2.55E-04	50.9%	1.64%	18.8%	28.6%	8.92E-04	36
241-AX-104	5.49E-04	5.83E-06	3.13E-07	2.20E-04	70.8%	0.75%	0.0%	28.4%	7.75E-04	32
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.49E-04	5.83E-06	3.13E-07	2.20E-04	70.8%	0.75%	0.0%	28.4%	7.75E-04	32
241-B-101	1.24E-04	9.86E-06	6.53E-08	2.60E-04	31.6%	2.50%	0.0%	65.9%	3.94E-04	16
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.24E-04	9.86E-06	6.53E-08	2.60E-04	31.6%	2.50%	0.0%	65.9%	3.94E-04	16
241-B-102	4.56E-07	6.78E-08	4.91E-10	2.20E-04	0.2%	0.03%	0.0%	99.8%	2.20E-04	9
Supernatant	1.45E-07	2.01E-09	7.14E-11	1.34E-06	9.8%	0.14%	0.0%	90.1%	1.48E-06	0
Solid Layer	3.11E-07	6.58E-08	4.19E-10	2.18E-04	0.1%	0.03%	0.0%	99.8%	2.19E-04	9
241-B-103	9.01E-07	7.30E-07	8.29E-10	2.28E-04	0.4%	0.32%	0.0%	99.3%	2.30E-04	9
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.01E-07	7.30E-07	8.29E-10	2.28E-04	0.4%	0.32%	0.0%	99.3%	2.30E-04	9
241-B-104	1.02E-05	1.25E-06	5.60E-09	3.37E-04	2.9%	0.36%	0.0%	96.7%	3.48E-04	14
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.02E-05	1.25E-06	5.60E-09	3.37E-04	2.9%	0.36%	0.0%	96.7%	3.48E-04	14
241-B-105	2.87E-06	7.96E-07	8.35E-09	3.08E-04	0.9%	0.26%	0.0%	98.8%	3.12E-04	13
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.87E-06	7.96E-07	8.35E-09	3.08E-04	0.9%	0.26%	0.0%	98.8%	3.12E-04	13
241-B-106	3.74E-05	4.19E-07	4.08E-09	2.49E-04	13.0%	0.15%	0.0%	86.8%	2.87E-04	12
Supernatant	3.84E-08	5.33E-10	1.78E-11	3.55E-07	9.7%	0.14%	0.0%	90.1%	3.94E-07	0
Solid Layer	3.74E-05	4.19E-07	4.07E-09	2.49E-04	13.0%	0.15%	0.0%	86.8%	2.87E-04	12
241-B-107	5.78E-06	4.15E-07	8.14E-10	2.64E-04	2.1%	0.15%	0.0%	97.7%	2.70E-04	11
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.78E-06	4.15E-07	8.14E-10	2.64E-04	2.1%	0.15%	0.0%	97.7%	2.70E-04	11

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-B-108	1.94E-06	1.11E-08	1.03E-09	2.41E-04	0.8%	0.00%	0.0%	99.2%	2.43E-04	10
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.94E-06	1.11E-08	1.03E-09	2.41E-04	0.8%	0.00%	0.0%	99.2%	2.43E-04	10
241-B-109	9.54E-07	2.40E-07	2.01E-09	2.51E-04	0.4%	0.10%	0.0%	99.5%	2.53E-04	10
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.54E-07	2.40E-07	2.01E-09	2.51E-04	0.4%	0.10%	0.0%	99.5%	2.53E-04	10
241-B-110	1.74E-04	7.01E-06	4.80E-05	2.95E-04	33.2%	1.34%	9.2%	56.3%	5.24E-04	21
Supernatant	1.03E-07	2.07E-09	1.89E-07	3.60E-07	15.7%	0.32%	28.9%	55.1%	6.54E-07	0
Solid Layer	1.74E-04	7.01E-06	4.78E-05	2.95E-04	33.2%	1.34%	9.1%	56.3%	5.23E-04	21
241-B-111	4.09E-04	4.97E-06	4.68E-05	2.95E-04	54.1%	0.66%	6.2%	39.0%	7.56E-04	31
Supernatant	1.04E-07	2.08E-09	2.48E-07	3.62E-07	14.5%	0.29%	34.6%	50.6%	7.16E-07	0
Solid Layer	4.09E-04	4.96E-06	4.66E-05	2.95E-04	54.2%	0.66%	6.2%	39.0%	7.56E-04	31
241-B-112	4.95E-06	1.31E-08	1.79E-05	2.22E-04	2.0%	0.01%	7.3%	90.6%	2.44E-04	10
Supernatant	1.12E-06	2.43E-09	2.79E-06	9.83E-07	22.9%	0.05%	57.0%	20.1%	4.90E-06	0
Solid Layer	3.83E-06	1.07E-08	1.52E-05	2.21E-04	1.6%	0.00%	6.3%	92.1%	2.40E-04	10
241-B-201	4.95E-07	3.84E-06	1.17E-06	5.32E-05	0.8%	6.54%	2.0%	90.6%	5.88E-05	2
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.95E-07	3.84E-06	1.17E-06	5.32E-05	0.8%	6.54%	2.0%	90.6%	5.88E-05	2
241-B-202	8.46E-07	1.03E-06	1.96E-06	5.20E-05	1.5%	1.84%	3.5%	93.1%	5.59E-05	2
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	8.46E-07	1.03E-06	1.96E-06	5.20E-05	1.5%	1.84%	3.5%	93.1%	5.59E-05	2
241-B-203	4.90E-08	3.02E-06	0.00E+00	1.95E-04	0.0%	1.53%	0.0%	98.4%	1.98E-04	8
Supernatant	1.01E-12	4.75E-10	0.00E+00	1.62E-06	0.0%	0.03%	0.0%	100.0%	1.63E-06	0
Solid Layer	4.90E-08	3.02E-06	0.00E+00	1.93E-04	0.0%	1.54%	0.0%	98.4%	1.96E-04	8
241-B-204	1.87E-08	3.68E-06	0.00E+00	1.99E-04	0.0%	1.82%	0.0%	98.2%	2.03E-04	8
Supernatant	9.20E-13	1.71E-11	0.00E+00	2.53E-06	0.0%	0.00%	0.0%	100.0%	2.53E-06	0
Solid Layer	1.87E-08	3.68E-06	0.00E+00	1.97E-04	0.0%	1.84%	0.0%	98.2%	2.00E-04	8

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-BX-101	4.06E-06	1.56E-06	1.75E-06	2.27E-04	1.7%	0.67%	0.7%	96.9%	2.35E-04	10
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.06E-06	1.56E-06	1.75E-06	2.27E-04	1.7%	0.67%	0.7%	96.9%	2.35E-04	10
241-BX-102	1.52E-07	1.91E-07	1.95E-06	2.37E-04	0.1%	0.08%	0.8%	99.0%	2.39E-04	10
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.52E-07	1.91E-07	1.95E-06	2.37E-04	0.1%	0.08%	0.8%	99.0%	2.39E-04	10
241-BX-103	3.30E-05	4.20E-05	1.09E-05	2.35E-04	10.3%	13.06%	3.4%	73.3%	3.21E-04	13
Supernatant	1.77E-07	3.62E-08	1.95E-06	4.21E-06	2.8%	0.57%	30.6%	66.1%	6.37E-06	0
Solid Layer	3.28E-05	4.19E-05	8.99E-06	2.31E-04	10.4%	13.31%	2.9%	73.4%	3.15E-04	13
241-BX-104	9.45E-05	6.77E-06	9.65E-06	2.47E-04	26.4%	1.89%	2.7%	69.0%	3.57E-04	15
Supernatant	1.37E-06	1.48E-10	4.59E-07	9.95E-07	48.4%	0.01%	16.3%	35.3%	2.82E-06	0
Solid Layer	9.31E-05	6.77E-06	9.19E-06	2.46E-04	26.3%	1.91%	2.6%	69.3%	3.55E-04	14
241-BX-105	2.80E-05	5.30E-07	5.30E-06	2.34E-04	10.4%	0.20%	2.0%	87.4%	2.68E-04	11
Supernatant	2.78E-06	2.03E-08	9.62E-07	1.61E-06	51.7%	0.38%	17.9%	30.0%	5.37E-06	0
Solid Layer	2.52E-05	5.10E-07	4.34E-06	2.32E-04	9.6%	0.19%	1.7%	88.6%	2.62E-04	11
241-BX-106	4.57E-05	2.67E-06	1.69E-06	2.22E-04	16.8%	0.98%	0.6%	81.6%	2.72E-04	11
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.57E-05	2.67E-06	1.69E-06	2.22E-04	16.8%	0.98%	0.6%	81.6%	2.72E-04	11
241-BX-107	4.83E-05	3.39E-06	1.49E-05	3.27E-04	12.3%	0.86%	3.8%	83.1%	3.93E-04	16
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.83E-05	3.39E-06	1.49E-05	3.27E-04	12.3%	0.86%	3.8%	83.1%	3.93E-04	16
241-BX-108	1.29E-05	1.09E-07	5.26E-07	2.20E-04	5.5%	0.05%	0.2%	94.2%	2.34E-04	10
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.29E-05	1.09E-07	5.26E-07	2.20E-04	5.5%	0.05%	0.2%	94.2%	2.34E-04	10
241-BX-109	2.02E-04	4.85E-07	1.32E-05	2.76E-04	41.1%	0.10%	2.7%	56.1%	4.92E-04	20
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.02E-04	4.85E-07	1.32E-05	2.76E-04	41.1%	0.10%	2.7%	56.1%	4.92E-04	20

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-BX-110	3.62E-05	2.37E-07	4.53E-05	2.79E-04	10.0%	0.07%	12.5%	77.4%	3.61E-04	15
Supernatant	3.92E-07	5.80E-10	3.46E-07	4.47E-07	33.1%	0.05%	29.2%	37.7%	1.19E-06	0
Solid Layer	3.58E-05	2.36E-07	4.49E-05	2.79E-04	10.0%	0.07%	12.5%	77.5%	3.60E-04	15
241-BX-111	4.29E-06	3.57E-08	1.27E-06	2.70E-04	1.6%	0.01%	0.5%	98.0%	2.76E-04	11
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.29E-06	3.57E-08	1.27E-06	2.70E-04	1.6%	0.01%	0.5%	98.0%	2.76E-04	11
241-BX-112	5.28E-05	4.52E-06	0.00E+00	2.63E-04	16.5%	1.41%	0.0%	82.1%	3.21E-04	13
Supernatant	1.36E-08	3.20E-10	0.00E+00	4.44E-07	3.0%	0.07%	0.0%	97.0%	4.58E-07	0
Solid Layer	5.28E-05	4.52E-06	0.00E+00	2.63E-04	16.5%	1.41%	0.0%	82.1%	3.20E-04	13
241-BY-101	1.36E-04	7.83E-07	2.64E-04	3.40E-04	18.4%	0.11%	35.7%	45.9%	7.41E-04	30
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.36E-04	7.83E-07	2.64E-04	3.40E-04	18.4%	0.11%	35.7%	45.9%	7.41E-04	30
241-BY-102	2.06E-05	9.97E-07	9.60E-06	3.05E-04	6.1%	0.30%	2.9%	90.7%	3.36E-04	14
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.06E-05	9.97E-07	9.60E-06	3.05E-04	6.1%	0.30%	2.9%	90.7%	3.36E-04	14
241-BY-103	3.68E-05	3.53E-07	2.60E-05	3.54E-04	8.8%	0.08%	6.2%	84.9%	4.17E-04	17
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.68E-05	3.53E-07	2.60E-05	3.54E-04	8.8%	0.08%	6.2%	84.9%	4.17E-04	17
241-BY-104	1.18E-04	1.21E-06	1.47E-04	3.32E-04	19.7%	0.20%	24.6%	55.5%	5.98E-04	24
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.18E-04	1.21E-06	1.47E-04	3.32E-04	19.7%	0.20%	24.6%	55.5%	5.98E-04	24
241-BY-105	7.25E-05	1.37E-06	1.05E-04	3.78E-04	13.0%	0.25%	18.8%	67.9%	5.57E-04	23
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.25E-05	1.37E-06	1.05E-04	3.78E-04	13.0%	0.25%	18.8%	67.9%	5.57E-04	23
241-BY-106	1.85E-04	8.23E-07	1.55E-04	3.71E-04	26.0%	0.12%	21.7%	52.1%	7.12E-04	29
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.85E-04	8.23E-07	1.55E-04	3.71E-04	26.0%	0.12%	21.7%	52.1%	7.12E-04	29

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-BY-107	7.57E-05	4.26E-07	7.06E-05	3.05E-04	16.8%	0.09%	15.6%	67.5%	4.52E-04	18
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.57E-05	4.26E-07	7.06E-05	3.05E-04	16.8%	0.09%	15.6%	67.5%	4.52E-04	18
241-BY-108	5.10E-05	4.88E-07	7.02E-05	2.90E-04	12.4%	0.12%	17.1%	70.4%	4.11E-04	17
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.10E-05	4.88E-07	7.02E-05	2.90E-04	12.4%	0.12%	17.1%	70.4%	4.11E-04	17
241-BY-109	2.12E-05	7.04E-07	7.05E-06	3.03E-04	6.4%	0.21%	2.1%	91.3%	3.32E-04	14
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.12E-05	7.04E-07	7.05E-06	3.03E-04	6.4%	0.21%	2.1%	91.3%	3.32E-04	14
241-BY-110	1.15E-04	8.34E-07	6.40E-04	3.33E-04	10.5%	0.08%	58.8%	30.6%	1.09E-03	44
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.15E-04	8.34E-07	6.40E-04	3.33E-04	10.5%	0.08%	58.8%	30.6%	1.09E-03	44
241-BY-111	1.59E-05	6.08E-07	3.84E-06	3.10E-04	4.8%	0.18%	1.2%	93.8%	3.30E-04	13
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.59E-05	6.08E-07	3.84E-06	3.10E-04	4.8%	0.18%	1.2%	93.8%	3.30E-04	13
241-BY-112	9.79E-06	2.66E-07	1.09E-05	3.10E-04	3.0%	0.08%	3.3%	93.7%	3.31E-04	13
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.79E-06	2.66E-07	1.09E-05	3.10E-04	3.0%	0.08%	3.3%	93.7%	3.31E-04	13
241-C-101	4.51E-05	7.97E-06	1.28E-05	2.49E-04	14.3%	2.53%	4.1%	79.1%	3.15E-04	13
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.51E-05	7.97E-06	1.28E-05	2.49E-04	14.3%	2.53%	4.1%	79.1%	3.15E-04	13
241-C-102	4.00E-05	7.66E-05	2.72E-05	3.22E-04	8.6%	16.45%	5.8%	69.1%	4.66E-04	19
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.00E-05	7.66E-05	2.72E-05	3.22E-04	8.6%	16.45%	5.8%	69.1%	4.66E-04	19
241-C-103	8.48E-03	4.30E-04	0.00E+00	6.24E-04	88.9%	4.51%	0.0%	6.5%	9.53E-03	389
Supernatant	4.78E-07	7.92E-09	0.00E+00	4.77E-07	49.6%	0.82%	0.0%	49.5%	9.62E-07	0
Solid Layer	8.47E-03	4.30E-04	0.00E+00	6.24E-04	88.9%	4.51%	0.0%	6.5%	9.53E-03	389

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-C-104	7.86E-04	3.16E-04	1.80E-04	3.10E-04	49.4%	19.87%	11.3%	19.5%	1.59E-03	65
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.86E-04	3.16E-04	1.80E-04	3.10E-04	49.4%	19.87%	11.3%	19.5%	1.59E-03	65
241-C-105	4.55E-04	1.02E-04	8.49E-06	2.74E-04	54.2%	12.11%	1.0%	32.6%	8.38E-04	34
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.55E-04	1.02E-04	8.49E-06	2.74E-04	54.2%	12.11%	1.0%	32.6%	8.38E-04	34
241-C-106	4.32E-04	7.39E-06	7.62E-09	5.43E-04	44.0%	0.75%	0.0%	55.3%	9.83E-04	40
Supernatant	1.70E-09	9.09E-13	4.76E-10	7.43E-08	2.2%	0.00%	0.6%	97.1%	7.64E-08	0
Solid Layer	4.32E-04	7.39E-06	7.15E-09	5.43E-04	44.0%	0.75%	0.0%	55.3%	9.83E-04	40
241-C-107	2.24E-03	1.59E-04	1.32E-04	3.14E-04	78.8%	5.58%	4.6%	11.0%	2.85E-03	116
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.24E-03	1.59E-04	1.32E-04	3.14E-04	78.8%	5.58%	4.6%	11.0%	2.85E-03	116
241-C-108	7.42E-05	2.90E-07	5.80E-06	2.37E-04	23.4%	0.09%	1.8%	74.7%	3.17E-04	13
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.42E-05	2.90E-07	5.80E-06	2.37E-04	23.4%	0.09%	1.8%	74.7%	3.17E-04	13
241-C-109	4.45E-04	2.59E-06	5.34E-06	2.35E-04	64.7%	0.38%	0.8%	34.1%	6.88E-04	28
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.45E-04	2.59E-06	5.34E-06	2.35E-04	64.7%	0.38%	0.8%	34.1%	6.88E-04	28
241-C-110	2.45E-05	3.19E-06	4.47E-07	6.79E-04	3.5%	0.45%	0.1%	96.0%	7.07E-04	29
Supernatant	3.62E-08	3.60E-10	3.92E-09	8.99E-07	3.9%	0.04%	0.4%	95.7%	9.39E-07	0
Solid Layer	2.45E-05	3.19E-06	4.43E-07	6.78E-04	3.5%	0.45%	0.1%	96.0%	7.06E-04	29
241-C-111	1.02E-03	7.42E-06	4.08E-06	2.33E-04	80.7%	0.59%	0.3%	18.4%	1.26E-03	51
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.02E-03	7.42E-06	4.08E-06	2.33E-04	80.7%	0.59%	0.3%	18.4%	1.26E-03	51
241-C-112	1.26E-03	1.59E-05	1.48E-05	2.50E-04	81.8%	1.03%	1.0%	16.2%	1.54E-03	63
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.26E-03	1.59E-05	1.48E-05	2.50E-04	81.8%	1.03%	1.0%	16.2%	1.54E-03	63

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from *radiolysis* $HGR_{rad}^{b/r}$ (cfm)	HGR from *radiolysis* HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-C-201	1.22E-07	2.22E-07	4.75E-09	1.56E-05	0.8%	1.39%	0.0%	97.8%	1.59E-05	1
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.22E-07	2.22E-07	4.75E-09	1.56E-05	0.8%	1.39%	0.0%	97.8%	1.59E-05	1
241-C-202	2.23E-07	1.88E-07	4.54E-09	1.54E-05	1.4%	1.18%	0.0%	97.4%	1.59E-05	1
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.23E-07	1.88E-07	4.54E-09	1.54E-05	1.4%	1.18%	0.0%	97.4%	1.59E-05	1
241-C-203	1.58E-07	1.84E-07	2.49E-08	1.68E-05	0.9%	1.07%	0.1%	97.9%	1.72E-05	1
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.58E-07	1.84E-07	2.49E-08	1.68E-05	0.9%	1.07%	0.1%	97.9%	1.72E-05	1
241-C-204	1.77E-07	1.79E-09	5.44E-08	1.67E-05	1.0%	0.01%	0.3%	98.6%	1.70E-05	1
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.77E-07	1.79E-09	5.44E-08	1.67E-05	1.0%	0.01%	0.3%	98.6%	1.70E-05	1
241-S-101	4.24E-04	7.92E-06	2.45E-04	3.40E-04	41.7%	0.78%	24.1%	33.4%	1.02E-03	41
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.24E-04	7.92E-06	2.45E-04	3.40E-04	41.7%	0.78%	24.1%	33.4%	1.02E-03	41
241-S-102	1.10E-04	3.25E-06	2.51E-04	3.60E-04	15.1%	0.45%	34.7%	49.7%	7.24E-04	30
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.10E-04	3.25E-06	2.51E-04	3.60E-04	15.1%	0.45%	34.7%	49.7%	7.24E-04	30
241-S-103	1.18E-04	2.87E-06	7.87E-05	2.93E-04	23.9%	0.58%	16.0%	59.5%	4.92E-04	20
Supernatant	8.45E-07	8.21E-11	5.19E-07	3.62E-07	49.0%	0.00%	30.1%	21.0%	1.73E-06	0
Solid Layer	1.17E-04	2.87E-06	7.82E-05	2.93E-04	23.8%	0.59%	15.9%	59.7%	4.91E-04	20
241-S-104	2.50E-04	6.68E-06	2.06E-05	3.18E-04	42.0%	1.12%	3.5%	53.4%	5.95E-04	24
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.50E-04	6.68E-06	2.06E-05	3.18E-04	42.0%	1.12%	3.5%	53.4%	5.95E-04	24
241-S-105	2.68E-06	1.76E-08	6.62E-06	3.50E-04	0.7%	0.00%	1.8%	97.4%	3.59E-04	15
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.68E-06	1.76E-08	6.62E-06	3.50E-04	0.7%	0.00%	1.8%	97.4%	3.59E-04	15

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-S-106	9.94E-05	8.03E-07	4.70E-05	3.66E-04	19.4%	0.16%	9.2%	71.3%	5.14E-04	21
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.94E-05	8.03E-07	4.70E-05	3.66E-04	19.4%	0.16%	9.2%	71.3%	5.14E-04	21
241-S-107	2.83E-04	3.34E-05	4.93E-05	3.38E-04	40.2%	4.74%	7.0%	48.0%	7.04E-04	29
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.83E-04	3.34E-05	4.93E-05	3.38E-04	40.2%	4.74%	7.0%	48.0%	7.04E-04	29
241-S-108	7.23E-06	2.04E-07	7.38E-06	4.01E-04	1.7%	0.05%	1.8%	96.4%	4.16E-04	17
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.23E-06	2.04E-07	7.38E-06	4.01E-04	1.7%	0.05%	1.8%	96.4%	4.16E-04	17
241-S-109	1.17E-05	4.75E-07	1.38E-05	3.94E-04	2.8%	0.11%	3.3%	93.8%	4.20E-04	17
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.17E-05	4.75E-07	1.38E-05	3.94E-04	2.8%	0.11%	3.3%	93.8%	4.20E-04	17
241-S-110	7.99E-05	2.84E-06	1.18E-04	3.49E-04	14.5%	0.52%	21.5%	63.5%	5.49E-04	22
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.99E-05	2.84E-06	1.18E-04	3.49E-04	14.5%	0.52%	21.5%	63.5%	5.49E-04	22
241-S-111	2.38E-04	5.26E-07	4.93E-05	3.51E-04	37.2%	0.08%	7.7%	55.0%	6.39E-04	26
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.38E-04	5.26E-07	4.93E-05	3.51E-04	37.2%	0.08%	7.7%	55.0%	6.39E-04	26
241-S-112	4.69E-05	2.24E-06	9.85E-06	2.49E-04	15.2%	0.73%	3.2%	80.8%	3.08E-04	13
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.69E-05	2.24E-06	9.85E-06	2.49E-04	15.2%	0.73%	3.2%	80.8%	3.08E-04	13
241-SX-101	1.67E-04	1.67E-05	8.10E-04	3.59E-04	12.3%	1.23%	59.9%	26.6%	1.35E-03	55
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.67E-04	1.67E-05	8.10E-04	3.59E-04	12.3%	1.23%	59.9%	26.6%	1.35E-03	55
241-SX-102	3.87E-04	8.35E-06	1.32E-03	3.61E-04	18.6%	0.40%	63.6%	17.4%	2.08E-03	85
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.87E-04	8.35E-06	1.32E-03	3.61E-04	18.6%	0.40%	63.6%	17.4%	2.08E-03	85

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-SX-103	7.64E-04	1.45E-05	6.17E-03	3.91E-04	10.4%	0.20%	84.1%	5.3%	7.34E-03	299
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.64E-04	1.45E-05	6.17E-03	3.91E-04	10.4%	0.20%	84.1%	5.3%	7.34E-03	299
241-SX-104	3.42E-04	8.18E-06	1.39E-03	3.69E-04	16.2%	0.39%	65.9%	17.5%	2.11E-03	86
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.42E-04	8.18E-06	1.39E-03	3.69E-04	16.2%	0.39%	65.9%	17.5%	2.11E-03	86
241-SX-105	3.87E-04	2.41E-05	4.39E-03	3.49E-04	7.5%	0.47%	85.2%	6.8%	5.15E-03	210
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.87E-04	2.41E-05	4.39E-03	3.49E-04	7.5%	0.47%	85.2%	6.8%	5.15E-03	210
241-SX-106	1.93E-04	7.17E-06	2.15E-04	3.50E-04	25.3%	0.94%	28.1%	45.7%	7.65E-04	31
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.93E-04	7.17E-06	2.15E-04	3.50E-04	25.3%	0.94%	28.1%	45.7%	7.65E-04	31
241-SX-107	1.10E-04	3.89E-06	4.91E-04	2.66E-04	12.6%	0.45%	56.3%	30.6%	8.71E-04	36
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.10E-04	3.89E-06	4.91E-04	2.66E-04	12.6%	0.45%	56.3%	30.6%	8.71E-04	36
241-SX-108	1.53E-04	2.07E-06	8.38E-05	2.65E-04	30.3%	0.41%	16.6%	52.6%	5.03E-04	21
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.53E-04	2.07E-06	8.38E-05	2.65E-04	30.3%	0.41%	16.6%	52.6%	5.03E-04	21
241-SX-109	1.65E-04	3.09E-06	1.19E-03	3.18E-04	9.8%	0.18%	71.1%	18.9%	1.68E-03	69
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.65E-04	3.09E-06	1.19E-03	3.18E-04	9.8%	0.18%	71.1%	18.9%	1.68E-03	69
241-SX-110	1.09E-04	2.53E-06	2.91E-04	2.51E-04	16.6%	0.39%	44.5%	38.5%	6.53E-04	27
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.09E-04	2.53E-06	2.91E-04	2.51E-04	16.6%	0.39%	44.5%	38.5%	6.53E-04	27
241-SX-111	1.28E-04	4.16E-06	9.63E-04	2.76E-04	9.4%	0.30%	70.2%	20.1%	1.37E-03	56
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.28E-04	4.16E-06	9.63E-04	2.76E-04	9.4%	0.30%	70.2%	20.1%	1.37E-03	56

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-SX-112	7.22E-05	2.83E-06	1.70E-04	2.59E-04	14.3%	0.56%	33.7%	51.4%	5.04E-04	21
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.22E-05	2.83E-06	1.70E-04	2.59E-04	14.3%	0.56%	33.7%	51.4%	5.04E-04	21
241-SX-113	8.69E-06	3.18E-07	1.76E-06	2.21E-04	3.7%	0.14%	0.8%	95.4%	2.32E-04	9
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	8.69E-06	3.18E-07	1.76E-06	2.21E-04	3.7%	0.14%	0.8%	95.4%	2.32E-04	9
241-SX-114	1.03E-04	3.06E-06	1.20E-03	2.90E-04	6.5%	0.19%	75.2%	18.2%	1.60E-03	65
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.03E-04	3.06E-06	1.20E-03	2.90E-04	6.5%	0.19%	75.2%	18.2%	1.60E-03	65
241-SX-115	1.04E-04	4.62E-06	8.91E-08	2.14E-04	32.2%	1.43%	0.0%	66.4%	3.22E-04	13
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.04E-04	4.62E-06	8.91E-08	2.14E-04	32.2%	1.43%	0.0%	66.4%	3.22E-04	13
241-T-101	1.74E-05	4.57E-06	1.67E-05	2.44E-04	6.2%	1.62%	5.9%	86.3%	2.83E-04	12
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.74E-05	4.57E-06	1.67E-05	2.44E-04	6.2%	1.62%	5.9%	86.3%	2.83E-04	12
241-T-102	1.72E-05	3.26E-07	2.01E-07	2.18E-04	7.3%	0.14%	0.1%	92.5%	2.36E-04	10
Supernatant	3.63E-06	1.62E-08	1.07E-07	4.25E-06	45.3%	0.20%	1.3%	53.1%	8.00E-06	0
Solid Layer	1.36E-05	3.10E-07	9.37E-08	2.14E-04	6.0%	0.14%	0.0%	93.9%	2.28E-04	9
241-T-103	1.23E-06	1.11E-07	2.79E-06	2.18E-04	0.6%	0.05%	1.3%	98.1%	2.22E-04	9
Supernatant	3.78E-07	1.16E-08	5.35E-07	1.34E-06	16.7%	0.51%	23.7%	59.1%	2.26E-06	0
Solid Layer	8.52E-07	9.92E-08	2.26E-06	2.17E-04	0.4%	0.05%	1.0%	98.5%	2.20E-04	9
241-T-104	6.19E-06	7.80E-06	1.37E-05	3.17E-04	1.8%	2.26%	4.0%	92.0%	3.44E-04	14
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.19E-06	7.80E-06	1.37E-05	3.17E-04	1.8%	2.26%	4.0%	92.0%	3.44E-04	14
241-T-105	5.69E-05	7.64E-06	1.12E-06	2.39E-04	18.7%	2.51%	0.4%	78.4%	3.04E-04	12
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.69E-05	7.64E-06	1.12E-06	2.39E-04	18.7%	2.51%	0.4%	78.4%	3.04E-04	12

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-T-106	9.52E-07	2.47E-07	3.69E-07	2.17E-04	0.4%	0.11%	0.2%	99.3%	2.18E-04	9
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.52E-07	2.47E-07	3.69E-07	2.17E-04	0.4%	0.11%	0.2%	99.3%	2.18E-04	9
241-T-107	1.28E-04	7.79E-06	6.36E-06	2.69E-04	31.1%	1.90%	1.5%	65.5%	4.11E-04	17
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.28E-04	7.79E-06	6.36E-06	2.69E-04	31.1%	1.90%	1.5%	65.5%	4.11E-04	17
241-T-108	3.46E-07	5.98E-08	1.37E-10	2.15E-04	0.2%	0.03%	0.0%	99.8%	2.15E-04	9
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.46E-07	5.98E-08	1.37E-10	2.15E-04	0.2%	0.03%	0.0%	99.8%	2.15E-04	9
241-T-109	6.83E-07	5.09E-08	1.21E-09	2.30E-04	0.3%	0.02%	0.0%	99.7%	2.31E-04	9
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.83E-07	5.09E-08	1.21E-09	2.30E-04	0.3%	0.02%	0.0%	99.7%	2.31E-04	9
241-T-110	2.97E-07	1.02E-05	0.00E+00	8.36E-04	0.0%	1.21%	0.0%	98.8%	8.47E-04	35
Supernatant	3.91E-11	5.11E-11	0.00E+00	6.70E-07	0.0%	0.01%	0.0%	100.0%	6.70E-07	0
Solid Layer	2.97E-07	1.02E-05	0.00E+00	8.36E-04	0.0%	1.21%	0.0%	98.8%	8.46E-04	35
241-T-111	1.67E-05	1.28E-05	2.07E-05	3.62E-04	4.1%	3.10%	5.0%	87.8%	4.13E-04	17
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.67E-05	1.28E-05	2.07E-05	3.62E-04	4.1%	3.10%	5.0%	87.8%	4.13E-04	17
241-T-112	6.45E-09	4.54E-06	0.00E+00	2.32E-04	0.0%	1.92%	0.0%	98.1%	2.36E-04	10
Supernatant	1.79E-09	4.13E-08	0.00E+00	2.32E-06	0.1%	1.75%	0.0%	98.2%	2.36E-06	0
Solid Layer	4.66E-09	4.50E-06	0.00E+00	2.29E-04	0.0%	1.92%	0.0%	98.1%	2.34E-04	10
241-T-201	3.58E-08	4.93E-06	0.00E+00	1.37E-04	0.0%	3.49%	0.0%	96.5%	1.41E-04	6
Supernatant	2.47E-12	1.55E-11	0.00E+00	7.51E-06	0.0%	0.00%	0.0%	100.0%	7.51E-06	0
Solid Layer	3.58E-08	4.93E-06	0.00E+00	1.29E-04	0.0%	3.68%	0.0%	96.3%	1.34E-04	5
241-T-202	1.50E-09	8.05E-07	9.07E-07	4.18E-05	0.0%	1.85%	2.1%	96.1%	4.35E-05	2
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.50E-09	8.05E-07	9.07E-07	4.18E-05	0.0%	1.85%	2.1%	96.1%	4.35E-05	2

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-T-203	2.36E-09	1.67E-06	1.50E-06	6.17E-05	0.0%	2.58%	2.3%	95.1%	6.48E-05	3
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.36E-09	1.67E-06	1.50E-06	6.17E-05	0.0%	2.58%	2.3%	95.1%	6.48E-05	3
241-T-204	3.34E-09	1.51E-06	1.68E-06	6.27E-05	0.0%	2.29%	2.6%	95.2%	6.59E-05	3
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.34E-09	1.51E-06	1.68E-06	6.27E-05	0.0%	2.29%	2.6%	95.2%	6.59E-05	3
241-TX-101	9.08E-05	6.29E-06	1.79E-05	2.42E-04	25.4%	1.76%	5.0%	67.8%	3.57E-04	15
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.08E-05	6.29E-06	1.79E-05	2.42E-04	25.4%	1.76%	5.0%	67.8%	3.57E-04	15
241-TX-102	1.49E-05	1.23E-06	2.04E-05	2.87E-04	4.6%	0.38%	6.3%	88.7%	3.23E-04	13
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.49E-05	1.23E-06	2.04E-05	2.87E-04	4.6%	0.38%	6.3%	88.7%	3.23E-04	13
241-TX-103	1.28E-05	1.19E-06	1.07E-05	2.59E-04	4.5%	0.42%	3.7%	91.3%	2.84E-04	12
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.28E-05	1.19E-06	1.07E-05	2.59E-04	4.5%	0.42%	3.7%	91.3%	2.84E-04	12
241-TX-104	5.99E-05	1.25E-06	1.64E-06	2.33E-04	20.3%	0.42%	0.6%	78.8%	2.96E-04	12
Supernatant	1.53E-06	1.38E-09	5.35E-08	8.05E-07	64.1%	0.06%	2.2%	33.7%	2.39E-06	0
Solid Layer	5.84E-05	1.25E-06	1.59E-06	2.32E-04	19.9%	0.42%	0.5%	79.1%	2.94E-04	12
241-TX-105	1.11E-05	1.15E-06	4.18E-05	4.08E-04	2.4%	0.25%	9.1%	88.3%	4.62E-04	19
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.11E-05	1.15E-06	4.18E-05	4.08E-04	2.4%	0.25%	9.1%	88.3%	4.62E-04	19
241-TX-106	3.09E-05	2.72E-06	3.73E-05	3.33E-04	7.6%	0.67%	9.2%	82.4%	4.04E-04	16
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	3.09E-05	2.72E-06	3.73E-05	3.33E-04	7.6%	0.67%	9.2%	82.4%	4.04E-04	16
241-TX-107	6.16E-06	5.22E-06	3.56E-06	2.21E-04	2.6%	2.22%	1.5%	93.7%	2.36E-04	10
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.16E-06	5.22E-06	3.56E-06	2.21E-04	2.6%	2.22%	1.5%	93.7%	2.36E-04	10

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-TX-108	5.73E-06	5.56E-07	3.89E-06	2.52E-04	2.2%	0.21%	1.5%	96.1%	2.63E-04	11
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.73E-06	5.56E-07	3.89E-06	2.52E-04	2.2%	0.21%	1.5%	96.1%	2.63E-04	11
241-TX-109	5.16E-05	5.57E-06	1.18E-04	3.59E-04	9.7%	1.04%	22.0%	67.2%	5.35E-04	22
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.16E-05	5.57E-06	1.18E-04	3.59E-04	9.7%	1.04%	22.0%	67.2%	5.35E-04	22
241-TX-110	1.02E-05	1.24E-06	2.04E-05	3.69E-04	2.5%	0.31%	5.1%	92.0%	4.01E-04	16
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.02E-05	1.24E-06	2.04E-05	3.69E-04	2.5%	0.31%	5.1%	92.0%	4.01E-04	16
241-TX-111	8.67E-06	1.10E-06	1.34E-05	3.35E-04	2.4%	0.31%	3.8%	93.5%	3.58E-04	15
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	8.67E-06	1.10E-06	1.34E-05	3.35E-04	2.4%	0.31%	3.8%	93.5%	3.58E-04	15
241-TX-112	2.09E-05	2.39E-06	1.52E-05	4.18E-04	4.6%	0.52%	3.3%	91.6%	4.56E-04	19
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	2.09E-05	2.39E-06	1.52E-05	4.18E-04	4.6%	0.52%	3.3%	91.6%	4.56E-04	19
241-TX-113	1.17E-06	7.99E-08	8.01E-06	4.28E-04	0.3%	0.02%	1.8%	97.9%	4.37E-04	18
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.17E-06	7.99E-08	8.01E-06	4.28E-04	0.3%	0.02%	1.8%	97.9%	4.37E-04	18
241-TX-114	1.01E-05	1.05E-06	2.31E-06	3.85E-04	2.5%	0.26%	0.6%	96.6%	3.99E-04	16
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.01E-05	1.05E-06	2.31E-06	3.85E-04	2.5%	0.26%	0.6%	96.6%	3.99E-04	16
241-TX-115	1.16E-05	1.32E-06	9.89E-06	3.98E-04	2.8%	0.31%	2.4%	94.6%	4.21E-04	17
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.16E-05	1.32E-06	9.89E-06	3.98E-04	2.8%	0.31%	2.4%	94.6%	4.21E-04	17
241-TX-116	5.62E-06	4.54E-07	3.13E-08	4.10E-04	1.3%	0.11%	0.0%	98.5%	4.16E-04	17
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.62E-06	4.54E-07	3.13E-08	4.10E-04	1.3%	0.11%	0.0%	98.5%	4.16E-04	17

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-TX-117	4.60E-06	4.72E-07	7.86E-10	3.70E-04	1.2%	0.13%	0.0%	98.6%	3.75E-04	15
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	4.60E-06	4.72E-07	7.86E-10	3.70E-04	1.2%	0.13%	0.0%	98.6%	3.75E-04	15
241-TX-118	6.43E-05	6.00E-05	2.40E-05	2.92E-04	14.6%	13.62%	5.4%	66.3%	4.41E-04	18
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.43E-05	6.00E-05	2.40E-05	2.92E-04	14.6%	13.62%	5.4%	66.3%	4.41E-04	18
241-TY-101	1.15E-06	3.74E-07	4.43E-10	2.49E-04	0.5%	0.15%	0.0%	99.4%	2.51E-04	10
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.15E-06	3.74E-07	4.43E-10	2.49E-04	0.5%	0.15%	0.0%	99.4%	2.51E-04	10
241-TY-102	5.44E-06	1.87E-08	2.12E-06	2.32E-04	2.3%	0.01%	0.9%	96.8%	2.40E-04	10
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.44E-06	1.87E-08	2.12E-06	2.32E-04	2.3%	0.01%	0.9%	96.8%	2.40E-04	10
241-TY-103	6.18E-05	3.19E-06	2.97E-05	2.62E-04	17.3%	0.89%	8.3%	73.4%	3.56E-04	15
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	6.18E-05	3.19E-06	2.97E-05	2.62E-04	17.3%	0.89%	8.3%	73.4%	3.56E-04	15
241-TY-104	3.93E-05	1.67E-06	6.95E-07	2.24E-04	14.8%	0.63%	0.3%	84.3%	2.66E-04	11
Supernatant	7.98E-08	3.68E-10	2.34E-08	4.46E-07	14.5%	0.07%	4.3%	81.1%	5.49E-07	0
Solid Layer	3.93E-05	1.67E-06	6.72E-07	2.24E-04	14.8%	0.63%	0.3%	84.3%	2.65E-04	11
241-TY-105	1.81E-04	6.24E-07	1.37E-05	2.89E-04	37.4%	0.13%	2.8%	59.6%	4.85E-04	20
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.81E-04	6.24E-07	1.37E-05	2.89E-04	37.4%	0.13%	2.8%	59.6%	4.85E-04	20
241-TY-106	1.57E-05	6.37E-08	3.55E-07	2.14E-04	6.8%	0.03%	0.2%	93.0%	2.30E-04	9
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.57E-05	6.37E-08	3.55E-07	2.14E-04	6.8%	0.03%	0.2%	93.0%	2.30E-04	9
241-U-101	5.59E-05	1.61E-07	9.79E-07	2.18E-04	20.3%	0.06%	0.4%	79.3%	2.75E-04	11
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.59E-05	1.61E-07	9.79E-07	2.18E-04	20.3%	0.06%	0.4%	79.3%	2.75E-04	11

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-U-102	3.00E-04	6.55E-06	2.73E-04	3.20E-04	33.3%	0.73%	30.4%	35.6%	9.00E-04	37
Supernatant	1.31E-06	8.51E-10	5.48E-07	3.58E-07	59.1%	0.04%	24.7%	16.1%	2.22E-06	0
Solid Layer	2.99E-04	6.55E-06	2.73E-04	3.20E-04	33.3%	0.73%	30.4%	35.6%	8.98E-04	37
241-U-103	2.11E-04	5.60E-06	4.81E-04	3.54E-04	20.1%	0.53%	45.7%	33.7%	1.05E-03	43
Supernatant	7.64E-07	8.31E-10	1.06E-06	1.80E-07	38.2%	0.04%	52.8%	9.0%	2.00E-06	0
Solid Layer	2.11E-04	5.59E-06	4.80E-04	3.54E-04	20.1%	0.53%	45.7%	33.7%	1.05E-03	43
241-U-104	1.08E-04	2.88E-06	8.94E-05	2.54E-04	23.8%	0.63%	19.7%	55.9%	4.54E-04	19
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.08E-04	2.88E-06	8.94E-05	2.54E-04	23.8%	0.63%	19.7%	55.9%	4.54E-04	19
241-U-105	1.69E-04	1.81E-05	3.88E-04	3.37E-04	18.5%	1.98%	42.5%	37.0%	9.12E-04	37
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.69E-04	1.81E-05	3.88E-04	3.37E-04	18.5%	1.98%	42.5%	37.0%	9.12E-04	37
241-U-106	2.27E-04	1.38E-05	3.26E-04	2.72E-04	27.1%	1.64%	38.8%	32.4%	8.40E-04	34
Supernatant	2.55E-06	3.16E-08	3.27E-06	5.47E-07	39.8%	0.49%	51.2%	8.5%	6.40E-06	0
Solid Layer	2.25E-04	1.38E-05	3.23E-04	2.72E-04	27.0%	1.65%	38.7%	32.6%	8.33E-04	34
241-U-107	7.34E-05	1.09E-05	1.09E-04	3.13E-04	14.5%	2.16%	21.5%	61.9%	5.07E-04	21
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	7.34E-05	1.09E-05	1.09E-04	3.13E-04	14.5%	2.16%	21.5%	61.9%	5.07E-04	21
241-U-108	1.55E-04	4.00E-06	2.90E-04	3.36E-04	19.7%	0.51%	37.0%	42.8%	7.86E-04	32
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.55E-04	4.00E-06	2.90E-04	3.36E-04	19.7%	0.51%	37.0%	42.8%	7.86E-04	32
241-U-109	9.98E-05	8.59E-07	1.23E-04	3.43E-04	17.6%	0.15%	21.8%	60.5%	5.67E-04	23
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.98E-05	8.59E-07	1.23E-04	3.43E-04	17.6%	0.15%	21.8%	60.5%	5.67E-04	23
241-U-110	1.87E-04	5.22E-06	1.26E-05	2.73E-04	39.1%	1.09%	2.6%	57.2%	4.78E-04	19
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	1.87E-04	5.22E-06	1.26E-05	2.73E-04	39.1%	1.09%	2.6%	57.2%	4.78E-04	19

Table B-4. Calculated Total Hydrogen Generation Rate In Dome Space for 177 Tanks (20 Sheets).

Tank	HGR from radiolysis $HGR_{rad}^{b/r}$ (cfm)	HGR from radiolysis HGR_{rad}^{alpha} (cfm)	HGR from thermolysis HGR_{therm} (cfm)	HGR from corrosion HGR_{corr} (cfm)	Percent of HGR from radiolysis $HGR_{rad}^{b/r}$	Percent of HGR from radiolysis HGR_{rad}^{alpha}	Percent of HGR from thermolysis HGR_{therm}	Percent of HGR from corrosion HGR_{corr}	Total HGR from model HGR_{mod} (cfm)	Total HGR from model HGR_{mod} (L/day)
241-U-111	9.64E-05	4.20E-06	7.79E-05	2.90E-04	20.6%	0.90%	16.6%	61.9%	4.68E-04	19
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	9.64E-05	4.20E-06	7.79E-05	2.90E-04	20.6%	0.90%	16.6%	61.9%	4.68E-04	19
241-U-112	5.38E-05	1.21E-07	1.92E-06	2.26E-04	19.1%	0.04%	0.7%	80.1%	2.81E-04	11
Supernatant	na	na	na	na	na	na	na	na	na	na
Solid Layer	5.38E-05	1.21E-07	1.92E-06	2.26E-04	19.1%	0.04%	0.7%	80.1%	2.81E-04	11
241-U-201	1.38E-07	7.62E-10	0.00E+00	1.99E-05	0.7%	0.00%	0.0%	99.3%	2.00E-05	1
Supernatant	1.05E-07	8.54E-11	0.00E+00	1.33E-06	7.3%	0.01%	0.0%	92.7%	1.44E-06	0
Solid Layer	3.31E-08	6.77E-10	0.00E+00	1.85E-05	0.2%	0.00%	0.0%	99.8%	1.86E-05	1
241-U-202	9.61E-08	7.38E-10	1.55E-09	1.95E-05	0.5%	0.00%	0.0%	99.5%	1.96E-05	1
Supernatant	7.24E-08	1.59E-12	6.75E-10	1.33E-06	5.2%	0.00%	0.0%	94.8%	1.41E-06	0
Solid Layer	2.37E-08	7.36E-10	8.79E-10	1.82E-05	0.1%	0.00%	0.0%	99.9%	1.82E-05	1
241-U-203	1.13E-07	7.23E-10	0.00E+00	1.91E-05	0.6%	0.00%	0.0%	99.4%	1.93E-05	1
Supernatant	7.72E-08	3.91E-12	0.00E+00	1.33E-06	5.5%	0.00%	0.0%	94.5%	1.41E-06	0
Solid Layer	3.58E-08	7.20E-10	0.00E+00	1.78E-05	0.2%	0.00%	0.0%	99.8%	1.78E-05	1
241-U-204	1.42E-07	1.62E-08	2.21E-10	1.84E-05	0.8%	0.09%	0.0%	99.2%	1.86E-05	1
Supernatant	6.49E-08	3.09E-12	1.31E-10	1.33E-06	4.7%	0.00%	0.0%	95.3%	1.39E-06	0
Solid Layer	7.66E-08	1.62E-08	9.00E-11	1.71E-05	0.4%	0.09%	0.0%	99.5%	1.72E-05	1
AY102-S-14U	1.95E-03	1.21E-04	1.69E-05	1.48E-04	87.2%	5.39%	0.8%	6.6%	2.24E-03	91
AY102-S-14L	1.74E-03	1.11E-04	2.67E-05	1.46E-04	86.0%	5.47%	1.3%	7.2%	2.02E-03	82
AY102-S-15U	7.39E-04	3.75E-05	3.78E-06	1.43E-04	80.0%	4.07%	0.4%	15.5%	9.23E-04	38
AY102-S-15L	5.01E-03	1.75E-04	5.29E-05	1.49E-04	93.0%	3.24%	1.0%	2.8%	5.39E-03	220
AY-102-S-16	8.05E-03	2.06E-04	3.35E-05	1.48E-04	95.4%	2.44%	0.4%	1.8%	8.43E-03	344
AY102-Orig-9"	1.51E-02	1.77E-04	4.38E-05	1.47E-04	97.6%	1.14%	0.3%	0.9%	1.55E-02	632

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-AN-101	5.02E+03	1.15E+05	1.61E+05	2.13E+05	1.93E+04	2.08E+00	1.96E+02	1.41	1.41	3663	51%	52%	41	48
Supernatant	5.05E+03	1.15E+05	1.60E+05	2.12E+05	1.87E+04	1.26E+00	1.97E+02	1.41	1.41	3545	52%	52%	41	48
Solid Layer	4.04E+03	1.22E+05	1.90E+05	2.36E+05	3.79E+04	2.46E+01	1.84E+02	1.55	1.45	118	40%	49%	29	48
241-AN-102	2.69E+04	8.32E+04	2.00E+05	2.35E+05	1.34E+04	6.60E+01	2.71E+02	1.41	1.41	4095	47%	48%	36	35
Supernatant	2.69E+04	8.31E+04	1.99E+05	2.35E+05	1.34E+04	5.51E+01	2.72E+02	1.40	1.40	3588	48%	48%	36	35
Solid Layer	2.72E+04	8.39E+04	2.01E+05	2.37E+05	1.35E+04	1.37E+02	2.64E+02	1.53	1.49	507	40%	48%	35	35
241-AN-103	3.01E+03	1.29E+05	1.27E+05	2.67E+05	2.96E+04	1.07E+00	3.17E+02	1.58	1.47	3457	41%	47%	42	33
Supernatant	2.99E+03	1.28E+05	1.26E+05	2.65E+05	2.94E+04	1.18E-02	4.20E+02	1.47	1.47	1928	47%	47%	42	33
Solid Layer	3.05E+03	1.30E+05	1.29E+05	2.70E+05	2.99E+04	2.22E+00	2.05E+02	1.72	1.48	1529	35%	47%	41	33
241-AN-104	3.11E+03	1.18E+05	1.88E+05	2.56E+05	3.86E+04	1.25E+01	3.27E+02	1.47	1.40	3903	49%	51%	41	37
Supernatant	3.09E+03	1.17E+05	1.87E+05	2.54E+05	3.83E+04	5.77E-02	3.47E+02	1.39	1.39	2337	52%	52%	40	37
Solid Layer	3.14E+03	1.19E+05	1.90E+05	2.58E+05	3.90E+04	2.88E+01	3.00E+02	1.59	1.40	1566	46%	51%	43	37
241-AN-105	2.74E+03	1.17E+05	1.55E+05	2.45E+05	4.13E+04	4.62E+00	2.26E+02	1.49	1.42	4190	48%	50%	38	32
Supernatant	2.72E+03	1.17E+05	1.54E+05	2.43E+05	4.10E+04	2.42E-02	2.04E+02	1.41	1.41	2265	50%	50%	37	32
Solid Layer	2.76E+03	1.19E+05	1.56E+05	2.47E+05	4.17E+04	9.50E+00	2.50E+02	1.57	1.42	1925	44%	50%	39	32
241-AN-106	2.23E+03	2.13E+04	2.69E+04	4.78E+04	4.40E+03	1.27E+01	5.41E+01	1.14	1.12	3315	78%	81%	29	29
Supernatant	2.23E+03	2.13E+04	2.69E+04	4.78E+04	4.39E+03	6.03E-01	4.92E+01	1.12	1.12	3141	81%	81%	29	29
Solid Layer	2.26E+03	2.16E+04	2.72E+04	4.83E+04	4.45E+03	1.70E+02	1.17E+02	1.54	1.11	174	37%	81%	24	29
241-AN-107	3.22E+04	6.61E+04	2.07E+05	2.06E+05	1.11E+03	7.73E+01	2.13E+02	1.44	1.43	4207	50%	52%	38	35
Supernatant	3.21E+04	6.60E+04	2.07E+05	2.05E+05	1.11E+03	5.32E+01	2.07E+02	1.43	1.43	3335	52%	52%	38	35
Solid Layer	3.25E+04	6.67E+04	2.09E+05	2.08E+05	1.12E+03	1.66E+02	2.33E+02	1.48	1.43	872	44%	52%	39	35
241-AP-101	1.95E+03	4.18E+04	1.31E+05	1.29E+05	6.92E+03	7.78E-05	1.01E+02	1.31	1.31	4237	62%	62%	27	27
Supernatant	1.95E+03	4.18E+04	1.31E+05	1.29E+05	6.92E+03	6.08E-02	1.01E+02	1.31	1.31	4237	62%	62%	27	27
Solid Layer	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	0%	62%	28	27
241-AP-102	2.97E+03	9.70E+04	1.65E+05	1.92E+05	3.05E+04	2.77E-01	1.68E+02	1.39	1.38	4193	58%	59%	31	29
Supernatant	2.97E+03	9.70E+04	1.65E+05	1.92E+05	3.05E+04	2.74E-01	1.70E+02	1.39	1.39	4105	59%	59%	31	29
Solid Layer	3.00E+03	9.79E+04	1.67E+05	1.94E+05	3.07E+04	3.68E-01	8.12E+01	1.75	1.15	88	31%	59%	29	29

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-AP-103	7.18E+03	7.94E+04	1.47E+05	1.76E+05	1.81E+04	6.85E-04	1.68E+02	1.35	1.35	3427	57%	57%	29	29
Supernatant	7.18E+03	7.94E+04	1.47E+05	1.76E+05	1.81E+04	1.77E+00	1.68E+02	1.35	1.35	3427	57%	57%	29	29
Solid Layer	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	0%	57%	29	29
241-AP-104	4.12E+03	6.33E+04	9.97E+04	1.27E+05	1.66E+04	1.16E-03	1.44E+02	1.28	1.28	4202	67%	67%	29	30
Supernatant	4.12E+03	6.33E+04	9.97E+04	1.27E+05	1.66E+04	1.29E+00	1.44E+02	1.28	1.28	4202	67%	67%	29	30
Solid Layer	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	0%	66%	30	30
241-AP-105	1.99E+03	5.23E+04	1.09E+05	1.29E+05	1.79E+04	3.01E+00	1.29E+02	1.31	1.27	2637	68%	71%	28	26
Supernatant	1.99E+03	5.22E+04	1.09E+05	1.29E+05	1.79E+04	2.41E-01	1.11E+02	1.27	1.27	2300	71%	71%	28	26
Solid Layer	2.02E+03	5.31E+04	1.11E+05	1.31E+05	1.82E+04	1.79E+01	2.25E+02	1.61	1.30	337	48%	71%	25	26
241-AP-106	3.43E+03	4.10E+04	7.01E+04	1.03E+05	1.34E+04	6.07E-05	1.44E+02	1.21	1.21	4339	73%	73%	27	27
Supernatant	3.43E+03	4.10E+04	7.01E+04	1.03E+05	1.34E+04	9.77E-01	1.44E+02	1.21	1.21	4339	73%	73%	27	27
Solid Layer	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	0%	72%	29	27
241-AP-107	2.32E+03	5.15E+04	1.12E+05	1.22E+05	1.39E+04	6.12E-05	1.04E+02	1.28	1.28	4309	66%	66%	27	24
Supernatant	2.32E+03	5.15E+04	1.12E+05	1.22E+05	1.39E+04	7.85E-01	1.04E+02	1.28	1.28	4309	66%	66%	27	24
Solid Layer	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	0%	66%	34	24
241-AP-108	4.29E+03	7.88E+04	1.73E+05	1.99E+05	2.41E+04	2.72E-04	1.37E+02	1.42	1.42	3148	54%	54%	44	46
Supernatant	4.29E+03	7.88E+04	1.73E+05	1.99E+05	2.41E+04	2.92E-01	1.37E+02	1.42	1.42	3148	54%	54%	44	46
Solid Layer	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0	na	54%	28	46
241-AW-101	2.59E+03	1.04E+05	1.70E+05	2.31E+05	2.92E+04	1.31E+01	2.41E+02	1.51	1.47	4211	44%	44%	38	33
Supernatant	2.58E+03	1.04E+05	1.69E+05	2.30E+05	2.91E+04	2.53E-01	2.55E+02	1.46	1.46	2808	44%	44%	38	33
Solid Layer	2.61E+03	1.05E+05	1.71E+05	2.33E+05	2.95E+04	3.68E+01	2.13E+02	1.59	1.47	1403	44%	44%	38	33
241-AW-102	2.41E+03	4.35E+04	9.28E+04	1.06E+05	1.30E+04	2.95E+01	8.53E+01	1.24	1.24	491	69%	70%	36	34
Supernatant	2.40E+03	4.34E+04	9.25E+04	1.06E+05	1.30E+04	1.80E-01	8.61E+01	1.24	1.24	466	70%	70%	36	34
Solid Layer	2.62E+03	4.72E+04	1.01E+05	1.15E+05	1.41E+04	5.42E+02	7.12E+01	1.32	1.13	25	39%	68%	33	34
241-AW-103	2.70E+03	6.50E+04	1.44E+05	1.53E+05	1.98E+04	2.26E+00	7.30E+01	1.31	1.30	4197	58%	57%	26	27
Supernatant	2.11E+03	3.95E+04	1.23E+05	1.16E+05	1.17E+04	9.82E-02	9.42E+01	1.24	1.24	3013	60%	60%	26	27
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	6.82E+00	2.82E+01	1.49	1.45	1184	54%	49%	27	27

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-AW-104	4.10E+03	7.50E+04	1.12E+05	1.81E+05	2.66E+04	1.06E+00	1.74E+02	1.37	1.36	4102	54%	56%	39	35
Supernatant	4.27E+03	7.36E+04	1.11E+05	1.68E+05	2.51E+04	1.19E+00	1.75E+02	1.35	1.35	3259	56%	56%	40	35
Solid Layer	3.42E+03	8.04E+04	1.18E+05	2.36E+05	3.29E+04	5.88E-01	1.69E+02	1.48	1.41	843	50%	55%	34	35
241-AW-105	3.71E+02	1.08E+04	4.29E+04	3.82E+04	9.65E+02	1.55E+01	2.48E+01	1.24	1.08	1631	69%	87%	23	25
Supernatant	3.20E+02	2.20E+03	2.58E+04	2.07E+04	1.28E+02	1.98E-02	8.95E+00	1.05	1.05	632	94%	94%	24	25
Solid Layer	4.09E+02	1.73E+04	5.58E+04	5.14E+04	1.60E+03	2.30E+01	3.25E+01	1.36	1.10	999	57%	84%	23	25
241-AW-106	1.74E+03	5.40E+04	1.12E+05	1.42E+05	2.07E+04	7.22E+00	1.63E+02	1.39	1.33	3450	62%	72%	45	49
Supernatant	1.73E+03	5.38E+04	1.12E+05	1.42E+05	2.06E+04	3.51E-01	1.17E+02	1.30	1.30	2378	72%	72%	45	49
Solid Layer	1.76E+03	5.47E+04	1.14E+05	1.44E+05	2.09E+04	1.95E+01	2.45E+02	1.61	1.44	1072	43%	72%	45	49
241-AY-101	1.94E+03	4.48E+04	5.25E+03	9.30E+04	2.68E+03	1.87E+03	7.72E+01	1.43	1.16	727	57%	81%	42	33
Supernatant	1.21E+03	3.00E+04	4.16E+03	1.04E+05	4.24E+03	7.11E-01	3.56E+01	1.17	1.17	363	82%	82%	41	33
Solid Layer	2.95E+03	6.53E+04	6.75E+03	7.80E+04	5.29E+02	3.17E+03	1.06E+02	1.68	1.14	364	40%	81%	42	33
241-AY-102	9.76E+02	2.75E+04	3.63E+02	6.22E+04	1.09E+03	2.14E+03	7.29E+01	1.24	1.18	3271	74%	82%	58	49
Supernatant	8.67E+02	3.17E+04	4.15E+02	6.04E+04	1.22E+03	1.02E+00	1.80E+01	1.18	1.18	2700	82%	82%	53	49
Solid Layer	1.66E+03	8.33E+02	3.81E+01	7.33E+04	2.69E+02	9.85E+03	2.70E+02	1.55	1.16	571	45%	79%	75	49
241-AZ-101	4.90E+02	5.90E+04	5.07E+04	1.07E+05	5.82E+03	1.24E+03	1.18E+03	1.26	1.24	3569	71%	73%	68	69
Supernatant	4.89E+02	5.90E+04	5.07E+04	1.07E+05	5.81E+03	6.74E-01	1.21E+03	1.24	1.24	3372	73%	73%	68	69
Solid Layer	4.95E+02	5.97E+04	5.13E+04	1.08E+05	5.88E+03	1.74E+04	7.64E+02	1.63	1.24	197	43%	71%	78	69
241-AZ-102	1.97E+03	4.02E+04	8.12E+03	6.07E+04	3.36E+02	6.49E+02	8.37E+02	1.14	1.11	3761	78%	83%	52	51
Supernatant	1.96E+03	4.01E+04	8.11E+03	6.06E+04	3.36E+02	1.74E+00	8.39E+02	1.11	1.11	3365	83%	83%	51	51
Solid Layer	1.99E+03	4.06E+04	8.21E+03	6.13E+04	3.40E+02	4.97E+03	8.23E+02	1.41	1.11	396	43%	83%	65	51
241-SY-101	2.65E+03	4.77E+04	1.19E+05	1.23E+05	1.09E+04	2.83E+01	1.24E+02	1.44	1.32	1385	55%	63%	32	32
Supernatant	2.50E+03	4.49E+04	1.12E+05	1.16E+05	1.02E+04	1.87E+00	1.00E+02	1.27	1.27	437	65%	65%	32	32
Solid Layer	2.73E+03	4.91E+04	1.22E+05	1.27E+05	1.12E+04	3.84E+01	1.33E+02	1.52	1.34	948	50%	63%	32	32
241-SY-102	1.42E+03	4.82E+04	1.13E+05	1.51E+05	2.06E+04	1.28E+01	1.09E+02	1.34	1.30	3696	67%	69%	34	30
Supernatant	9.35E+02	4.45E+04	1.10E+05	1.50E+05	2.25E+04	1.92E-01	1.08E+02	1.30	1.30	3146	71%	71%	34	30
Solid Layer	4.65E+03	7.31E+04	1.34E+05	1.52E+05	7.58E+03	7.29E+01	1.13E+02	1.56	1.36	550	47%	63%	34	30

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-SY-103	6.07E+03	1.50E+05	1.65E+05	2.12E+05	3.71E+04	1.59E+01	2.58E+02	1.52	1.46	2785	41%	44%	35	29
Supernatant	6.01E+03	1.49E+05	1.64E+05	2.09E+05	3.67E+04	1.76E+00	2.89E+02	1.46	1.46	1581	44%	44%	33	29
Solid Layer	6.16E+03	1.52E+05	1.68E+05	2.15E+05	3.76E+04	3.28E+01	2.20E+02	1.61	1.47	1204	37%	43%	38	29
241-A-101	3.74E+03	1.65E+05	2.33E+05	2.78E+05	5.18E+04	7.05E+01	1.72E+02	1.70	1.49	1388	32%	47%	51	35
Supernatant	3.74E+03	1.65E+05	2.33E+05	2.78E+05	5.18E+04	7.05E+01	1.72E+02	1.49	1.49	38	47%	47%	62	35
Solid Layer	3.74E+03	1.65E+05	2.33E+05	2.78E+05	5.18E+04	7.05E+01	1.72E+02	1.70	1.49	1350	31%	47%	51	35
241-A-102	9.70E+03	1.53E+03	1.00E+05	1.55E+05	3.17E+04	2.69E+02	1.41E+02	1.53	1.44	189	46%	53%	35	34
Supernatant	3.01E+03	4.77E+02	3.11E+04	4.81E+04	9.87E+03	2.35E-01	1.05E+02	1.14	1.14	50	82%	82%	33	34
Solid Layer	1.25E+04	1.98E+03	1.29E+05	2.00E+05	4.09E+04	3.34E+02	1.50E+02	1.67	1.57	139	37%	46%	35	34
241-A-103	7.62E+03	1.08E+05	1.86E+05	2.22E+05	5.64E+04	5.81E+01	1.46E+02	1.36	1.43	1443	45%	54%	44	36
Supernatant	2.44E+03	3.46E+04	5.94E+04	7.13E+04	1.80E+04	4.99E-01	6.98E+01	1.14	1.14	55	82%	82%	50	36
Solid Layer	7.89E+03	1.11E+05	1.92E+05	2.30E+05	5.83E+04	5.99E+01	1.49E+02	1.37	1.45	1388	44%	54%	44	36
241-A-104	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.32E+04	3.56E+02	1.52	1.17	144	0%	0%	74	34
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.32E+04	3.56E+02	1.17	1.17	38	0%	0%	76	34
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.32E+04	3.56E+02	1.64	1.17	106	0%	0%	74	34
241-A-105	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.60E+00	5.00E+02	1.17	1.17	38	0%	0%	74	34
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.35E+04	5.00E+02	1.17	1.17	38	0%	0%	0	na
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.35E+04	5.00E+02	1.54	1.17	0	0%	0%	74	34
241-A-106	1.10E+04	3.60E+04	7.96E+04	8.20E+04	4.94E+03	9.62E+02	1.26E+02	1.64	1.17	337	38%	75%	53	39
Supernatant	1.10E+04	3.60E+04	7.96E+04	8.20E+04	4.94E+03	9.62E+02	1.26E+02	1.17	1.17	38	75%	75%	54	39
Solid Layer	1.10E+04	3.60E+04	7.96E+04	8.20E+04	4.94E+03	9.62E+02	1.26E+02	1.70	1.17	299	34%	75%	53	39
241-AX-101	3.98E+03	1.73E+05	2.72E+05	2.82E+05	5.03E+04	9.59E+01	1.76E+02	1.70	1.53	1391	34%	43%	35	25
Supernatant	3.98E+03	1.73E+05	2.72E+05	2.82E+05	5.03E+04	9.59E+01	1.76E+02	1.53	1.53	38	43%	43%	35	25
Solid Layer	3.98E+03	1.73E+05	2.72E+05	2.82E+05	5.03E+04	9.59E+01	1.76E+02	1.70	1.53	1353	34%	43%	35	25
241-AX-102	2.30E+04	1.07E+05	1.76E+05	1.98E+05	2.75E+04	1.29E+03	1.38E+02	1.53	1.39	151	39%	51%	24	25
Supernatant	2.30E+04	1.07E+05	1.76E+05	1.98E+05	2.75E+04	1.29E+03	1.38E+02	1.39	1.39	38	51%	51%	24	25
Solid Layer	2.30E+04	1.07E+05	1.76E+05	1.98E+05	2.75E+04	1.29E+03	1.38E+02	1.58	1.39	113	36%	51%	24	25

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-AX-103	4.03E+03	1.22E+05	1.91E+05	2.36E+05	3.79E+04	6.98E+02	1.81E+02	1.57	1.45	441	45%	49%	39	33
Supernatant	4.03E+03	1.22E+05	1.91E+05	2.36E+05	3.79E+04	6.98E+02	1.81E+02	1.45	1.45	38	49%	49%	43	33
Solid Layer	4.03E+03	1.22E+05	1.91E+05	2.36E+05	3.79E+04	6.98E+02	1.81E+02	1.58	1.45	403	44%	49%	39	33
241-AX-104	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.07E+04	9.88E+02	1.44	1.17	66	39%	75%	32	32
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.07E+04	9.88E+02	1.17	1.17	38	75%	75%	32	32
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.07E+04	9.88E+02	1.80	1.17	28	8%	75%	32	32
241-B-101	6.77E+00	1.32E+05	3.56E+05	2.26E+05	7.23E+02	4.04E+02	3.60E+00	1.49	1.53	449	37%	50%	43	37
Supernatant	6.77E+00	1.32E+05	3.56E+05	2.26E+05	7.23E+02	4.04E+02	3.60E+00	1.53	1.53	38	50%	50%	39	37
Solid Layer	6.77E+00	1.32E+05	3.56E+05	2.26E+05	7.23E+02	4.04E+02	3.60E+00	1.49	1.53	411	35%	50%	43	37
241-B-102	2.47E+00	6.23E+03	1.59E+05	8.25E+04	2.64E+02	5.84E-01	2.57E+00	1.43	1.19	159	56%	75%	18	20
Supernatant	9.59E-01	2.40E+03	6.15E+04	3.20E+04	1.03E+02	5.60E-01	2.36E+00	1.07	1.07	53	90%	90%	18	20
Solid Layer	3.38E+00	8.52E+03	2.17E+05	1.13E+05	3.61E+02	5.91E-01	2.64E+00	1.61	1.26	106	45%	70%	18	20
241-B-103	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.62E+02	1.40E+00	2.65E+00	1.56	1.26	249	52%	70%	17	20
Supernatant	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.62E+02	1.40E+00	2.65E+00	1.26	1.26	38	70%	70%	17	20
Solid Layer	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.62E+02	1.40E+00	2.65E+00	1.61	1.26	211	49%	70%	17	20
241-B-104	3.38E+00	8.49E+03	2.16E+05	1.13E+05	3.62E+02	1.98E+00	6.62E+00	1.38	1.26	1455	48%	70%	19	21
Supernatant	3.38E+00	8.49E+03	2.16E+05	1.13E+05	3.62E+02	1.98E+00	6.62E+00	1.26	1.26	38	70%	70%	20	21
Solid Layer	3.38E+00	8.49E+03	2.16E+05	1.13E+05	3.62E+02	1.98E+00	6.62E+00	1.38	1.26	1417	48%	70%	19	21
241-B-105	3.38E+00	8.51E+03	2.16E+05	1.13E+05	3.62E+02	5.56E-01	2.34E+00	1.64	1.26	1136	44%	70%	23	21
Supernatant	3.38E+00	8.51E+03	2.16E+05	1.13E+05	3.62E+02	5.56E-01	2.34E+00	1.26	1.26	38	70%	70%	18	21
Solid Layer	3.38E+00	8.51E+03	2.16E+05	1.13E+05	3.62E+02	5.56E-01	2.34E+00	1.65	1.26	1098	43%	70%	23	21
241-B-106	3.12E+00	7.86E+03	2.01E+05	1.04E+05	3.33E+02	4.61E+01	1.46E+01	1.35	1.18	502	62%	71%	23	19
Supernatant	3.23E-01	8.12E+02	2.07E+04	1.08E+04	3.44E+01	1.98E-01	8.32E-01	1.02	1.02	42	96%	96%	18	19
Solid Layer	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.60E+02	4.92E+01	1.55E+01	1.38	1.19	460	60%	70%	23	19
241-B-107	5.04E+00	6.51E+03	3.31E+05	1.46E+05	2.01E+01	3.23E+00	1.10E+01	1.61	1.34	649	39%	58%	16	21
Supernatant	5.04E+00	6.51E+03	3.31E+05	1.46E+05	2.01E+01	3.23E+00	1.10E+01	1.34	1.34	38	58%	58%	16	21
Solid Layer	5.04E+00	6.51E+03	3.31E+05	1.46E+05	2.01E+01	3.23E+00	1.10E+01	1.63	1.34	611	38%	58%	16	21

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-B-108	2.58E+00	5.37E+04	3.76E+05	1.75E+05	8.98E+02	1.57E+00	1.22E+01	1.65	1.38	387	40%	79%	18	21
Supernatant	2.58E+00	5.37E+04	3.76E+05	1.75E+05	8.98E+02	1.57E+00	1.22E+01	1.38	1.38	38	79%	79%	16	21
Solid Layer	2.58E+00	5.37E+04	3.76E+05	1.75E+05	8.98E+02	1.57E+00	1.22E+01	1.68	1.38	349	37%	79%	18	21
241-B-109	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.60E+02	4.90E-01	1.71E+00	1.74	1.26	511	42%	70%	19	20
Supernatant	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.60E+02	4.90E-01	1.71E+00	1.26	1.26	38	70%	70%	18	20
Solid Layer	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.60E+02	4.90E-01	1.71E+00	1.78	1.26	473	41%	70%	19	20
241-B-110	5.34E+03	3.80E+04	7.48E+04	9.18E+04	1.00E+04	7.52E+01	1.05E+01	1.35	1.01	967	60%	77%	21	23
Supernatant	5.30E+02	3.78E+03	7.43E+03	9.13E+03	9.94E+02	2.17E-01	1.31E+00	1.02	1.02	42	97%	97%	21	23
Solid Layer	5.55E+03	3.95E+04	7.78E+04	9.55E+04	1.04E+04	7.77E+01	1.09E+01	1.36	1.01	925	58%	76%	21	23
241-B-111	5.26E+03	3.74E+04	7.36E+04	9.04E+04	9.85E+03	1.85E+02	1.19E+02	1.26	1.01	952	64%	98%	24	25
Supernatant	5.30E+02	3.78E+03	7.43E+03	9.13E+03	9.94E+02	2.17E-01	1.31E+00	1.02	1.02	42	100%	100%	24	25
Solid Layer	5.55E+03	3.95E+04	7.78E+04	9.55E+04	1.04E+04	1.92E+02	1.24E+02	1.27	1.01	910	63%	98%	24	25
241-B-112	1.37E+04	8.84E+04	1.64E+05	1.93E+05	3.58E+04	3.35E+00	3.36E+01	1.38	1.39	170	51%	55%	17	21
Supernatant	4.09E+03	2.64E+04	4.89E+04	5.73E+04	1.06E+04	4.66E-01	3.08E+01	1.11	1.11	49	84%	84%	21	21
Solid Layer	1.82E+04	1.17E+05	2.17E+05	2.55E+05	4.73E+04	4.23E+00	3.44E+01	1.49	1.51	121	41%	46%	17	21
241-B-201	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.70E+00	1.36E-01	1.26	1.17	119	65%	75%	17	20
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.70E+00	1.36E-01	1.17	1.17	4	75%	75%	17	20
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.70E+00	1.36E-01	1.26	1.17	115	64%	75%	17	20
241-B-202	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	3.00E+00	7.61E-02	1.22	1.17	115	76%	83%	21	21
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	3.00E+00	7.61E-02	1.17	1.17	4	83%	83%	19	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	3.00E+00	7.61E-02	1.22	1.17	111	76%	83%	21	21
241-B-203	9.41E+01	1.54E+03	5.54E+04	3.05E+04	0.00E+00	6.75E-02	6.45E-03	1.18	1.05	199	76%	90%	18	12
Supernatant	3.32E+01	5.43E+02	1.95E+04	1.08E+04	0.00E+00	2.77E-05	3.21E-05	1.02	1.02	6	96%	96%	19	12
Solid Layer	9.60E+01	1.57E+03	5.65E+04	3.12E+04	0.00E+00	6.92E-02	6.62E-03	1.19	1.05	193	76%	89%	18	12
241-B-204	7.38E+01	1.34E+03	3.40E+04	2.73E+04	0.00E+00	2.54E-03	2.54E-02	1.18	1.05	196	78%	92%	17	23
Supernatant	3.33E+01	6.03E+02	1.53E+04	1.23E+04	0.00E+00	1.57E-05	1.80E-05	1.02	1.02	7	96%	96%	19	23
Solid Layer	7.53E+01	1.36E+03	3.47E+04	2.78E+04	0.00E+00	2.61E-03	2.62E-02	1.19	1.05	189	77%	91%	17	23

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-BX-101	4.98E+03	6.43E+04	1.21E+05	1.41E+05	5.17E+03	4.45E+01	5.21E+00	1.57	1.28	218	24%	75%	23	23
Supernatant	4.98E+03	6.43E+04	1.21E+05	1.41E+05	5.17E+03	4.45E+01	5.21E+00	1.28	1.28	38	75%	75%	23	23
Solid Layer	4.98E+03	6.43E+04	1.21E+05	1.41E+05	5.17E+03	4.45E+01	5.21E+00	1.63	1.28	180	16%	75%	23	23
241-BX-102	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.69E-01	3.16E-01	1.06	1.17	336	39%	75%	20	21
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.69E-01	3.16E-01	1.17	1.17	38	75%	75%	20	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.69E-01	3.16E-01	1.04	1.17	298	33%	75%	20	21
241-BX-103	3.39E+03	1.27E+04	4.13E+04	3.61E+04	1.65E+04	2.76E+01	3.21E+00	1.46	1.09	320	57%	80%	21	22
Supernatant	2.14E+03	8.04E+03	2.62E+04	2.29E+04	1.04E+04	2.96E-01	3.48E-01	1.04	1.04	85	87%	87%	21	22
Solid Layer	3.87E+03	1.45E+04	4.72E+04	4.13E+04	1.88E+04	3.40E+01	3.88E+00	1.61	1.11	235	50%	78%	21	22
241-BX-104	2.74E+03	5.48E+04	1.15E+05	1.20E+05	2.44E+03	1.79E+02	5.80E+01	1.61	1.24	418	32%	61%	30	25
Supernatant	7.18E+02	1.43E+04	3.01E+04	3.15E+04	6.39E+02	3.58E-01	2.62E+01	1.06	1.06	49	89%	89%	30	25
Solid Layer	3.19E+03	6.37E+04	1.34E+05	1.40E+05	2.84E+03	1.94E+02	6.07E+01	1.68	1.28	369	27%	59%	30	25
241-BX-105	6.82E+03	5.69E+04	8.46E+04	8.94E+04	4.29E+03	1.04E+02	3.54E+01	1.54	1.21	310	26%	71%	20	21
Supernatant	3.04E+03	2.54E+04	3.78E+04	3.99E+04	1.92E+03	2.21E+00	3.50E+01	1.09	1.09	56	88%	88%	20	21
Solid Layer	9.44E+03	7.89E+04	1.17E+05	1.24E+05	5.94E+03	1.19E+02	3.55E+01	1.64	1.29	254	17%	69%	20	21
241-BX-106	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.32E+02	5.33E+01	1.54	1.17	180	45%	75%	20	21
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.32E+02	5.33E+01	1.17	1.17	38	75%	75%	21	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.32E+02	5.33E+01	1.64	1.17	142	39%	75%	20	21
241-BX-107	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	7.51E+00	1.34E+01	1.43	1.17	1351	51%	75%	19	21
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	7.51E+00	1.34E+01	1.17	1.17	38	75%	75%	21	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	7.51E+00	1.34E+01	1.44	1.17	1313	51%	75%	19	21
241-BX-108	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.29E+02	2.26E+01	1.39	1.17	157	29%	75%	20	21
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.29E+02	2.26E+01	1.17	1.17	38	75%	75%	20	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.29E+02	2.26E+01	1.46	1.17	119	17%	75%	20	21
241-BX-109	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.07E+02	1.08E+01	1.50	1.17	768	51%	72%	22	22
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.07E+02	1.08E+01	1.17	1.17	38	72%	72%	22	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.07E+02	1.08E+01	1.52	1.17	730	51%	72%	22	22

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-BX-110	1.44E+04	4.94E+04	3.91E+05	2.12E+05	4.17E+03	7.55E+00	4.73E+01	1.63	1.42	814	44%	54%	19	21
Supernatant	1.77E+03	6.09E+03	4.81E+04	2.61E+04	5.13E+02	2.13E-01	1.41E+01	1.05	1.05	43	93%	93%	20	21
Solid Layer	1.51E+04	5.21E+04	4.12E+05	2.23E+05	4.40E+03	7.81E+00	4.85E+01	1.66	1.44	771	42%	53%	19	21
241-BX-111	1.70E+03	1.06E+05	1.85E+05	2.27E+05	4.88E+04	1.14E+01	6.49E+01	1.45	1.45	751	26%	51%	19	18
Supernatant	1.70E+03	1.06E+05	1.85E+05	2.27E+05	4.88E+04	1.14E+01	6.49E+01	1.45	1.45	38	51%	51%	19	18
Solid Layer	1.70E+03	1.06E+05	1.85E+05	2.27E+05	4.88E+04	1.14E+01	6.49E+01	1.45	1.45	713	25%	51%	19	18
241-BX-112	0.00E+00	3.33E+04	9.31E+04	7.35E+04	4.52E+01	5.52E+00	3.85E+01	1.29	1.17	660	65%	69%	20	19
Supernatant	0.00E+00	4.11E+03	1.15E+04	9.08E+03	5.58E+00	8.39E-02	9.85E-02	1.02	1.02	43	96%	96%	19	19
Solid Layer	0.00E+00	3.52E+04	9.86E+04	7.78E+04	4.78E+01	5.81E+00	4.06E+01	1.31	1.18	617	63%	68%	20	19
241-BY-101	1.82E+04	1.17E+05	2.17E+05	2.55E+05	4.72E+04	7.38E+01	1.20E+02	1.82	1.51	1438	24%	46%	27	26
Supernatant	1.82E+04	1.17E+05	2.17E+05	2.55E+05	4.72E+04	7.38E+01	1.20E+02	1.51	1.51	38	46%	46%	27	26
Solid Layer	1.82E+04	1.17E+05	2.17E+05	2.55E+05	4.72E+04	7.38E+01	1.20E+02	1.82	1.51	1400	24%	46%	27	26
241-BY-102	1.55E+03	8.41E+04	1.48E+05	2.34E+05	5.66E+04	1.06E+01	6.64E+01	1.57	1.46	1092	32%	51%	22	22
Supernatant	1.55E+03	8.41E+04	1.48E+05	2.34E+05	5.66E+04	1.06E+01	6.64E+01	1.46	1.46	38	51%	51%	22	22
Solid Layer	1.55E+03	8.41E+04	1.48E+05	2.34E+05	5.66E+04	1.06E+01	6.64E+01	1.57	1.46	1054	31%	51%	22	22
241-BY-103	1.91E+03	5.37E+04	1.69E+05	2.15E+05	4.14E+04	1.11E+01	6.68E+01	1.65	1.29	1613	28%	59%	24	24
Supernatant	1.91E+03	5.37E+04	1.69E+05	2.15E+05	4.14E+04	1.11E+01	6.68E+01	1.29	1.29	38	59%	59%	26	24
Solid Layer	1.91E+03	5.37E+04	1.69E+05	2.15E+05	4.14E+04	1.11E+01	6.68E+01	1.66	1.29	1575	28%	59%	24	24
241-BY-104	2.37E+03	1.11E+05	2.06E+05	2.48E+05	7.22E+04	1.43E+02	8.62E+01	1.70	1.51	1394	27%	49%	38	22
Supernatant	2.37E+03	1.11E+05	2.06E+05	2.48E+05	7.22E+04	1.43E+02	8.62E+01	1.51	1.51	38	49%	49%	50	22
Solid Layer	2.37E+03	1.11E+05	2.06E+05	2.48E+05	7.22E+04	1.43E+02	8.62E+01	1.71	1.51	1356	26%	49%	38	22
241-BY-105	2.43E+03	6.89E+04	1.99E+05	2.08E+05	3.92E+04	4.26E+01	4.62E+01	1.80	1.44	1859	18%	51%	33	25
Supernatant	2.43E+03	6.89E+04	1.99E+05	2.08E+05	3.92E+04	4.26E+01	4.62E+01	1.44	1.44	38	51%	51%	43	25
Solid Layer	2.43E+03	6.89E+04	1.99E+05	2.08E+05	3.92E+04	4.26E+01	4.62E+01	1.80	1.44	1821	18%	51%	33	25
241-BY-106	2.67E+03	7.81E+04	1.10E+05	1.65E+05	3.97E+04	4.70E+01	1.08E+02	1.67	1.31	1788	25%	59%	34	25
Supernatant	2.67E+03	7.81E+04	1.10E+05	1.65E+05	3.97E+04	4.70E+01	1.08E+02	1.31	1.31	38	59%	59%	49	25
Solid Layer	2.67E+03	7.81E+04	1.10E+05	1.65E+05	3.97E+04	4.70E+01	1.08E+02	1.67	1.31	1750	25%	59%	34	25

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-BY-107	2.40E+03	1.17E+05	1.31E+05	2.43E+05	5.11E+04	4.28E+01	1.14E+02	1.68	1.46	1066	38%	49%	32	24
Supernatant	2.40E+03	1.17E+05	1.31E+05	2.43E+05	5.11E+04	4.28E+01	1.14E+02	1.46	1.46	38	49%	49%	25	24
Solid Layer	2.40E+03	1.17E+05	1.31E+05	2.43E+05	5.11E+04	4.28E+01	1.14E+02	1.69	1.46	1028	38%	49%	32	24
241-BY-108	2.37E+03	7.86E+04	2.94E+05	2.82E+05	3.63E+04	1.03E+02	4.36E+01	1.48	1.33	879	28%	33%	34	26
Supernatant	2.37E+03	7.86E+04	2.94E+05	2.82E+05	3.63E+04	1.03E+02	4.36E+01	1.33	1.33	38	33%	33%	45	26
Solid Layer	2.37E+03	7.86E+04	2.94E+05	2.82E+05	3.63E+04	1.03E+02	4.36E+01	1.48	1.33	841	27%	33%	34	26
241-BY-109	1.88E+03	8.29E+04	1.90E+05	2.10E+05	3.88E+04	7.75E+00	4.98E+01	1.70	1.50	1124	42%	53%	18	17
Supernatant	1.88E+03	8.29E+04	1.90E+05	2.10E+05	3.88E+04	7.75E+00	4.98E+01	1.50	1.50	38	53%	53%	18	17
Solid Layer	1.88E+03	8.29E+04	1.90E+05	2.10E+05	3.88E+04	7.75E+00	4.98E+01	1.71	1.50	1086	42%	53%	18	17
241-BY-110	1.94E+04	1.24E+05	1.25E+05	2.54E+05	6.57E+04	7.28E+01	8.77E+01	1.56	1.44	1422	29%	40%	35	21
Supernatant	1.94E+04	1.24E+05	1.25E+05	2.54E+05	6.57E+04	7.28E+01	8.77E+01	1.44	1.44	38	40%	40%	45	21
Solid Layer	1.94E+04	1.24E+05	1.25E+05	2.54E+05	6.57E+04	7.28E+01	8.77E+01	1.57	1.44	1384	28%	40%	35	21
241-BY-111	1.28E+03	3.30E+04	1.21E+05	1.31E+05	2.58E+04	9.92E+00	6.07E+01	1.65	1.42	1177	36%	54%	26	20
Supernatant	1.28E+03	3.30E+04	1.21E+05	1.31E+05	2.58E+04	9.92E+00	6.07E+01	1.42	1.42	38	54%	54%	30	20
Solid Layer	1.28E+03	3.30E+04	1.21E+05	1.31E+05	2.58E+04	9.92E+00	6.07E+01	1.66	1.42	1139	36%	54%	26	20
241-BY-112	1.72E+03	1.40E+05	1.90E+05	2.45E+05	5.54E+04	1.17E+01	6.39E+01	1.73	1.47	1121	30%	49%	30	24
Supernatant	1.72E+03	1.40E+05	1.90E+05	2.45E+05	5.54E+04	1.17E+01	6.39E+01	1.47	1.47	38	49%	49%	26	24
Solid Layer	1.72E+03	1.40E+05	1.90E+05	2.45E+05	5.54E+04	1.17E+01	6.39E+01	1.74	1.47	1083	30%	49%	30	24
241-C-101	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	6.42E+01	5.06E+01	1.72	1.17	371	27%	74%	33	33
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	6.42E+01	5.06E+01	1.17	1.17	38	74%	74%	32	33
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	6.42E+01	5.06E+01	1.78	1.17	333	23%	74%	33	33
241-C-102	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.39E+01	1.29E+01	1.67	1.17	1234	44%	75%	28	26
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.39E+01	1.29E+01	1.17	1.17	38	75%	75%	26	26
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.39E+01	1.29E+01	1.68	1.17	1196	43%	75%	28	26
241-C-103	4.89E+03	1.28E+04	7.16E+02	2.80E+04	0.00E+00	3.13E+03	9.24E+01	1.50	1.10	311	63%	90%	43	41
Supernatant	2.81E+02	7.38E+02	4.12E+01	1.61E+03	0.00E+00	1.64E-01	1.74E+00	1.00	1.00	40	99%	99%	46	41
Solid Layer	5.60E+03	1.47E+04	8.20E+02	3.21E+04	0.00E+00	3.42E+03	1.01E+02	1.58	1.11	271	60%	89%	43	41

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-C-104	5.60E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.71E+02	5.38E+01	1.66	1.17	1018	49%	81%	36	34
Supernatant	5.60E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.71E+02	5.38E+01	1.17	1.17	38	81%	81%	36	34
Solid Layer	5.60E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.71E+02	5.38E+01	1.68	1.17	980	48%	81%	36	34
241-C-105	2.87E+03	3.70E+04	3.43E+04	1.13E+05	9.02E+00	5.69E+02	9.85E+01	1.53	1.23	538	30%	67%	48	43
Supernatant	2.87E+03	3.70E+04	3.43E+04	1.13E+05	9.02E+00	5.69E+02	9.85E+01	1.23	1.23	38	67%	67%	44	43
Solid Layer	2.87E+03	3.70E+04	3.43E+04	1.13E+05	9.02E+00	5.69E+02	9.85E+01	1.55	1.23	500	28%	67%	48	43
241-C-106	4.73E+01	7.74E+00	8.58E+00	1.39E+03	1.33E+01	1.22E+03	2.68E+01	1.12	1.02	48	83%	99%	30	30
Supernatant	2.80E+00	4.58E-01	5.08E-01	8.25E+01	7.91E-01	3.72E-04	3.67E-03	1.00	1.00	38	100%	100%	31	30
Solid Layer	3.32E+02	5.43E+01	6.02E+01	9.78E+03	9.38E+01	4.17E+03	9.14E+01	1.56	1.14	10	42%	98%	30	30
241-C-107	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.44E+03	4.07E+01	1.54	1.17	973	48%	79%	44	42
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.44E+03	4.07E+01	1.17	1.17	38	79%	79%	48	42
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.44E+03	4.07E+01	1.55	1.17	935	48%	79%	44	42
241-C-108	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.16E+01	2.10E+02	1.44	1.17	288	42%	75%	27	27
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.16E+01	2.10E+02	1.17	1.17	38	75%	75%	27	27
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.16E+01	2.10E+02	1.48	1.17	250	38%	75%	27	27
241-C-109	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	6.80E+02	4.65E+02	1.50	1.17	278	43%	75%	26	26
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	6.80E+02	4.65E+02	1.17	1.17	38	75%	75%	26	26
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	6.80E+02	4.65E+02	1.55	1.17	240	39%	75%	26	26
241-C-110	5.36E+02	4.25E+03	5.57E+04	2.82E+04	1.93E+02	3.67E+00	1.44E+01	1.32	1.09	712	62%	84%	21	23
Supernatant	5.54E+01	4.40E+02	5.76E+03	2.91E+03	1.99E+01	2.00E-03	3.55E-01	1.01	1.01	42	98%	98%	21	23
Solid Layer	5.80E+02	4.60E+03	6.03E+04	3.05E+04	2.09E+02	3.84E+00	1.50E+01	1.34	1.10	670	60%	83%	21	23
241-C-111	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.70E+03	5.89E+01	1.49	1.17	255	41%	75%	25	26
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.70E+03	5.89E+01	1.17	1.17	38	75%	75%	25	26
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.70E+03	5.89E+01	1.55	1.17	217	36%	75%	25	26
241-C-112	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	9.56E+02	4.23E+02	1.56	1.17	431	53%	75%	28	28
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	9.56E+02	4.23E+02	1.17	1.17	38	75%	75%	28	28
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	9.56E+02	4.23E+02	1.60	1.17	393	52%	75%	28	28

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-C-201	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	8.71E+01	1.02E+01	1.27	1.17	6	49%	75%	16	20
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	8.71E+01	1.02E+01	1.17	1.17	4	75%	75%	16	20
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	8.71E+01	1.02E+01	1.44	1.17	2	14%	75%	16	20
241-C-202	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.65E+02	8.77E+00	1.26	1.17	6	53%	75%	16	19
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.65E+02	8.77E+00	1.17	1.17	4	75%	75%	16	19
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.65E+02	8.77E+00	1.44	1.17	2	16%	75%	16	19
241-C-203	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.99E+01	1.45E+00	1.45	1.17	10	42%	75%	15	19
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.99E+01	1.45E+00	1.17	1.17	4	75%	75%	19	19
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.99E+01	1.45E+00	1.62	1.17	6	27%	75%	15	19
241-C-204	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.09E+01	4.72E+00	1.45	1.17	10	51%	75%	17	16
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.09E+01	4.72E+00	1.17	1.17	4	75%	75%	17	16
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.09E+01	4.72E+00	1.62	1.17	6	41%	75%	17	16
241-S-101	1.79E+03	1.13E+05	2.14E+05	2.22E+05	3.00E+04	1.98E+02	1.13E+02	1.64	1.47	1365	40%	51%	41	31
Supernatant	1.79E+03	1.13E+05	2.14E+05	2.22E+05	3.00E+04	1.98E+02	1.13E+02	1.47	1.47	38	51%	51%	46	31
Solid Layer	1.79E+03	1.13E+05	2.14E+05	2.22E+05	3.00E+04	1.98E+02	1.13E+02	1.65	1.47	1327	39%	51%	41	31
241-S-102	3.76E+03	1.27E+05	1.55E+05	2.89E+05	5.62E+04	3.70E+01	1.41E+02	1.59	1.46	1262	33%	49%	35	23
Supernatant	3.76E+03	1.27E+05	1.55E+05	2.89E+05	5.62E+04	3.70E+01	1.41E+02	1.46	1.46	38	49%	49%	38	23
Solid Layer	3.76E+03	1.27E+05	1.55E+05	2.89E+05	5.62E+04	3.70E+01	1.41E+02	1.59	1.46	1224	32%	49%	35	23
241-S-103	4.44E+03	1.40E+05	2.05E+05	2.16E+05	3.04E+04	2.80E+01	1.32E+02	1.59	1.43	934	37%	51%	27	24
Supernatant	4.47E+02	1.40E+04	2.06E+04	2.18E+04	3.06E+03	3.39E-02	2.96E+01	1.04	1.04	42	93%	93%	28	24
Solid Layer	4.68E+03	1.47E+05	2.16E+05	2.28E+05	3.20E+04	2.88E+01	1.35E+02	1.61	1.45	892	36%	50%	27	24
241-S-104	3.96E+02	3.82E+04	2.68E+05	1.98E+05	1.19E+04	2.20E+02	4.24E+01	1.67	1.37	1128	39%	55%	37	31
Supernatant	3.96E+02	3.82E+04	2.68E+05	1.98E+05	1.19E+04	2.20E+02	4.24E+01	1.37	1.37	38	55%	55%	40	31
Solid Layer	3.96E+02	3.82E+04	2.68E+05	1.98E+05	1.19E+04	2.20E+02	4.24E+01	1.68	1.37	1090	39%	55%	37	31
241-S-105	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	2.56E+00	3.42E+01	1.65	1.45	1574	9%	49%	24	24
Supernatant	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	2.56E+00	3.42E+01	1.45	1.45	38	49%	49%	25	24
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	2.56E+00	3.42E+01	1.66	1.45	1536	8%	49%	24	24

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-S-106	1.98E+03	1.04E+05	2.36E+05	2.44E+05	3.80E+04	1.23E+01	9.13E+01	1.72	1.43	1761	35%	54%	24	23
Supernatant	1.98E+03	1.04E+05	2.36E+05	2.44E+05	3.80E+04	1.23E+01	9.13E+01	1.43	1.43	38	54%	54%	24	23
Solid Layer	1.98E+03	1.04E+05	2.36E+05	2.44E+05	3.80E+04	1.23E+01	9.13E+01	1.72	1.43	1723	34%	54%	24	23
241-S-107	1.18E+03	7.11E+04	1.14E+05	1.55E+05	1.07E+04	1.30E+02	6.77E+01	1.76	1.31	1394	35%	64%	35	27
Supernatant	1.18E+03	7.11E+04	1.14E+05	1.55E+05	1.07E+04	1.30E+02	6.77E+01	1.31	1.31	38	64%	64%	40	27
Solid Layer	1.18E+03	7.11E+04	1.14E+05	1.55E+05	1.07E+04	1.30E+02	6.77E+01	1.78	1.31	1356	34%	64%	35	27
241-S-108	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.77E+04	2.10E+01	9.60E+01	1.67	1.45	2120	31%	49%	27	25
Supernatant	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.77E+04	2.10E+01	9.60E+01	1.45	1.45	38	49%	49%	28	25
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.77E+04	2.10E+01	9.60E+01	1.68	1.45	2082	30%	49%	27	25
241-S-109	1.11E+03	8.49E+04	1.32E+05	2.19E+05	4.59E+04	1.48E+01	1.30E+01	1.65	1.49	2055	11%	53%	27	24
Supernatant	1.11E+03	8.49E+04	1.32E+05	2.19E+05	4.59E+04	1.48E+01	1.30E+01	1.49	1.49	38	53%	53%	29	24
Solid Layer	1.11E+03	8.49E+04	1.32E+05	2.19E+05	4.59E+04	1.48E+01	1.30E+01	1.66	1.49	2017	11%	53%	27	24
241-S-110	2.28E+03	8.58E+04	2.17E+05	2.11E+05	3.10E+04	9.40E+01	7.27E+01	1.66	1.43	1511	21%	49%	41	27
Supernatant	2.28E+03	8.58E+04	2.17E+05	2.11E+05	3.10E+04	9.40E+01	7.27E+01	1.43	1.43	38	49%	49%	44	27
Solid Layer	2.28E+03	8.58E+04	2.17E+05	2.11E+05	3.10E+04	9.40E+01	7.27E+01	1.66	1.43	1473	20%	49%	41	27
241-S-111	1.50E+03	8.36E+04	1.93E+05	2.23E+05	3.64E+04	1.76E+02	1.07E+02	1.54	1.45	1434	30%	51%	30	23
Supernatant	1.50E+03	8.36E+04	1.93E+05	2.23E+05	3.64E+04	1.76E+02	1.07E+02	1.45	1.45	38	51%	51%	24	23
Solid Layer	1.50E+03	8.36E+04	1.93E+05	2.23E+05	3.64E+04	1.76E+02	1.07E+02	1.54	1.45	1396	30%	51%	30	23
241-S-112	8.31E+02	6.21E+04	1.68E+05	2.29E+05	3.69E+04	1.29E+02	3.46E+00	1.67	1.45	477	41%	52%	28	21
Supernatant	8.31E+02	6.21E+04	1.68E+05	2.29E+05	3.69E+04	1.29E+02	3.46E+00	1.45	1.45	38	52%	52%	27	21
Solid Layer	8.31E+02	6.21E+04	1.68E+05	2.29E+05	3.69E+04	1.29E+02	3.46E+00	1.69	1.45	439	40%	52%	28	21
241-SX-101	3.35E+02	7.49E+04	1.08E+05	2.42E+05	8.00E+04	1.13E+02	1.00E+02	1.67	1.48	1622	27%	49%	67	27
Supernatant	3.35E+02	7.49E+04	1.08E+05	2.42E+05	8.00E+04	1.13E+02	1.00E+02	1.48	1.48	38	49%	49%	57	27
Solid Layer	3.35E+02	7.49E+04	1.08E+05	2.42E+05	8.00E+04	1.13E+02	1.00E+02	1.68	1.48	1584	27%	49%	67	27
241-SX-102	1.51E+03	1.51E+05	1.57E+05	2.35E+05	4.56E+04	8.00E+01	1.43E+02	1.68	1.46	1582	40%	48%	55	32
Supernatant	1.51E+03	1.51E+05	1.57E+05	2.35E+05	4.56E+04	8.00E+01	1.43E+02	1.46	1.46	38	48%	48%	60	32
Solid Layer	1.51E+03	1.51E+05	1.57E+05	2.35E+05	4.56E+04	8.00E+01	1.43E+02	1.69	1.46	1544	39%	48%	55	32

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-SX-103	3.38E+03	1.57E+05	1.56E+05	2.40E+05	4.44E+04	1.54E+02	1.23E+02	1.72	1.47	1964	31%	47%	62	28
Supernatant	3.38E+03	1.57E+05	1.56E+05	2.40E+05	4.44E+04	1.54E+02	1.23E+02	1.47	1.47	38	47%	47%	70	28
Solid Layer	3.38E+03	1.57E+05	1.56E+05	2.40E+05	4.44E+04	1.54E+02	1.23E+02	1.73	1.47	1926	30%	47%	62	28
241-SX-104	2.13E+03	1.17E+05	2.90E+05	2.50E+05	3.56E+04	1.42E+02	8.70E+01	1.69	1.47	1726	29%	45%	55	28
Supernatant	2.13E+03	1.17E+05	2.90E+05	2.50E+05	3.56E+04	1.42E+02	8.70E+01	1.47	1.47	38	45%	45%	59	28
Solid Layer	2.13E+03	1.17E+05	2.90E+05	2.50E+05	3.56E+04	1.42E+02	8.70E+01	1.69	1.47	1688	28%	45%	55	28
241-SX-105	3.26E+03	1.43E+05	1.64E+05	2.36E+05	4.41E+04	8.21E+01	9.27E+01	1.63	1.47	1460	35%	43%	61	32
Supernatant	3.26E+03	1.43E+05	1.64E+05	2.36E+05	4.41E+04	8.21E+01	9.27E+01	1.47	1.47	38	43%	43%	75	32
Solid Layer	3.26E+03	1.43E+05	1.64E+05	2.36E+05	4.41E+04	8.21E+01	9.27E+01	1.63	1.47	1422	35%	43%	61	32
241-SX-106	3.14E+03	1.49E+05	2.45E+05	2.17E+05	2.26E+04	1.21E+01	1.31E+02	1.57	1.29	1539	40%	49%	33	26
Supernatant	3.14E+03	1.49E+05	2.45E+05	2.17E+05	2.26E+04	1.21E+01	1.31E+02	1.29	1.29	38	49%	49%	37	26
Solid Layer	3.14E+03	1.49E+05	2.45E+05	2.17E+05	2.26E+04	1.21E+01	1.31E+02	1.58	1.29	1501	40%	49%	33	26
241-SX-107	1.01E+03	9.86E+04	2.17E+05	2.51E+05	4.72E+04	3.49E+02	6.91E+01	1.73	1.50	394	26%	52%	69	51
Supernatant	1.01E+03	9.86E+04	2.17E+05	2.51E+05	4.72E+04	3.49E+02	6.91E+01	1.50	1.50	38	52%	52%	75	51
Solid Layer	1.01E+03	9.86E+04	2.17E+05	2.51E+05	4.72E+04	3.49E+02	6.91E+01	1.75	1.50	356	24%	52%	69	51
241-SX-108	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.56E+03	1.65E+02	1.70	1.17	318	8%	75%	77	58
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.56E+03	1.65E+02	1.17	1.17	38	75%	75%	84	58
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.56E+03	1.65E+02	1.77	1.17	280	2%	75%	77	58
241-SX-109	9.20E+03	1.07E+05	1.76E+05	1.98E+05	2.75E+04	1.18E+02	7.44E+01	1.72	1.39	951	24%	51%	52	48
Supernatant	9.20E+03	1.07E+05	1.76E+05	1.98E+05	2.75E+04	1.18E+02	7.44E+01	1.39	1.39	38	51%	51%	57	48
Solid Layer	9.20E+03	1.07E+05	1.76E+05	1.98E+05	2.75E+04	1.18E+02	7.44E+01	1.73	1.39	913	23%	51%	52	48
241-SX-110	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.25E+02	7.03E+01	1.66	1.17	250	29%	75%	68	50
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.25E+02	7.03E+01	1.17	1.17	38	75%	75%	59	50
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.25E+02	7.03E+01	1.75	1.17	212	23%	75%	68	50
241-SX-111	1.01E+03	9.89E+04	2.17E+05	2.51E+05	4.71E+04	2.82E+02	7.54E+01	1.72	1.50	474	27%	52%	74	54
Supernatant	1.01E+03	9.89E+04	2.17E+05	2.51E+05	4.71E+04	2.82E+02	7.54E+01	1.50	1.50	38	52%	52%	85	54
Solid Layer	1.01E+03	9.89E+04	2.17E+05	2.51E+05	4.71E+04	2.82E+02	7.54E+01	1.74	1.50	436	25%	52%	74	54

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-SX-112	1.01E+03	9.88E+04	2.17E+05	2.51E+05	4.72E+04	3.16E+02	7.23E+01	1.72	1.50	321	27%	52%	60	51
Supernatant	1.01E+03	9.88E+04	2.17E+05	2.51E+05	4.72E+04	3.16E+02	7.23E+01	1.50	1.50	38	52%	52%	54	51
Solid Layer	1.01E+03	9.88E+04	2.17E+05	2.51E+05	4.72E+04	3.16E+02	7.23E+01	1.74	1.50	283	24%	52%	60	51
241-SX-113	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	5.10E+01	3.74E+01	1.12	1.17	110	56%	75%	28	28
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	5.10E+01	3.74E+01	1.17	1.17	38	75%	75%	28	28
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	5.10E+01	3.74E+01	1.09	1.17	72	46%	75%	28	28
241-SX-114	1.01E+03	9.90E+04	2.17E+05	2.51E+05	4.72E+04	1.27E+02	9.08E+01	1.68	1.50	626	29%	52%	72	52
Supernatant	1.01E+03	9.90E+04	2.17E+05	2.51E+05	4.72E+04	1.27E+02	9.08E+01	1.50	1.50	38	52%	52%	54	52
Solid Layer	1.01E+03	9.90E+04	2.17E+05	2.51E+05	4.72E+04	1.27E+02	9.08E+01	1.69	1.50	588	28%	52%	72	52
241-SX-115	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.34E+04	2.03E+01	1.34	1.17	52	52%	75%	25	25
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.34E+04	2.03E+01	1.17	1.17	38	75%	75%	25	25
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.34E+04	2.03E+01	1.79	1.17	14	10%	75%	25	25
241-T-101	4.04E+03	1.22E+05	1.89E+05	2.37E+05	3.77E+04	6.63E-01	6.76E+01	1.54	1.45	414	40%	49%	21	22
Supernatant	4.04E+03	1.22E+05	1.89E+05	2.37E+05	3.77E+04	6.63E-01	6.76E+01	1.45	1.45	38	49%	49%	22	22
Solid Layer	4.04E+03	1.22E+05	1.89E+05	2.37E+05	3.77E+04	6.63E-01	6.76E+01	1.54	1.45	376	39%	49%	21	22
241-T-102	3.17E+02	1.61E+04	7.67E+04	4.55E+04	5.96E+03	7.51E+01	2.07E+01	1.41	1.10	158	54%	83%	18	18
Supernatant	2.52E+02	1.28E+04	6.09E+04	3.61E+04	4.73E+03	5.06E-01	2.67E+01	1.08	1.08	86	88%	88%	18	18
Solid Layer	4.50E+02	2.29E+04	1.09E+05	6.46E+04	8.46E+03	1.28E+02	1.64E+01	1.80	1.14	72	30%	80%	18	18
241-T-103	3.78E+03	2.69E+04	5.31E+04	6.48E+04	7.07E+03	3.40E+00	1.95E+00	1.46	1.12	140	52%	77%	19	20
Supernatant	1.58E+03	1.12E+04	2.21E+04	2.71E+04	2.95E+03	6.21E-01	3.77E+00	1.05	1.05	53	91%	91%	19	20
Solid Layer	5.55E+03	3.96E+04	7.80E+04	9.53E+04	1.04E+04	4.43E+00	1.27E+00	1.71	1.18	87	37%	72%	19	20
241-T-104	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.03E+00	1.55E-01	1.29	1.17	1237	71%	84%	18	21
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.03E+00	1.55E-01	1.17	1.17	38	84%	84%	20	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.03E+00	1.55E-01	1.29	1.17	1199	71%	84%	18	21
241-T-105	2.98E+03	5.42E+04	3.71E+04	8.72E+04	3.62E+02	5.18E+01	9.23E+00	1.43	1.18	409	57%	80%	17	16
Supernatant	2.98E+03	5.42E+04	3.71E+04	8.72E+04	3.62E+02	5.18E+01	9.23E+00	1.18	1.18	38	80%	80%	17	16
Solid Layer	2.98E+03	5.42E+04	3.71E+04	8.72E+04	3.62E+02	5.18E+01	9.23E+00	1.46	1.18	371	55%	80%	17	16

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-T-106	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.72E+00	1.41E+01	1.46	1.17	120	32%	75%	20	21
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.72E+00	1.41E+01	1.17	1.17	38	75%	75%	20	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.72E+00	1.41E+01	1.59	1.17	82	17%	75%	20	21
241-T-107	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.01E+02	1.47E+01	1.54	1.17	693	47%	84%	19	22
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.01E+02	1.47E+01	1.17	1.17	38	84%	84%	20	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.01E+02	1.47E+01	1.56	1.17	655	46%	84%	19	22
241-T-108	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.61E+02	1.77E+00	6.77E+00	1.44	1.26	98	46%	70%	16	21
Supernatant	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.61E+02	1.77E+00	6.77E+00	1.26	1.26	38	70%	70%	16	21
Solid Layer	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.61E+02	1.77E+00	6.77E+00	1.55	1.26	60	35%	70%	16	21
241-T-109	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.61E+02	3.64E-01	2.48E+00	1.56	1.26	273	54%	70%	19	20
Supernatant	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.61E+02	3.64E-01	2.48E+00	1.26	1.26	38	70%	70%	19	20
Solid Layer	3.38E+00	8.50E+03	2.18E+05	1.13E+05	3.61E+02	3.64E-01	2.48E+00	1.61	1.26	235	52%	70%	19	20
241-T-110	4.39E+01	5.75E+01	1.78E+04	3.61E+04	0.00E+00	2.67E-02	1.45E-02	1.24	1.05	1438	76%	87%	18	21
Supernatant	3.30E+00	4.33E+00	1.34E+03	2.72E+03	0.00E+00	3.29E-05	2.14E-04	1.00	1.00	41	99%	99%	19	21
Solid Layer	4.50E+01	5.90E+01	1.83E+04	3.70E+04	0.00E+00	2.73E-02	1.49E-02	1.25	1.05	1397	76%	87%	18	21
241-T-111	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.08E+00	1.02E-01	1.24	1.17	1729	75%	75%	19	22
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.08E+00	1.02E-01	1.17	1.17	38	75%	75%	21	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.08E+00	1.02E-01	1.24	1.17	1691	75%	75%	19	22
241-T-112	3.82E+02	3.38E+04	2.03E+04	4.99E+04	0.00E+00	2.33E-03	3.96E-03	1.23	1.09	290	78%	87%	19	20
Supernatant	1.79E+02	1.58E+04	9.49E+03	2.33E+04	0.00E+00	3.76E-03	4.39E-03	1.04	1.04	64	94%	94%	19	20
Solid Layer	4.38E+02	3.88E+04	2.33E+04	5.73E+04	0.00E+00	2.00E-03	3.85E-03	1.28	1.10	226	74%	85%	19	20
241-T-201	7.52E+01	3.24E+02	4.47E+04	2.44E+04	0.00E+00	6.16E-02	2.03E-02	1.28	1.06	123	70%	91%	18	20
Supernatant	5.47E+01	2.36E+02	3.25E+04	1.78E+04	0.00E+00	2.53E-05	2.92E-05	1.04	1.04	13	94%	94%	18	20
Solid Layer	7.78E+01	3.36E+02	4.62E+04	2.52E+04	0.00E+00	6.73E-02	2.21E-02	1.31	1.06	110	68%	91%	18	20
241-T-202	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.24E-03	6.77E-03	1.18	1.17	85	76%	75%	17	20
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.24E-03	6.77E-03	1.17	1.17	4	75%	75%	17	20
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.24E-03	6.77E-03	1.18	1.17	81	76%	75%	17	20

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-T-203	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.21E-03	6.67E-03	1.22	1.17	144	76%	85%	18	20
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.21E-03	6.67E-03	1.17	1.17	4	85%	85%	17	20
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	2.21E-03	6.67E-03	1.22	1.17	140	76%	85%	18	20
241-T-204	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.03E-03	6.87E-03	1.18	1.17	147	75%	75%	18	21
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.03E-03	6.87E-03	1.17	1.17	4	75%	75%	17	21
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.03E-03	6.87E-03	1.18	1.17	143	75%	75%	18	21
241-TX-101	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	3.23E+02	6.70E+01	1.71	1.45	382	27%	49%	25	23
Supernatant	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	3.23E+02	6.70E+01	1.45	1.45	38	49%	49%	25	23
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	3.23E+02	6.70E+01	1.74	1.45	344	25%	49%	25	23
241-TX-102	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.57E+00	8.75E+01	1.61	1.45	859	32%	49%	27	25
Supernatant	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.57E+00	8.75E+01	1.45	1.45	38	49%	49%	27	25
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.57E+00	8.75E+01	1.61	1.45	821	31%	49%	27	25
241-TX-103	3.86E+03	1.17E+05	1.91E+05	2.31E+05	3.61E+04	7.31E-01	8.25E+01	1.61	1.44	586	32%	50%	22	22
Supernatant	3.86E+03	1.17E+05	1.91E+05	2.31E+05	3.61E+04	7.31E-01	8.25E+01	1.44	1.44	38	50%	50%	22	22
Solid Layer	3.86E+03	1.17E+05	1.91E+05	2.31E+05	3.61E+04	7.31E-01	8.25E+01	1.62	1.44	548	31%	50%	22	22
241-TX-104	1.19E+03	8.30E+04	3.11E+05	1.80E+05	2.81E+03	1.47E+02	6.42E+01	1.64	1.39	300	50%	56%	21	21
Supernatant	2.60E+02	1.81E+04	6.81E+04	3.95E+04	6.13E+02	1.65E-01	5.90E+01	1.08	1.08	47	88%	88%	21	21
Solid Layer	1.36E+03	9.43E+04	3.53E+05	2.05E+05	3.19E+03	1.64E+02	6.48E+01	1.74	1.44	253	45%	52%	21	21
241-TX-105	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.95E+00	7.10E+01	1.63	1.45	2219	30%	49%	34	23
Supernatant	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.95E+00	7.10E+01	1.45	1.45	38	49%	49%	36	23
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.95E+00	7.10E+01	1.63	1.45	2181	29%	49%	34	23
241-TX-106	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	6.09E+00	8.27E+01	1.62	1.45	1356	31%	49%	26	26
Supernatant	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	6.09E+00	8.27E+01	1.45	1.45	38	49%	49%	27	26
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	6.09E+00	8.27E+01	1.62	1.45	1318	30%	49%	26	26
241-TX-107	3.22E+03	1.16E+05	1.97E+05	2.40E+05	4.03E+04	5.47E+00	1.02E+02	1.70	1.46	150	33%	51%	22	22
Supernatant	3.22E+03	1.16E+05	1.97E+05	2.40E+05	4.03E+04	5.47E+00	1.02E+02	1.46	1.46	38	51%	51%	22	22
Solid Layer	3.22E+03	1.16E+05	1.97E+05	2.40E+05	4.03E+04	5.47E+00	1.02E+02	1.78	1.46	112	28%	51%	22	22

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-TX-108	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	5.27E+00	7.50E+01	1.61	1.45	516	32%	49%	20	21
Supernatant	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	5.27E+00	7.50E+01	1.45	1.45	38	49%	49%	19	21
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	5.27E+00	7.50E+01	1.62	1.45	478	31%	49%	20	21
241-TX-109	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.82E+00	1.59E+01	1.42	1.17	1413	55%	75%	36	45
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.82E+00	1.59E+01	1.17	1.17	38	75%	75%	39	45
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	4.82E+00	1.59E+01	1.43	1.17	1375	54%	75%	36	45
241-TX-110	4.02E+03	1.22E+05	1.90E+05	2.37E+05	3.78E+04	1.03E+00	6.52E+01	1.61	1.45	1807	31%	49%	28	22
Supernatant	4.02E+03	1.22E+05	1.90E+05	2.37E+05	3.78E+04	1.03E+00	6.52E+01	1.45	1.45	38	49%	49%	28	22
Solid Layer	4.02E+03	1.22E+05	1.90E+05	2.37E+05	3.78E+04	1.03E+00	6.52E+01	1.62	1.45	1769	31%	49%	28	22
241-TX-111	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.17E+00	6.21E+01	1.61	1.45	1419	32%	49%	25	23
Supernatant	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.17E+00	6.21E+01	1.45	1.45	38	49%	49%	26	23
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.17E+00	6.21E+01	1.61	1.45	1381	31%	49%	25	23
241-TX-112	3.47E+03	1.06E+05	1.94E+05	2.18E+05	3.26E+04	7.24E-01	6.81E+01	1.63	1.42	2436	29%	52%	21	17
Supernatant	3.47E+03	1.06E+05	1.94E+05	2.18E+05	3.26E+04	7.24E-01	6.81E+01	1.42	1.42	38	52%	52%	23	17
Solid Layer	3.47E+03	1.06E+05	1.94E+05	2.18E+05	3.26E+04	7.24E-01	6.81E+01	1.63	1.42	2398	29%	52%	21	17
241-TX-113	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.40E+00	8.18E+00	1.61	1.45	2454	16%	49%	22	23
Supernatant	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.40E+00	8.18E+00	1.45	1.45	38	49%	49%	23	23
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.40E+00	8.18E+00	1.61	1.45	2416	15%	49%	22	23
241-TX-114	1.53E+03	5.15E+04	2.07E+05	1.60E+05	1.45E+04	7.29E-01	5.94E+01	1.63	1.33	2050	30%	61%	21	18
Supernatant	1.53E+03	5.15E+04	2.07E+05	1.60E+05	1.45E+04	7.29E-01	5.94E+01	1.33	1.33	38	61%	61%	21	18
Solid Layer	1.53E+03	5.15E+04	2.07E+05	1.60E+05	1.45E+04	7.29E-01	5.94E+01	1.63	1.33	2012	29%	61%	21	18
241-TX-115	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	2.15E+00	7.13E+01	1.63	1.45	2131	30%	49%	21	22
Supernatant	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	2.15E+00	7.13E+01	1.45	1.45	38	49%	49%	22	22
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	2.15E+00	7.13E+01	1.63	1.45	2093	29%	49%	21	22
241-TX-116	3.19E+02	1.05E+04	3.79E+05	1.51E+05	8.79E+00	3.42E-01	3.51E+01	1.65	1.39	2302	22%	53%	21	20
Supernatant	3.19E+02	1.05E+04	3.79E+05	1.51E+05	8.79E+00	3.42E-01	3.51E+01	1.39	1.39	38	53%	53%	21	20
Solid Layer	3.19E+02	1.05E+04	3.79E+05	1.51E+05	8.79E+00	3.42E-01	3.51E+01	1.66	1.39	2264	21%	53%	21	20

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-TX-117	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.60E+02	5.08E-01	3.89E+01	1.57	1.26	1855	28%	70%	21	20
Supernatant	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.60E+02	5.08E-01	3.89E+01	1.26	1.26	38	70%	70%	21	20
Solid Layer	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.60E+02	5.08E-01	3.89E+01	1.58	1.26	1817	27%	70%	21	20
241-TX-118	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.21E+02	5.39E+01	1.68	1.45	973	45%	49%	23	20
Supernatant	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.21E+02	5.39E+01	1.45	1.45	38	49%	49%	21	20
Solid Layer	4.03E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	1.21E+02	5.39E+01	1.69	1.45	935	45%	49%	23	20
241-TY-101	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.61E+02	9.71E+00	2.49E-01	1.61	1.26	485	45%	70%	19	21
Supernatant	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.61E+02	9.71E+00	2.49E-01	1.26	1.26	38	70%	70%	20	21
Solid Layer	3.38E+00	8.50E+03	2.17E+05	1.13E+05	3.61E+02	9.71E+00	2.49E-01	1.64	1.26	447	44%	70%	19	21
241-TY-102	2.18E+03	6.98E+04	2.02E+05	1.79E+05	2.06E+04	2.62E+00	2.87E+01	1.71	1.36	300	35%	58%	16	20
Supernatant	2.18E+03	6.98E+04	2.02E+05	1.79E+05	2.06E+04	2.62E+00	2.87E+01	1.36	1.36	38	58%	58%	16	20
Solid Layer	2.18E+03	6.98E+04	2.02E+05	1.79E+05	2.06E+04	2.62E+00	2.87E+01	1.76	1.36	262	32%	58%	16	20
241-TY-103	4.02E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	7.00E+01	2.78E+01	1.67	1.45	623	52%	49%	21	21
Supernatant	4.02E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	7.00E+01	2.78E+01	1.45	1.45	38	49%	49%	30	21
Solid Layer	4.02E+03	1.22E+05	1.90E+05	2.36E+05	3.78E+04	7.00E+01	2.78E+01	1.68	1.45	585	52%	49%	21	21
241-TY-104	1.71E+03	9.11E+03	7.98E+04	6.73E+04	4.60E+02	7.46E+01	3.04E+01	1.52	1.15	206	58%	80%	20	20
Supernatant	2.47E+02	1.32E+03	1.16E+04	9.73E+03	6.65E+01	6.90E-03	1.31E+00	1.02	1.02	43	97%	97%	20	20
Solid Layer	2.12E+03	1.13E+04	9.90E+04	8.34E+04	5.70E+02	8.67E+01	3.51E+01	1.65	1.18	163	52%	78%	20	20
241-TY-105	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.48E+02	6.24E+00	1.52	1.17	912	41%	75%	25	22
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.48E+02	6.24E+00	1.17	1.17	38	75%	75%	26	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.48E+02	6.24E+00	1.53	1.17	874	39%	75%	25	22
241-TY-106	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.21E+02	5.66E+01	1.31	1.17	100	51%	75%	16	20
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.21E+02	5.66E+01	1.17	1.17	38	75%	75%	16	20
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.21E+02	5.66E+01	1.40	1.17	62	38%	75%	16	20
241-U-101	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	3.71E+02	5.73E+01	1.59	1.17	125	40%	76%	22	22
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	3.71E+02	5.73E+01	1.17	1.17	38	76%	76%	19	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	3.71E+02	5.73E+01	1.77	1.17	87	30%	76%	22	22

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-U-102	1.08E+04	1.41E+05	1.91E+05	2.15E+05	3.20E+04	8.28E+01	1.38E+02	1.65	1.46	1276	35%	48%	27	21
Supernatant	1.07E+03	1.40E+04	1.89E+04	2.13E+04	3.18E+03	6.15E-01	4.11E+01	1.05	1.05	42	93%	93%	21	21
Solid Layer	1.12E+04	1.46E+05	1.98E+05	2.23E+05	3.32E+04	8.45E+01	1.40E+02	1.67	1.48	1234	34%	48%	27	21
241-U-103	1.21E+04	1.33E+05	1.48E+05	2.24E+05	3.98E+04	2.25E+01	1.09E+02	1.68	1.43	1448	40%	51%	28	24
Supernatant	6.22E+02	6.88E+03	7.63E+03	1.16E+04	2.05E+03	4.59E-01	2.19E+01	1.02	1.02	40	96%	96%	31	24
Solid Layer	1.24E+04	1.37E+05	1.52E+05	2.30E+05	4.09E+04	2.28E+01	1.10E+02	1.70	1.44	1408	40%	50%	28	24
241-U-104	9.58E+03	1.05E+05	2.07E+05	2.03E+05	3.21E+04	1.66E+02	5.22E+01	1.42	1.40	500	41%	55%	28	24
Supernatant	9.58E+03	1.05E+05	2.07E+05	2.03E+05	3.21E+04	1.66E+02	5.22E+01	1.40	1.40	38	55%	55%	28	24
Solid Layer	9.58E+03	1.05E+05	2.07E+05	2.03E+05	3.21E+04	1.66E+02	5.22E+01	1.43	1.40	462	39%	55%	28	24
241-U-105	1.64E+04	1.08E+05	1.81E+05	2.27E+05	2.98E+04	1.14E+01	1.37E+02	1.66	1.46	1374	31%	52%	28	28
Supernatant	1.64E+04	1.08E+05	1.81E+05	2.27E+05	2.98E+04	1.14E+01	1.37E+02	1.46	1.46	38	52%	52%	32	28
Solid Layer	1.64E+04	1.08E+05	1.81E+05	2.27E+05	2.98E+04	1.14E+01	1.37E+02	1.67	1.46	1336	30%	52%	28	28
241-U-106	3.19E+04	9.32E+04	2.35E+05	2.10E+05	1.13E+04	5.71E+01	1.40E+02	1.52	1.32	682	44%	50%	26	27
Supernatant	4.63E+03	1.35E+04	3.40E+04	3.06E+04	1.65E+03	7.19E+00	3.68E+01	1.05	1.05	44	91%	91%	27	27
Solid Layer	3.38E+04	9.87E+04	2.49E+05	2.23E+05	1.20E+04	5.94E+01	1.45E+02	1.55	1.34	638	42%	49%	26	27
241-U-107	6.28E+03	1.28E+05	1.42E+05	2.05E+05	4.10E+04	2.09E+00	7.55E+01	1.73	1.43	1151	33%	50%	24	25
Supernatant	6.28E+03	1.28E+05	1.42E+05	2.05E+05	4.10E+04	2.09E+00	7.55E+01	1.43	1.43	38	50%	50%	26	25
Solid Layer	6.28E+03	1.28E+05	1.42E+05	2.05E+05	4.10E+04	2.09E+00	7.55E+01	1.74	1.43	1113	33%	50%	24	25
241-U-108	7.07E+03	1.34E+05	1.84E+05	2.28E+05	3.05E+04	7.59E+00	1.19E+02	1.68	1.40	1374	37%	50%	30	27
Supernatant	7.07E+03	1.34E+05	1.84E+05	2.28E+05	3.05E+04	7.59E+00	1.19E+02	1.40	1.40	38	50%	50%	28	27
Solid Layer	7.07E+03	1.34E+05	1.84E+05	2.28E+05	3.05E+04	7.59E+00	1.19E+02	1.68	1.40	1336	37%	50%	30	27
241-U-109	6.53E+03	1.28E+05	1.85E+05	2.28E+05	2.92E+04	6.95E+00	1.13E+02	1.65	1.47	1390	29%	51%	27	19
Supernatant	6.53E+03	1.28E+05	1.85E+05	2.28E+05	2.92E+04	6.95E+00	1.13E+02	1.47	1.47	38	51%	51%	21	19
Solid Layer	6.53E+03	1.28E+05	1.85E+05	2.28E+05	2.92E+04	6.95E+00	1.13E+02	1.65	1.47	1352	29%	51%	27	19
241-U-110	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.62E+02	1.81E+01	1.69	1.17	703	32%	75%	26	26
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.62E+02	1.81E+01	1.17	1.17	38	75%	75%	26	26
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.62E+02	1.81E+01	1.72	1.17	665	31%	75%	26	26

Table B-5. Input Data With Water Addition for Hydrogen Generation Rate Model Calculations for 177 Tanks. (20 Sheets)

Tank	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Na in liquid [Na] (ug/mL)	Al in liquid [Al] (µg/mL)	90Sr in waste [Sr] (µCi/g)	137Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. Tw (°C)	Dome temp. Td (°C)
241-U-111	5.41E+03	1.20E+05	1.67E+05	2.39E+05	3.66E+04	3.82E+01	1.27E+02	1.60	1.40	878	36%	53%	26	26
Supernatant	5.41E+03	1.20E+05	1.67E+05	2.39E+05	3.66E+04	3.82E+01	1.27E+02	1.40	1.40	38	53%	53%	27	26
Solid Layer	5.41E+03	1.20E+05	1.67E+05	2.39E+05	3.66E+04	3.82E+01	1.27E+02	1.61	1.40	840	36%	53%	26	26
241-U-112	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.65E+02	3.01E+01	1.64	1.17	210	38%	75%	21	22
Supernatant	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.65E+02	3.01E+01	1.17	1.17	38	75%	75%	21	22
Solid Layer	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.65E+02	3.01E+01	1.74	1.17	172	32%	75%	21	22
241-U-201	0.00E+00	1.49E+04	1.03E+05	8.34E+04	1.02E+02	9.87E-02	7.24E+00	1.42	1.17	19	45%	74%	18	20
Supernatant	0.00E+00	1.06E+04	7.33E+04	5.95E+04	7.26E+01	5.78E-03	1.24E+01	1.13	1.13	8	82%	82%	19	20
Solid Layer	0.00E+00	2.07E+04	1.43E+05	1.16E+05	1.41E+02	1.44E-01	4.72E+00	1.63	1.22	11	27%	69%	18	20
241-U-202	9.92E+01	1.73E+04	1.07E+05	8.41E+04	1.68E+02	3.89E-02	5.86E+00	1.35	1.17	18	48%	74%	18	19
Supernatant	7.24E+01	1.26E+04	7.80E+04	6.14E+04	1.23E+02	2.77E-04	8.79E+00	1.14	1.14	8	82%	82%	18	19
Solid Layer	1.41E+02	2.45E+04	1.52E+05	1.20E+05	2.39E+02	6.17E-02	4.13E+00	1.51	1.22	10	28%	69%	18	19
241-U-203	0.00E+00	1.42E+04	1.06E+05	7.38E+04	1.38E+02	7.76E-02	5.56E+00	1.38	1.21	17	56%	74%	18	19
Supernatant	0.00E+00	9.94E+03	7.40E+04	5.15E+04	9.63E+01	2.44E-04	8.24E+00	1.14	1.14	8	82%	82%	19	19
Solid Layer	0.00E+00	1.94E+04	1.44E+05	1.00E+05	1.88E+02	1.26E-01	3.89E+00	1.59	1.28	9	40%	69%	18	19
241-U-204	5.20E+01	4.51E+03	3.55E+04	2.52E+04	9.39E+00	2.12E+00	4.23E+00	1.25	1.07	15	56%	90%	18	19
Supernatant	4.16E+01	3.61E+03	2.84E+04	2.02E+04	7.51E+00	9.56E-05	3.31E+00	1.06	1.06	8	93%	93%	18	19
Solid Layer	8.10E+01	7.03E+03	5.53E+04	3.93E+04	1.46E+01	3.81E+00	4.98E+00	1.47	1.11	7	26%	87%	18	19

APPENDIX C

CALCULATIONS OF THE HENRY'S LAW CONSTANTS AND THE MASS TRANPORT PRODUCTS OF h AND A

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Table C-1 Input Ion Concentration for NH3 Calculation (3 Sheets)

Tanks	Na+ in liquid (μg/mL)	Al+3 in liquid (μg/mL)	Fe+3 in liquid (μg/mL)	Cr+3 in liquid (μg/mL)	Ni+2 in liquid (μg/mL)	K+1 in liquid (μg/mL)	OH-1 in liquid (μg/mL)	NO3-1 in liquid (μg/mL)	NO2-1 in liquid (μg/mL)	CO3-2 in liquid (μg/mL)	PO4-3 in liquid (μg/mL)	SO4-2 in liquid (μg/mL)	F-1 in liquid (μg/mL)	Cl-1 in liquid (μg/mL)
241-AN-101	9.29E+04	1.09E+04	6.32E+00	1.21E+02	3.61E+00	2.68E+03	3.08E+04	7.18E+04	4.07E+04	9.65E+03	1.59E+03	1.36E+03	2.89E+02	2.33E+03
241-AN-102	2.27E+05	1.54E+04	4.90E+01	2.97E+02	4.17E+02	2.88E+03	3.23E+03	2.36E+05	9.04E+04	7.00E+04	5.52E+03	1.53E+04	1.91E+03	4.11E+03
241-AN-103	2.85E+05	3.02E+04	3.01E+01	5.66E+02	1.20E+01	1.68E+04	9.93E+04	1.68E+05	1.65E+05	5.80E+03	1.65E+03	1.45E+03	6.60E+02	9.76E+03
241-AN-104	2.56E+05	3.86E+04	3.01E+01	3.36E+02	1.20E+01	6.69E+03	7.09E+04	1.70E+05	1.25E+05	1.07E+04	2.71E+03	3.54E+03	8.19E+01	8.09E+03
241-AN-105	2.46E+05	4.11E+04	2.47E+01	2.22E+02	9.95E+00	6.50E+03	5.86E+04	1.62E+05	1.21E+05	1.18E+04	1.22E+03	2.85E+03	3.06E+02	9.90E+03
241-AN-106	7.56E+04	3.22E+03	1.77E+00	9.91E+01	2.79E+02	5.96E+03	9.93E+04	6.58E+04	1.76E+04	2.18E+04	2.02E+03	5.50E+03	5.11E+03	9.60E+02
241-AN-107	2.03E+05	2.93E+02	1.67E+03	1.72E+02	5.51E+02	1.81E+03	9.93E+04	2.38E+05	6.59E+04	7.55E+04	2.94E+03	8.98E+03	4.18E+03	2.02E+03
241-AP-101	1.29E+05	6.94E+03	2.50E+00	1.43E+02	7.90E+00	3.12E+04	4.94E+04	1.32E+05	4.19E+04	3.23E+04	1.02E+03	4.03E+03	2.90E+03	1.98E+03
241-AP-102	1.02E+05	1.15E+04	3.82E+00	6.19E+02	2.66E+01	1.29E+03	9.09E+03	7.60E+04	3.59E+04	2.66E+04	1.16E+04	4.52E+03	1.68E+02	2.73E+03
241-AP-103	1.81E+05	8.43E+03	3.01E+01	3.72E+02	1.22E+02	1.33E+04	9.51E+03	1.35E+05	1.06E+05	7.55E+04	3.46E+03	4.50E+03	2.09E+03	2.82E+03
241-AP-104	1.36E+05	1.97E+04	1.04E+02	1.37E+03	7.85E+01	2.11E+03	2.26E+03	1.13E+05	6.74E+04	1.93E+04	3.86E+03	3.84E+03	4.15E+02	5.49E+03
241-AP-105	1.90E+05	2.07E+04	3.01E+01	5.13E+02	2.54E+01	1.23E+04	3.35E+04	2.32E+05	1.01E+05	1.12E+05	3.16E+03	6.78E+03	4.74E+03	5.45E+03
241-AP-106	1.22E+05	1.83E+04	1.13E+02	1.57E+03	7.56E+01	3.12E+03	9.01E+03	9.03E+04	6.14E+04	1.88E+04	2.76E+03	3.20E+03	6.71E+02	4.92E+03
241-AP-107	7.97E+04	8.69E+03	1.01E+01	6.55E+02	2.36E+00	1.58E+03	7.28E+03	9.56E+04	2.80E+04	4.55E+03	4.84E+03	2.41E+03	7.22E+02	2.29E+03
241-AP-108	9.03E+04	1.09E+04	1.01E+01	8.21E+02	4.02E+00	2.85E+03	1.39E+04	9.10E+04	3.27E+04	1.27E+04	3.40E+03	2.72E+03	9.70E+02	2.86E+03
241-AW-101	2.53E+05	3.07E+04	1.80E+01	1.12E+02	6.10E+00	4.12E+04	8.63E+04	1.70E+05	1.20E+05	9.20E+03	9.96E+02	1.26E+03	9.62E+02	7.30E+03
241-AW-102	5.68E+04	6.39E+03	6.95E+00	4.81E+02	1.90E+00	1.32E+03	7.45E+03	6.50E+04	2.01E+04	2.31E+03	6.22E+02	1.72E+03	5.42E+02	1.68E+03
241-AW-103	2.46E+04	6.46E+01	5.57E+00	2.53E+01	5.08E+00	1.43E+04	9.62E+03	4.22E+03	1.78E+03	4.70E+03	5.92E+01	6.72E+02	1.68E+04	1.38E+02
241-AW-104	1.74E+04	7.11E+02	1.86E+00	2.20E+00	7.40E-01	1.67E+03	3.55E+03	1.66E+04	5.33E+03	7.25E+03	2.93E+02	6.54E+02	1.32E+02	2.39E+02
241-AW-105	1.49E+04	4.34E+01	4.61E+00	2.12E+00	9.91E-01	1.99E+03	6.12E+03	2.70E+04	1.28E+03	1.62E+03	1.85E+02	3.01E+02	4.81E+02	2.45E+02
241-AW-106	1.77E+05	1.99E+04	2.18E+01	1.47E+03	8.39E+00	5.65E+03	9.80E+03	1.92E+05	6.35E+04	2.84E+04	1.47E+03	5.14E+03	1.23E+03	5.17E+03
241-AY-101	5.19E+04	1.21E+01	1.20E+01	1.05E+02	5.90E+01	7.63E+02	2.29E+02	2.60E+04	3.53E+04	3.44E+04	1.15E+03	5.87E+03	1.74E+02	6.36E+02
241-AY-102	5.40E+04	1.97E+03	1.01E+01	2.91E+01	4.02E+00	3.88E+02	1.44E+03	4.86E+02	7.29E+03	4.87E+04	3.01E+03	2.32E+03	1.72E+02	1.60E+02
241-AZ-101	1.11E+05	8.56E+03	2.24E+01	7.23E+02	8.02E+00	4.76E+03	1.15E+04	7.12E+04	7.26E+04	3.42E+04	1.34E+03	1.50E+04	1.75E+03	1.51E+02
241-AZ-102	5.59E+04	6.68E+02	1.00E+00	7.37E+02	1.75E+00	3.20E+03	1.21E+03	1.85E+04	3.55E+04	3.50E+04	4.97E+02	1.86E+04	1.14E+03	7.66E+01
241-SY-101	1.63E+05	1.34E+04	3.97E+02	5.18E+03	2.02E+02	4.14E+03	2.63E+04	1.52E+05	9.56E+04	3.44E+04	4.94E+03	4.19E+03	5.50E+02	1.11E+04
241-SY-102	9.84E+04	1.44E+04	1.41E+01	2.41E+02	5.04E+01	1.53E+03	1.97E+04	9.20E+04	5.89E+04	1.31E+04	3.48E+03	2.91E+03	1.51E+02	4.64E+03

Table C-1 Input Ion Concentration for NH3 Calculation (3 Sheets)

Tanks	Na+ in liquid (μg/mL)	Al+3 in liquid (μg/mL)	Fe+3 in liquid (μg/mL)	Cr+3 in liquid (μg/mL)	Ni+2 in liquid (μg/mL)	K+1 in liquid (μg/mL)	OH-1 in liquid (μg/mL)	NO3-1 in liquid (μg/mL)	NO2-1 in liquid (μg/mL)	CO3-2 in liquid (μg/mL)	PO4-3 in liquid (μg/mL)	SO4-2 in liquid (μg/mL)	F-1 in liquid (μg/mL)	Cl-1 in liquid (μg/mL)
241-SY-103	2.12E+05	4.14E+04	2.10E+01	3.30E+01	4.90E+01	3.91E+03	2.89E+04	1.79E+05	1.43E+05	3.44E+04	3.12E+03	4.08E+03	3.51E+02	1.16E+04
241-A-101	2.78E+05	5.18E+04	4.29E+01	5.73E+01	1.85E+01	7.42E+03	4.48E+04	2.33E+05	1.65E+05	1.33E+04	5.89E+03	1.40E+03	2.17E+02	9.01E+03
241-A-103	2.20E+05	3.56E+04	1.81E+01	2.96E+02	9.46E+01	5.44E+03	4.48E+04	1.33E+05	1.65E+05	1.33E+04	3.67E+03	1.40E+03	2.17E+02	9.01E+03
241-AX-101	2.82E+05	5.03E+04	3.01E+01	1.75E+02	1.20E+01	7.42E+03	3.90E+04	2.72E+05	1.73E+05	1.10E+04	6.59E+03	1.54E+03	5.78E+01	8.82E+03
241-B-203	3.12E+04	1.00E+01	1.00E+01	1.62E+02	4.02E+00	5.44E+03	3.90E+04	5.67E+04	1.57E+03	1.09E+04	1.90E+03	5.62E+02	6.04E+03	6.77E+02
241-B-204	2.94E+04	8.35E+00	8.35E+00	1.52E+02	3.35E+00	6.42E+03	3.90E+04	4.82E+04	1.82E+03	1.09E+04	7.14E+02	8.24E+02	6.55E+03	6.22E+02
241-BY-106	1.65E+05	3.98E+04	3.20E+01	3.54E+02	2.80E+01	8.93E+03	3.58E+04	1.10E+05	7.81E+04	6.60E+03	1.99E+03	2.02E+03	2.93E+02	4.65E+03
241-C-103	3.53E+04	1.16E+01	5.40E+00	7.86E+01	7.85E+01	3.10E+02	4.49E+04	4.30E+03	2.43E+04	2.94E+04	4.59E+03	3.22E+03	1.16E+03	4.05E+02
241-S-101	2.15E+05	2.45E+04	2.01E+01	8.13E+02	8.02E+00	2.36E+03	4.49E+04	1.81E+05	9.40E+04	5.30E+03	3.86E+03	5.65E+03	1.06E+02	7.45E+03
241-S-102	2.36E+05	4.19E+04	4.01E+01	1.08E+02	1.64E+01	3.25E+03	4.10E+04	1.59E+05	1.14E+05	2.01E+04	4.93E+03	4.63E+03	3.50E+02	1.04E+04
241-S-103	2.28E+05	3.20E+04	3.01E+01	2.69E+02	1.20E+01	3.90E+03	3.65E+04	2.16E+05	1.47E+05	2.21E+04	3.57E+03	5.10E+03	2.56E+02	1.33E+04
241-S-106	2.44E+05	3.85E+04	3.01E+01	9.41E+03	1.20E+01	1.84E+03	5.49E+04	2.40E+05	1.09E+05	1.58E+04	6.38E+03	5.73E+03	1.40E+02	1.11E+04
241-S-111	2.19E+05	2.91E+04	2.01E+01	4.06E+03	8.02E+00	1.64E+03	4.73E+04	1.90E+05	7.05E+04	1.28E+04	1.02E+04	4.32E+03	1.05E+02	6.39E+03
241-SX-101	2.42E+05	7.56E+04	3.56E+01	1.21E+04	3.44E+04	2.52E+03	4.87E+04	1.05E+05	7.80E+04	8.05E+03	5.18E+03	1.83E+03	7.14E+01	1.67E+04
241-SX-102	2.35E+05	4.56E+04	3.65E+01	2.77E+03	1.45E+01	3.55E+03	5.01E+04	1.58E+05	1.51E+05	8.80E+03	3.49E+03	3.33E+03	7.80E+01	1.02E+04
241-SX-103	2.37E+05	4.41E+04	3.01E+01	8.36E+01	2.05E+04	4.24E+03	4.15E+04	1.59E+05	1.58E+05	1.28E+04	3.33E+03	2.01E+03	1.01E+02	1.10E+04
241-SX-104	2.50E+05	3.56E+04	3.38E+01	9.39E+02	1.35E+01	2.88E+03	3.42E+04	2.91E+05	1.17E+05	2.48E+04	1.27E+04	3.90E+03	1.87E+02	8.23E+03
241-SX-105	2.36E+05	4.41E+04	3.01E+01	3.38E+02	1.20E+01	3.38E+03	4.09E+04	1.65E+05	1.43E+05	1.41E+04	3.27E+03	4.20E+03	1.04E+02	9.01E+03
241-SX-106	2.45E+05	2.59E+04	3.01E+01	1.30E+02	1.20E+01	3.89E+03	3.31E+04	2.10E+05	1.32E+05	2.56E+04	3.52E+03	7.20E+03	3.11E+02	1.17E+04
241-SX-108	2.27E+05	1.54E+04	4.90E+01	2.97E+02	4.17E+02	2.88E+03	4.14E+04	2.36E+05	9.04E+04	7.00E+04	5.66E+03	1.53E+04	1.91E+03	4.11E+03
241-T-110	3.70E+04	5.00E+00	5.00E+00	3.46E+01	2.00E+00	3.27E+02	5.11E+03	1.83E+04	5.90E+01	7.00E+04	1.49E+03	4.36E+03	4.22E+03	9.58E+02
241-T-203	4.12E+04	5.05E+00	5.05E+00	4.26E+01	2.02E+00	8.39E+03	5.11E+03	7.37E+04	3.53E+02	7.00E+04	1.90E+03	4.69E+02	7.02E+03	7.07E+02
241-U-102	2.43E+05	1.80E+04	2.01E+01	2.79E+02	1.26E+02	3.77E+03	2.93E+04	2.45E+05	1.05E+05	4.68E+04	3.80E+03	9.84E+03	1.33E+02	8.82E+03
241-U-103	2.31E+05	4.09E+04	3.01E+01	1.08E+02	1.69E+02	4.83E+03	3.08E+04	1.52E+05	1.37E+05	1.56E+04	7.64E+02	2.68E+03	1.09E+03	1.14E+04

Table C-1 Input Ion Concentration for NH3 Calculation (3 Sheets)

Tanks	Na+ in liquid (µg/mL)	Al+3 in liquid (µg/mL)	Fe+3 in liquid (µg/mL)	Cr+3 in liquid (µg/mL)	Ni+2 in liquid (µg/mL)	K+1 in liquid (µg/mL)	OH-1 in liquid (µg/mL)	NO3-1 in liquid (µg/mL)	NO2-1 in liquid (µg/mL)	CO3-2 in liquid (µg/mL)	PO4-3 in liquid (µg/mL)	SO4-2 in liquid (µg/mL)	F-1 in liquid (µg/mL)	Cl-1 in liquid (µg/mL)
241-U-105	2.27E+05	2.98E+04	3.10E+01	2.01E+02	2.48E+02	3.98E+03	2.09E+04	1.81E+05	1.08E+05	2.78E+04	3.92E+03	8.01E+03	1.31E+03	8.92E+03
241-U-106	2.23E+05	1.20E+04	3.93E+01	4.96E+02	5.22E+02	1.89E+03	5.11E+03	2.52E+05	9.90E+04	4.73E+04	3.84E+03	8.64E+03	3.32E+02	5.46E+03
241-U-107	2.21E+05	2.64E+04	3.77E+01	5.75E+02	1.72E+01	3.27E+03	3.61E+04	2.27E+05	1.11E+05	2.65E+04	3.44E+03	6.63E+03	1.67E+02	8.99E+03
241-U-108	2.43E+05	3.29E+04	3.33E+01	1.28E+03	3.13E+01	4.01E+03	4.92E+04	1.81E+05	1.30E+05	2.20E+04	3.13E+03	4.23E+03	7.90E+02	8.94E+03
241-U-109	2.28E+05	2.92E+04	1.00E+02	2.61E+03	4.55E+01	3.33E+03	4.42E+04	1.85E+05	1.28E+05	1.87E+04	3.37E+03	5.17E+03	3.96E+02	8.69E+03

Table C-2 Calculations of Henry's Law Constant by Schumpe Model (3 Sheets)

Tanks	(NH_3)ss in dome (ppm)	Liquid NH_3 (µg/mL)	wt% H_2O in liquid (%)	Spg in Liquid (g/ml)	Waste Volume (kL)	Head space T(°C)	Waste T (°C)	Sum of ion conc. Sum(Ci) (mole/L)	Sum of ion conc. times ionic coeff. Sum (Ci*Hi) (mole/L)	KHo in water (mole/L-atm)	KH in solns' correction factor	KH in solns' (mole/L-atm)
241-AN-101	11	4.00E+01	70	1.15	606	18	18	8.64	0.82	86.11	1.25	41.96
241-AN-102	300	2.10E+02	48	1.43	4013	29	31	18.10	1.69	46.00	2.03	14.07
241-AN-103	7	3.45E+02	49	1.49	3627	28	38	26.53	2.54	34.01	2.30	4.25
241-AN-104	21	2.46E+02	51	1.40	3986	29	36	22.85	2.24	37.50	2.30	6.17
241-AN-105	15	2.10E+02	50	1.42	4263	28	34	21.62	2.15	40.39	2.26	7.15
241-AN-106	1	2.10E+02	76	1.20	148	18	17	11.59	1.04	88.51	1.38	40.30
241-AN-107	400	2.10E+02	50	1.37	3952	26	29	21.70	1.89	50.41	2.26	16.15
241-AP-101	125	4.39E+02	58	1.31	4221	19	19	13.43	1.22	81.52	1.41	30.97
241-AP-102	75	4.39E+02	75	1.20	4134	20	20	8.15	0.82	77.21	1.23	35.13
241-AP-103	1	2.50E+02	80	1.31	1079	16	16	15.11	1.46	96.18	1.40	24.73
241-AP-104	3	1.33E+02	97	1.29	91	15	15	10.73	1.06	98.90	1.33	37.70
241-AP-105	7	3.24E+02	62	1.35	2896	26	19	19.62	1.84	79.34	1.95	19.84
241-AP-106	5	6.75E+01	94	1.25	352	19	18	9.95	0.99	86.11	1.31	34.54
241-AP-107	5	1.06E+03	87	1.21	3695	17	14	6.67	0.60	101.71	1.17	61.92
241-AP-108	27	8.00E+02	81	1.25	1397	19	16	7.83	0.74	93.55	1.21	49.38
241-AW-101	5	1.00E+01	49	1.47	4263	16	34	24.06	2.31	40.39	2.26	6.46
241-AW-102	3	7.43E+01	88	1.15	303	26	21	4.81	0.44	75.16	1.10	51.68
241-AW-103	138	5.12E+02	93	1.02	1931	27	17	3.09	0.30	88.51	1.10	68.43
241-AW-104	6	1.69E+02	82	1.06	4236	25	21	1.56	0.15	73.16	1.10	68.40
241-AW-105	43	1.01E+03	93	1.02	1624	33	16	1.59	0.12	93.55	1.10	92.16
241-AW-106	28	3.55E+02	59	1.38	1791	33	32	14.42	1.34	44.63	1.60	16.10
241-AY-101	5	1.13E+02	84	1.09	583	30	38	4.15	0.42	34.01	1.00	20.48
241-AY-102	4	7.37E+01	92	1.12	2355	21	37	3.56	0.43	35.19	1.00	19.36
241-AZ-101	1	1.25E+02	72	1.22	3199	27	51	9.52	0.94	19.52	1.67	10.74
241-AZ-102	6	4.38E+02	84	1.14	3524	19	46	4.54	0.47	23.96	1.00	13.29
241-SY-101	400	1.04E+03	61	1.33	3685	30	32	14.89	1.37	43.96	1.63	15.79
241-SY-102	12	1.15E+03	75	1.23	2317	15	22	9.20	0.87	69.34	1.28	32.86

Table C-2 Calculations of Henry's Law Constant by Schumpe Model (3 Sheets)

Tanks	(NH_3)ss in dome (ppm)	Liquid NH_3 (μg/mL)	wt% H_2O in liquid (%)	Spg in Liquid (g/ml)	Waste Volume (kL)	Head space T(°C)	Waste T (°C)	Sum of ion conc. Sum(Ci) (mole/L)	Sum of ion conc. times ionic coeff. Sum (Ci*Hi) (mole/L)	KHo in water (mole/L-atm)	KH in solns' correction factor	KH in solns' (mole/L-atm)
241-SY-103	59	1.29E+03	49	1.47	2817	16	31	19.55	1.93	45.77	2.25	10.57
241-A-101	394	5.31E+02	55	1.49	3608	36	60	24.74	2.42	13.69	3.28	2.61
241-A-103	261	5.31E+02	75	1.48	1404	36	58	19.95	1.98	14.96	3.28	4.70
241-AX-101	41	5.41E+02	48	1.49	2832	29	49	25.28	2.42	20.79	2.57	3.32
241-B-203	5	1.00E+02	89	1.17	193	12	12	5.28	0.44	115.89	1.00	76.38
241-B-204	5	1.00E+02	89	1.05	189	14	13	5.11	0.43	107.29	1.00	70.65
241-BY-106	79	1.03E+03	59	1.31	2127	25	49	14.76	1.52	21.17	2.50	8.12
241-C-103	324	1.21E+03	86	1.08	750	38	43	5.43	0.53	27.01	1.17	16.99
241-S-101	765	1.21E+03	63	1.36	1616	31	43	18.34	1.73	26.82	2.27	8.66
241-S-102	588	1.70E+03	50	1.39	1946	27	39	20.10	2.03	32.41	2.31	6.54
241-S-103	149	1.41E+03	50	1.45	939	23	28	20.88	1.96	53.20	2.26	13.35
241-S-106	14	2.40E+02	51	1.46	1613	20	25	22.44	2.12	62.01	2.26	12.86
241-S-111	120	1.50E+03	52	1.40	2044	23	28	18.67	1.79	51.99	2.24	14.83
241-SX-101	4	1.32E+02	49	1.46	1696	38	52	21.14	2.37	19.00	2.57	2.14
241-SX-102	5	1.37E+03	48	1.45	1946	33	55	21.34	2.13	16.63	3.28	4.30
241-SX-103	31	1.80E+03	47	1.47	2400	31	62	21.45	2.17	12.84	3.28	3.10
241-SX-104	5	7.93E+02	51	1.39	1768	29	46	22.36	2.07	23.85	2.57	6.23
241-SX-105	27	1.21E+03	43	1.47	2411	34	63	20.74	2.07	12.06	3.28	3.31
241-SX-106	177	2.50E+03	46	1.42	1601	26	37	20.81	1.96	35.71	2.31	9.06
241-SX-108	5	1.30E+03	47	1.43	329	53	72	20.35	1.88	8.86	4.04	4.48
241-T-110	107	1.50E+03	87	1.17	1465	16	17	3.69	0.41	90.99	1.00	53.35
241-T-203	5	1.00E+02	85	1.17	132	15	17	5.08	0.47	89.83	1.00	53.34
241-U-102	651	7.45E+02	48	1.38	1420	24	28	20.47	1.88	53.34	2.26	15.39
241-U-103	722	1.40E+03	49	1.41	1772	25	28	19.59	1.97	51.99	2.26	11.13

Table C-2 Calculations of Henry's Law Constant by Schumpe Model (3 Sheets)

Tanks	(NH_3)ss in dome (ppm)	Liquid NH_3 (µg/mL)	wt% H_2O in liquid (%)	Spg in Liquid (g/ml)	Waste Volume (kL)	Head space T(°C)	Waste T (°C)	Sum of ion conc. Sum(Ci) (mole/L)	Sum of ion conc. times ionic coeff. Sum (Ci*Hi) (mole/L)	KHo in water (mole/L-atm)	KH in solns' correction factor	KH in solns' (mole/L-atm)
241-U-105	1936	1.60E+03	69	1.46	1582	25	30	18.50	1.80	48.15	2.10	12.29
241-U-106	940	1.05E+03	49	1.36	856	24	26	17.81	1.60	57.66	2.01	21.04
241-U-107	448	4.03E+02	58	1.41	1545	23	24	19.69	1.82	62.37	2.00	16.58
241-U-108	684	1.05E+03	50	1.40	1772	24	28	21.29	2.06	51.99	2.26	10.70
241-U-109	5	1.10E+03	52	1.47	1760	23	26	20.17	1.93	57.66	2.26	14.45

Table C-3 Calculation of Mass Transport Product of h and A from Normal Ventilation Condition and Prediction for Off-Normal Condition (3 Sheets)

Tanks	Liquid NH_3 Cl (M/L)	Ammonia Partial P_{NH3} (atm)	Steady State NH_3 Co (M)	Molar Volume (L/mole)	Normal Vent Q (cfm)	Headspace Volume V (ft^3)	Equiv $(NH_3)ss$ in Liquid (mole/L)	Product hA from Normal Condition (cfm)	Normal Steady-State Release Rate (cfm)	Off-Normal Barometric Vent Q (cfm)	Off-normal const. k1 (min-1)	Off-normal const. k2 (mole/L-min)	Off-Normal $(NH_3)ss$ (atm)	(NH3)ss at off-Normal Vent (ppm)	Off-Normal Steady-State Release Rate (cfm)	Time t to reach steady state (day)
241-AN-101	0.002	0.000056	4.73E-07	23.85	113	166,700	0.00047	2.85E-02	1.28E-03	0.52	1.74E-04	4.02E-10	5.50E-05	55	2.86E-05	49
241-AN-102	0.012	0.000876	1.21E-05	24.78	119	46,387	0.00422	1.78E-01	3.57E-02	0.14	1.34E-03	4.72E-08	8.74E-04	874	1.27E-04	5
241-AN-103	0.020	0.004763	2.69E-07	24.69	100	60,023	0.00003	1.33E-03	6.65E-04	0.19	5.46E-06	4.49E-10	2.03E-03	2034	3.82E-04	976
241-AN-104	0.014	0.002339	8.47E-07	24.79	100	47,323	0.00013	5.92E-03	2.10E-03	0.15	2.23E-05	1.81E-09	2.01E-03	2011	2.97E-04	250
241-AN-105	0.012	0.001725	6.14E-07	24.66	100	3756430%	0.00011	5.02E-03	1.51E-03	0.12	2.67E-05	1.65E-09	1.52E-03	1523	1.79E-04	271
241-AN-106	0.012	0.000306	4.19E-08	23.84	117	182,875	0.00004	3.99E-04	1.17E-04	0.57	5.22E-06	2.69E-11	1.23E-04	123	7.02E-05	200
241-AN-107	0.012	0.000763	1.63E-05	24.53	129	48,526	0.00646	3.58E-01	5.16E-02	0.15	2.93E-03	9.11E-08	7.63E-04	763	1.16E-04	1
241-AP-101	0.026	0.000832	5.21E-06	23.98	108	39,035	0.00387	2.57E-02	1.35E-02	0.12	4.92E-04	1.70E-08	8.27E-04	827	1.01E-04	13
241-AP-102	0.026	0.000734	3.13E-06	24.02	135	42,109	0.00264	1.83E-02	1.02E-02	0.13	3.69E-04	1.12E-08	7.28E-04	728	9.57E-05	13
241-AP-103	0.015	0.000594	4.22E-08	23.68	200	149,990	0.00002	5.76E-04	2.00E-04	0.47	5.38E-06	5.64E-11	2.48E-04	248	1.16E-04	822
241-AP-104	0.008	0.000207	1.33E-07	23.64	71	184,881	0.00012	1.23E-03	2.23E-04	0.58	9.04E-06	5.19E-11	1.36E-04	136	7.83E-05	433
241-AP-105	0.019	0.000959	2.99E-07	24.52	176	85,823	0.00015	2.79E-03	1.29E-03	0.27	1.89E-05	6.18E-10	8.00E-04	800	2.15E-04	281
241-AP-106	0.004	0.000115	2.23E-07	23.94	111	175,657	0.00018	6.54E-03	5.92E-04	0.55	3.39E-05	1.48E-10	1.04E-04	104	5.72E-05	96
241-AP-107	0.062	0.001005	2.10E-07	23.81	342	57,616	0.00031	1.16E-03	1.71E-03	0.18	3.28E-05	1.25E-09	9.09E-04	909	1.64E-04	151
241-AP-108	0.047	0.000951	1.11E-06	23.96	129	138,761	0.00131	3.14E-03	3.43E-03	0.43	2.99E-05	1.06E-09	8.52E-04	852	3.69E-04	188
241-AW-101	0.001	0.000091	2.17E-07	23.70	100	37,564	0.00003	3.92E-02	5.15E-04	0.12	1.63E-04	6.13E-10	8.92E-05	89	1.05E-05	22
241-AW-102	0.004	0.000084	1.04E-07	24.55	292	177,394	0.00013	7.16E-03	7.44E-04	0.55	5.44E-05	1.76E-10	7.96E-05	80	4.41E-05	95
241-AW-103	0.030	0.000439	5.59E-06	24.62	134	119,912	0.00942	3.63E-02	1.85E-02	0.37	5.13E-04	9.10E-09	4.37E-04	437	1.64E-04	13
241-AW-104	0.010	0.000145	2.45E-07	24.46	141	38,500	0.00041	3.64E-03	8.46E-04	0.12	1.61E-04	9.37E-10	1.42E-04	142	1.71E-05	25
241-AW-105	0.059	0.000643	1.70E-06	25.10	194	130,740	0.00394	5.97E-03	8.30E-03	0.41	1.09E-04	2.71E-09	6.25E-04	625	2.55E-04	43
241-AW-106	0.021	0.001295	1.11E-06	25.10	158	124,858	0.00045	8.59E-03	4.40E-03	0.39	3.09E-05	1.43E-09	1.16E-03	1164	4.54E-04	184
241-AY-101	0.007	0.000324	2.01E-07	24.87	250	167,502	0.00010	7.69E-03	1.25E-03	0.52	2.65E-05	3.05E-10	2.86E-04	286	1.50E-04	188
241-AY-102	0.004	0.000224	1.78E-07	24.12	250	104,939	0.00008	1.05E-02	1.07E-03	0.33	4.97E-05	4.32E-10	2.09E-04	209	6.87E-05	129
241-AZ-101	0.007	0.000683	4.06E-08	24.61	150	75,129	0.00001	8.32E-04	1.50E-04	0.23	6.05E-06	8.12E-11	3.30E-04	330	7.76E-05	680
241-AZ-102	0.026	0.001936	2.31E-07	23.96	112	63,632	0.00007	1.01E-03	6.19E-04	0.20	8.16E-06	4.07E-10	1.19E-03	1195	2.38E-04	681
241-SY-101	0.061	0.003883	1.61E-05	24.86	486	57,834	0.00632	1.42E-01	1.94E-01	0.18	9.68E-04	1.51E-07	3.87E-03	3870	6.99E-04	8
241-SY-102	0.068	0.002055	4.95E-07	23.59	363	106,276	0.00038	2.67E-03	4.24E-03	0.33	2.26E-05	1.70E-09	1.77E-03	1771	5.88E-04	256

Table C-3 Calculation of Mass Transport Product of h and A from Normal Ventilation Condition and Prediction for Off-Normal Condition (3 Sheets)

Tanks	Liquid NH_3 Cl (M/L)	Ammonia Partial P_{NH3} (atm)	Steady State NH_3 Co (M)	Molar Volume (L/mole)	Normal Vent Q (cfm)	Headspace Volume V (ft^3)	Equiv $(NH_3)ss$ in Liquid (mole/L)	Product hA from Normal Condition (cfm)	Normal Steady-State Release Rate (cfm)	Off-Normal Barometric Vent Q (cfm)	Off-normal const. k1 (min-1)	Off-normal const. k2 (mole/L-min)	Off-Normal $(NH_3)ss$ (atm)	(NH3)ss at off-Normal Vent (ppm)	Off-Normal Steady-State Release Rate (cfm)	Time t to reach steady state (day)
241-SY-103	0.076	0.007169	2.50E-06	23.74	116	88,630	0.00063	3.88E-03	6.92E-03	0.28	1.41E-05	3.32E-09	5.58E-03	5581	1.55E-03	487
241-A-101	0.031	0.011934	1.56E-05	25.32	10	48,793	0.00103	5.17E-03	3.94E-03	0.15	1.01E-05	3.30E-09	8.25E-03	8253	1.26E-03	709
241-A-103	0.031	0.006640	1.03E-05	25.32	8	126,596	0.00122	2.61E-03	1.98E-03	0.40	5.58E-06	6.44E-10	2.92E-03	2922	1.16E-03	1058
241-AX-101	0.032	0.009580	1.67E-06	24.77	10	80,208	0.00014	5.29E-04	4.15E-04	0.25	3.67E-06	2.10E-10	1.42E-03	1416	3.55E-04	1668
241-B-203	0.006	0.000077	2.14E-07	23.40	0	1,069	0.00038	1.10E-05	1.41E-06	0.00	2.15E-05	6.03E-11	6.57E-05	66	2.20E-07	187
241-B-204	0.006	0.000083	2.12E-07	23.54	0	1,203	0.00035	1.05E-05	1.36E-06	0.00	1.76E-05	5.10E-11	6.83E-05	68	2.57E-07	171
241-BY-106	0.060	0.007449	3.23E-06	24.46	6	64,969	0.00064	3.18E-04	4.66E-04	0.20	4.10E-06	2.96E-10	1.77E-03	1769	3.59E-04	470
241-C-103	0.071	0.004182	1.27E-05	25.48	10	87,026	0.00550	1.94E-03	3.24E-03	0.27	1.28E-05	1.58E-09	3.16E-03	3159	8.59E-04	470
241-S-101	0.071	0.008203	3.07E-05	24.93	6	83,283	0.00662	2.94E-03	4.72E-03	0.26	1.07E-05	2.51E-09	5.82E-03	5817	1.51E-03	720
241-S-102	0.100	0.015269	2.39E-05	24.64	2	71,653	0.00384	5.47E-04	1.29E-03	0.22	4.35E-06	7.62E-10	4.31E-03	4312	9.66E-04	1450
241-S-103	0.083	0.006203	6.11E-06	24.32	15	107,212	0.00198	1.16E-03	2.28E-03	0.34	6.63E-06	8.95E-10	3.28E-03	3281	1.10E-03	921
241-S-106	0.014	0.001096	5.72E-07	24.08	9	83,417	0.00018	3.78E-04	1.27E-04	0.26	4.53E-06	6.38E-11	3.40E-04	340	8.85E-05	1549
241-S-111	0.088	0.005938	4.94E-06	24.30	5	68,177	0.00178	3.09E-04	6.49E-04	0.21	4.76E-06	4.00E-10	2.04E-03	2041	4.35E-04	1316
241-SX-101	0.008	0.003619	1.48E-07	25.53	40	113,228	0.00001	7.62E-04	1.51E-04	0.35	3.49E-06	5.22E-11	3.81E-04	381	1.35E-04	1206
241-SX-102	0.080	0.018726	1.99E-07	25.10	40	104,405	0.00002	9.91E-05	2.00E-04	0.33	3.23E-06	7.63E-11	5.94E-04	594	1.94E-04	1696
241-SX-103	0.106	0.034140	1.23E-06	24.93	53	88,363	0.00009	6.11E-04	1.61E-03	0.28	3.66E-06	7.30E-10	4.98E-03	4977	1.37E-03	1660
241-SX-104	0.047	0.007472	2.02E-07	24.75	30	110,688	0.00003	1.30E-04	1.50E-04	0.35	3.31E-06	5.48E-11	4.10E-04	410	1.42E-04	1360
241-SX-105	0.071	0.021446	1.07E-06	25.19	40	87,962	0.00009	6.11E-04	1.09E-03	0.27	3.71E-06	4.94E-10	3.36E-03	3358	9.23E-04	1789
241-SX-106	0.147	0.016198	7.22E-06	24.53	39	116,570	0.00160	1.93E-03	6.86E-03	0.36	6.80E-06	2.43E-09	8.75E-03	8752	3.19E-03	962
241-SX-108	0.076	0.017030	1.87E-07	26.76	455	161,486	0.00002	1.11E-03	2.28E-03	0.50	3.95E-06	5.27E-10	3.57E-03	3565	1.80E-03	1463
241-T-110	0.088	0.001651	4.51E-06	23.69	7	61,761	0.00570	3.83E-04	7.48E-04	0.19	1.10E-05	5.47E-10	1.18E-03	1181	2.28E-04	573
241-T-203	0.006	0.000110	2.12E-07	23.59	6	3,208	0.00027	2.28E-04	3.02E-05	0.01	9.27E-05	4.18E-10	1.06E-04	106	1.07E-06	36
241-U-102	0.044	0.002842	2.67E-05	24.36	2	63,365	0.01002	1.66E-03	1.37E-03	0.20	1.30E-05	1.15E-09	2.16E-03	2157	4.27E-04	432
241-U-103	0.082	0.007383	2.95E-05	24.45	2	50,932	0.00804	9.56E-04	1.73E-03	0.16	8.24E-06	1.54E-09	4.58E-03	4582	7.29E-04	838

Table C-3 Calculation of Mass Transport Product of h and A from Normal Ventilation Condition and Prediction for Off-Normal Condition (3 Sheets)

Tanks	Liquid NH_3 Cl (M/L)	Ammonia Partial P_{NH3} (atm)	Steady State NH_3 Co (M)	Molar Volume (L/mole)	Normal Vent Q (cfm)	Headspace Volume V (ft^3)	Equiv $(NH_3)ss$ in Liquid (mole/L)	Product hA from Normal Condition (cfm)	Normal Steady-State Release Rate (cfm)	Off-Normal Barometric Vent Q (cfm)	Off-normal const. k1 (min-1)	Off-normal const. k2 (mole/L-min)	Off-Normal $(NH_3)ss$ (atm)	(NH3)ss at off-Normal Vent (ppm)	Off-Normal Steady-State Release Rate (cfm)	Time t to reach steady state (day)
241-U-105	0.094	0.007642	7.91E-05	24.47	5	57,616	0.02379	5.64E-03	9.68E-03	0.18	3.26E-05	9.19E-09	6.91E-03	6909	1.24E-03	199
241-U-106	0.062	0.002931	3.86E-05	24.33	1	83,283	0.01977	1.20E-03	1.22E-03	0.26	1.05E-05	8.88E-10	2.06E-03	2058	5.36E-04	521
241-U-107	0.024	0.001428	1.85E-05	24.26	12	58,953	0.00743	1.34E-02	5.27E-03	0.18	9.45E-05	5.37E-09	1.38E-03	1380	2.54E-04	52
241-U-108	0.062	0.005764	2.81E-05	24.36	4	50,932	0.00732	1.87E-03	2.47E-03	0.16	1.27E-05	2.26E-09	4.34E-03	4345	6.92E-04	538
241-U-109	0.065	0.004469	2.06E-07	24.28	4	51,333	0.00007	1.37E-05	2.14E-05	0.16	3.22E-06	1.72E-11	1.30E-04	130	2.08E-05	1423

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APPENDIX D

CALCULATION RESULTS OF STEADY-STATE FLAMMABILITY EVALUATIONS IN TANK DOME SPACES FOR 177 HANFORD TANKS

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Table D-1. Steady-State Flammability Calculation Under Normal Ventilation Conditions for Current Waste. (8 sheets)

Tank	Ammonia headspace concentration $[NH_3]$ (%)	Methane headspace concentration $[CH_4]$ (%)	N_2O headspace concentration $[N_2O]$ (%)	Waste volume V_w (kgal)	Headspace volume V_h (ft^3)	Normal ventilation rate $(Vr)_{norm}$ (cfm)	Steady-state flammability at normal condition (% LFL)	Ammonia release rate $Rr(NH_3)$ (cfm)	N_2O release rate $Rr(N_2O)$ (cfm)	Model hydrogen release rate $Rr(H_2)$ (cfm)	Methane release rate $Rr(CH_4)$ (cfm)
241-AN-101	0.0011	0.0002	0.0011	968	58,742	113.0	0.13%	1.28E-03	1.20E-03	5.20E-03	1.92E-04
241-AN-102	0.0300	0.0003	0.0053	1,082	43,487	119.0	0.53%	3.57E-02	6.31E-03	1.56E-02	3.19E-04
241-AN-103	0.0007	0.0002	0.0007	968	58,671	100.0	0.10%	6.65E-04	6.50E-04	3.77E-03	2.05E-04
241-AN-104	0.0021	0.0002	0.0007	1,062	46,065	100.0	0.15%	2.10E-03	7.09E-04	5.13E-03	1.95E-04
241-AN-105	0.0015	0.0002	0.0013	1,136	36,283	100.0	0.10%	1.51E-03	1.28E-03	3.31E-03	2.20E-04
241-AN-106	0.0000	0.0000	0.0002	876	71,031	117.0	0.02%	0.00E+00	2.32E-04	1.06E-03	1.17E-05
241-AN-107	0.0400	0.0005	0.0053	1,111	39,532	129.0	0.51%	5.16E-02	6.84E-03	1.23E-02	6.29E-04
241-AP-101	0.0125	0.0003	0.0061	1,119	38,472	108.0	0.11%	1.35E-02	6.63E-03	9.59E-04	1.92E-04
241-AP-102	0.0075	0.0002	0.0048	1,108	40,026	135.0	0.09%	1.02E-02	6.50E-03	1.92E-03	3.29E-04
241-AP-103	0.0000	0.0000	0.0008	905	67,076	200.0	0.03%	0.00E+00	1.70E-03	2.18E-03	8.58E-05
241-AP-104	0.0003	0.00001	0.0002	1,110	39,708	71.0	0.08%	2.23E-04	1.43E-04	2.07E-03	7.23E-06
241-AP-105	0.0007	0.0001	0.0026	697	94,972	176.0	0.02%	1.29E-03	4.55E-03	8.05E-04	1.61E-04
241-AP-106	0.0005	0.00003	0.0005	1,146	34,871	111.0	0.05%	5.92E-04	5.53E-04	1.82E-03	2.80E-05
241-AP-107	0.0005	0.0001	0.0017	1,138	35,930	342.0	0.01%	1.71E-03	5.81E-03	1.20E-03	2.39E-04
241-AP-108	0.0027	0.0000	0.0017	832	76,928	129.0	0.12%	3.43E-03	2.20E-03	5.22E-03	1.11E-05
241-AW-101	0.0005	0.0002	0.0007	1,137	36,036	100.0	0.09%	5.15E-04	7.29E-04	3.22E-03	1.56E-04
241-AW-102	0.0003	0.0000	0.0002	130	170,753	292.0	0.00%	7.44E-04	4.76E-04	2.82E-04	2.41E-05
241-AW-103	0.0138	0.0004	0.0009	1,109	39,885	134.0	0.12%	1.85E-02	1.23E-03	1.07E-03	2.15E-04
241-AW-104	0.0006	0.0007	0.0009	1,084	43,240	141.0	0.10%	8.46E-04	1.30E-03	4.42E-03	8.84E-04
241-AW-105	0.0043	0.0002	0.0009	431	130,497	194.0	0.04%	8.30E-03	1.78E-03	3.09E-04	6.18E-05
241-AW-106	0.0028	0.0001	0.0018	911	66,263	158.0	0.07%	4.40E-03	2.81E-03	2.86E-03	1.42E-04
241-AY-101	0.0005	0.0001	0.0009	192	162,419	250.0	0.05%	1.25E-03	2.21E-03	4.95E-03	1.42E-04
241-AY-102	0.0004	0.0001	0.0010	864	72,584	250.0	0.40%	1.07E-03	2.50E-03	3.90E-02	3.61E-04
241-AZ-101	0.0001	0.0005	0.0010	943	62,061	150.0	0.42%	1.88E-04	1.50E-03	2.47E-02	7.79E-04

Table D-1. Steady-State Flammability Calculation Under Normal Ventilation Conditions for Current Waste. (8 sheets)

Tank	Ammonia headspace concentration [NH_3] (%)	Methane headspace concentration [CH_4] (%)	N_2O headspace concentration [N_2O] (%)	Waste volume V_w (kgal)	Headspace volume V_h (ft^3)	Normal ventilation rate $(Vr)_{norm}$ (cfm)	Steady-state flammability at normal condition (% LFL)	Ammonia release rate $Rr(NH_3)$ (cfm)	N_2O release rate $Rr(N_2O)$ (cfm)	Model hydrogen release rate $Rr(H_2)$ (cfm)	Methane release rate $Rr(CH_4)$ (cfm)
241-AZ-102	0.0006	0.0008	0.0010	993	55,281	112.0	0.55%	6.19E-04	1.12E-03	2.39E-02	8.58E-04
241-SY-101	0.0200	0.0001	0.0005	390	135,900	461.0	0.14%	9.22E-02	2.46E-03	6.29E-04	1.26E-04
241-SY-102	0.0012	0.0004	0.0005	976	57,577	363.0	0.03%	4.24E-03	1.95E-03	1.64E-03	3.28E-04
241-SY-103	0.0059	0.0003	0.0016	760	86,533	116.4	0.12%	6.92E-03	1.87E-03	3.52E-03	3.15E-04
241-A-101*	0.0394	0.0006	0.0134	418	120,241	10.0	0.97%	3.94E-03	1.34E-03	2.78E-03	5.51E-05
241-A-102	0.0254	0.0002	0.0224	50	169,386	7.6	0.44%	1.93E-03	1.71E-03	8.22E-04	1.31E-05
241-A-103*	0.0261	0.0004	0.0220	381	125,104	10.0	0.83%	2.61E-03	2.20E-03	2.60E-03	3.92E-05
241-A-104	0.0005	0.0003	0.0040	38	170,975	10.0	0.07%	5.00E-05	4.02E-04	2.32E-04	2.58E-05
241-A-105	na	na	na	na	na	na	na	na	na	na	na
241-A-106	0.0275	0.0012	0.0198	89	164,160	10.0	0.73%	2.75E-03	1.98E-03	2.08E-03	1.15E-04
241-AX-101	0.0041	0.0002	0.0006	367	129,213	28.3	0.12%	1.17E-03	1.81E-04	1.01E-03	5.95E-05
241-AX-102	0.0034	0.0001	0.0050	40	173,001	16.5	0.13%	5.55E-04	8.23E-04	6.70E-04	9.04E-06
241-AX-103	0.0041	0.0002	0.0024	116	162,760	24.7	0.13%	1.02E-03	5.85E-04	9.67E-04	4.94E-05
241-AX-104	0.0007	0.0001	0.0016	17	176,002	7.0	1.87%	5.18E-05	1.15E-04	5.20E-03	7.37E-06
241-B-101	0.0013	0.0004	0.0086	119	97,777	7.8	0.15%	9.81E-05	6.72E-04	4.16E-04	3.40E-05
241-B-102	0.0005	0.0001	0.0063	42	108,018	7.0	0.09%	3.28E-05	4.40E-04	2.31E-04	9.64E-06
241-B-103	0.0008	0.0003	0.0061	66	104,839	7.0	0.09%	5.82E-05	4.26E-04	2.33E-04	1.78E-05
241-B-104	0.0005	0.0049	0.0076	384	62,253	7.0	0.23%	3.50E-05	5.31E-04	3.52E-04	7.04E-05
241-B-105	0.0012	0.0005	0.0092	300	73,517	7.0	0.13%	8.40E-05	6.45E-04	3.15E-04	3.27E-05
241-B-106	0.0005	0.0015	0.0240	133	95,905	7.0	0.14%	3.50E-05	1.68E-03	2.96E-04	5.93E-05
241-B-107	0.0021	0.0007	0.0017	171	90,714	7.0	0.13%	1.47E-04	1.19E-04	2.74E-04	4.95E-05
241-B-108	0.0034	0.0004	0.0087	102	99,966	7.0	0.12%	2.40E-04	6.08E-04	2.46E-04	3.00E-05
241-B-109	0.0042	0.0006	0.0117	135	95,588	7.0	0.13%	2.92E-04	8.21E-04	2.56E-04	4.05E-05
241-B-110	0.0050	0.0032	0.0050	255	79,485	7.0	0.29%	3.50E-04	3.49E-04	5.33E-04	1.07E-04

Table D-1. Steady-State Flammability Calculation Under Normal Ventilation Conditions for Current Waste. (8 sheets)

Tank	Ammonia headspace concentration [NH_3] (%)	Methane headspace concentration [CH_4] (%)	N_2O headspace concentration [N_2O] (%)	Waste volume V_w (kgal)	Headspace volume V_h (ft^3)	Normal ventilation rate $(Vr)_{norm}$ (cfm)	Steady-state flammability at normal condition (% LFL)	Ammonia release rate $Rr(NH_3)$ (cfm)	N_2O release rate $Rr(N_2O)$ (cfm)	Model hydrogen release rate $Rr(H_2)$ (cfm)	Methane release rate $Rr(CH_4)$ (cfm)
241-B-111	0.0025	0.0058	0.0090	251	80,015	3.5	0.68%	8.79E-05	3.15E-04	7.66E-04	1.53E-04
241-B-112	0.0031	0.0004	0.0068	45	107,629	7.0	0.12%	2.14E-04	4.74E-04	2.50E-04	3.04E-05
241-B-201	0.0005	0.0004	0.0006	31	3,746	7.0	0.03%	3.50E-05	4.16E-05	6.02E-05	1.20E-05
241-B-202	0.0003	0.0003	0.0017	30	3,887	7.2	0.03%	1.92E-05	1.23E-04	5.73E-05	1.15E-05
241-B-203	0.0005	0.0007	0.0105	53	921	0.3	1.80%	1.41E-06	2.95E-05	2.01E-04	1.89E-06
241-B-204	0.0005	0.0007	0.0103	52	1,027	0.3	1.91%	1.36E-06	2.79E-05	2.06E-04	1.79E-06
241-BX-101	0.0050	0.0006	0.0088	58	105,800	7.0	0.13%	3.50E-04	6.17E-04	2.44E-04	3.96E-05
241-BX-102	0.0003	0.0013	0.0017	89	101,634	7.0	0.11%	1.79E-05	1.19E-04	2.43E-04	4.86E-05
241-BX-103	0.0090	0.0009	0.0079	84	102,199	7.0	0.19%	6.27E-04	5.52E-04	3.24E-04	6.49E-05
241-BX-104	0.0212	0.0010	0.0130	110	98,738	8.7	0.27%	1.85E-03	1.14E-03	3.64E-04	7.28E-05
241-BX-105	0.0145	0.0006	0.0116	82	102,552	8.5	0.19%	1.23E-03	9.76E-04	2.75E-04	4.70E-05
241-BX-106	0.0047	0.0005	0.0043	48	107,142	7.0	0.15%	3.26E-04	3.02E-04	2.94E-04	3.50E-05
241-BX-107	0.0082	0.0004	0.0012	357	65,791	7.0	0.21%	5.74E-04	8.34E-05	3.99E-04	2.75E-05
241-BX-108	0.0024	0.0003	0.0053	41	107,955	7.0	0.11%	1.68E-04	3.73E-04	2.52E-04	2.40E-05
241-BX-109	0.0020	0.0025	0.0396	203	86,379	7.0	0.25%	1.40E-04	2.77E-03	5.07E-04	1.01E-04
241-BX-110	0.0063	0.0008	0.0017	215	84,754	7.0	0.19%	4.40E-04	1.19E-04	3.65E-04	5.57E-05
241-BX-111	0.0062	0.0002	0.0017	198	86,979	7.0	0.15%	4.35E-04	1.19E-04	2.82E-04	1.15E-05
241-BX-112	0.0122	0.0022	0.0339	174	90,192	7.0	0.24%	8.51E-04	2.37E-03	3.30E-04	6.60E-05
241-BY-101	0.0059	0.0010	0.0056	380	89,455	7.0	0.33%	4.15E-04	3.91E-04	7.73E-04	6.80E-05
241-BY-102	0.0173	0.0004	0.0017	288.4	101,673	7.0	0.25%	1.21E-03	1.22E-04	3.43E-04	2.75E-05
241-BY-103	0.0029	0.0002	0.0017	426	83,275	14.4	0.10%	4.12E-04	2.43E-04	4.24E-04	2.75E-05
241-BY-104	0.0259	0.0007	0.0250	368	91,009	7.6	0.40%	1.98E-03	1.92E-03	6.49E-04	5.41E-05
241-BY-105	0.0083	0.0004	0.0076	491	74,588	15.9	0.16%	1.32E-03	1.21E-03	5.79E-04	6.93E-05
241-BY-106	0.0079	0.0005	0.0132	472	77,096	5.9	0.38%	4.64E-04	7.75E-04	7.58E-04	2.89E-05

Table D-1. Steady-State Flammability Calculation Under Normal Ventilation Conditions for Current Waste. (8 sheets)

Tank	Ammonia headspace concentration $[NH_3]$ (%)	Methane headspace concentration $[CH_4]$ (%)	N_2O headspace concentration $[N_2O]$ (%)	Waste volume V_w (kgal)	Headspace volume V_h (ft^3)	Normal ventilation rate $(Vr)_{norm}$ (cfm)	Steady-state flammability at normal condition (% LFL)	Ammonia release rate $Rr(NH_3)$ (cfm)	N_2O release rate $Rr(N_2O)$ (cfm)	Model hydrogen release rate $Rr(H_2)$ (cfm)	Methane release rate $Rr(CH_4)$ (cfm)
241-BY-107	0.0962	0.0010	0.0704	282	102,591	5.2	0.88%	5.03E-03	3.68E-03	4.62E-04	5.20E-05
241-BY-108	0.0870	0.0008	0.0553	232	109,195	6.8	0.76%	5.88E-03	3.74E-03	4.37E-04	5.16E-05
241-BY-109	0.0045	0.0002	0.0011	296.9	100,543	14.7	0.09%	6.57E-04	1.57E-04	3.38E-04	3.11E-05
241-BY-110	0.0397	0.0003	0.0102	376	90,020	13.3	0.51%	5.30E-03	1.37E-03	1.29E-03	4.36E-05
241-BY-111	0.0059	0.0003	0.0082	311	98,672	6.0	0.19%	3.51E-04	4.93E-04	3.39E-04	1.65E-05
241-BY-112	0.0063	0.0001	0.0039	296	100,649	13.6	0.11%	8.55E-04	5.34E-04	3.38E-04	1.72E-05
241-C-101	0.0098	0.0012	0.0636	98	100,531	3.6	0.32%	3.52E-04	2.29E-03	3.33E-04	4.30E-05
241-C-102	0.0187	0.0008	0.0141	326	70,057	11.8	0.24%	2.20E-03	1.66E-03	4.77E-04	9.54E-05
241-C-103*	0.0324	0.0016	0.0737	82	102,650	10.0	2.63%	3.24E-03	7.37E-03	9.54E-03	1.58E-04
241-C-104	0.0044	0.0004	0.0063	269	77,684	67.1	0.10%	2.96E-03	4.24E-03	1.65E-03	2.72E-04
241-C-105	0.0002	0.0000	0.0005	142	94,634	535.0	0.01%	1.29E-03	2.81E-03	9.20E-04	1.24E-04
241-C-106	0.0002	0.0001	0.0004	13	111,920	176.1	0.02%	4.38E-04	6.49E-04	9.92E-04	9.86E-05
241-C-107	0.0066	0.0010	0.0096	257	79,273	1.1	7.00%	7.24E-05	1.05E-04	3.05E-03	1.08E-05
241-C-108	0.0003	0.0000	0.0178	76	103,462	7.0	0.12%	1.84E-05	1.25E-03	3.39E-04	2.17E-06
241-C-109	0.0010	0.0001	0.0365	73	103,815	13.0	0.16%	1.30E-04	4.76E-03	7.95E-04	1.19E-05
241-C-110	0.0123	0.0031	0.0014	188	88,490	7.9	0.37%	9.69E-04	1.08E-04	7.15E-04	1.43E-04
241-C-111	0.0004	0.0001	0.0053	67	104,628	7.0	0.56%	2.74E-05	3.73E-04	1.55E-03	3.54E-06
241-C-112	0.0023	0.0001	0.0538	114	98,413	11.2	0.39%	2.52E-04	6.02E-03	1.68E-03	1.12E-05
241-C-201	0.0001	0.0000	0.0007	2	7,729	3.9	0.01%	4.02E-06	2.87E-05	1.98E-05	1.84E-06
241-C-202	0.0001	0.0000	0.0004	2	7,740	3.6	0.02%	2.48E-06	1.44E-05	2.02E-05	9.22E-07
241-C-203	0.0005	0.0001	0.0010	3	7,595	7.0	0.01%	3.23E-05	7.18E-05	1.89E-05	3.79E-06
241-C-204	0.0001	0.0001	0.0014	3	7,581	3.0	0.02%	2.18E-06	4.31E-05	1.84E-05	2.76E-06
241-S-101*	0.0765	0.0007	0.0197	361	92,167	6.2	0.95%	4.72E-03	1.21E-03	1.05E-03	4.36E-05
241-S-102*	0.0588	0.0008	0.0394	447	80,549	2.2	1.26%	1.29E-03	8.68E-04	7.46E-04	1.83E-05

Table D-1. Steady-State Flammability Calculation Under Normal Ventilation Conditions for Current Waste. (8 sheets)

Tank	Ammonia headspace concentration $[NH_3]$ (%)	Methane headspace concentration $[CH_4]$ (%)	N_2O headspace concentration $[N_2O]$ (%)	Waste volume V_w (kgal)	Headspace volume V_h (ft^3)	Normal ventilation rate $(Vr)_{norm}$ (cfm)	Steady-state flammability at normal condition (% LFL)	Ammonia release rate $Rr(NH_3)$ (cfm)	N_2O release rate $Rr(N_2O)$ (cfm)	Model hydrogen release rate $Rr(H_2)$ (cfm)	Methane release rate $Rr(CH_4)$ (cfm)
241-S-103	0.0149	0.0005	0.0135	247	107,386	15.3	0.19%	2.28E-03	2.06E-03	5.00E-04	6.96E-05
241-S-104	0.0025	0.0047	0.0073	298	100,536	5.6	0.38%	1.40E-04	4.10E-04	6.10E-04	1.22E-04
241-S-105	0.0036	0.0002	0.0008	416	84,786	16.7	0.08%	6.00E-04	1.25E-04	3.67E-04	3.84E-05
241-S-106	0.0014	0.0016	0.0006	465	78,183	9.2	0.18%	1.27E-04	5.11E-05	5.21E-04	1.04E-04
241-S-107	0.0181	0.0010	0.0184	368	91,142	4.4	0.55%	7.93E-04	8.08E-04	7.23E-04	4.45E-05
241-S-108	0.0025	0.0001	0.0003	560	65,506	7.0	0.17%	1.77E-04	2.08E-05	4.27E-04	7.66E-06
241-S-109	0.0025	0.0196	0.0021	543	67,801	7.0	0.56%	1.74E-04	1.48E-04	4.25E-04	8.51E-05
241-S-110	0.0146	0.0005	0.0039	399	87,011	10.4	0.25%	1.52E-03	4.07E-04	5.75E-04	5.19E-05
241-S-111	0.0120	0.0003	0.0021	421	84,045	5.4	0.39%	6.49E-04	1.14E-04	6.53E-04	1.50E-05
241-S-112	0.0088	0.0003	0.0006	126	123,524	4.0	0.26%	3.52E-04	2.53E-05	3.17E-04	1.05E-05
241-SX-101	0.0004	0.0002	0.0007	428	116,110	40.0	0.09%	1.51E-04	2.74E-04	1.37E-03	6.57E-05
241-SX-102	0.0000	0.0002	0.0006	418	117,522	40.0	0.14%	0.00E+00	2.40E-04	2.15E-03	8.00E-05
241-SX-103*	0.0031	0.0005	0.0010	519	104,033	52.5	0.40%	1.61E-03	5.41E-04	7.69E-03	2.38E-04
241-SX-104	0.0005	0.0002	0.0007	456	112,437	30.0	0.19%	1.50E-04	2.00E-04	2.19E-03	6.53E-05
241-SX-105	0.0027	0.0002	0.0008	386	121,831	40.5	0.37%	1.09E-03	3.38E-04	5.66E-03	7.38E-05
241-SX-106	0.0177	0.0003	0.0023	407	119,041	38.8	0.17%	6.86E-03	9.10E-04	7.82E-04	1.07E-04
241-SX-107	0.0002	0.0000	0.0004	104	159,474	387.0	0.01%	6.73E-04	1.49E-03	1.06E-03	9.58E-05
241-SX-108	0.0001	0.0000	0.0003	84	162,157	455.0	0.01%	5.63E-04	1.25E-03	1.61E-03	8.02E-05
241-SX-109	0.0017	0.0001	0.0009	251	139,805	30.0	0.18%	5.05E-04	2.72E-04	1.94E-03	3.75E-05
241-SX-110	0.0001	0.0000	0.0003	66	164,559	293.0	0.01%	4.01E-04	8.90E-04	7.43E-04	5.71E-05
241-SX-111	0.0003	0.0000	0.0007	125	156,649	264.0	0.02%	7.89E-04	1.75E-03	1.81E-03	1.12E-04
241-SX-112	0.0003	0.0000	0.0007	85	162,052	225.0	0.01%	6.99E-04	1.55E-03	5.47E-04	9.95E-05
241-SX-113	0.0029	0.0004	0.0064	29	169,502	7.0	0.11%	2.01E-04	4.45E-04	2.45E-04	2.86E-05
241-SX-114	0.0004	0.0001	0.0008	165	151,281	325.0	0.02%	1.17E-03	2.60E-03	1.63E-03	1.67E-04

Table D-1. Steady-State Flammability Calculation Under Normal Ventilation Conditions for Current Waste. (8 sheets)

Tank	Ammonia headspace concentration [NH_3] (%)	Methane headspace concentration [CH_4] (%)	N_2O headspace concentration [N_2O] (%)	Waste volume V_w (kgal)	Headspace volume V_h (ft^3)	Normal ventilation rate $(Vr)_{norm}$ (cfm)	Steady-state flammability at normal condition (% LFL)	Ammonia release rate $Rr(NH_3)$ (cfm)	N_2O release rate $Rr(N_2O)$ (cfm)	Model hydrogen release rate $Rr(H_2)$ (cfm)	Methane release rate $Rr(CH_4)$ (cfm)
241-SX-115	0.0003	0.0002	0.0025	14	171,551	7.0	0.63%	1.75E-05	1.72E-04	1.75E-03	1.11E-05
241-T-101	0.0022	0.0004	0.0050	109	99,013	7.0	0.13%	1.52E-04	3.47E-04	2.91E-04	2.76E-05
241-T-102	0.0005	0.0004	0.0066	42	108,053	7.0	0.10%	3.50E-05	4.59E-04	2.42E-04	2.95E-05
241-T-103	0.0005	0.0004	0.0055	37	108,689	7.0	0.09%	3.50E-05	3.88E-04	2.26E-04	2.49E-05
241-T-104	0.0104	0.0004	0.0008	327	69,951	7.0	0.20%	7.30E-04	5.26E-05	3.49E-04	2.75E-05
241-T-105	0.0094	0.0013	0.0201	108	99,189	7.0	0.20%	6.60E-04	1.41E-03	3.15E-04	6.31E-05
241-T-106	0.0100	0.0003	0.0043	32	109,395	7.0	0.15%	7.00E-04	3.01E-04	2.24E-04	1.94E-05
241-T-107	0.0123	0.0023	0.0041	183	89,161	6.4	0.30%	7.85E-04	2.62E-04	4.26E-04	8.53E-05
241-T-108	0.0020	0.0002	0.0041	26	110,172	7.0	0.10%	1.40E-04	2.85E-04	2.19E-04	1.40E-05
241-T-109	0.0005	0.0002	0.0049	72	103,992	7.0	0.09%	3.50E-05	3.45E-04	2.34E-04	1.75E-05
241-T-110	0.0107	0.0002	0.0015	380	62,853	7.0	0.38%	7.48E-04	1.02E-04	8.55E-04	1.70E-05
241-T-111	0.0223	0.0058	0.0013	457	52,577	6.0	0.44%	1.35E-03	7.64E-05	4.17E-04	8.35E-05
241-T-112	0.0029	0.0009	0.0137	77	103,392	7.0	0.12%	2.01E-04	9.62E-04	2.40E-04	4.80E-05
241-T-201	0.0001	0.0004	0.0059	32	3,605	7.0	0.06%	7.00E-06	4.16E-04	1.45E-04	2.67E-05
241-T-202	0.0002	0.0003	0.0043	22	4,947	7.0	0.02%	1.60E-05	3.01E-04	4.49E-05	8.98E-06
241-T-203	0.0000	0.0085	0.1318	38	2,863	0.4	0.60%	0.00E+00	5.02E-04	6.62E-05	1.32E-05
241-T-204	0.0001	0.0005	0.0078	39	2,757	7.0	0.03%	8.75E-06	5.45E-04	6.73E-05	1.35E-05
241-TX-101	0.0014	0.0011	0.0050	101	126,745	7.0	0.17%	9.65E-05	3.47E-04	3.81E-04	7.63E-05
241-TX-102	0.0168	0.0002	0.0054	227	109,901	11.5	0.19%	1.93E-03	6.28E-04	3.34E-04	2.24E-05
241-TX-103	0.0107	0.0003	0.0086	155	119,541	7.0	0.18%	7.49E-04	6.05E-04	2.92E-04	2.20E-05
241-TX-104	0.0028	0.0006	0.0050	79	129,641	3.5	0.25%	9.83E-05	1.73E-04	3.04E-04	2.07E-05
241-TX-105	0.0020	0.0001	0.0013	586	61,876	14.4	0.10%	2.83E-04	1.82E-04	4.79E-04	1.98E-05
241-TX-106	0.0252	0.0007	0.0050	358	92,351	7.0	0.33%	1.77E-03	3.47E-04	4.14E-04	4.69E-05
241-TX-107	0.0204	0.0002	0.0031	40	134,938	7.0	0.23%	1.43E-03	2.14E-04	2.47E-04	1.08E-05

Table D-1. Steady-State Flammability Calculation Under Normal Ventilation Conditions for Current Waste. (8 sheets)

Tank	Ammonia headspace concentration $[NH_3]$ (%)	Methane headspace concentration $[CH_4]$ (%)	N_2O headspace concentration $[N_2O]$ (%)	Waste volume V_w (kgal)	Headspace volume V_h (ft^3)	Normal ventilation rate $(Vr)_{norm}$ (cfm)	Steady-state flammability at normal condition (% LFL)	Ammonia release rate $Rr(NH_3)$ (cfm)	N_2O release rate $Rr(N_2O)$ (cfm)	Model hydrogen release rate $Rr(H_2)$ (cfm)	Methane release rate $Rr(CH_4)$ (cfm)
241-TX-108	0.0025	0.0001	0.0022	136	122,013	9.0	0.09%	2.21E-04	1.99E-04	2.70E-04	1.01E-05
241-TX-109	0.0400	0.0043	0.0668	373	90,338	7.0	0.55%	2.80E-03	4.68E-03	5.46E-04	1.09E-04
241-TX-110	0.0974	0.0003	0.0129	477	76,425	7.0	0.80%	6.82E-03	9.01E-04	4.11E-04	2.12E-05
241-TX-111	0.0605	0.0002	0.0175	375	90,126	9.7	0.50%	5.88E-03	1.70E-03	3.67E-04	1.87E-05
241-TX-112	0.0112	0.0007	0.0050	643	54,213	7.0	0.25%	7.84E-04	3.47E-04	4.64E-04	4.57E-05
241-TX-113	0.0021	0.0004	0.0050	648	53,578	9.3	0.14%	1.99E-04	4.61E-04	4.43E-04	3.46E-05
241-TX-114	0.0160	0.0002	0.0040	541	67,844	12.0	0.20%	1.93E-03	4.79E-04	4.05E-04	2.43E-05
241-TX-115	0.0014	0.0002	0.0046	563	64,983	10.0	0.12%	1.38E-04	4.58E-04	4.29E-04	2.32E-05
241-TX-116	0.0014	0.0012	0.0050	608	58,945	3.1	0.37%	4.34E-05	1.55E-04	4.21E-04	3.69E-05
241-TX-117	0.0014	0.0003	0.0050	490	74,730	6.5	0.16%	8.97E-05	3.22E-04	3.80E-04	1.87E-05
241-TX-118	0.0036	0.0022	0.0018	257	105,875	10.0	0.18%	3.57E-04	1.80E-04	4.59E-04	9.18E-05
241-TY-101	0.0016	0.0003	0.0097	128	123,242	3.2	0.21%	5.23E-05	3.15E-04	2.55E-04	8.38E-06
241-TY-102	0.0004	0.0003	0.0066	79	129,774	7.0	0.10%	2.84E-05	4.65E-04	2.44E-04	1.93E-05
241-TY-103	0.0045	0.0015	0.0198	165	118,368	8.2	0.17%	3.73E-04	1.63E-03	3.70E-04	7.39E-05
241-TY-104	0.0059	0.0003	0.0097	54	133,094	13.4	0.10%	7.87E-04	1.30E-03	2.75E-04	4.24E-05
241-TY-105	0.0003	0.0023	0.0051	241	108,163	7.0	0.23%	1.75E-05	3.54E-04	5.05E-04	1.01E-04
241-TY-106	0.0019	0.0003	0.0043	26	136,837	7.0	0.11%	1.36E-04	3.01E-04	2.50E-04	1.94E-05
241-U-101	0.0100	0.0003	0.0051	33	109,218	7.0	0.19%	7.00E-04	3.59E-04	3.20E-04	2.30E-05
241-U-102*	0.0651	0.0012	0.0805	337	68,574	2.1	1.54%	1.37E-03	1.69E-03	9.09E-04	2.47E-05
241-U-103*	0.0722	0.0014	0.0761	427	56,567	2.4	1.61%	1.73E-03	1.83E-03	1.06E-03	3.37E-05
241-U-104	0.0001	0.0006	0.0085	132	95,976	7.0	0.18%	4.88E-06	5.96E-04	4.80E-04	3.89E-05
241-U-105*	0.1936	0.0039	0.1324	363	65,113	5.0	1.84%	9.68E-03	6.62E-03	9.50E-04	1.90E-04
241-U-106	0.0940	0.0052	0.0554	180	89,549	1.3	2.36%	1.22E-03	7.20E-04	8.46E-04	6.81E-05
241-U-107*	0.0448	0.0010	0.0445	304	72,988	11.8	0.43%	5.27E-03	5.23E-03	5.19E-04	1.04E-04

Table D-1. Steady-State Flammability Calculation Under Normal Ventilation Conditions for Current Waste. (8 sheets)

Tank	Ammonia headspace concentration [NH_3] (%)	Methane headspace concentration [CH_4] (%)	N_2O headspace concentration [N_2O] (%)	Waste volume V_w (kgal)	Headspace volume V_h (ft^3)	Normal ventilation rate $(Vr)_{norm}$ (cfm)	Steady-state flammability at normal condition (% LFL)	Ammonia release rate $Rr(NH_3)$ (cfm)	N_2O release rate $Rr(N_2O)$ (cfm)	Model hydrogen release rate $Rr(H_2)$ (cfm)	Methane release rate $Rr(CH_4)$ (cfm)
241-U-108*	0.0684	0.0011	0.0485	363	65,113	3.6	1.03%	2.47E-03	1.75E-03	8.02E-04	3.94E-05
241-U-109	0.0005	0.0010	0.0499	411	58,686	4.3	0.36%	2.14E-05	2.14E-03	5.78E-04	4.45E-05
241-U-110	0.0225	0.0091	0.1418	186	88,808	1.9	1.00%	4.24E-04	2.67E-03	5.01E-04	1.00E-04
241-U-111	0.0669	0.0012	0.0324	232	82,628	1.9	1.11%	1.27E-03	6.15E-04	4.83E-04	2.27E-05
241-U-112	0.0301	0.0035	0.0203	55	106,217	1.3	0.87%	3.85E-04	2.60E-04	3.04E-04	4.52E-05
241-U-201	0.0005	0.0001	0.0010	5	7,277	7.0	0.01%	3.23E-05	7.18E-05	2.14E-05	4.27E-06
241-U-202	0.0005	0.0001	0.0010	5	7,312	7.0	0.01%	3.23E-05	7.18E-05	2.09E-05	4.18E-06
241-U-203	0.0001	0.0001	0.0021	4	7,348	2.1	0.03%	1.77E-06	4.31E-05	2.06E-05	2.76E-06
241-U-204	0.0000	0.0000	0.0004	4	7,418	10.2	0.01%	1.35E-06	4.31E-05	2.38E-05	2.76E-06

Note: For all DSTs and SSTs with "*", the ammonia was analyzed with equilibrium model.

Table D-2. Steady-State Flammability Calculations With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Off-normal ventilation rate $(Vr)_{bb}$ (cfm)	Steady-state hydrogen concentration $[H_2]$ (%)	Steady-state ammonia concentration $[NH_3]$ (%)	Steady-state methane concentration $[CH_4]$ (%)	Steady-state N_2O concentration $[N_2O]$ (%)	Steady-state hydrogen flammability (% LFL)	Steady-state ammonia flammability (% LFL)	Steady-state methane flammability (% LFL)	Steady-state total flammability (% LFL)
241-AN-101	0.18	2.83	0.01	0.10	0.66	71	0.04	2.09	72.9
241-AN-102	0.14	11.47	0.09	0.23	4.64	286.83	0.58	4.70	292.1
241-AN-103	0.18	2.05	0.20	0.11	0.35	51.35	1.36	2.23	54.9
241-AN-104	0.14	3.56	0.20	0.14	0.49	89.05	1.34	2.71	93.1
241-AN-105	0.11	2.92	0.15	0.19	1.13	73.02	1.02	3.88	77.9
241-AN-106	0.22	0.48	0.01	0.01	0.10	11.99	0.08	0.11	12.2
241-AN-107	0.12	9.93	0.08	0.51	5.53	248.22	0.51	10.18	258.9
241-AP-101	0.12	0.80	0.08	0.16	5.52	19.94	0.55	3.19	23.7
241-AP-102	0.13	1.54	0.07	0.26	5.20	38.41	0.49	5.26	44.2
241-AP-103	0.21	1.04	0.02	0.04	0.81	26.00	0.17	0.82	27.0
241-AP-104	0.12	1.67	0.01	0.01	0.12	41.65	0.09	0.12	41.9
241-AP-105	0.30	0.27	0.08	0.05	1.53	6.78	0.53	1.08	8.4
241-AP-106	0.11	1.67	0.01	0.03	0.51	41.78	0.07	0.51	42.4
241-AP-107	0.11	1.07	0.09	0.21	5.17	26.65	0.61	4.26	31.5
241-AP-108	0.24	2.17	0.09	0.00	0.91	54.29	0.57	0.09	54.9
241-AW-101	0.11	2.86	0.01	0.14	0.65	71.43	0.06	2.76	74.2
241-AW-102	0.53	0.05	0.01	0.00	0.09	1.32	0.05	0.09	1.5
241-AW-103	0.12	0.86	0.04	0.17	0.99	21.52	0.29	3.44	25.2
241-AW-104	0.14	3.27	0.01	0.65	0.96	81.73	0.09	13.08	94.9
241-AW-105	0.41	0.08	0.06	0.02	0.44	1.90	0.42	0.30	2.6
241-AW-106	0.21	1.38	0.12	0.07	1.36	34.51	0.78	1.38	36.7
241-AY-101	0.51	0.97	0.03	0.03	0.44	24.37	0.19	0.56	25.1
241-AY-102	0.23	17.19	0.02	0.16	1.10	430	0.14	3.18	433.2
241-AZ-101	0.19	12.73	0.03	0.40	0.77	318.35	0.22	8.03	326.6

Table D-2. Steady-State Flammability Calculations With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Off-normal ventilation rate $(Vr)_{bb}$ (cfm)	Steady-state hydrogen concentration $[H_2]$ (%)	Steady-state ammonia concentration $[NH_3]$ (%)	Steady-state methane concentration $[CH_4]$ (%)	Steady-state N_2O concentration $[N_2O]$ (%)	Steady-state hydrogen flammability (% LFL)	Steady-state ammonia flammability (% LFL)	Steady-state methane flammability (% LFL)	Steady-state total flammability (% LFL)
241-AZ-102	0.17	13.85	0.12	0.50	0.65	346.20	0.80	9.93	356.9
241-SY-101	0.42	0.15	0.39	0.03	0.58	3.70	2.58	0.59	6.9
241-SY-102	0.18	0.91	0.18	0.18	1.08	22.81	1.18	3.65	27.6
241-SY-103	0.27	1.30	0.56	0.12	0.69	32.51	3.72	2.33	38.6
241-A-101*	0.38	0.74	0.83	0.01	0.36	18.52	5.50	0.29	24.3
241-A-102	0.53	0.16	0.36	0.00	0.32	3.88	2.43	0.05	6.4
241-A-103*	0.39	0.66	0.29	0.01	0.56	16.62	1.95	0.20	18.8
241-A-104	0.53	0.04	0.01	0.00	0.08	1.09	0.06	0.10	1.2
241-A-105	na	na	na	na	na	na	na	na	na
241-A-106	0.51	0.40	0.54	0.02	0.39	10.11	3.57	0.45	14.1
241-AX-101*	0.40	0.25	0.14	0.01	0.04	6.27	0.94	0.29	7.5
241-AX-102	0.54	0.12	0.10	0.00	0.15	3.10	0.68	0.03	3.8
241-AX-103	0.51	0.19	0.20	0.01	0.11	4.75	1.33	0.19	6.3
241-AX-104	0.55	0.95	0.01	0.00	0.02	23.65	0.06	0.03	23.7
241-B-101	0.31	0.14	0.03	0.01	0.22	3.40	0.21	0.22	3.8
241-B-102	0.34	0.07	0.01	0.00	0.13	1.71	0.06	0.06	1.8
241-B-103	0.33	0.07	0.02	0.01	0.13	1.78	0.12	0.11	2.0
241-B-104	0.19	0.18	0.02	0.04	0.27	4.53	0.12	0.72	5.4
241-B-105	0.23	0.14	0.04	0.01	0.28	3.43	0.24	0.28	4.0
241-B-106	0.30	0.10	0.01	0.02	0.56	2.47	0.08	0.40	2.9
241-B-107	0.28	0.10	0.05	0.02	0.04	2.42	0.35	0.35	3.1
241-B-108	0.31	0.08	0.08	0.01	0.19	1.97	0.51	0.19	2.7
241-B-109	0.30	0.09	0.10	0.01	0.27	2.14	0.65	0.27	3.1
241-B-110	0.25	0.21	0.14	0.04	0.14	5.37	0.94	0.86	7.2

Table D-2. Steady-State Flammability Calculations With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Off-normal ventilation rate $(Vr)_{bb}$ (cfm)	Steady-state hydrogen concentration $[H_2]$ (%)	Steady-state ammonia concentration $[NH_3]$ (%)	Steady-state methane concentration $[CH_4]$ (%)	Steady-state N_2O concentration $[N_2O]$ (%)	Steady-state hydrogen flammability (% LFL)	Steady-state ammonia flammability (% LFL)	Steady-state methane flammability (% LFL)	Steady-state total flammability (% LFL)
241-B-111	0.25	0.31	0.04	0.06	0.13	7.66	0.23	1.22	9.1
241-B-112	0.34	0.07	0.06	0.01	0.14	1.86	0.42	0.18	2.5
241-B-201	0.01	0.51	0.30	0.10	0.36	12.86	1.99	2.06	16.9
241-B-202	0.01	0.47	0.16	0.09	1.01	11.78	1.05	1.89	14.7
241-B-203*	0.003	6.98	0.01	0.07	1.03	174.38	0.04	1.32	175.7
241-B-204*	0.003	6.42	0.01	0.06	0.87	160.52	0.05	1.11	161.7
241-BX-101	0.33	0.07	0.11	0.01	0.19	1.84	0.71	0.24	2.8
241-BX-102	0.32	0.08	0.01	0.02	0.04	1.91	0.04	0.31	2.3
241-BX-103	0.32	0.10	0.20	0.02	0.17	2.54	1.31	0.41	4.3
241-BX-104	0.31	0.12	0.60	0.02	0.37	2.95	3.99	0.47	7.4
241-BX-105	0.32	0.09	0.38	0.01	0.30	2.14	2.55	0.29	5.0
241-BX-106	0.33	0.09	0.10	0.01	0.09	2.20	0.65	0.21	3.1
241-BX-107	0.21	0.19	0.28	0.01	0.04	4.85	1.86	0.27	7.0
241-BX-108	0.34	0.07	0.05	0.01	0.11	1.87	0.33	0.14	2.3
241-BX-109	0.27	0.19	0.05	0.04	1.03	4.70	0.35	0.75	5.8
241-BX-110	0.26	0.14	0.17	0.02	0.05	3.45	1.11	0.42	5.0
241-BX-111	0.27	0.10	0.16	0.00	0.04	2.60	1.07	0.08	3.8
241-BX-112	0.28	0.12	0.30	0.02	0.84	2.93	2.01	0.47	5.4
241-BY-101	0.28	0.28	0.15	0.02	0.14	6.91	0.99	0.49	8.4
241-BY-102	0.32	0.11	0.38	0.01	0.04	2.70	2.54	0.17	5.4
241-BY-103	0.26	0.16	0.16	0.01	0.09	4.08	1.06	0.21	5.3
241-BY-104	0.28	0.23	0.70	0.02	0.67	5.71	4.63	0.38	10.7
241-BY-105	0.23	0.25	0.57	0.03	0.52	6.21	3.78	0.59	10.6
241-BY-106*	0.24	0.31	0.18	0.01	0.32	7.87	1.18	0.24	9.3

Table D-2. Steady-State Flammability Calculations With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Off-normal ventilation rate $(Vr)_{bb}$ (cfm)	Steady-state hydrogen concentration $[H_2]$ (%)	Steady-state ammonia concentration $[NH_3]$ (%)	Steady-state methane concentration $[CH_4]$ (%)	Steady-state N_2O concentration $[N_2O]$ (%)	Steady-state hydrogen flammability (% LFL)	Steady-state ammonia flammability (% LFL)	Steady-state methane flammability (% LFL)	Steady-state total flammability (% LFL)
241-BY-107	0.32	0.14	1.00	0.02	1.15	3.60	6.67	0.32	10.6
241-BY-108	0.34	0.13	1.00	0.02	1.10	3.20	6.67	0.30	10.2
241-BY-109	0.31	0.11	0.21	0.01	0.05	2.69	1.39	0.20	4.3
241-BY-110	0.28	0.46	1.00	0.02	0.49	11.47	6.67	0.31	18.5
241-BY-111	0.31	0.11	0.11	0.01	0.16	2.75	0.76	0.11	3.6
241-BY-112	0.31	0.11	0.27	0.01	0.17	2.69	1.81	0.11	4.6
241-C-101	0.31	0.11	0.11	0.01	0.73	2.65	0.75	0.27	3.7
241-C-102	0.22	0.22	1.00	0.04	0.76	5.45	6.67	0.87	13.0
241-C-103*	0.32	2.97	0.32	0.05	2.30	74.34	2.11	0.98	77.4
241-C-104	0.24	0.68	1.00	0.11	1.75	17.03	6.67	2.24	25.9
241-C-105	0.30	0.31	0.44	0.04	0.95	7.78	2.91	0.84	11.5
241-C-106	0.35	0.28	0.13	0.03	0.19	7.09	0.83	0.56	8.5
241-C-107	0.25	1.23	0.03	0.00	0.04	30.82	0.19	0.09	31.1
241-C-108	0.32	0.10	0.01	0.00	0.39	2.62	0.04	0.01	2.7
241-C-109	0.32	0.25	0.04	0.00	1.47	6.13	0.27	0.07	6.5
241-C-110	0.28	0.26	0.35	0.05	0.04	6.47	2.34	1.03	9.8
241-C-111	0.33	0.47	0.01	0.00	0.11	11.84	0.06	0.02	11.9
241-C-112	0.31	0.55	0.08	0.00	1.96	13.65	0.55	0.07	14.3
241-C-201	0.02	0.08	0.02	0.01	0.12	2.05	0.11	0.15	2.3
241-C-202	0.02	0.08	0.01	0.00	0.06	2.09	0.07	0.08	2.2
241-C-203	0.02	0.08	0.14	0.02	0.30	1.99	0.91	0.32	3.2
241-C-204	0.02	0.08	0.01	0.01	0.18	1.94	0.06	0.23	2.2
241-S-101*	0.29	0.36	0.58	0.02	0.42	9.10	3.88	0.30	13.3
241-S-102*	0.25	0.30	0.43	0.01	0.34	7.41	2.87	0.15	10.4

Table D-2. Steady-State Flammability Calculations With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Off-normal ventilation rate $(Vr)_{bb}$ (cfm)	Steady-state hydrogen concentration $[H_2]$ (%)	Steady-state ammonia concentration $[NH_3]$ (%)	Steady-state methane concentration $[CH_4]$ (%)	Steady-state N_2O concentration $[N_2O]$ (%)	Steady-state hydrogen flammability (% LFL)	Steady-state ammonia flammability (% LFL)	Steady-state methane flammability (% LFL)	Steady-state total flammability (% LFL)
241-S-103*	0.34	0.15	0.33	0.02	0.61	3.72	2.19	0.41	6.3
241-S-104	0.31	0.19	0.04	0.04	0.13	4.85	0.30	0.78	5.9
241-S-105	0.26	0.14	0.23	0.01	0.05	3.47	1.51	0.29	5.3
241-S-106*	0.24	0.21	0.03	0.04	0.02	5.34	0.23	0.85	6.4
241-S-107	0.28	0.25	0.28	0.02	0.28	6.35	1.86	0.31	8.5
241-S-108	0.20	0.21	0.09	0.00	0.01	5.22	0.58	0.07	5.9
241-S-109	0.21	0.20	0.08	0.04	0.07	5.02	0.55	0.80	6.4
241-S-110	0.27	0.21	0.56	0.02	0.15	5.29	3.71	0.38	9.4
241-S-111*	0.26	0.25	0.20	0.01	0.04	6.22	1.36	0.11	7.7
241-S-112	0.39	0.08	0.09	0.00	0.01	2.05	0.61	0.05	2.7
241-SX-101*	0.36	0.38	0.04	0.02	0.08	9.46	0.25	0.36	10.1
241-SX-102*	0.37	0.59	0.06	0.02	0.07	14.64	0.40	0.44	15.5
241-SX-103*	0.33	2.36	0.50	0.07	0.17	59.11	3.32	1.46	63.9
241-SX-104*	0.35	0.62	0.04	0.02	0.06	15.58	0.27	0.37	16.2
241-SX-105*	0.38	1.49	0.34	0.02	0.09	37.15	2.24	0.39	39.8
241-SX-106*	0.37	0.21	0.88	0.03	0.24	5.26	5.83	0.57	11.7
241-SX-107	0.50	0.21	0.14	0.02	0.30	5.33	0.90	0.38	6.6
241-SX-108*	0.51	0.32	0.36	0.02	0.25	7.96	2.38	0.32	10.7
241-SX-109	0.44	0.45	0.12	0.01	0.06	11.13	0.77	0.17	12.1
241-SX-110	0.51	0.14	0.08	0.01	0.17	3.61	0.52	0.22	4.4
241-SX-111	0.49	0.37	0.16	0.02	0.36	9.24	1.07	0.46	10.8
241-SX-112	0.51	0.11	0.14	0.02	0.31	2.70	0.92	0.39	4.0
241-SX-113	0.53	0.05	0.04	0.01	0.08	1.16	0.25	0.11	1.5
241-SX-114	0.47	0.35	0.25	0.04	0.55	8.63	1.65	0.71	11.0

Table D-2. Steady-State Flammability Calculations With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Off-normal ventilation rate $(Vr)_{bb}$ (cfm)	Steady-state hydrogen concentration $[H_2]$ (%)	Steady-state ammonia concentration $[NH_3]$ (%)	Steady-state methane concentration $[CH_4]$ (%)	Steady-state N_2O concentration $[N_2O]$ (%)	Steady-state hydrogen flammability (% LFL)	Steady-state ammonia flammability (% LFL)	Steady-state methane flammability (% LFL)	Steady-state total flammability (% LFL)
241-SX-115	0.54	0.33	0.00	0.00	0.03	8.15	0.02	0.04	8.2
241-T-101	0.31	0.09	0.05	0.01	0.11	2.35	0.33	0.18	2.9
241-T-102	0.34	0.07	0.01	0.01	0.14	1.79	0.07	0.17	2.0
241-T-103	0.34	0.07	0.01	0.01	0.11	1.66	0.07	0.15	1.9
241-T-104	0.22	0.16	0.33	0.01	0.02	3.99	2.23	0.25	6.5
241-T-105	0.31	0.10	0.21	0.02	0.45	2.54	1.42	0.41	4.4
241-T-106	0.34	0.07	0.20	0.01	0.09	1.64	1.37	0.11	3.1
241-T-107	0.28	0.15	0.28	0.03	0.09	3.82	1.88	0.61	6.3
241-T-108	0.34	0.06	0.04	0.00	0.08	1.59	0.27	0.08	1.9
241-T-109	0.32	0.07	0.01	0.01	0.11	1.80	0.07	0.11	2.0
241-T-110*	0.20	0.44	0.12	0.01	0.05	10.89	0.79	0.17	11.8
241-T-111	0.16	0.25	0.82	0.05	0.05	6.35	5.48	1.02	12.8
241-T-112	0.32	0.07	0.06	0.01	0.30	1.86	0.42	0.30	2.6
241-T-201	0.01	1.28	0.06	0.24	3.70	32.10	0.41	4.74	37.3
241-T-202	0.02	0.29	0.10	0.06	1.95	7.26	0.69	1.16	9.1
241-T-203*	0.01	0.74	0.01	0.15	5.61	18.49	0.07	2.96	21.5
241-T-204	0.01	0.78	0.10	0.16	6.33	19.52	0.68	3.12	23.3
241-TX-101	0.40	0.10	0.02	0.02	0.09	2.41	0.16	0.39	3.0
241-TX-102	0.34	0.10	0.56	0.01	0.18	2.43	3.75	0.13	6.3
241-TX-103	0.37	0.08	0.20	0.01	0.16	1.96	1.34	0.12	3.4
241-TX-104	0.41	0.08	0.02	0.01	0.04	1.88	0.16	0.10	2.1
241-TX-105	0.19	0.25	0.15	0.01	0.09	6.20	0.98	0.20	7.4
241-TX-106	0.29	0.14	0.61	0.02	0.12	3.59	4.08	0.32	8.0
241-TX-107	0.42	0.06	0.34	0.00	0.05	1.46	2.25	0.05	3.8

Table D-2. Steady-State Flammability Calculations With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Off-normal ventilation rate $(Vr)_{bb}$ (cfm)	Steady-state hydrogen concentration $[H_2]$ (%)	Steady-state ammonia concentration $[NH_3]$ (%)	Steady-state methane concentration $[CH_4]$ (%)	Steady-state N_2O concentration $[N_2O]$ (%)	Steady-state hydrogen flammability (% LFL)	Steady-state ammonia flammability (% LFL)	Steady-state methane flammability (% LFL)	Steady-state total flammability (% LFL)
241-TX-108	0.38	0.07	0.06	0.00	0.05	1.77	0.39	0.05	2.2
241-TX-109	0.28	0.19	0.99	0.04	1.66	4.84	6.61	0.77	12.2
241-TX-110	0.24	0.17	1.00	0.01	0.38	4.30	6.67	0.18	11.1
241-TX-111	0.28	0.13	1.00	0.01	0.60	3.26	6.67	0.13	10.1
241-TX-112	0.17	0.27	0.46	0.03	0.20	6.84	3.08	0.54	10.5
241-TX-113	0.17	0.26	0.12	0.02	0.28	6.62	0.79	0.41	7.8
241-TX-114	0.21	0.19	0.91	0.01	0.23	4.78	6.06	0.23	11.1
241-TX-115	0.20	0.21	0.07	0.01	0.23	5.28	0.45	0.23	6.0
241-TX-116	0.18	0.23	0.02	0.02	0.08	5.71	0.16	0.40	6.3
241-TX-117	0.23	0.16	0.04	0.01	0.14	4.07	0.26	0.16	4.5
241-TX-118	0.33	0.14	0.11	0.03	0.05	3.47	0.72	0.56	4.7
241-TY-101	0.39	0.07	0.01	0.00	0.08	1.65	0.09	0.04	1.8
241-TY-102	0.41	0.06	0.01	0.00	0.11	1.51	0.05	0.10	1.6
241-TY-103	0.37	0.10	0.10	0.02	0.44	2.50	0.67	0.40	3.6
241-TY-104	0.42	0.07	0.19	0.01	0.31	1.65	1.26	0.20	3.1
241-TY-105	0.34	0.15	0.01	0.03	0.10	3.73	0.03	0.60	4.4
241-TY-106	0.43	0.06	0.03	0.00	0.07	1.46	0.21	0.09	1.8
241-U-101	0.34	0.09	0.21	0.01	0.11	2.34	1.37	0.13	3.8
241-U-102*	0.21	0.42	0.22	0.01	0.79	10.61	1.44	0.23	12.3
241-U-103*	0.18	0.60	0.46	0.02	1.03	14.98	3.05	0.38	18.4
241-U-104	0.30	0.16	0.00	0.01	0.20	4.00	0.01	0.26	4.3
241-U-105*	0.20	0.47	0.69	0.09	3.25	11.67	4.61	1.87	18.1
241-U-106*	0.28	0.30	0.21	0.02	0.26	7.56	1.37	0.49	9.4
241-U-107*	0.23	0.23	0.14	0.05	2.29	5.69	0.92	0.91	7.5

Table D-2. Steady-State Flammability Calculations With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Off-normal ventilation rate $(Vr)_{bb}$ (cfm)	Steady-state hydrogen concentration $[H_2]$ (%)	Steady-state ammonia concentration $[NH_3]$ (%)	Steady-state methane concentration $[CH_4]$ (%)	Steady-state N_2O concentration $[N_2O]$ (%)	Steady-state hydrogen flammability (% LFL)	Steady-state ammonia flammability (% LFL)	Steady-state methane flammability (% LFL)	Steady-state total flammability (% LFL)
241-U-108*	0.20	0.39	0.43	0.02	0.86	9.85	2.90	0.39	13.1
241-U-109*	0.18	0.31	0.01	0.02	1.17	7.87	0.09	0.49	8.4
241-U-110	0.28	0.18	0.15	0.04	0.96	4.51	1.02	0.72	6.3
241-U-111	0.26	0.19	0.49	0.01	0.24	4.68	3.28	0.18	8.1
241-U-112	0.33	0.09	0.12	0.01	0.08	2.29	0.77	0.27	3.3
241-U-201	0.00	3.22	1.00	0.64	10.81	80.44	6.67	12.87	100.0
241-U-202	0.00	3.22	1.00	0.64	11.04	80.47	6.67	12.88	100.0
241-U-203	0.00	3.54	0.30	0.48	7.40	88.44	2.03	9.51	100.0
241-U-204	0.00	3.61	0.21	0.42	6.54	90.27	1.37	8.40	100.0

Table D-3. Time to Reach 25% LFL With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 25% LFL $t_{25\%}$ (day)	Minimum vent rate to prevent 25% LFL (cfm)	Hydrogen concentration at time $t_{25\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{25\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{25\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{25\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{25\%}$ (%)	Ammonia flammability at time $t_{25\%}$ (%)	Methane flammability at time $t_{25\%}$ (%)
241-AN-101	92	0.55	1	0	0	0	24.24	0.04	0.72
241-AN-102	19	1.65	0.94	0.09	0.02	0.39	23.60	0.58	0.39
241-AN-103	132	0.41	0.92	0.13	0.05	0.16	23.03	0.88	1.00
241-AN-104	66	0.56	0.92	0.18	0.03	0.13	22.92	1.18	0.70
241-AN-105	82	0.37	0.90	0.15	0.06	0.35	22.62	0.97	1.20
241-AN-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AN-107	21	1.33	0.94	0.08	0.05	0.53	23.45	0.51	0.97
241-AP-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AP-102	182	0.23	0.86	0.07	0.15	2.91	21.52	0.49	2.94
241-AP-103	578	0.23	0.96	0.02	0.04	0.75	24.08	0.16	0.76
241-AP-104	201	0.21	0.99	0.01	0.00	0.07	24.79	0.08	0.07
241-AP-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AP-106	197	0.19	0.98	0.01	0.02	0.30	24.56	0.07	0.30
241-AP-107	345	0.15	0.84	0.09	0.17	4.08	21.01	0.61	3.36
241-AP-108	132	0.55	0.97	0.08	0.00	0.41	24.33	0.57	0.04
241-AW-101	90	0.34	0.96	0.01	0.05	0.22	23.97	0.06	0.92
241-AW-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AW-103	1023	0.13	0.85	0.04	0.17	0.98	21.30	0.29	3.41
241-AW-104	67	0.52	0.86	0.01	0.17	0.25	21.45	0.09	3.41
241-AW-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AW-106	249	0.31	0.93	0.12	0.05	0.92	23.27	0.78	0.93
241-AY-101	1180	0.52	0.97	0.03	0.03	0.43	24.25	0.19	0.56
241-AY-102	12	4.02	0.98	0.01	0.01	0.06	24.48	0.09	0.18
241-AZ-101	17	2.59	0.94	0.00	0.03	0.06	23.54	0.03	0.60

Table D-3. Time to Reach 25% LFL With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 25% LFL $t_{25\%}$ (day)	Minimum vent rate to prevent 25% LFL (cfm)	Hydrogen concentration at time $t_{25\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{25\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{25\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{25\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{25\%}$ (%)	Ammonia flammability at time $t_{25\%}$ (%)	Methane flammability at time $t_{25\%}$ (%)
241-AZ-102	15	2.53	0.91	0.02	0.03	0.04	22.80	0.13	0.66
241-SY-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SY-102	512	0.20	0.82	0.18	0.16	0.98	20.53	1.18	3.29
241-SY-103	210	0.44	0.80	0.55	0.07	0.42	19.89	3.67	1.43
241-A-101*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-A-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-A-103*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-A-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-A-105	na	na	na	na	na	na	na	na	na
241-A-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AX-101*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AX-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AX-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AX-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-3. Time to Reach 25% LFL With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 25% LFL $t_{25\%}$ (day)	Minimum vent rate to prevent 25% LFL (cfm)	Hydrogen concentration at time $t_{25\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{25\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{25\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{25\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{25\%}$ (%)	Ammonia flammability at time $t_{25\%}$ (%)	Methane flammability at time $t_{25\%}$ (%)
241-B-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-201	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-202	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-203*	31	0.02	0.99	0.01	0.01	0.15	24.75	0.05	0.20
241-B-204*	34	0.02	0.99	0.01	0.01	0.14	24.77	0.05	0.18
241-BX-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-106*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-3. Time to Reach 25% LFL With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 25% LFL $t_{25\%}$ (day)	Minimum vent rate to prevent 25% LFL (cfm)	Hydrogen concentration at time $t_{25\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{25\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{25\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{25\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{25\%}$ (%)	Ammonia flammability at time $t_{25\%}$ (%)	Methane flammability at time $t_{25\%}$ (%)
241-BY-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-103*	75	1.04	0.92	0.25	0.02	0.72	22.91	1.64	0.31
241-C-104	671	0.27	0.65	1.00	0.11	1.66	16.20	6.67	2.14
241-C-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-107	305	0.31	0.99	0.02	0.00	0.04	24.76	0.16	0.07
241-C-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-201	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-202	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-203	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-204	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-101*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-102*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-3. Time to Reach 25% LFL With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 25% LFL $t_{25\%}$ (day)	Minimum vent rate to prevent 25% LFL (cfm)	Hydrogen concentration at time $t_{25\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{25\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{25\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{25\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{25\%}$ (%)	Ammonia flammability at time $t_{25\%}$ (%)	Methane flammability at time $t_{25\%}$ (%)
241-S-103*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-106*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-111*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-101*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-102*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-103*	108	0.83	0.92	0.22	0.03	0.07	22.94	1.46	0.57
241-SX-104*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-105*	215	0.61	0.94	0.18	0.01	0.06	23.54	1.22	0.25
241-SX-106*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-108*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-113	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-114	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-3. Time to Reach 25% LFL With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 25% LFL $t_{25\%}$ (day)	Minimum vent rate to prevent 25% LFL (cfm)	Hydrogen concentration at time $t_{25\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{25\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{25\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{25\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{25\%}$ (%)	Ammonia flammability at time $t_{25\%}$ (%)	Methane flammability at time $t_{25\%}$ (%)
241-SX-115	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-110*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-201	247	0.02	0.86	0.04	0.16	2.48	21.54	0.28	3.20
241-T-202	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-203*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-204	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-3. Time to Reach 25% LFL With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 25% LFL $t_{25\%}$ (day)	Minimum vent rate to prevent 25% LFL (cfm)	Hydrogen concentration at time $t_{25\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{25\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{25\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{25\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{25\%}$ (%)	Ammonia flammability at time $t_{25\%}$ (%)	Methane flammability at time $t_{25\%}$ (%)
241-TX-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-113	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-114	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-115	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-116	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-117	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-118	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-102*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-103*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-105*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-106*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-107*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-3. Time to Reach 25% LFL With Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 25% LFL $t_{25\%}$ (day)	Minimum vent rate to prevent 25% LFL (cfm)	Hydrogen concentration at time $t_{25\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{25\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{25\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{25\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{25\%}$ (%)	Ammonia flammability at time $t_{25\%}$ (%)	Methane flammability at time $t_{25\%}$ (%)
241-U-108*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-109*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-201	1500	#VALUE!	0.58	0.87	0.12	1.93	14.40	5.81	2.30
241-U-202	1500	#VALUE!	0.56	0.87	0.11	1.93	14.07	5.80	2.25
241-U-203	1500	#VALUE!	0.56	0.05	0.07	1.17	13.94	0.32	1.50
241-U-204	1500	#VALUE!	0.63	0.04	0.07	1.14	15.75	0.24	1.47

Table D-4. Time to Reach 100% LFL Under Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 100% LFL $t_{100\%}$ (day)	Minimum vent rate to prevent 100% LFL (cfm)	Hydrogen concentration at time $t_{100\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{100\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{100\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{100\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{100\%}$ (%)	Ammonia flammability at time $t_{100\%}$ (%)	Methane flammability at time $t_{100\%}$ (%)
241-AN-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AN-102	92	0.40	3.89	0.09	0.08	1.58	97.30	0.58	1.60
241-AN-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AN-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AN-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AN-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AN-107	107	0.32	3.80	0.08	0.19	2.12	94.89	0.51	3.90
241-AP-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AP-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AP-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AP-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AP-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AP-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AP-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AP-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AW-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AW-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AW-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AW-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AW-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AW-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AY-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AY-102	58	0.98	3.95	0.02	0.04	0.25	98.79	0.14	0.73
241-AZ-101	80	0.63	3.89	0.02	0.12	0.24	97.31	0.11	2.46

Table D-4. Time to Reach 100% LFL Under Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 100% LFL $t_{100\%}$ (day)	Minimum vent rate to prevent 100% LFL (cfm)	Hydrogen concentration at time $t_{100\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{100\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{100\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{100\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{100\%}$ (%)	Ammonia flammability at time $t_{100\%}$ (%)	Methane flammability at time $t_{100\%}$ (%)
241-AZ-102	72	0.62	3.84	0.07	0.14	0.18	95.96	0.46	2.76
241-SY-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SY-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SY-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-A-101*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-A-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-A-103*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-A-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-A-105	na	na	na	na	na	na	na	na	na
241-A-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AX-101*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AX-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AX-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-AX-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-4. Time to Reach 100% LFL Under Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 100% LFL $t_{100\%}$ (day)	Minimum vent rate to prevent 100% LFL (cfm)	Hydrogen concentration at time $t_{100\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{100\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{100\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{100\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{100\%}$ (%)	Ammonia flammability at time $t_{100\%}$ (%)	Methane flammability at time $t_{100\%}$ (%)
241-B-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-201	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-202	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-B-203*	184	0.005	3.96	0.03	0.04	0.59	99.06	0.19	0.76
241-B-204*	211	0.005	3.97	0.03	0.04	0.54	99.13	0.18	0.70
241-BX-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BX-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-106*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-4. Time to Reach 100% LFL Under Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 100% LFL $t_{100\%}$ (day)	Minimum vent rate to prevent 100% LFL (cfm)	Hydrogen concentration at time $t_{100\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{100\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{100\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{100\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{100\%}$ (%)	Ammonia flammability at time $t_{100\%}$ (%)	Methane flammability at time $t_{100\%}$ (%)
241-BY-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-BY-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-103*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-201	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-202	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-203	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-C-204	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-101*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-102*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-4. Time to Reach 100% LFL Under Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 100% LFL $t_{100\%}$ (day)	Minimum vent rate to prevent 100% LFL (cfm)	Hydrogen concentration at time $t_{100\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{100\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{100\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{100\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{100\%}$ (%)	Ammonia flammability at time $t_{100\%}$ (%)	Methane flammability at time $t_{100\%}$ (%)
241-S-103*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-106*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-111*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-S-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-101*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-102*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-103*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-104*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-105*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-106*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-108*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-113	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-SX-114	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-4. Time to Reach 100% LFL Under Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 100% LFL $t_{100\%}$ (day)	Minimum vent rate to prevent 100% LFL (cfm)	Hydrogen concentration at time $t_{100\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{100\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{100\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{100\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{100\%}$ (%)	Ammonia flammability at time $t_{100\%}$ (%)	Methane flammability at time $t_{100\%}$ (%)
241-SX-115	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-110*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-201	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-202	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-203*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-T-204	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-107	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-4. Time to Reach 100% LFL Under Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 100% LFL $t_{100\%}$ (day)	Minimum vent rate to prevent 100% LFL (cfm)	Hydrogen concentration at time $t_{100\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{100\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{100\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{100\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{100\%}$ (%)	Ammonia flammability at time $t_{100\%}$ (%)	Methane flammability at time $t_{100\%}$ (%)
241-TX-108	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-109	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-113	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-114	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-115	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-116	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-117	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TX-118	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-102	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-103	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-105	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-TY-106	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-101	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-102*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-103*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-104	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-105*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-106*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-107*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur

Table D-4. Time to Reach 100% LFL Under Barometric Breathing Rate for Current Waste. (8 sheets)

Tank	Time to reach 100% LFL $t_{100\%}$ (day)	Minimum vent rate to prevent 100% LFL (cfm)	Hydrogen concentration at time $t_{100\%}$ $[H_2](t)$ (%)	Ammonia concentration at time $t_{100\%}$ $[NH_3](t)$ (%)	Methane concentration at time $t_{100\%}$ $[CH_4](t)$ (%)	N_2O concentration at time $t_{100\%}$ $[N_2O](t)$ (%)	Hydrogen flammability at time $t_{100\%}$ (%)	Ammonia flammability at time $t_{100\%}$ (%)	Methane flammability at time $t_{100\%}$ (%)
241-U-108*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-109*	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-110	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-111	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-112	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-201	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-202	1500	#VALUE!	0.56	0.87	0.11	1.93	14.07	5.80	2.25
241-U-203	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur	not occur
241-U-204	1500	#VALUE!	0.63	0.04	0.07	1.14	15.75	0.24	1.47

APPENDIX E

EQUATIONS TO CALCULATE THE MASS TRANSPORT COEFFICIENT h FOR SOLUBLE GAS

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APPENDIX E

EQUATIONS TO CALCULATE THE MASS TRANSPORT COEFFICIENT h FOR SOLUBLE GAS

As described in RPP-4941, *Methodology for Predicting Flammable Gas Mixtures in Double-Contained Receiver Tanks*, the overall mass transport coefficient for steady state can be written in terms of the mass transport coefficient in vapor phase, h_g, and in liquid, h_l, as:

$$h = \frac{1}{\frac{1}{h_l} + \frac{K_H RT}{h_g}}$$

with

$$h_g = 0.15 \cdot \frac{D_g}{L_c} \cdot (S_c \cdot G_r)^{1/3}$$

$$h_l = 0.15 \cdot D_L \cdot \left(\frac{\mu_L}{D_L \cdot \rho_L}\right)^{1/3} \cdot \left(\frac{g \cdot \beta_L \cdot \rho_L^{\,2} \cdot \Delta T}{\mu_L^{\,2}}\right)^{1/3}$$

and

$$S_c = \frac{\mu_g}{D_g \cdot \rho_g} \qquad G_r = \frac{g \cdot \beta_g \cdot \rho_g^{\,2} \cdot L_c^{\,3} \cdot \Delta T}{\mu_g^{\,2}}$$

where

ρ_g	=	density of gas	kg/m^3	1.17
D_g	=	diffusion coefficient in gas phase	m^2/s	2.50 E-05
μ_g	=	viscosity of gas	kg/m-s	2.0 E-05
S_c	=	Schmidt number	(none)	6.84 E-01
G	=	gravitational constant	m/s^2	9.8
ΔT	=	delta temperature between waste surface and gas	°K	1.00
β_g	=	thermal expansion coeffficient of gas	$(°K)^{-1}$	3.30 E-03
L_c	=	characteristic length (1/4 of diameter)	m	5.7825
G_r	=	Grashoff number	(none)	2.14 E+10
h_g	=	vapor film coefficient	m/s	0.001586
D_L	=	diffusion coefficient in liquid phase	m^2/s	2.8 E-09
ρ_L	=	density of liquid	kg/m^3	1,300
μ_L	=	viscosity of liquid	kg/m-s	6.82 E-04
β_L	=	thermal expansion coefficient of liquid	$(°K)^{-1}$	3.02 E-04

h_L = liquid film coefficient.	m/s	5.3047 E-06

The last column lists the typical values used in the calculation of h.

Reference

RPP-4941, 2000, *Methodology for Predicting Flammable Gas Mixtures in Double-Contained Receiver Tanks*, Rev 0B, CH2M HILL Hanford Group, Inc., Richland, Washington.

APPENDIX F

CALCULATIONS OF THE GAS DIFFUSION COEFFICIENTS FOR THE CONCRETE DOME OF SINGLE-SHELL TANKS

PREPARED BY JOE MEACHAM

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Table F-2 The Diffusion Resistance and Gas Diffusion Rate of Hydrogen and Methane for 149 Single-Shell Tanks. F-6

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Table F-1. The Thickness of Dome Coating for 149 Single Shell Tanks and Diffusion Coefficients of Hydrogen and Methane (6 sheets)

Tank	Dome Area (cm^2)	Coatings of the Tank Dome	Concrete Thick (cm)	Asphatic Thick (cm)	Gunite Thick (cm)	Soil Thick (cm)	Concrete De of H_2 (cm^2/sec)	Asphatic De of H_2 (cm^2/sec)	Gunite De of H_2 (cm^2/sec)	Soil De of H_2 (cm^2/sec)	Concrete De of CH_4 (cm^2/sec)	Asphatic De of CH_4 (cm^2/sec)	Gunite De of CH_4 (cm^2/sec)	Soil De of CH_4 (cm^2/sec)
A-101	4.39E+06	2-Ply	38.1	0.6350	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
A-102	4.39E+06	2-Ply	38.1	0.6350	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
A-103	4.39E+06	2-Ply	38.1	0.6350	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
A-104	4.39E+06	2-Ply	38.1	0.6350	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
A-105	4.39E+06	2-Ply	38.1	0.6350	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
A-106	4.39E+06	2-Ply	38.1	0.6350	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
AX-101	4.39E+06	No Coatings	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
AX-102	4.39E+06	No Coatings	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
AX-103	4.39E+06	No Coatings	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
AX-104	4.39E+06	No Coatings	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-101	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-102	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-103	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-104	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-105	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-106	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-107	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-108	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-109	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-110	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-111	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-112	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-201	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-202	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-203	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
B-204	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BX-101	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037

Table F-1. The Thickness of Dome Coating for 149 Single Shell Tanks and Diffusion Coefficients of Hydrogen and Methane (6 sheets)

Tank	Dome Area (cm^2)	Coatings of the Tank Dome	Concrete Thick (cm)	Asphatic Thick (cm)	Gunite Thick (cm)	Soil Thick (cm)	Concrete De of H_2 (cm^2/sec)	Asphatic De of H_2 (cm^2/sec)	Gunite De of H_2 (cm^2/sec)	Soil De of H_2 (cm^2/sec)	Concrete De of CH_4 (cm^2/sec)	Asphatic De of CH_4 (cm^2/sec)	Gunite De of CH_4 (cm^2/sec)	Soil De of CH_4 (cm^2/sec)
BX-102	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BX-103	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BX-104	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BX-105	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BX-106	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BX-107	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BX-108	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BX-109	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BX-110	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BX-111	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BX-112	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-101	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-102	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-103	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-104	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-105	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-106	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-107	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-108	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-109	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-110	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-111	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
BY-112	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-101	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-102	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-103	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-104	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037

Table F-1. The Thickness of Dome Coating for 149 Single Shell Tanks and Diffusion Coefficients of Hydrogen and Methane (6 sheets)

Tank	Dome Area (cm^2)	Coatings of the Tank Dome	Concrete Thick (cm)	Asphatic Thick (cm)	Gunite Thick (cm)	Soil Thick (cm)	Concrete De of H_2 (cm^2/sec)	Asphatic De of H_2 (cm^2/sec)	Gunite De of H_2 (cm^2/sec)	Soil De of H_2 (cm^2/sec)	Concrete De of CH_4 (cm^2/sec)	Asphatic De of CH_4 (cm^2/sec)	Gunite De of CH_4 (cm^2/sec)	Soil De of CH_4 (cm^2/sec)
C-105	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-106	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-107	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-108	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-109	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-110	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-111	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-112	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-201	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-202	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-203	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
C-204	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-101	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-102	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-103	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-104	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-105	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-106	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-107	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-108	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-109	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-110	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-111	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
S-112	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-101	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-102	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-103	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037

Table F-1. The Thickness of Dome Coating for 149 Single Shell Tanks and Diffusion Coefficients of Hydrogen and Methane (6 sheets)

Tank	Dome Area (cm^2)	Coatings of the Tank Dome	Concrete Thick (cm)	Asphatic Thick (cm)	Gunite Thick (cm)	Soil Thick (cm)	Concrete De of H_2 (cm^2/sec)	Asphatic De of H_2 (cm^2/sec)	Gunite De of H_2 (cm^2/sec)	Soil De of H_2 (cm^2/sec)	Concrete De of CH_4 (cm^2/sec)	Asphatic De of CH_4 (cm^2/sec)	Gunite De of CH_4 (cm^2/sec)	Soil De of CH_4 (cm^2/sec)
SX-104	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-105	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-106	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-107	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-108	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-109	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-110	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-111	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-112	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-113	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-114	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
SX-115	4.39E+06	Hardner	38.1	0.0000	0.000	366	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-101	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-102	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-103	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-104	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-105	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-106	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-107	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-108	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-109	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-110	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-111	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-112	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-201	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-202	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
T-203	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037

Table F-1. The Thickness of Dome Coating for 149 Single Shell Tanks and Diffusion Coefficients of Hydrogen and Methane (6 sheets)

Tank	Dome Area (cm^2)	Coatings of the Tank Dome	Concrete Thick (cm)	Asphatic Thick (cm)	Gunite Thick (cm)	Soil Thick (cm)	Concrete De of H_2 (cm^2/sec)	Asphatic De of H_2 (cm^2/sec)	Gunite De of H_2 (cm^2/sec)	Soil De of H_2 (cm^2/sec)	Concrete De of CH_4 (cm^2/sec)	Asphatic De of CH_4 (cm^2/sec)	Gunite De of CH_4 (cm^2/sec)	Soil De of CH_4 (cm^2/sec)
T-204	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-101	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-102	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-103	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-104	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-105	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-106	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-107	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-108	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-109	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-110	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-111	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-112	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-113	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-114	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-115	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-116	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-117	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TX-118	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TY-101	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TY-102	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TY-103	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TY-104	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TY-105	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
TY-106	4.38E+06	Hardner + 3-Ply + ¾ Gunite	38.1	0.9525	1.905	427	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-101	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-102	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037

Table F-1. The Thickness of Dome Coating for 149 Single Shell Tanks and Diffusion Coefficients of Hydrogen and Methane (6 sheets)

Tank	Dome Area (cm^2)	Coatings of the Tank Dome	Concrete Thick (cm)	Asphatic Thick (cm)	Gunite Thick (cm)	Soil Thick (cm)	Concrete De of H_2 (cm^2/sec)	Asphatic De of H_2 (cm^2/sec)	Gunite De of H_2 (cm^2/sec)	Soil De of H_2 (cm^2/sec)	Concrete De of CH_4 (cm^2/sec)	Asphatic De of CH_4 (cm^2/sec)	Gunite De of CH_4 (cm^2/sec)	Soil De of CH_4 (cm^2/sec)
U-103	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-104	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-105	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-106	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-107	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-108	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-109	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-110	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-111	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-112	4.43E+06	3-Ply + ¾ Mortar	38.1	0.9525	1.905	404	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-201	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-202	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-203	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037
U-204	1.46E+05	Hardner + 3-Ply	30.48	0.9525	0.000	335	3.80E-03	5.00E-07	3.80E-03	0.12	1.20E-03	5.00E-07	1.20E-03	0.037

Table F-2. The Diffusion Resistance and Gas Diffusion Rates of Hydrogen and Methane for 149 Single Shell Tanks (6 sheets)

Tank	Concrete Resist of H_2 (sec/cm)	Asphatic Resist of H_2 (sec/cm)	Gunite Resist of H_2 (sec/cm)	Soil Resist of H_2 (sec/cm)	Concrete Resist of CH_4 (sec/cm)	Asphatic Resist of CH_4 (sec/cm)	Gunite Resist of CH_4 (sec/cm)	Soil Resist of CH_4 (sec/cm)	Total Resist of H_2 (sec/cm)	Total Resist of CH_4 (sec/cm)	H_2 Diff Rate Ai/Ri (cfm)	CH_4 Diff Rate Ai/Ri (cfm)
A-101	1.00E+04	1.27E+06	0.00E+00	3.05E+03	3.18E+04	1.27E+06	0.00E+00	9.89E+03	1.28E+06	1.31E+06	7.25E-03	7.09E-03
A-102	1.00E+04	1.27E+06	0.00E+00	3.05E+03	3.18E+04	1.27E+06	0.00E+00	9.89E+03	1.28E+06	1.31E+06	7.25E-03	7.09E-03
A-103	1.00E+04	1.27E+06	0.00E+00	3.05E+03	3.18E+04	1.27E+06	0.00E+00	9.89E+03	1.28E+06	1.31E+06	7.25E-03	7.09E-03
A-104	1.00E+04	1.27E+06	0.00E+00	3.05E+03	3.18E+04	1.27E+06	0.00E+00	9.89E+03	1.28E+06	1.31E+06	7.25E-03	7.09E-03
A-105	1.00E+04	1.27E+06	0.00E+00	3.05E+03	3.18E+04	1.27E+06	0.00E+00	9.89E+03	1.28E+06	1.31E+06	7.25E-03	7.09E-03
A-106	1.00E+04	1.27E+06	0.00E+00	3.05E+03	3.18E+04	1.27E+06	0.00E+00	9.89E+03	1.28E+06	1.31E+06	7.25E-03	7.09E-03
AX-101	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
AX-102	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
AX-103	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
AX-104	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
B-101	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-102	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-103	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-104	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-105	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-106	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-107	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-108	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-109	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-110	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-111	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-112	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
B-201	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
B-202	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
B-203	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
B-204	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
BX-101	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03

Table F-2. The Diffusion Resistance and Gas Diffusion Rates of Hydrogen and Methane for 149 Single Shell Tanks (6 sheets)

Tank	Concrete Resist of H_2 (sec/cm)	Asphatic Resist of H_2 (sec/cm)	Gunite Resist of H_2 (sec/cm)	Soil Resist of H_2 (sec/cm)	Concrete Resist of CH_4 (sec/cm)	Asphatic Resist of CH_4 (sec/cm)	Gunite Resist of CH_4 (sec/cm)	Soil Resist of CH_4 (sec/cm)	Total Resist of H_2 (sec/cm)	Total Resist of CH_4 (sec/cm)	H_2 Diff Rate Ai/Ri (cfm)	CH_4 Diff Rate Ai/Ri (cfm)
BX-102	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
BX-103	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
BX-104	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
BX-105	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
BX-106	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
BX-107	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
BX-108	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
BX-109	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
BX-110	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
BX-111	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
BX-112	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
BY-101	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
BY-102	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
BY-103	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
BY-104	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
BY-105	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
BY-106	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
BY-107	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
BY-108	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
BY-109	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
BY-110	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
BY-111	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
BY-112	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
C-101	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
C-102	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
C-103	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
C-104	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03

Table F-2. The Diffusion Resistance and Gas Diffusion Rates of Hydrogen and Methane for 149 Single Shell Tanks (6 sheets)

Tank	Concrete Resist of H_2 (sec/cm)	Asphatic Resist of H_2 (sec/cm)	Gunite Resist of H_2 (sec/cm)	Soil Resist of H_2 (sec/cm)	Concrete Resist of CH_4 (sec/cm)	Asphatic Resist of CH_4 (sec/cm)	Gunite Resist of CH_4 (sec/cm)	Soil Resist of CH_4 (sec/cm)	Total Resist of H_2 (sec/cm)	Total Resist of CH_4 (sec/cm)	H_2 Diff Rate Ai/Ri (cfm)	CH_4 Diff Rate Ai/Ri (cfm)
C-105	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
C-106	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
C-107	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
C-108	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
C-109	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
C-110	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
C-111	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
C-112	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
C-201	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
C-202	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
C-203	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
C-204	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
S-101	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
S-102	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
S-103	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
S-104	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
S-105	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
S-106	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
S-107	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
S-108	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
S-109	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
S-110	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
S-111	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
S-112	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
SX-101	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-102	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-103	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01

Table F-2. The Diffusion Resistance and Gas Diffusion Rates of Hydrogen and Methane for 149 Single Shell Tanks (6 sheets)

Tank	Concrete Resist of H_2 (sec/cm)	Asphatic Resist of H_2 (sec/cm)	Gunite Resist of H_2 (sec/cm)	Soil Resist of H_2 (sec/cm)	Concrete Resist of CH_4 (sec/cm)	Asphatic Resist of CH_4 (sec/cm)	Gunite Resist of CH_4 (sec/cm)	Soil Resist of CH_4 (sec/cm)	Total Resist of H_2 (sec/cm)	Total Resist of CH_4 (sec/cm)	H_2 Diff Rate Ai/Ri (cfm)	CH_4 Diff Rate Ai/Ri (cfm)
SX-104	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-105	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-106	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-107	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-108	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-109	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-110	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-111	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-112	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-113	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-114	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
SX-115	1.00E+04	0.00E+00	0.00E+00	3.05E+03	3.18E+04	0.00E+00	0.00E+00	9.89E+03	1.31E+04	4.16E+04	7.11E-01	2.23E-01
T-101	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-102	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-103	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-104	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-105	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-106	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-107	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-108	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-109	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-110	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-111	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-112	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
T-201	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
T-202	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
T-203	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04

Table F-2. The Diffusion Resistance and Gas Diffusion Rates of Hydrogen and Methane for 149 Single Shell Tanks (6 sheets)

Tank	Concrete Resist of H_2 (sec/cm)	Asphatic Resist of H_2 (sec/cm)	Gunite Resist of H_2 (sec/cm)	Soil Resist of H_2 (sec/cm)	Concrete Resist of CH_4 (sec/cm)	Asphatic Resist of CH_4 (sec/cm)	Gunite Resist of CH_4 (sec/cm)	Soil Resist of CH_4 (sec/cm)	Total Resist of H_2 (sec/cm)	Total Resist of CH_4 (sec/cm)	H_2 Diff Rate Ai/Ri (cfm)	CH_4 Diff Rate Ai/Ri (cfm)
T-204	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
TX-101	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-102	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-103	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-104	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-105	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-106	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-107	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-108	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-109	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-110	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-111	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-112	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-113	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-114	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-115	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-116	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-117	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TX-118	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TY-101	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TY-102	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TY-103	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TY-104	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TY-105	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
TY-106	1.00E+04	1.91E+06	5.01E+02	3.56E+03	3.18E+04	1.91E+06	1.59E+03	1.15E+04	1.92E+06	1.95E+06	4.84E-03	4.76E-03
U-101	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
U-102	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03

Table F-2. The Diffusion Resistance and Gas Diffusion Rates of Hydrogen and Methane for 149 Single Shell Tanks (6 sheets)

Tank	Concrete Resist of H_2 (sec/cm)	Asphatic Resist of H_2 (sec/cm)	Gunite Resist of H_2 (sec/cm)	Soil Resist of H_2 (sec/cm)	Concrete Resist of CH_4 (sec/cm)	Asphatic Resist of CH_4 (sec/cm)	Gunite Resist of CH_4 (sec/cm)	Soil Resist of CH_4 (sec/cm)	Total Resist of H_2 (sec/cm)	Total Resist of CH_4 (sec/cm)	H_2 Diff Rate Ai/Ri (cfm)	CH_4 Diff Rate Ai/Ri (cfm)
U-103	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
U-104	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
U-105	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
U-106	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
U-107	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
U-108	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
U-109	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
U-110	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
U-111	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
U-112	1.00E+04	1.91E+06	5.01E+02	3.37E+03	3.18E+04	1.91E+06	1.59E+03	1.09E+04	1.92E+06	1.95E+06	4.89E-03	4.82E-03
U-201	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
U-202	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
U-203	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04
U-204	8.02E+03	1.91E+06	0.00E+00	2.79E+03	2.54E+04	1.91E+06	0.00E+00	9.05E+03	1.92E+06	1.94E+06	1.61E-04	1.60E-04

APPENDIX G

FLAMMABILITY EVALUATION OF TIME TO 25% OF THE LOWER FLAMMABILITY LIMIT TO SUPPORT THE VACUUM RETRIEVAL PROJECT

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G1.0 OBJECTIVE

This case study provides an evaluation to support the determination that the potential risk associated with using the single-shell tank (SST) waste retrieval system vacuum system for retrieval of the 241-C Tank Farm 200-series SSTs is adequately addressed for steady-state gas accumulation by the current tank farm safety basis. The evaluation provides an upper limit for water additions to the designated SST receiver tank to ensure that the time to 25% of the lower flammability limit (LFL) is 365 days or greater.

G2.0 SUMMARY OF RESULTS AND CONCLUSIONS

The evaluation shows that the maximum water addition to the SST receiver is equal to 112 kL or 29.6 kgal. This is the water volume that would cause the time to 25% of the LFL in the dome space of the designated SST receiver to be 365 days, as specified for this case study.

G3.0 BACKGROUND

Waste from the 241-C Tank Farm 200-series tanks is planned to be transferred in to the double-shell tank (DST) system after accumulation in one of the four SSTs. A description of the system design and overall process can be found in RPP-17190, *Safety Evaluation of the Waste Retrieval System Vacuum System for 241-C Tank Farm 200-Series Tanks.* During the retrieval of the 241-C Tank Farm 200-series SSTs, the retrieval solution will be routinely drained to the designated SST receiver tank; in this case, SST 241-C-203. The retrieval solution is essentially water in the water separator with small amounts of entrained tank waste.

For the bounding case study, the time to 25% of the LFL for the SST receiver tank is 365 days, a limit specified by Retrieval/Closure Nuclear Safety. Currently, the 241-C 200-series SSTs contain very little waste. The time to 25% of the LFL is over 1,500 days for SSTs 241-C-201, 241-C-202, 241-C-203, and 241-C-204, respectively, under zero ventilation condition (see Table 4-5 of the main text). These times to 25% of the LFL are much longer than 365 days. This evaluation of steady-state flammable gas accumulation analyzes how much water could be added to the designated SST receiver tank before the time to 25% of the LFL would decrease to 365 days.

G4.0 INPUT DATA

The bounding case evaluation assumes that all the solid waste in the four 241-C 200-series SSTs is accumulated in one of the tanks. Also as the bounding case, the hydrogen generation rate (HGR) calculations and flammability evaluations assume the waste condition of SST 241-C-204

represents all the waste. SST 241-C-204 is used because it has the waste that contains the highest HGR per unit volume.

The steady-state HGR input data for SST 241-C-204 is documented in Appendix B, Table B-5. The volume of all the waste is the sum of the solid waste in each tank. These data are used in Table F-1A. For the time to LFL calculations, the required data are taken from Appendix D, Table D-1. Because a verified spreadsheet is used, only input data needs to be checked for accuracy.

G5.0 ASSUMPTIONS

All of the waste from the four 241-C 200-series tanks is assumed to have the characteristics of SST 241-C-204 waste. This evaluation assumes a hypothetical 1,000-gal water addition, documented in Table B-5, has been made to the SST 241-C-204 prior accumulation in the SST receiver and prior to those tanks receiving any retrieval waste or water. The 1,000-gal water addition to SST 241-C-204 waste is assumed to form a thin liquid layer and has the waste composition of the interstitial liquid.

The additional water used for retrieval is assumed to be well mixed with the hypothetical liquid layer in the SST receiver.

G6.0 METHOD OF ANALYSIS

The methodology and equations for the flammability evaluation used in this study is discussed in Chapter 3.0 and 4.0 of the main text of this document. This methodology is developed to calculate the gas release rate, gas generation rate, flammability level, and time to 25% and 100% of the LFL for a given ventilation rate.

Given the calculated HGRs along with historical gas release rates of ammonia and methane from the identified waste, the time to 25% of the LFL are calculated. Note that water additions will decrease the volume of the dome space, and therefore, the time to reach 25% of the LFL for a given ventilation rate will decrease. In order to find the upper limit of water addition, the volume of water is gradually increased until the time to 25% of the LFL is 365 days.

G7.0 USE OF COMPUTER SOFTWARE

This case study uses a validated Excel[5] spreadsheet, documented in RPP-5926, Rev. 4, to conduct the calculations (RPP-5926-8050-R3-LFL-CAL-T2-1102004.xls). Refer to the spreadsheet verification form in Appendix I, page I-3. This spreadsheet used the input data to

[5] Excel is a registered trademark of Microsoft Corporation, Redmond, Washington.

calculate the gas generation rates, then calculates the flammability and time to LFL for a given ventilation rate.

G8.0 RESULTS

Appendix B, Table B-1 shows that the total waste volume of the four 241-C 200-series SST is 17 kL. The waste composition, physical properties, and waste temperature for SST 241-C-204, along with the total waste volume of 17 kL, is used to calculate the HGR and flammability for the solid waste layer in the SST receiver.

For the liquid layer, the volume of water added is used to calculate the dilution factor, and then the dilution factor is used to recalculate the waste composition and physical properties based on the input data for the liquid layer listed in Table B-5 of Appendix B, which includes a hypothetical 1,000 gal of water addition to the waste. The dilution factor is determined by the ratio of total water addition and supernatant volume of 1,000 gal. Details of the input data and HGR calculation results are given in Table G-1A to Table G-1D. Note that in Table G-1D, note that HGR is primarily coming from the corrosion (about 99%) for both liquid and solid layers. So in this case it will make not much difference whether we treat the liquid layer as pure water or assume the added water is well mixed with waste.

It is found that when total water additions are 112 kL or 29.6 kgal including the hypothetical supernatant of 1,000 gal, the time to 25% of the LFL is 365 days. Also, note that the steady-state flammability of the system, which is 17 kL of solid waste and 112 kL of water, under barometric breathing condition is 15.4%. Details of calculated input data and time to 25% of the LFL under zero ventilation are given in Table G-2A to Table G-2B.

G9.0 CONCLUSIONS

For the given maximum solid waste volume of 17 kL, as long as the total water additions to the SST receiver tank are less than 112 kL or 29.6 kgal, the time to 25% of the LFL will not reach 365 days during the waste retrieval activities.

G10.0 REFERENCES

RPP-17190, 2003, *Safety Evaluation of the Waste Retrieval System Vacuum System for 241-C Tank Farm 200-Series Tanks*, Rev 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

Table G1-A. Input Data for Hydrogen Generation Rate Model Calculations.

Tank	Volume of Water Addition (kL) and Dilution factor	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid $[NO_2]$ (µg/mL)	NO_3 in liquid $[NO_3]$ (µg/mL)	Al in liquid [Al] (µg/mL)	Na in liquid [Na] (µg/mL)	^{90}Sr in waste [Sr] (µCi/g)	^{137}Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume V (kL)	Bulk water $[H_2O]$ (wt%)	Liquid water $[H_2O]$ (wt%)	Waste temp. T_w (°C)	Dome temp. T_d (°C)
Supernatant	111.9	2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.09E+01	4.72E+00	1.17	1.17	112	75%	75%	17	16
Solid Layer		2.98E+03	3.60E+04	7.96E+04	8.20E+04	4.94E+03	1.09E+01	4.72E+00	1.62	1.17	17	41%	75%	17	16

Table G1-B. Derived Data for Hydrogen Generation Rate Model Calculations

Tank	Waste level D_w (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area A_{wet} (ft^2)	Heat load per kg H_L B/γ (watt/kg)	Tank heat load H_L^{alpha} (wattKg)	NO_3 in liquid $[NO_3]_M$ (mole/L)	NO_2 in liquid $[NO_2]_M$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid $[NO_2]_M$ (mole/L)	TOC in liquid $[TOC]_{\%}$ (wt%)	Al in liquid $[Al]_{\%}$ (wt%)	E_{H2} Efficiency H2 by corrosion	Total G values GB/γ_{TOT} (H_2/100eV)	Total G values G^a_{TOT} (H_2/100eV)
Supernatant	150.8	1.31E+05	100%	789	9.52E-05	2.63E-07	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230
Solid Layer	22.2	2.67E+04	55%	431	9.52E-05	2.63E-07	1.28	0.78	1.50	1.00	0.26	0.42	0.20	0.063	0.230

Table G1-C. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume

Tank	HGR from radiolysis $RC\ B/\gamma_{rad}$ (mole/kg-d)	HGR from radiolysis $RC^{alpha}{}_{rad}$ (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis $RC\ B/\gamma_{rad}$ (mole/m^3-s)	HGR from radiolysis $RC^{alpha}{}_{rad}$ (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RC_{tot} (mole/m^3-s)
Supernatant	5.36E-08	5.42E-10	1.64E-08	4.84E-07	5.55E-07	7.26E-10	7.34E-12	2.23E-10	6.55E-09	7.51E-09
Solid Layer	2.94E-08	2.98E-10	9.03E-09	1.29E-06	1.33E-06	5.52E-10	5.58E-12	1.69E-10	2.42E-08	2.50E-08

Table G1-D. Calculated Total Hydrogen Generation Rate In Dome Space

Tank	HGR from radiolysis $G_{rad}\ B/\gamma$ (cfm)	HGR from radiolysis $G_{rad}{}^{alpha}$ (cfm)	HGR from thermolysis G_{therm} (cfm)	HGR from corrosion G_{corr} (cfm)	Percent of HGR from radiolysis $(G_{rad}\ B/\gamma)_{\%}$	Percent of HGR from radiolysis $(G_{rad}{}^{alpha})_{\%}$	Percent of HGR from thermolysis $(G_{therm})_{\%}$	Percent of HGR from corrosion $(G_{corr})_{\%}$	Total HGR from model G_{mod} (cfm)	Total HGR from model G_{mod} (L/day)
Supernatant	4.07E-06	4.12E-08	1.25E-06	3.68E-05	9.7%	0.10%	3.0%	87.3%	4.21E-05	2
Solid Layer	4.57E-07	4.62E-09	1.40E-07	2.01E-05	2.2%	0.02%	0.7%	97.1%	2.07E-05	1

Table G2-A. Steady-State Gas Concentrations, Release Rates and Flammability Levels Under Normal Ventilation Conditions.

Tank	Ammonia headspace concen. $[NH_3]$ (%)	Methane headspace concen. $[CH_4]$ (%)	N_2O headspace concen. $[N_2O]$ (%)	Waste volume V_w (kgal)	Headspace volume V_h (ft^3)	Normal ventilation rate $(Vr)_{norm}$ (cfm)	Steady-state flammability at normal condition (% LFL)	Ammonia release rate $Rr(NH_3)$ (cfm)	N_2O release rate $Rr(N_2O)$ (cfm)	Model hydrogen release rate $Rr(H_2)$ (cfm)	Methane release rate $Rr(CH_4)$ (cfm)
241-C-204	0.0001	0.0001	0.0014	34	3,408	3	0.05%	2.18E-06	4.31E-05	6.28E-05	2.76E-06

Table G2-B Steady-State Flammability Under Barometric Breathing and Time to 25% of the LFL under Zero Vent

Tank	Off-Normal Barometric Breathing Rate $(Vr)_{bb}$ (cfm)	Steady State Hydrogen Concen. $[H_2]$ (%)	Steady State Ammonia Concen. $[NH_3]$ (%)	Steady State Methane Concen. $[CH_4]$ (%)	Steady State N_2O Concen. $[N_2O]$ (%)	Steady State Hydrogen Flammab. (%)	Steady State Ammonia Flammab. (%)	Steady State Methane Flammab. (%)	Steady State Total Flammab (%)	Time to Reach 25% of the LFL under Diffusion (days)	Time to Reach 100% of the LFL under diffusion (days)
241-C-204	0.01	0.59	0.02	0.03	0.40	14.7	0.14	0.52	15.4	365	1,500

APPENDIX H

FLAMMABILITY EVALUATION OF TIME TO REACH 25% AND 100% OF THE LOWER FLAMMABILITY LIMIT FOR DOUBLE-SHELL TANK 241-AY-102 AT VARIOUS WASTE LEVELS WHILE RECEIVING EXHAUSTER CONDENSATE COLLECTED FROM CATCH TANK 241-AZ-151

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APPENDIX H

FLAMMABILITY EVALUATION OF TIME TO REACH 25% AND 100% OF THE LOWER FLAMMABILITY LIMIT FOR DOUBLE-SHELL TANK 241-AY-102 AT VARIOUS WASTE LEVELS WHILE RECEIVING EXHAUSTER CONDENSATE COLLECTED FROM CATCH TANK 241-AZ-151

H1.0 OBJECTIVE

This calculation provides the technical basis for an amendment to the HNF-SD-WM-TSR-006, *Technical Safety Requirements*, LCO 3.2.1, "DST Primary Ventilation Systems, Surveillance Requirement 3.2.1.4." The amendment is needed because DST 241-AY-102 will continue receiving condensate. The calculation provides the time to reach 25% and 100% of the lower flammability limit (LFL) as function of waste level. The evaluation determines the hydrogen generation rate (HGR) and the minimum ventilation rate required to keep below 25% and 100% of the LFL for the given waste level.

H2.0 SUMMARY OF RESULTS AND CONCLUSIONS

The evaluation shows that the times required to reach 25% of the LFL are 12, 10, 8 and 6 days for the waste levels of 313.8 in. (current waste level), 333.0 in., 366.3 in., and 399.1 in., respectively, under zero ventilation. For all calculated waste level cases, the HGR is 3.93 E-2 ft^3/min, and the minimum ventilation rates to stay within 25% and 100% of the LFL level are around 4.0 and 1.0 ft^3/min, respectively, for all waste levels calculated.

H3.0 BACKGROUND

Condensate from tanks in the 241-AY/AZ Tank Farms is collected in catch tank 241-AZ-151 and directed to DST 241-AY-102. Currently, the waste level of DST 241-AY-102 is about 313.8 in., and it will increase approximately 3 in. per month because of condensate received from DST 241-AZ-151. LCO 3.2.1, "Surveillance Requirement 3.2.1.4," specifies that the surveillance time for flammable gas in the 241-AY tanks is 5 days. Surveillance times plus the time needed to complete Actions described in LCO 3.2.1 must be equal to or less than the time it takes the flammable gas concentration in the tank to reach 25% of the LFL. At the current waste level in DST 241-AY-102, the combined Surveillance time and Action time is equal to the time to 25% of the LFL. To continue receiving condensate in DST 241-AY-102, the Surveillance time must be changed to reflect the changes in the time to reach 25% of the LFL.

This appendix calculation determines the corresponding time for DST 241-AY-102 to reach 25% of the LFL as condensate received from DST 241-AZ-151 increases the waste level in DST 241-AY-102. The results will be used for an amendment to RPP-13033, *Tank Farms Documented Safety Analysis*, that specifies a new surveillance requirement for the 241-AY

Tank Farm such that the condensate can be added until the operational level limit of 364 in., documented in OSD-T-151-00007, *Operating Specifications for the Double-Shell Storage Tanks*, is reached.

H4.0 INPUT DATA

The input data for HGR calculation, such as waste compositions of total organic carbon (TOC), NO_3, NO_2, Al, Sr-90, Cs-137 and waste density, are exactly the same as the previous evaluation listed in Appendix B, Table B-1 of this document, except the condensate addition dilutes the composition and density of supernatant. The composition of condensate is treated as water although the condensate is slightly contaminated. The volume of condensate (Table H-1a, column 2) represents the amount of condensate added on top of the supernatant since the last evaluation (Appendix H, Table B-1). The condensate additions of ;24, 200, 375, 548, 719, and 889 kL correspond to the final waste levels of 316.0, 333.0, 349.7,366.3, 382.7 and 399.1 in., respectively, and are listed in Table H-2b. The waste compositions and temperatures after the condensate additions also are given in Table H-1a. The temperature is the same as the previous calculation, following the rule of using the maximum temperature from the past year. The temperature reflects 5 °C higher temperature than the baseline temperature for double-shell tanks (DST) as discussed in Chapters 3.0 and 4.0.

H5.0 ASSUMPTIONS

The condensate is treated as if it is contaminated water. The condensate addition is assumed to be well mixed with the supernatant layer of DST 241-AY-102. The waste composition and density of supernatant are corrected by the dilution factor.

H6.0 METHOD OF ANALYSIS

The methodology and equations for the flammability evaluation used in this study are discussed in Chapter 3.0. This methodology is developed to calculate the gas release rate, gas generation rate, flammability level, and times to reach 25% and 100% of the LFL for a given ventilation rate.

Given the calculated HGRs along with historical gas release rates of ammonia and methane from the identified waste, the time to reach 25% of the LFL is calculated. Note that condensate additions will decrease the volume of the dome space; and, therefore, the time to reach 25% of the LFL for a given ventilation rate will decrease. To find the waste level of water addition, the volume of condensate is gradually increased until the time to reach 25% of the LFL is 11, 10, 9, 8, 7 and 6 days. Also, the time to reach 25% of the LFL is calculated at the current waste level of 313.8 in. and the operational waste level of 364 in.

H7.0 USE OF COMPUTER SOFTWARE

This case study uses a validated Excel[6] spreadsheet, documented in RPP-5926, Rev. 4, to conduct the calculations (RPP-5926-8050-R3-LFL-CAL-T2-102004.xls). Refer to the spreadsheet verification form in Appendix I, page I-3. This spreadsheet used the input data to calculate the gas generation rates and then calculate the flammability and time to reach the LFL for a given ventilation rate.

H8.0 RESULTS

Tables H-1b to H-1d provide the derived term for the HGR model calculation from input data (Table H-1a), the unit HGRs, and total HGRs, respectively. The HGRs are roughly 3.9 E-02 ft^3/min (about 1,598 L/day) for all calculated waste levels as shown in Table H-2B. The condensate addition increases the volume of supernatant and also slightly reduces concentrations, resulting in almost no change in the total HGR for the supernatant layer. All of the calculations include 5 °C higher temperature than the waste temperature as discussed in Chapter 3.0 and 4.0

The times to reach 25% of the LFL at the current waste level of 313.8 in. and the operational waste level of 364 in. are 12 and 9 days, respectively. The condensate additions increasing the waste level to 316.0, 333.0, 349.7,366.3, 382.7 and 399.1 i. result in 11, 10, 9, 8, 7, and 6 days, respectively, for the time to reach 25% of the LFL; and are 43, 40, 37, 33, 30, and 26 days, respectively, for the time to reach 100% of the LFL under zero ventilation. The minimum ventilation rates to keep the headspace below 25% and 100% of the LFL are about 4.0 and 1.0 ft^3/min, respectively.

The 241-AY Tank Farm tanks cannot be filled to 390 in. due to physical piping limitations. As part of the parametric study, times to LFL down to 7 days was calculated.

H.09 CONCLUSIONS

The time to reach 25% of the LFL for the current waste level of 313.8 in. is 12 days, which is still within the current flammable gas surveillance requirement for the 241-AY Tank Farm given in HNF-SD-WM-TSR-006, LCO 3.2.1, "DST Primary Ventilation Systems." The time to reach 25% of the LFL is 9 days for the operational waste limit of 364 in. under zero ventilation.

H10.0 REFERENCES

HNF-SD-WM-TSR-006, *Tank Farms Technical Safety Requirements*, as amended, CH2M HILL Hanford Group, Inc., Richland, Washington.

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[6] Excel is a registered trademark of Microsoft Corporation, Redmond, Washington.

OSD-T-151-00007, 2003, *Operating Specifications for the Double-Shell Storage Tanks,* Rev. I-7, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-13033, *Tank Farms Documented Safety Analysis,* as amended, CH2M HILL Hanford Group, Inc., Richland, Washington.

Table H1-A. Input Data for Hydrogen Generation Rate Model Calculations.

Tank	Volume of Water Addition (kL) and Dilution factor	TOC in liquid [TOC] (µg/mL)	NO_2 in liquid [NO_2] (µg/mL)	NO_3 in liquid [NO_3] (µg/mL)	Al in liquid [Al] (µg/mL)	Na in liquid [Na] (µg/mL)	^{90}Sr in waste [Sr] (µCi/g)	^{137}Cs in waste [Cs] (µCi/g)	Bulk density D (g/mL)	Liquid Density D_L (g/ml)	Non-RGS waste volume V (kL)	Bulk water [H_2O] (wt%)	Liquid water [H_2O] (wt%)	Waste temp. T_w (°C)	Dome temp. T_d (°C)
Supernatant	0	8.67E+02	3.17E+04	4.15E+02	6.04E+04	1.22E+03	1.02E+00	1.80E+01	1.18	1.18	2700	82%	82%	53	49
Solid Layer		1.66E+03	8.33E+02	3.81E+01	7.33E+04	2.69E+02	9.85E+03	2.70E+02	1.55	1.16	571	45%	79%	75	49
Supernatant	24	8.67E+02	3.15E+04	4.11E+02	5.98E+04	1.21E+03	1.01E+00	1.78E+01	1.18	1.18	2724	83%	83%	53	49
Solid Layer		1.66E+03	8.33E+02	3.81E+01	7.33E+04	2.69E+02	9.85E+03	2.70E+02	1.55	1.16	571	45%	79%	75	49
Supernatant	200	8.67E+02	2.95E+04	3.86E+02	5.62E+04	1.14E+03	9.56E-01	1.69E+01	1.17	1.17	2900	83%	83%	53	49
Solid Layer		1.66E+03	8.33E+02	3.81E+01	7.33E+04	2.69E+02	9.85E+03	2.70E+02	1.55	1.16	571	45%	79%	75	49
Supernatant	375	8.67E+02	2.79E+04	3.64E+02	5.30E+04	1.07E+03	9.09E-01	1.61E+01	1.16	1.16	3075	84%	84%	53	49
Solid Layer		1.66E+03	8.33E+02	3.81E+01	7.33E+04	2.69E+02	9.85E+03	2.70E+02	1.55	1.16	571	45%	79%	75	49
Supernatant	524	7.26E+02	2.66E+04	3.47E+02	5.06E+04	1.02E+03	8.72E-01	1.54E+01	1.15	1.15	3224	85%	85%	53	49
Solid Layer		1.66E+03	8.33E+02	3.81E+01	7.33E+04	2.69E+02	9.85E+03	2.70E+02	1.55	1.16	571	45%	79%	75	49
Supernatant	548	8.67E+02	2.64E+04	3.45E+02	5.02E+04	1.02E+03	8.67E-01	1.53E+01	1.15	1.15	3248	85%	85%	53	49
Solid Layer		1.66E+03	8.33E+02	3.81E+01	7.33E+04	2.69E+02	9.85E+03	2.70E+02	1.55	1.16	571	45%	79%	75	49
Supernatant	719	8.67E+02	2.51E+04	3.28E+02	4.77E+04	9.65E+02	8.29E-01	1.46E+01	1.14	1.14	3419	86%	86%	53	49
Solid Layer		1.66E+03	8.33E+02	3.81E+01	7.33E+04	2.69E+02	9.85E+03	2.70E+02	1.55	1.16	571	45%	79%	75	49
Supernatant	889	8.67E+02	2.39E+04	3.12E+02	4.54E+04	9.19E+02	7.94E-01	1.40E+01	1.13	1.13	3589	86%	86%	53	49
Solid Layer		1.66E+03	8.33E+02	3.81E+01	7.33E+04	2.69E+02	9.85E+03	2.70E+02	1.55	1.16	571	45%	79%	75	49

Table H1-B. Derived Data for Hydrogen Generation Rate Model Calculations

Tank	Waste level D_w (inch)	Total mass M (kg)	Liquid in waste (wt%)	Wetted area A_{wet} (ft^2)	Heat load per kg H_L B/γ (watt/kg)	Tank heat load H_L^{alpha} (wattKg)	NO_3 in liquid $[NO_3]_M$ (mole/L)	NO_2 in liquid $[NO_2]_M$ (mole/L)	Excess Na in liquid $[Na]_{ex}$ (mole/L)	OH in liquid $[NO_2]_M$ (mole/L)	TOC in liquid $[TOC]_{\%}$ (wt%)	Al in liquid $[Al]_{\%}$ (wt%)	E_{H2} Efficiency H2 by corrosion	Total G values G B/γ_{TOT} (H_2/100eV)	Total G values G^a_{TOT} (H_2/100eV)
Supernatant	259.0	3.18E+06	100%	5085	9.18E-05	6.65E-08	0.01	0.69	1.93	0.23	0.07	0.10	0.50	0.134	0.729
Solid Layer	54.8	8.83E+05	57%	5493	6.71E-02	2.55E-04	0.00	0.02	3.17	0.23	0.14	0.02	0.50	0.184	1.092
Supernatant	261.3	3.20E+06	100%	5130	9.11E-05	6.60E-08	0.01	0.68	1.91	0.23	0.07	0.10	0.50	0.135	0.731
Solid Layer	54.8	8.83E+05	57%	5493	6.71E-02	2.55E-04	0.00	0.02	3.17	0.23	0.14	0.02	0.50	0.184	1.092
Supernatant	278.2	3.38E+06	100%	5463	8.63E-05	6.25E-08	0.01	0.64	1.79	0.23	0.07	0.10	0.50	0.144	0.745
Solid Layer	54.8	8.83E+05	57%	5493	6.71E-02	2.55E-04	0.00	0.02	3.17	0.23	0.14	0.02	0.50	0.184	1.092
Supernatant	295.0	3.55E+06	100%	5792	8.21E-05	5.95E-08	0.01	0.61	1.69	0.23	0.07	0.09	0.50	0.152	0.757
Solid Layer	54.8	8.83E+05	57%	5493	6.71E-02	2.55E-04	0.00	0.02	3.17	0.23	0.14	0.02	0.50	0.184	1.092
Supernatant	309.2	3.70E+06	100%	6117	7.88E-05	5.71E-08	0.01	0.58	1.61	0.23	0.06	0.09	0.50	0.157	0.810
Solid Layer	54.8	8.83E+05	57%	5493	6.71E-02	2.55E-04	0.00	0.02	3.17	0.23	0.14	0.02	0.50	0.184	1.092
Supernatant	311.5	3.73E+06	100%	6117	7.83E-05	5.67E-08	0.01	0.57	1.60	0.23	0.08	0.09	0.50	0.159	0.769
Solid Layer	54.8	8.83E+05	57%	5493	6.71E-02	2.55E-04	0.00	0.02	3.17	0.23	0.14	0.02	0.50	0.184	1.092
Supernatant	328.0	3.90E+06	100%	6440	7.48E-05	5.42E-08	0.01	0.54	1.52	0.23	0.08	0.08	0.50	0.166	0.780
Solid Layer	54.8	8.83E+05	57%	5493	6.71E-02	2.55E-04	0.00	0.02	3.17	0.23	0.14	0.02	0.50	0.184	1.092
Supernatant	344.3	4.07E+06	100%	6761	7.17E-05	5.19E-08	0.01	0.52	1.45	0.23	0.08	0.08	0.50	0.173	0.789
Solid Layer	54.8	8.83E+05	57%	5493	6.71E-02	2.55E-04	0.00	0.02	3.17	0.23	0.14	0.02	0.50	0.184	1.092

Table H1-C. Calculated Hydrogen Generation Rate as Mole Per Unit Waste Weight and Volume

Tank	HGR from radiolysis RC B/γ_{rad} (mole/kg-d)	HGR from radiolysis $RC^{alpha}{}_{rad}$ (mole/kg-d)	HGR from thermolysis RC_{therm} (mole/kg-d)	HGR from corrosion RC_{corr} (mole/kg-d)	Total HGR from model RC_{tot} (mole/kg-d)	HGR from radiolysis RC B/γ_{rad} (mole/m^3-s)	HGR from radiolysis $RC^{alpha}{}_{rad}$ (mole/m^3-s)	HGR from thermolysis RC_{therm} (mole/m^3-s)	HGR from corrosion RC_{corr} (mole/m^3-s)	Total HGR from model RC_{tot} (mole/m^3-s)
Supernatant	1.10E-07	4.34E-10	3.08E-07	8.01E-08	4.99E-07	1.50E-09	5.91E-12	4.20E-09	1.09E-09	6.80E-09
Solid Layer	6.32E-05	1.42E-06	1.46E-06	3.11E-07	6.64E-05	1.13E-06	2.54E-08	2.61E-08	5.58E-09	1.19E-06
Supernatant	1.10E-07	4.32E-10	3.08E-07	8.02E-08	4.99E-07	1.50E-09	5.88E-12	4.19E-09	1.09E-09	6.79E-09
Solid Layer	6.32E-05	1.42E-06	1.46E-06	3.11E-07	6.64E-05	1.13E-06	2.54E-08	2.61E-08	5.58E-09	1.19E-06
Supernatant	1.11E-07	4.17E-10	3.04E-07	8.10E-08	4.96E-07	1.50E-09	5.62E-12	4.10E-09	1.09E-09	6.69E-09
Solid Layer	6.32E-05	1.42E-06	1.46E-06	3.11E-07	6.64E-05	1.13E-06	2.54E-08	2.61E-08	5.58E-09	1.19E-06
Supernatant	1.12E-07	4.03E-10	3.00E-07	8.16E-08	4.94E-07	1.49E-09	5.40E-12	4.02E-09	1.09E-09	6.61E-09
Solid Layer	6.32E-05	1.42E-06	1.46E-06	3.11E-07	6.64E-05	1.13E-06	2.54E-08	2.61E-08	5.58E-09	1.19E-06
Supernatant	1.11E-07	3.92E-10	2.49E-07	8.21E-08	4.42E-07	1.47E-09	5.21E-12	3.31E-09	1.09E-09	5.88E-09
Solid Layer	6.32E-05	1.42E-06	1.46E-06	3.11E-07	6.64E-05	1.13E-06	2.54E-08	2.61E-08	5.58E-09	1.19E-06
Supernatant	1.12E-07	3.91E-10	2.97E-07	8.22E-08	4.91E-07	1.48E-09	5.19E-12	3.94E-09	1.09E-09	6.52E-09
Solid Layer	6.32E-05	1.42E-06	1.46E-06	3.11E-07	6.64E-05	1.13E-06	2.54E-08	2.61E-08	5.58E-09	1.19E-06
Supernatant	1.12E-07	3.79E-10	2.93E-07	8.27E-08	4.88E-07	1.47E-09	5.00E-12	3.87E-09	1.09E-09	6.44E-09
Solid Layer	6.32E-05	1.42E-06	1.46E-06	3.11E-07	6.64E-05	1.13E-06	2.54E-08	2.61E-08	5.58E-09	1.19E-06
Supernatant	1.11E-07	3.67E-10	2.90E-07	8.32E-08	4.85E-07	1.46E-09	4.82E-12	3.80E-09	1.09E-09	6.36E-09
Solid Layer	6.32E-05	1.42E-06	1.46E-06	3.11E-07	6.64E-05	1.13E-06	2.54E-08	2.61E-08	5.58E-09	1.19E-06

Table H1-D. Calculated Total Hydrogen Generation Rate In Dome Space

Tank	HGR from radiolysis G_{rad} B/γ (cfm)	HGR from radiolysis G_{rad}^{alpha} (cfm)	HGR from thermolysis G_{therm} (cfm)	HGR from corrosion G_{corr} (cfm)	Percent of HGR from radiolysis $(G_{rad}$ B/γ$)_{\%}$	Percent of HGR from radiolysis $(G_{rad}^{alpha})_{\%}$	Percent of HGR from thermolysis $(G_{therm})_{\%}$	Percent of HGR from corrosion $(G_{corr})_{\%}$	Total HGR from model G_{mod} (cfm)	Total HGR from model G_{mod} (L/day)
Supernatant	2.27E-04	8.93E-07	6.34E-04	1.65E-04	22.1%	8.70E-04	61.8%	16.1%	1.03E-03	42
Solid Layer	3.61E-02	8.12E-04	8.34E-04	1.78E-04	95.2%	2.14E-02	2.2%	0.5%	3.80E-02	1548
Supernatant	2.29E-04	8.95E-07	6.38E-04	1.66E-04	22.1%	8.66E-04	61.7%	16.1%	1.03E-03	42
Solid Layer	3.61E-02	8.12E-04	8.34E-04	1.78E-04	95.2%	2.14E-02	2.2%	0.5%	3.80E-02	1548
Supernatant	2.43E-04	9.13E-07	6.65E-04	1.77E-04	22.4%	8.40E-04	61.2%	16.3%	1.09E-03	44
Solid Layer	3.61E-02	8.12E-04	8.34E-04	1.78E-04	95.2%	2.14E-02	2.2%	0.5%	3.80E-02	1548
Supernatant	2.57E-04	9.28E-07	6.91E-04	1.88E-04	22.6%	8.17E-04	60.8%	16.5%	1.14E-03	46
Solid Layer	3.61E-02	8.12E-04	8.34E-04	1.78E-04	95.2%	2.14E-02	2.2%	0.5%	3.80E-02	1548
Supernatant	2.66E-04	9.40E-07	5.97E-04	1.97E-04	25.1%	8.86E-04	56.3%	18.6%	1.06E-03	43
Solid Layer	3.61E-02	8.12E-04	8.34E-04	1.78E-04	95.2%	2.14E-02	2.2%	0.5%	3.80E-02	1548
Supernatant	2.70E-04	9.42E-07	7.16E-04	1.98E-04	22.7%	7.95E-04	60.4%	16.7%	1.18E-03	48
Solid Layer	3.61E-02	8.12E-04	8.34E-04	1.78E-04	95.2%	2.14E-02	2.2%	0.5%	3.80E-02	1548
Supernatant	2.82E-04	9.55E-07	7.40E-04	2.09E-04	22.9%	7.76E-04	60.1%	17.0%	1.23E-03	50
Solid Layer	3.61E-02	8.12E-04	8.34E-04	1.78E-04	95.2%	2.14E-02	2.2%	0.5%	3.80E-02	1548
Supernatant	2.93E-04	9.68E-07	7.64E-04	2.19E-04	22.9%	7.58E-04	59.8%	17.2%	1.28E-03	52
Solid Layer	3.61E-02	8.12E-04	8.34E-04	1.78E-04	95.2%	2.14E-02	2.2%	0.5%	3.80E-02	1548

Table H2-A. Steady-State Gas Concentrations, Release Rates and Flammability Levels Under Normal Ventilation Conditions.

Tank	Ammonia headspace concen. $[NH_3]$ (%)	Methane headspace concen. $[CH_4]$ (%)	N_2O headspace concen. $[N_2O]$ (%)	Waste volume V_w (kgal)	Headspace volume V_h (ft^3)	Normal ventilation rate $(Vr)_{norm}$ (cfm)	Steady-state flammability at normal condition (% LFL)	Ammonia release rate $Rr(NH_3)$ (cfm)	N_2O release rate $Rr(N_2O)$ (cfm)	Model hydrogen release rate $Rr(H_2)$ (cfm)	Methane release rate $Rr(CH_4)$ (cfm)
241-AY-102	0.0004	0.0001	0.0010	864	72,584	250	0.40%	1.07E-03	2.50E-03	3.90E-02	3.61E-04
241-AY-102	0.0004	0.0001	0.0010	870	71,742	250	0.40%	1.07E-03	2.50E-03	3.90E-02	3.61E-04
241-AY-102	0.0004	0.0001	0.0010	917	65,500	250	0.40%	1.07E-03	2.50E-03	3.91E-02	3.61E-04
241-AY-102	0.0004	0.0001	0.0010	963	59,337	250	0.40%	1.07E-03	2.50E-03	3.91E-02	3.61E-04
241-AY-102	0.0004	0.0001	0.0010	1,002	54,084	250	0.40%	1.07E-03	2.50E-03	3.90E-02	3.61E-04
241-AY-102	0.0004	0.0001	0.0010	1,009	53,242	250	0.40%	1.07E-03	2.50E-03	3.92E-02	3.61E-04
241-AY-102	0.0004	0.0001	0.0010	1,054	47,187	250	0.40%	1.07E-03	2.50E-03	3.92E-02	3.61E-04
241-AY-102	0.0004	0.0001	0.0010	1,099	41,171	250	0.40%	1.07E-03	2.50E-03	3.93E-02	3.61E-04

Table H2-B Steady-State Flammability Under Barometric Breathing and Time to 25% of the LFL under Zero Vent

Tank	Off-Normal Barometric Breathing Rate $(Vr)_{bb}$ (cfm)	Steady State Hydrogen Concen. $[H_2]$ (%)	Steady State Ammonia Concen. $[NH_3]$ (%)	Steady State Methane Concen. $[CH_4]$ (%)	Steady State N_2O Concen. $[N_2O]$ (%)	Steady State Total Flammab (%)	Time to Reach 25% of the LFL under Diffusion (days)	Time to Reach 100% of the LFL under diffusion (days)	Minimum Vent Rate to Keep below 25% LFL (cfm)	Minimum Vent Rate to Keep below 100% LFL (cfm)	Waste level D_w (inch)
241-AY-102	0.23	17.19	0.02	0.16	1.10	433.2	12	43	3.94	0.98	313.8
241-AY-102	0.22	17.40	0.02	0.16	1.12	438.3	11	43	3.94	0.98	316.0
241-AY-102	0.20	19.08	0.02	0.18	1.22	480.7	10	40	3.95	0.98	333.0
241-AY-102	0.19	21.09	0.02	0.19	1.35	531.3	9	37	3.95	0.99	349.7
241-AY-102	0.17	23.10	0.02	0.21	1.48	577.4	9	38	3.95	0.99	364.0
241-AY-102	0.17	23.54	0.02	0.22	1.50	592.9	8	33	3.96	0.99	366.3
241-AY-102	0.15	26.59	0.02	0.24	1.70	669.7	7	30	3.96	0.99	382.7
241-AY-102	0.13	30.51	0.02	0.28	1.94	768.4	6	26	3.97	0.99	399.1

APPENDIX I

PEER REVIEW CHECKLIST

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APPENDIX I

PEER REVIEW CHECKLIST

CHECKLIST FOR TECHNICAL PEER REVIEW

Document Reviewed: RPP-5926, 2004, Steady-State Flammable Gas Release Rate Calculation and Lower Flammability Level Evaluation for Hanford Tank Waste, Rev. 4, CH2M HILL Hanford Group, Inc., Richland, Washington.

Scope of Review (e.g., document section or portion of calculation): Review included the main body of the document and revised calculations pertaining to the Hydrogen Generation Rate.

Yes	No	NA*	
[X]	[ ]	[ ]	1. Previous reviews are complete and cover the analysis, up to the scope of this review, with no gaps.
[X]	[ ]	[ ]	2. Problem is completely defined.
[ ]	[ ]	[X]	3. Accident scenarios are developed in a clear and logical manner.
[X]	[ ]	[ ]	4. Analytical and technical approaches and results are reasonable and appropriate. *(ORP QAPP criterion 2.8)*
[X]	[ ]	[ ]	5. Necessary assumptions are reasonable, explicitly stated, and supported. *(ORP QAPP criterion 2.2)*
[X]	[ ]	[ ]	6. Computer codes and data files are documented.
[X]	[ ]	[ ]	7. Data used in calculations are explicitly stated.
[X]	[ ]	[ ]	8. Bases for calculations, including assumptions and data, are consistent with the supported safety basis document (e.g., the Tank Farms Final Safety Analysis Report).
[X]	[ ]	[ ]	9. Data were checked for consistency with original source information as applicable. *(ORP QAPP criterion 2.9)*
[X]	[ ]	[ ]	10. For both qualitative and quantitative data, uncertainties are recognized and discussed, as appropriate. *(ORP QAPP criterion 2.17)*
[ ]	[ ]	[X]	11. Mathematical derivations were checked including dimensional consistency of results. *(ORP QAPP criterion 2.16)*
[X]	[ ]	[ ]	12. Models are appropriate and were used within their established range of validity or adequate justification was provided for use outside their established range of validity.
[X]	[ ]	[ ]	13. Spreadsheet results and all hand calculations were verified.
[X]	[ ]	[ ]	14. Calculations are sufficiently detailed such that a technically qualified person can understand the analysis without requiring outside information. *(ORP QAPP criterion 2.5)*
[X]	[ ]	[ ]	15. Software input is correct and consistent with the document reviewed.
[X]	[ ]	[ ]	16. Software output is consistent with the input and with the results reported in the document reviewed.
[X]	[ ]	[ ]	17. Software verification and validation are addressed adequately. *(ORP QAPP criterion 2.6)*
[X]	[ ]	[ ]	18. Limits/criteria/guidelines applied to the analysis results are appropriate and referenced. Limits/criteria/guidelines were checked against references. *(ORP QAPP criterion 2.9)*
[X]	[ ]	[ ]	19. Safety margins are consistent with good engineering practices.
[X]	[ ]	[ ]	20. Conclusions are consistent with analytical results and applicable limits.

CHECKLIST FOR TECHNICAL PEER REVIEW

[X]	[ ]	[ ]	21. Results and conclusions address all points in the purpose. *(ORP QAPP criterion 2.3)*
[ ]	[ ]	[X]	22. All references cited in the text, figures, and tables are contained in the reference list.
[ ]	[ ]	[X]	23. Reference citations (e.g., title and number) are consistent between the text callout and the reference list.
[ ]	[ ]	[X]	24. Only released (i.e., not draft) references are cited. *(ORP QAPP criterion 2.1)*
[ ]	[ ]	[X]	25. Referenced documents are retrievable or otherwise available.
[ ]	[ ]	[X]	26. The most recent version of each reference is cited, as appropriate. *(ORP QAPP criterion 2.1)*
[ ]	[ ]	[X]	27. There are no duplicate citations in the reference list.
[ ]	[ ]	[X]	28. Referenced documents are spelled out (title and number) the first time they are cited.
[ ]	[ ]	[X]	29. All acronyms are spelled out the first time they are used.
[ ]	[ ]	[X]	30. The Table of Contents is correct.
[ ]	[ ]	[X]	31. All figure, table, and section callouts are correct.
[ ]	[ ]	[X]	32. Unit conversions are correct and consistent.
[ ]	[ ]	[X]	33. The number of significant digits is appropriate and consistent.
[ ]	[ ]	[X]	34. Chemical reactions are correct and balanced.
[ ]	[ ]	[X]	35. All tables are formatted consistently and are free of blank cells.
[ ]	[ ]	[X]	36. The document is complete (pages, attachments, and appendices) and in the proper order.
[ ]	[ ]	[X]	37. The document is free of typographical errors.
[ ]	[ ]	[X]	38. The tables are internally consistent.
[X]	[ ]	[ ]	39. The document was prepared in accordance with HNF-2353, Section 4.3, Attachment B, "Calculation Note Format and Preparation Instructions".
[X]	[ ]	[ ]	40. Impacted documents are appropriately identified in Blocks 7 and 25 of the Engineering Change Notice (form A-6003-563.1).
[X]	[ ]	[ ]	41. If more than one Technical Peer Reviewer was designated for this document, an overall review of the entire document was performed after resolution of all Technical Peer Review comments and confirmed that the document is self-consistent and complete.
[x]	[ ]	[ ]	**Concurrence**

D.C. Hedengren / D. C. Hedengren 10/27/04

Steven Barker / [signature] 10/27/04

Reviewer (Printed Name and Signature) — Date

* If No or NA is chosen, provide an explanation on this form.

3. Accident scenarios are not discussed
11. This paper contains derivative work only.
34. no chemical reactions discussed
22-33, 35-38 are covered under another peer review.

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CHECKLIST FOR TECHNICAL PEER REVIEW

Document Reviewed: RPP-5926, Rev. 4 Tech Edit

Scope of Review (e.g., document section or portion of calculation): Review included the main body of the document and Appendices A, B, C, D, E, J, K, and M and includes all currently active spreadsheets associated with the document.

Yes	No	NA*	
[ ]	[ ]	[X]	1. Previous reviews are complete and cover the analysis, up to the scope of this review, with no gaps.
[ ]	[ ]	[X]	2. Problem is completely defined.
[ ]	[ ]	[X]	3. Accident scenarios are developed in a clear and logical manner.
[ ]	[ ]	[X]	4. Analytical and technical approaches and results are reasonable and appropriate. *(ORP QAPP criterion 2.8)*
[ ]	[ ]	[X]	5. Necessary assumptions are reasonable, explicitly stated, and supported. *(ORP QAPP criterion 2.2)*
[ ]	[ ]	[X]	6. Computer codes and data files are documented.
[ ]	[ ]	[X]	7. Data used in calculations are explicitly stated.
[ ]	[ ]	[X]	8. Bases for calculations, including assumptions and data, are consistent with the supported safety basis document (e.g., the Tank Farms Final Safety Analysis Report).
[ ]	[ ]	[X]	9. Data were checked for consistency with original source information as applicable. *(ORP QAPP criterion 2.9)*
[ ]	[ ]	[X]	10. For both qualitative and quantitative data, uncertainties are recognized and discussed, as appropriate. *(ORP QAPP criterion 2.17)*
[ ]	[ ]	[X]	11. Mathematical derivations were checked including dimensional consistency of results. *(ORP QAPP criterion 2.16)*
[ ]	[ ]	[X]	12. Models are appropriate and were used within their established range of validity or adequate justification was provided for use outside their established range of validity.
[ ]	[ ]	[X]	13. Spreadsheet results and all hand calculations were verified.
[ ]	[ ]	[X]	14. Calculations are sufficiently detailed such that a technically qualified person can understand the analysis without requiring outside information. *(ORP QAPP criterion 2.5)*
[ ]	[ ]	[X]	15. Software input is correct and consistent with the document reviewed.
[ ]	[ ]	[X]	16. Software output is consistent with the input and with the results reported in the document reviewed.
[ ]	[ ]	[X]	17. Software verification and validation are addressed adequately. *(ORP QAPP criterion 2.6)*
[ ]	[ ]	[X]	18. Limits/criteria/guidelines applied to the analysis results are appropriate and referenced. Limits/criteria/guidelines were checked against references. *(ORP QAPP criterion 2.9)*
[ ]	[ ]	[X]	19. Safety margins are consistent with good engineering practices.
[ ]	[ ]	[X]	20. Conclusions are consistent with analytical results and applicable limits.

CHECKLIST FOR TECHNICAL PEER REVIEW

[ ]	[ ]	[X]	21. Results and conclusions address all points in the purpose. *(ORP QAPP criterion 2.3)*
[X]	[ ]	[ ]	22. All references cited in the text, figures, and tables are contained in the reference list.
[X]	[ ]	[ ]	23. Reference citations (e.g., title and number) are consistent between the text callout and the reference list.
[X]	[ ]	[ ]	24. Only released (i.e., not draft) references are cited. *(ORP QAPP criterion 2.1)*
[X]	[ ]	[ ]	25. Referenced documents are retrievable or otherwise available.
[X]	[ ]	[ ]	26. The most recent version of each reference is cited, as appropriate. *(ORP QAPP criterion 2.1)*
[X]	[ ]	[ ]	27. There are no duplicate citations in the reference list.
[X]	[ ]	[ ]	28. Referenced documents are spelled out (title and number) the first time they are cited.
[X]	[ ]	[ ]	29. All acronyms are spelled out the first time they are used.
[X]	[ ]	[ ]	30. The Table of Contents is correct.
[X]	[ ]	[ ]	31. All figure, table, and section callouts are correct.
[X]	[ ]	[ ]	32. Unit conversions are correct and consistent.
[X]	[ ]	[ ]	33. The number of significant digits is appropriate and consistent.
[ ]	[ ]	[X]	34. Chemical reactions are correct and balanced.
[X]	[ ]	[ ]	35. All tables are formatted consistently and are free of blank cells.
[X]	[ ]	[ ]	36. The document is complete (pages, attachments, and appendices) and in the proper order.
[X]	[ ]	[ ]	37. The document is free of typographical errors.
[X]	[ ]	[ ]	38. The tables are internally consistent.
[X]	[ ]	[ ]	39. The document was prepared in accordance with HNF-2353, Section 4.3, Attachment B, "Calculation Note Format and Preparation Instructions".
[ ]	[ ]	[X]	40. Impacted documents are appropriately identified in Blocks 7 and 25 of the Engineering Change Notice (form A-6003-563.1).
[X]	[ ]	[ ]	41. If more than one Technical Peer Reviewer was designated for this document, an overall review of the entire document was performed after resolution of all Technical Peer Review comments and confirmed that the document is self-consistent and complete.
[x]	[ ]	[ ]	**Concurrence**

Leona Armot — 10/27/04

Reviewer (Printed Name and Signature) — Date

* If No or NA is chosen, provide an explanation on this form.

Tech. edit