Petroleum Refining Process Waste
Listing Determination

Additional Groundwater Pathway Risk Analyses

Supplemental Background Document

US Environmental Protection Agency
Office of Solid Waste
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (cont'd)

Page

1.0 INTRODUCTION

1.1 GENERAL BACKGROUND

This document describes groundwater pathway analyses performed to support the petroleum refining listing determination. These analyses supplement the analyses carried out earlier as part of the EPA's proposal for the petroleum refining listing determination (60 FR 57747, November 20, 1995; USEPA, 1995b) and EPA's Notice of Data Availability (NODA, 62 FR 16747, April 8, 1997; USEPA, 1997a) . The analyses were designed to determine the potential exposure, via the groundwater pathway, to human receptors from petroleum refining wastes, being managed and/or disposed in land management units. The exposure is expressed in terms of the contaminant concentration at a groundwater extraction well located down-gradient from the waste-management unit.

The contaminant concentrations were obtained using the EPA's Composite Model for Leachate Migration with Transformation Products (EPACMTP) (USEPA, 1996b, c, d; USEPA, 1997b). EPACMTP simulates the subsurface fate and transport of waste constituents leaching from land disposal units. Wastestreams and waste constituents of potential concern are identified by comparing the model predicted exposure concentrations to health-based numbers (HBNs) for both carcinogens and non-carcinogens.

In the current modeling analyses, revisions have been made to several modeling assumptions such as landfill active lifetime and offsite landfill area distributions. The revisions were made based on EPA's reevaluation of the petroleum refining data in response to public comment on the NODA.

1.2 ADDITIONAL ANALYSES

A number of public comments were received challenging the modeling assumptions used for the groundwater pathway analyses conducted in support of the Petroleum Refining Waste NODA. The Agency disagreed with many of the comments and has addressed those comments individually in the comment-response document (USEPA, 1998). There are however several issues which EPA agreed required revisions to the groundwater pathway analysis. Those issues were as follows:

- Active Offsite Landfill Life
- Median Offsite Landfill Area
- Appropriate Database for Landfill Area Distributions
- Sensitivity to Exposure Duration

- Dispersivity Values used in Two High-End Parameter Analysis
- Off-spec Product and Fines Volume Distribution for Monte Carlo Analysis

In addition to the changes noted above, the Agency has also corrected the health-based number (HBN) for benz(a)anthracene (BaA). The current analysis uses the correct value of 4.0×10^{-4} mg/l (corresponding to a risk level of 1E-6) rather than the value of 2.0×10^{-5} mg/l which was used in the previous analyses (U.S.EPA, 1995b; 1997a).

1.3 WASTESTREAMS AND MANAGEMENT SCENARIOS

The 1994 consent decree mandating investigation of the Petroleum Refining Industry indentified 14 specific residuals or wastestreams for which the Agency must make a listing determination (listing wastestreams) and 15 wastestreams for which the Agency must conduct an industry study (study wastestreams). A complete description of listing and study wastestreams is presented in the appropriate background documents (USEPA, 1995a and USEPA, 1996a). Of the 12 listing wastestreams evaluated in the 1997 analysis, four showed very low groundwater risk and were therefore not evaluated in the current analysis. The eight wastestreams evaluated in the current (1998) analysis are listed in Table 1.1. Both single-wastestream disposal (baseline) and multi-wastestream disposal (codisposal) scenarios have been reevaluated; however, only offsite landfills have been reevaluated because the Agency does not believe any changes are required in the onsite landfill assumptions (see the comment and response document; USEPA, 1998). Table 1.1 presents a summary of the modeled listing wastestreams and landfill modeling scenarios. The study wastestreams (Table 1.2) were included only in the codisposal scenario.

1.4 METHODOLOGY

1.4.1 Approach

The modeling approach for both the deterministic sensitivity analyses and the Monte Carlo analysis are identical to the approach described in Section 2 of the Supplemental Background Document for the Groundwater Pathway Risk Analysis (USEPA, 1997a) with the following exceptions:

- Waste volumes were based on an active life of 30 years rather than 20 years (seeSection 2.1).
- Areas were selected from a distribution of municipal landfill areas rather than industrial landfills (see Section 2.3).

Table 1.1 Petroleum Refining Listing Wastestreams and Landfill Scenarios.

Wastestream	Landfill Scenarios			
	Deterministic Sensitivity Analysis		Monte Carlo Analysis	
	On-site	Off-site	On-site	Off-site
Crude Oil Tank Sediment		x		x
CSO Sediment		x		x
Contingent CSO Sediment		x		x
Unleaded Gasoline Tank Sediment		x		x
Off-spec Product Fines (Coke Fines)		x		x
HF Alkylation Sludge		x		x
Hydrotreating Catalyst		x		x
Hydrorefining Catalyst		x		x
Codisposal [1]		x[2]		x

1. The Codisposal landfill scenario consisted of all wastestreams listed above except hydrotreating and hydrorefining catalysts plus study wastestreams listed in Table 1.2.
2. A two high-end parameter analysis was performed for codisposal based on the results of a 1995 two high-end parameter sensitivity analysis for crude tank sediment. Downgradient well distance (X-well) and landfill area were selected as the two high-end parameters.

1.4.2 Input Data

The data sources are described in the 1997 Supplemental Background Document for Groundwater Pathway Analysis (USEPA, 1997a; Section 2.2 and Appendices A-D). All of the input data for the current analyses are identical to the data described in that document with the following exceptions:

- The waste volumes are based on 30 year rather than 20 year active lives (see Section 2.1) and are therefore 1.5 times greater and ,
- The distribution of Off-spec Product and Fines waste volumes has been updated (see section 4.1).

Table 1.2 Petroleum Refining Study Wastestreams Included in the Codisposal Analysis.

Wastestream		Codisposal	
		On-site	Off-site
I.	Desalting Sludge		x
II.	Extraction Clay		x
III.	HF Treating Clay		x
IV.	Isomerization Clay		x
V.	Phosphoric Acid Catalyst		x
VI.	Process Sludge-Residual Upgrade		x
VII.	Off-spec Sulfur		x
VIII.	Treating Clay from Clay-Filtering		x
IX.	Hydrocracking Catalyst [1]		x
X.	Residual Oil Tank Sludge		x

1. Codisposal analysis was performed both with and without hydrocracking catalyst

2.0 REVISED TWO PARAMETER SENSITIVITY ANALYSES

Revised sensitivity analyses have been conducted for offsite landfill disposal of petroleum refining wastes. The following issues were addressed in the revised sensitivity analyses: (1) active landfill life, (2) use of correct median industrial landfill area, (3) use of municipal versus industrial landfill areas, and (4) use of correct dispersivity values.

2.1 ACTIVE LANDFILL LIFE

In both the Proposal analyses and the NODA analyses an active landfill life of 20 years was assumed for both onsite and offsite landfills (USEPA, 1995b and 1997a). Review of landfill lifetime data from the RCRA §3007 Survey suggests that 20 years is reasonable for onsite landfills (see comment and response document; USEPA, 1998). However, an OSW survey of municipal landfills (USEPA, 1988) suggests that 30 years may be more representative for offsite landfills (USEPA, 1998). Consequently, revised analyses were conducted for both 20 and 30 year active lives to evaluate the impact of increasing the active life assumption.

2.2 REVISED MEDIAN LANDFILL AREA

One commenter correctly noted that the median landfill area used in the offsite landfill two parameter sensitivity analysis seemed unreasonably small, 2,020 m^2 (see comment and response document; US EPA, 1998). In fact, the correct median area should have been 20,200 m^2. The updated median landfill area was used in both the 20 and 30 year active life sensitivity analyses.

2.3 MUNICIPAL LANDFILL AREA DISTRIBUTION

In the previous petroleum refining waste analyses, offsite landfills areas were assumed to be represented by the Industrial Subtitle D landfill area distribution. However, one commenter suggested that the Industrial Subtitle D Landfill survey consisted of onsite industrial landfills not offsite units (see comment and response document; USEPA, 1998). Therefore, the Agency believes the municipal landfill area distribution may be more appropriate (USEPA, 1988). Consequently, revised sensitivity analyses were conducted using both municipal and industrial landfill area distributions. A comparison of municipal and industrial landfill areas is shown in Table 2.1.

Table 2.1 Landfill Area Distributions

Percentile	Area (m^2)	
	Industrial	Municipal
10th	809	8,094
50th	20,200	60,705
90th	162,000	420,888
Maximum	3,120,000	9,348,570

2.4 REVISED DISPERSIVITY VALUES

One commenter correctly noted that a single dispersivity value was used for all two high-end parameter analyses regardless of well location. To correct this inconsistency, dispersivity values were adjusted for the distance between the well location and the waste management unit based on the Gelhar distribution (USEPA, 1997b) for each simulation. In addition, a sensitivity analysis was performed for crude oil tank sediment to compare well concentrations using the single fixed dispersivity from the previous analyses with well concentrations using the distance-adjusted dispersivity. The effect of the change in dispersivity was minimal.

2.5 SUMMARY OF RESULTS

A summary of the revised two high-end parameter sensitivity analyses is shown in Tables 2.2 and 2.3 for the 20 year and 30 year analyses respectively. With the exception of the hydrotreating catalyst-municipal area-arsenic scenario, in all cases, Xwell (downgradient well distance) was one of the two most sensitive parameters for each wastestream. Other sensitive parameters included infiltration, waste volume, TCLP concentration, and waste concentration.

Table 2.2 Summary of Two High-End Parameter Sensitivity Analysis for 20 Year Active Landfill Life

Waste Stream	Constituent	Two Parameters at High End	Area (m2)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	Maximum 9-year Avg. Well Conc.
CSO-Industrial	Benzene	Infil & Xwell	20200	2635.71	0.059	1.2	20.3	1.4	**0.46**	**102**	60.76	6.5	1.52E-02
CSO-Municipal	Benzene	Xwell & Wst Vol	60705	**44900**	0.059	1.2	20.3	1.4	0.17	**102**	93.79	6.5	2.15E-02
Cont-CSO-Industrial	Benzene	Infil & Xwell	20200	2500	0.059	1.2	20.3	1.4	**0.46**	**102**	60.76	6.5	1.50E-02
Cont-CSO-Municipal	Benzene	Xwell & Wst Vol	60705	**44900**	0.059	1.2	20.3	1.4	0.17	**102**	93.79	6.5	2.15E-02
COTS-Industrial	Benzene	Infil & Xwell	20200	457.24	0.679	58.72	86.5	1.52	**0.46**	**102**	60.76	6.5	1.57E-01
COTS-Municipal	Benzene	Xwell & Wst Vol	60705	**8315.8**	0.679	58.72	86.5	1.52	0.17	**102**	93.79	6.5	2.38E-01
Hydrotreating-Industrial	Benzene	Wst. Conc. & X-Well	20200	476	7.9	**500**	63.3	0.84	0.17	**102**	60.76	6.5	6.02E-01
Hydrotreating-Municipal	Benzene	Wst. Conc. & X-Well	60705	476	7.9	**500**	63.3	0.84	0.17	**102**	93.79	6.5	5.73E-01
Hydrotreating-Industrial	Arsenic	Wst. Conc. & X-Well	20200	476	1.1	**1600**	**1454.5**	0.84	0.17	**102**	60.76	6.5	2.24E-02
Hydrotreating-Municipal	Arsenic	Wst. Vol & Wst Conc	60705	**1842.9**	1.1	**1600**	**1454.5**	0.84	0.17	430	117.75	6.5	1.66E-02
Off-Spec Prod. and Fines Ind.[1]	Benz(a)anthracene	Xwell & Wst Vol	20200	**10460.3**	0.013	12	923.1	1.26	0.17	**102**	60.76	6.5	6.39E-04
Off-Spec Prod. and Fines Mun.[1]	Benz(a)anthracene	Xwell & Wst Vol	60705	**10460.3**	0.013	12	923.1	1.26	0.17	**102**	93.79	6.5	6.96E-04
Off-Spec Prod. and Fines Ind.[2]	Benz(a)anthracene	X-well & TCLP	20200	1439.68	0.013	12	923.1	1.26	0.17	**102**	60.76	6.5	2.11E-04
Off-Spec Prod. and Fines Mun.[2]	Benz(a)anthracene	X-well & TCLP	60705	1439.68	0.013	12	923.1	1.26	0.17	**102**	93.79	6.5	1.39E-04
Hydrorefining-Industrial	Benzene	Infil & Xwell	20200	1476	1.49	43.73	29.3	1.2	**0.46**	**102**	60.76	6.5	3.19E-01
Hydrorefining-Municipal	Benzene	Xwell & Wst Vol	60705	**8333.3**	1.49	43.73	29.3	1.2	0.17	**102**	93.79	6.5	4.20E-01
Hydrorefining-Industrial	Arsenic	Xwell & Wst Vol	20200	**8333.3**	13.71	493.3	36.0	1.2	0.17	**102**	60.76	6.5	1.77E-01
Hydrorefining-Municipal	Arsenic	Xwell & Wst Vol	60705	**8333.3**	13.71	493.3	36.0	1.2	0.17	**102**	93.79	6.5	1.18E-01
Unl. Gas. Tank Sed.-Industrial	Benzene	Xwell & Wst Vol	20200	**1038.57**	0.75	51.9	69.2	1.4	0.17	**102**	60.76	6.5	9.94E-02
Unl. Gas. Tank Sed.-Municipal	Benzene	Xwell & Wst Vol	60705	**1038.57**	0.75	51.9	69.2	1.4	0.17	**102**	93.79	6.5	1.41E-01
HF Alkylation Sludge-Industrial	Benzene	Infil & Xwell	20200	24542.4	0.076	4.3	56.6	1.18	**0.46**	**102**	60.76	6.5	3.73E-02
HF Alkylation Sludge-Municipal	Benzene	TCLP & Xwell	60705	24542.4	**0.18**	4.3	23.9	1.18	0.17	**102**	93.79	6.5	6.06E-02

1. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value
2. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value

Table 2.3 Summary of Two High-End Parameter Sensitivity Analysis for 30 Year Active Landfill Life

Waste Stream	Constituent	Two Parameters at High End	Area (m2)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	Maximum 9-year Avg. Well Conc.
CSO-Industrial	Benzene	Infil & Xwell	20200	3953.57	0.059	1.2	20.34	1.4	**0.46**	**102**	60.76	6.5	1.82E-02
CSO-Municipal	Benzene	Xwell & Wst Vol	60705	**67350**	0.059	1.2	20.34	1.4	0.17	**102**	93.79	6.5	2.21E-02
Cont-CSO-Industrial	Benzene	X-Well & Infil	20200	3750	0.059	1.2	20.34	1.4	**0.46**	**102**	60.76	6.5	1.78E-02
Cont-CSO-Municipal	Benzene	Wst. Vol & X-Well	60705	**67350**	0.059	1.2	20.34	1.4	0.17	**102**	93.79	6.5	2.21E-02
COTS-Industrial	Benzene	Infil & Xwell	20200	685.86	0.679	58.72	86.48	1.52	**0.46**	**102**	60.76	6.5	1.91E-01
COTS-Municipal	Benzene	Xwell & Wst Vol	60705	**12437.7**	0.679	58.72	86.48	1.52	0.17	**102**	93.79	6.5	2.39E-01
Hydrotreating-Industrial	Benzene	Wst. Conc. & X-Well	20200	714	7.9	**500**	63.29	0.84	0.17	**102**	60.76	6.5	7.41E-01
Hydrotreating-Municipal	Benzene	Wst. Conc. & X-Well	60705	714	7.9	**500**	63.29	0.84	0.17	**102**	93.79	6.5	7.97E-01
Hydrotreating-Industrial	Arsenic	Wst. Conc. & X-Well	20200	714	1.1	**1600**	1454.55	0.84	0.17	**102**	60.76	6.5	3.23E-02
Hydrotreating-Municipal	Arsenic	Wst. Vol & Wst Conc	60705	**2763.9**	1.1	**1600**	**1454.55**	0.84	0.17	430	117.75	6.5	2.41E-02
Off-Spec Prod. and Fines Ind.[1]	Benz(a)anthracene	Wst. Vol & X-Well	20200	**15690.45**	0.013	12	923.08	1.26	0.17	**102**	60.76	6.5	7.02E-04
Off-Spec Prod. and Fines Mun.[1]	Benz(a)anthracene	Wst. Vol & X-Well	60705	**15690.45**	0.013	12	923.08	1.26	0.17	**102**	93.79	6.5	8.56E-04
Off-Spec Prod. and Fines Ind.[2]	Benz(a)anthracene	X-well & TCLP	20200	2159.52	0.013	12	923.08	1.26	0.17	**102**	60.76	6.5	2.91E-04
Off-Spec Prod. and Fines Mun.[2]	Benz(a)anthracene	X-well & TCLP	60705	2159.52	0.013	12	923.08	1.26	0.17	**102**	93.79	6.5	2.03E-04
Hydrorefining-Industrial	Benzene	Infil & Xwell	20200	2214	1.49	43.73	29.35	1.2	**0.46**	**102**	60.76	6.5	3.93E-01
Hydrorefining-Municipal	Benzene	Xwell & Wst Vol	60705	**12500**	1.49	43.73	29.35	1.2	0.17	**102**	93.79	6.5	4.59E-01
Hydrorefining-Industrial	Arsenic	Xwell & Wst Vol	20200	**12500**	13.71	493.3	35.98	1.2	0.17	**102**	60.76	6.5	2.61E-01
Hydrorefining-Municipal	Arsenic	Xwell & Wst Vol	60705	**12500**	13.71	493.3	35.98	1.2	0.17	**102**	93.79	6.5	1.77E-01
Unl. Gas. Tank Sed.-Industrial	Benzene	Xwell & Wst Vol	20200	**1557.85**	0.75	51.9	69.20	1.4	0.17	**102**	60.76	6.5	1.08E-01
Unl. Gas. Tank Sed.-Municipal	Benzene	Xwell & Wst Vol	60705	**1557.85**	0.75	51.9	69.20	1.4	0.17	**102**	93.79	6.5	1.70E-01
HF Alkylation Sludge-Industrial	Benzene	Area & Xwell	**162000**	36813.6	0.076	4.3	56.58	1.18	0.17	**102**	142.35	6.5	3.92E-02
HF Alkylation Sludge-Municipal	Benzene	TCLP & xwell	60705	36813.6	**0.18**	4.3	23.89	1.18	0.17	**102**	93.79	6.5	6.36E-02

1. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value
2. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value

3.0 TWO PARAMETER SENSITIVITY TO EXPOSURE DURATION

One commenter noted that exposure duration was included in the nongroundwater pathway sensitivity analysis, while a fixed exposure duration of 9 years was assumed for the groundwater pathway analysis (see comment and response document; USEPA, 1998). To address this comment, two parameter sensitivity analyses including exposure duration as a parameter were conducted for three wastestreams: HF alkylation sludge, hydrorefining catalyst, and unleaded gasoline tank sediment. Results of the analyses showed that exposure duration was never a sensitive parameter, and inclusion of exposure duration in the sensitivity analyses had no impact on selection of the two high-end parameters and consequently had no impact on the two high-end parameter analysis.

The results of the two parameter sensitivity analyses including exposure duration as a sensitive parameter are presented in Appendix B, Tables B.1 through B.8.

4.0 REVISED MONTE CARLO ANALYSES

Revised Monte Carlo Analyses of all wastestreams showing risk levels above 1.0×10^{-6} in the 1997 NODA analysis have been performed for offsite disposal. The revised analyses use the same Monte Carlo Approach discussed in the March 1997 Supplemental Background Document Groundwater Pathway Risk Analysis (U.S.EPA, 1997a) with several fundamental changes in modeling assumptions and data used. The changes were made to address the major comments discussed in Section 2, specifically landfill active life and use of municipal area distributions.

4.1 OFF- SPEC PRODUCT AND FINES VOLUME DISTRIBUTION

In the NODA comments it was noted that there seemed to be a discrepancy between the Off-spec Product and Fines waste volume distribution used for the Monte Carlo analysis and that used for the two high-end parameter analysis. That discrepancy was investigated and it was determined that a quantity of Off-spec Product and Fines waste sold as product was inadvertently listed as a quantity sent to an offsite landfill. That incorrect listing was identified and removed from the offsite landfill Off-spec Product and Fines waste quantity distribution. The updated volume distribution was used in the current Monte Carlo analysis and is listed in Table 4.1. Results of the Monte Carlo analysis are discussed in Section 5.

Table 4.1 Off-Spec Product and Fines Volume Distribution

Facility I.D.	1992 Waste Quantity (MT/year) [1]	30 Year Waste Volume (m^3) [2]
8	12	316.5
14	535	14,079
15	10	262.5
25	91	2,386.5
35	548	14,421
67	659	17,341.5

1. Reported in RCRA §3007 Survey Responses
2. 30 year waste volume = 1992 waste quantity (MT/year)/waste density (MT/m^3) * 30 years

4.2 MONTE CARLO ANALYSES WITH 30 YEAR ACTIVE LIFE AND MUNICIPAL LANDFILL AREA DISTRIBUTIONS

Monte Carlo analyses were performed assuming 30 year active landfill lives and municipal landfill area distributions. In addition, to better assess the impact of those changes in model assumptions, analyses were performed for select wastestreams (HF alkylation sludge and hydrorefining catalyst) with 20 year active landfill lives and municipal area distributions and 30 year active lives and industrial area distributions. Those results are presented in
Table 5.10.

The municipal landfill area distribution used for the Monte Carlo analysis is shown in Table 4.2

Table 4.2 Municipal Landfill Area Distribution

Area (m^2)	Cumulative Probability
4,000	0.000
8,094	0.100
20,200	0.250
60,705	0.500
194,000	0.750
420,888	0.900
9,348,570	1.000

5.0 RESULTS OF REVISED 1998 ANALYSES

A summary of risks for both the two high-end parameter analysis and the Monte Carlo analysis is shown in Table 5.1. High-end risks for industrial versus municipal landfill area assumptions are shown in Tables 5.2 and 5.3. Table 5.2 compares industrial landfill areas versus municipal landfill areas for a 20 year active life and Table 5.3 compares industrial landfill areas versus municipal landfill areas for a 30 year active life. Tables 5.4 and 5.5 compare municipal and industrial central tendency risks for 20 and 30 year landfill active lives respectively.

5.1 DETERMINISTIC RESULTS

Details of the two parameter sensitivity analyses are presented in Appendix A. Tables A.1 through A.32 provide results for the 20 year active lifetime and Tables A.33 through A.64 provide results for the 30 year active lifetime. Dilution attenuation factors (DAF's) for both central tendency and high-end results are presented in Appendix C (Tables C.1 through C.8). DAF's are defined as the source leachate concentration, C(0), divided by the receptor well concentration, Cw.

Details of the 30 year sensitivity analyses including exposure duration as a sensitive parameter are presented in Appendix B (Tables B.1 through B.8). Comparison of those sensitivity analyses with those presented in Tables A.51, A.53, A.55, A.57, A.59, A.61, A.63 and A.64, demonstrates that inclusion of exposure duration as a sensitive parameter does not impact the selection of the two high-end parameters.

5.2 MONTE CARLO RESULTS

The Monte Carlo results are presented in Table 5.6 through 5.10. Results are presented in terms of total risk and DAF. Well concentrations at the 50^{th}, 90^{th} ,95^{th}, and 99^{th} percentiles of the Monte Carlo distribution are listed in Appendix D. In the current analysis only a 30 year municipal scenario was evaluated for most wastestreams. However, two select wastestreams (hydrorefining catalyst and unleaded gasoline tank sediment) were also modeled for a 20 year municipal scenario and 30 year industrial scenario to better assess the impact of the individual changes in modeling assumptions. The results of those select scenarios are presented in Table 5.10

5.3 COMPARISON OF DETERMINISTIC RESULTS AND MONTE CARLO RESULTS

It has been found that, for this analysis, the receptor well concentrations determined using the central-tendency parameters are greater than the respective 50^{th} percentile concentrations of equivalent Monte-Carlo simulations. For unleaded gasoline tank

sediment, the central tendency receptor well concentration is at least six orders of magnitude greater than the 50th percentile Monte-Carlo concentration. The deterministic central-tendency concentration approximately corresponds to the 94th percentile of the Monte-Carlo concentration CDF.

One fundamental reason to which the differences between the deterministic central-tendency runs and the 50th percentile of Monte-Carlo simulations may be attributed is the difference in definitions of the y-coordinate (YWELL) of the receptor well in the two analysis techniques.

Details are provided below.

5.3.1 Definitions of Central-Tendency Parameters

The term "central tendency" for YWELL is defined differently for deterministic and stochastic runs.

- Deterministic definition

  YWELL is defined as the midpoint between the plume centerline and the edge of the plume (USEPA, 1995b, 1997a). Based on the municipal landfill central-tendency area of 60,700 square meters, the central-tendency YWELL is 117.8 meters.

- Monte-Carlo definition

  YWELL in the Monte-Carlo sense is defined as $R\sin\theta$ where R is the radial distance from the landfill and θ is the inclination angle from the plume centerline. In the Monte-Carlo analysis, R, based on an empirical non-parametric distribution, varies from 0 to 1,600 meters (one mile) and θ from 0 to 90° . The 50th percentile for YWELL based on this definition is 343 meters.

YWELL is a sensitive parameter. Because the angle is allowed to vary from 0 to 90° a large number of YWELL tends to be outside the plume. It is therefore conceivable that if the receptor well is allowed to lie anywhere downgradient, the 50th percentile of the Monte-Carlo concentration CDF will be several orders of magnitude smaller than the deterministic central tendency.

This difference in definition between the y-well coordinate for the two analyses techniques has been remedied by performing Monte Carlo analyses with the receptor well constrained to lie within the plume (Tables 5.7 and 5.9). The 50th percentile well

concentrations for this analysis are greater by several orders of magnitude than the analyses where the receptor was allowed to lie anywhere downgradient (within one mile) of the landfill (Tables 5.6 and 5.8) and are therefore more consistent with the central tendency well concentrations.

The results of the Monte Carlo analyses based on the two definitions of well location (well allowed anywhere downgradient within one mile and well constrained to lie within the plume) are directly compared and summarized in Table 5.1.

5.4 COMPARISON OF REVISED (1998) ANALYSIS RESULTS TO 1997 (NODA) RESULTS

Several observations can be made from a comparison of the 1997 analysis (NODA) results with the current 1998 analysis:

- Increasing active landfill life to 30 years increased risk in both the Monte Carlo analysis and the two high-end parameter analysis (see Tables 5.2,5.3 and 5.10).

- For the two high-end parameter analyses, the use of municipal areas slightly increased risk in some cases and slightly decreased risk in other cases because sensitivity of concentration at receptor well location to landfill area is not monotonic (see Tables 5.2 and 5.3).

- In the Monte Carlo analysis use of municipal areas decreased the risk (see Table 5.10).

- The net effect of 30 year active life and municipal areas had no definite trend (see Tables 5.2 and 5.3).

- The effect due to correcting dispersivity to account for well distance and landfill size in the two high-end parameter analysis is minimal.

- The high-end risk for unleaded gasoline tank sediment increased above 10^{-5} according to the new sensitivity analysis. However, the Monte Carlo analysis showed risks below 10^{-5} at the 95^{th} percentile.

- Inclusion of exposure duration as a sensitive parameter in the sensitivity analyses had no impact on the selection of the two most sensitive parameters and therefore had no impact on the two high-end parameter analysis.

- Constraining the receptor well to lie within the plume for the Monte Carlo analysis increases risk at the 50^{th} percentile by several orders of magnitude and increases risk somewhat at other percentiles (Tables 5.6 through 5.9).

- The risks for off-spec product and fines decrease to well below 10^{-5} due to the use of the correct HBN.

Table 5.1 Summary of Revised 1998 Groundwater Risks for Petroleum Wastes in Off-Site Landfills

Waste	Constituent	Revised Risks [1]		TC-Capped Risks [2]	
		High-End Risk [3]	Monte Carlo Risk [4] (95th%)	High-End Risk	Monte Carlo Risk (95th%)
Clarified Slurry Oil	benzene	4E-06	2E-06 (2E-06)	NC	NC
Hydrotreating Catalyst	benzene	1E-04	1E-05 (3E-05)	3E-05	5E-06 (9E-06)
	arsenic	8E-05	1E-05 (2E-05)	NC	NC
Hydrorefining Catalyst	benzene	7E-05	8E-06 (2E-05)	3E-05	6E-06 (8E-06)
	arsenic	6E-04	1E-04 (4E-04)	6E-04	1E-04 (4E-04)
Crude Oil Tank	benzene	4E-05	7E-06 (1E-05)	3E-05	5E-06 (9E-06)
Unleaded Gas Tank Sediment	benzene	3E-05	2E-06 (6E-06)	2E-05	2E-06 (4E-06)
HF Alkylation	benzene	1E-05	2E-06 (2E-06)	NC	NC
Off-Spec Product and Fines	benzo(a)-anthracene [7]	2E-06 [5] 5E-07 [6]	3E-07 (1E-06) 3E-07 (8E-07)	NC	NC
Co-disposal Scenario	benzene	8E-06	1E-06 (3E-06)	NC	NC
	arsenic	4E-06	8E-07 (2E-06)	NC	NC

[1] Revised risk includes new inputs for active landfill life (30 yr.) and municipal landfill areas.
[2] Input leaching rates were capped at TC regulatory levels for disposal in Subtitle D landfills (0.5 mg/L for benzene and 5.0 mg/L for arsenic); NC = no change because TCLP values were already below TC levels.
[3] Risks using high-end values for two most sensitive parameters, and remaining parameters kept at median values.
[4] Risks using Monte Carlo simulation runs at the 95th percentile level; numbers in parentheses reflect runs with well locations restricted to plume.
[5] Estimated TCLP input assumed to be mean value.
[6] Estimated TCLP assumed to be one high-end parameter.
[7] Risk for benzo(a)anthracene was based on HBN = 4E-04 mg/L

Table 5.2 Summary of 1998 Sensitivity Analyses with 20 Year Waste Volumes and Revised Waste Unit Areas

Waste Stream	Constituent	1997 NODA Risk [2]	Industrial Landfill Areas		Municipal Landfill Areas	
			Total Risk [1]	TC Capped Revised Total Risk	Total Risk [1]	TC Capped Revised Total Risk
CSO sludge	Benzene	2.5	2.4	NA	3.5	NA
Contingent CSO Sludge	Benzene	2.5	2.4	NA	3.5	NA
Crude Oil tank sediment	Benzene	**27.5**	**25.2**	**21.7**	**38.2**	**28.6**
Hydrotreating Catalyst [3]	Benzene	**54.3**	**96.7**	**23.0**	**92.0**	**24.4**
	Arsenic	**70.3**	**74.7**	NA	**55.3**	NA
Off-spec products and fines [4]	Benz(a)anthracene [6]	**19.3**	1.6	NA	1.7	NA
Off-spec products and fines [5]	Benz(a)anthracene [6]	4.6	0.5	NA	0.3	NA
Hydrorefining catalyst [3]	Benzene	**36.3**	**51.2**	**27.4**	**67.4**	**27.5**
	Arsenic	**680.0**	**590.0**	**544.3**	**394.0**	**390.0**
Unleaded gasoline tank sediment	Benzene	4.7	**16.0**	**11.6**	**22.6**	**18.3**
HFalkylation sludge	Benzene	6.4	6.0	NA	9.7	NA
Co-disposal with H/Cracking	Benzene	8.9	8.9	NA	6.8	NA
	Arsenic	7.4	7.4	NA	3.0	NA
Co-disposal without H/Cracking	Benzene	3.8	3.8	NA	3.0	NA
	Arsenic	7.3	7.3	NA	2.9	NA

1. Carcinogenic risks are presented as the ratio of the concentration at the well to the concentration corresponding to a risk of 1E-6.
   The total risk for Benzene includes a direct risk from drinking 1.4 l/day of water (HBN = 0.01 mg/l)
   and an indirect risk from showering (6.05E-5 risk per 1mg/l benzene). Arsenic and benz(a)anthracene include only direct ingestion risk.
2. NODA risk based on 20-year waste volumes and industrial landfill area distribution.
3. For hydrotreating and hydrorefining, all waste quantities, except those managed in Subtitle C landfills, were modeled including reclaimed waste.
4. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value and two high-end parameters were selected.
5. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value and one additional high-end parameter was selected.
6. The 1998 risk for benz(a)anthracene is based on an HBN value of 4E-4 mg/L, while the 1997 NODA risk was based on an HBN value of 2E-5 mg/L.

NA : Not applicable because TCLP values were below the TC Rule level or because TC values are not available for the constituent.

Table 5.3 Summary of 1998 Sensitivity Analyses with 30 Year Waste Volumes and Revised Waste Unit Areas

Waste Stream	Constituent	1997 NODA Risk [2]	Industrial Landfill Areas		Municipal Landfill Areas	
			Total Risk [1]	TC Capped Revised Total Risk	Total Risk [1]	TC Capped Revised Total Risk
CSO sludge	Benzene	2.5	2.9	NA	3.5	NA
Contingent CSO Sludge	Benzene	2.5	2.9	NA	3.5	NA
Crude Oil tank sediment	Benzene	**27.5**	**30.7**	**25.4**	**38.4**	**29.9**
Hydrotreating Catalyst [3]	Benzene	**54.3**	**119.0**	**26.7**	**128.0**	**26.3**
	Arsenic	**70.3**	**107.7**	NA	**80.3**	NA
Off-spec products and fines [4]	Benz(a)anthracene [6]	**19.3**	1.8	NA	2.1	NA
Off-spec products and fines [5]	Benz(a)anthracene [6]	4.6	0.7	NA	0.5	NA
Hydrorefining catalyst [3]	Benzene	**36.3**	**63.1**	**30.7**	**73.7**	**32.0**
	Arsenic	**680.0**	**870.0**	**753.3**	**589.7**	**576.7**
Unleaded gasoline tank sediment	Benzene	4.7	**17.3**	**12.4**	**27.3**	**21.0**
HFalkylation sludge	Benzene	6.4	6.3	NA	**10.2**	NA
Co-disposal with H/Cracking	Benzene	8.9	8.8	NA	7.5	NA
	Arsenic	7.4	8.7	NA	3.9	NA
Co-disposal without H/Cracking	Benzene	3.8	3.8	NA	3.3	NA
	Arsenic	7.3	8.6	NA	3.8	NA

1. Carcinogenic risks are presented as the ratio of the concentration at the well to the concentration corresponding to a risk of 1E-6.

   The total risk for Benzene includes a direct risk from drinking 1.4 l/day of water (HBN = 0.01 mg/l)

   and an indirect risk from showering (6.05E-5 risk per 1mg/l benzene). Arsenic and benz(a)anthracene include only direct ingestion risk.

2. NODA risk based on 20-year waste volumes and industrial landfill area distribution.

3. For hydrotreating and hydrorefining, all waste quantities, except those managed in Subtitle C landfills, were modeled including reclaimed waste.

4. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value and two high-end parameteres were selected.

5. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value and one additional high-end parameter was selected.

6. The 1998 risk for benz(a)anthracene is based on an HBN value of 4E-4 mg/L, while the 1997 NODA risk was based on an HBN value of 2E-5 mg/L.

NA : Not applicable because TCLP values were below the TC Rule level or because TC values are not available for the constituent.

Table 5.4 Total Risks of Constituents for the Central Tendency Scenario Using 20-yr. Waste Volumes

Waste Stream	Constituent	1997 NODA Central Tendency Risk [1,2]	1998 Total Risk [1]	
			Industrial Landfill Areas	Municipal Landfill Areas
CSO sludge	Benzene	0.1	0.3	0.5
Contingent CSO Sludge	Benzene	0.1	0.3	0.4
Crude Oil Tank Sludge	Benzene	0.8	3.4	4.7
Hydrotreating Catalyst	Benzene	6.4	8.0	6.8
	Arsenic	6.4	4.1	3.6
Off-spec products and fines (1-param)	Benz(a)anthracene	0.0	0.0	0.0
Off-spec products and fines (2-param)	Benz(a)anthracene	0.0	0.0	0.0
Hydrorefining catalyst	Benzene	0.6	7.0	9.3
	Arsenic	39.0	22.7	18.3
Unleaded gasoline tank sludge	Benzene	N/A	1.1	0.9
HFalkylation sludge	Benzene	0.1	0.6	1.5

*N/A Unleaded gasoline tank sediment sensitivity analysis not performed for NODA.

1. Carcinogenic risks are presented as the ratio of the concentration at the well to the concentration corresponding to a risk of 1E-6. The total risk for Benzene includes a direct risk from drinking 1.4 l/day of water (HBN = 0.01 mg/l) and an indirect risk from showering (6.05E-5 risk per 1mg/l benzene). Arsenic and benz(a)anthracene include only direct ingestion risk.
2. NODA risk based on 20-year waste volumes and industrial landfill area distribution.

Table 5.5 Total Risks of Constituents for the Central Tendency Scenario Using 30-yr Waste Volumes

Waste Stream	Constituent	1997 NODA Central Tendency Risk [1,2]	1998 Total Risk [1]	
			Industrial Landfill Areas	Municipal Landfill Areas
CSO sludge	Benzene	0.1	0.4	0.6
Contingent CSO Sludge	Benzene	0.1	0.4	0.6
Crude Oil Tank Sludge	Benzene	0.8	3.9	6.1
Hydrotreating Catalyst	Benzene	6.4	11.5	10.2
	Arsenic	6.4	0.0	5.5
Off-spec products and fines (1-param)	Benz(a)anthracene	0.0	0.0	0.0
Off-spec products and fines (2-param)	Benz(a)anthracene	0.0	0.0	0.0
Hydrorefining catalyst	Benzene	0.6	8.1	12.2
	Arsenic	39.0	34.0	27.5
Unleaded gasoline tank sludge	Benzene	N/A	1.5	1.4
HFalkylation sludge	Benzene	0.1	0.6	1.6

*N/A Unleaded gasoline tank sediment sensitivity analysis not performed for NODA.

1. Carcinogenic risks are presented as the ratio of the concentration at the well to the concentration corresponding to a risk of 1E-6. The total risk for Benzene includes a direct risk from drinking 1.4 l/day of water (HBN = 0.01 mg/l) and an indirect risk from showering (6.05E-5 risk per 1mg/l benzene). Arsenic and benz(a)anthracene include only direct ingestion risk.
2. NODA risk based on 20-year waste volumes and industrial landfill area distribution.

Table 5.6 Summary of Total Risk and DAF's for 1998 Monte Carlo Analyses
(30 Year Waste Volumes, Municipal Landfill Areas, Receptor Well Anywhere)

Waste Stream	Constituent	HBN Total[1] (mg/L)	1997 NODA 95-th Perc. Risk [2]	1998 Total Risk [1]					1998 DAF				
				50-th perc.	90-th perc.	95-th perc.	98-th perc.	99-th perc.	50-th perc.	90-th perc.	95-th perc.	98-th perc.	99-th perc.
CSO sludge	Benzene	6.23E-03	1.1	5.5E-05	0.9	1.8	3.1	4.1	1.70E+05	9.4	4.4	2.4	1.3
Contingent CSO Sludge	Benzene	6.23E-03	1.1	1.5E-05	0.4	1.0	2.3	3.1	5.83E+05	19.2	7.3	3.0	1.4
Crude Oil tank sediment	Benzene	6.23E-03	4.5	4.4E-05	1.8	7.2	**22.4**	**36.6**	9.95E+05	37.6	11.3	4.0	1.5
Hydrotreating Catalyst [3]	Benzene	6.23E-03	**10.6**	1.8E-05	2.3	**11.1**	**49.1**	**122.4**	6.18E+06	61.2	18.8	6.2	1.8
	Arsenic	3.00E-04	9.6	6.8E-10	2.9	**11.5**	**33.1**	**63.9**	7.48E+11	99.9	19.3	5.1	1.3
Off-spec products and fines [4]	Benz(a)anthracene [6]	4.00E-04	5.4	0.0E+00	0.0	0.3	1.9	4.4	infinity	1989.0	180.0	23.6	1.5
Off-spec products and fines [5]	Benz(a)anthracene [6]	4.00E-04	4.4	0.0E+00	0.0	0.3	1.5	2.8	infinity	693.7	69.4	11.5	1.3
Hydrorefining catalyst [3]	Benzene	6.23E-03	8.3	6.3E-05	3.0	7.9	**33.7**	**82.7**	7.20E+05	13.0	5.2	2.6	1.3
	Arsenic	3.00E-04	**124.9**	3.6E-06	**38.5**	**146.1**	**670.0**	**1576.0**	3.97E+09	303.8	57.7	11.2	1.7
Unleaded gasoline tank sediment	Benzene	6.23E-03	1.7	2.8E-07	0.4	1.9	8.2	**18.0**	2.24E+08	148.8	29.5	6.7	1.5
HFalkylation sludge	Benzene	6.23E-03	1.6	1.9E-05	0.6	1.5	3.0	4.4	4.67E+05	12.6	5.3	2.7	1.3
Co-disposal with H/Cracking	Benzene	6.23E-03	0.9	1.0E-07	0.3	1.2	4.3	**10.0**	6.05E+07	19.8	5.9	2.6	1.4
	Arsenic	3.00E-04	0.8	3.9E-20	0.2	0.8	3.1	6.6	2.87E+20	46.6	8.7	2.7	1.2
Co-disposal without H/Cracking	Benzene	6.23E-03	0.8	8.0E-08	0.3	1.1	4.1	8.5	7.24E+07	19.1	5.4	2.4	1.2
	Arsenic	3.00E-04	0.8	4.4E-20	0.2	0.9	3.1	6.0	4.17E+20	45.0	9.0	2.7	1.2

1. Carcinogenic risks are presented as the ratio of the concentration at the well to the concentration corresponding to a risk of 1E-6.

   The total risk for Benzene includes a direct risk from drinking 1.4 l/day of water (HBN = 0.01 mg/l)

   and an indirect risk from showering (6.05E-5 risk per 1mg/l benzene). Arsenic and benz(a)anthracene include only direct ingestion risk.

2. NODA risk based on 20-year waste volumes and industrial landfill area distribution and the receptor well was located anywhere within 180 degrees of the plume centerline.

3. For hydrotreating and hydrorefining, all waste quantities, except those managed in Subtitle C landfills, were modeled including reclaimed waste.

4. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value and non-detect values of 0.05 mg/l were included in the analysis.

5. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value and non-detect values of 0.05 mg/l were excluded from the analysis.

6. The 1998 risk for benz(a)anthracene is based on an HBN value of 4E-4 mg/L, while the 1997 NODA risk was based on an HBN value of 2E-5 mg/L.

Table 5.7 Summary of Total Risk and DAF's for 1998 Monte Carlo Analyses
(30 Year Waste Volumes, Municipal Landfill Areas, Receptor Well within Plume)

Waste Stream	Constituent	HBN Total[1] (mg/L)	1997 NODA 95-th Perc. Risk [2]	1998 Total Risk [1]					1998 DAF				
				50-th perc.	90-th perc.	95-th perc.	98-th perc.	99-th perc.	50-th perc.	90-th perc.	95-th perc.	98-th perc.	99-th perc.
CSO sludge	Benzene	6.23E-03	1.1	5.0E-02	1.3	2.2	3.3	4.1	1.9E+02	6.5	3.8	2.3	1.3
Contingent CSO Sludge	Benzene	6.23E-03	1.1	3.4E-02	0.8	1.5	2.5	3.4	2.8E+02	10.0	5.4	2.8	1.3
Crude Oil tank sediment	Benzene	6.23E-03	4.5	9.7E-02	5.6	**14.1**	**33.3**	**52.4**	6.0E+02	16.2	7.5	3.6	1.5
Hydrotreating Catalyst [3]	Benzene	6.23E-03	**10.6**	1.5E-01	**10.6**	**32.7**	**107.7**	**207.7**	9.4E+02	25.1	11.8	5.1	1.7
	Arsenic	3.00E-04	9.6	1.3E-01	9.3	**22.9**	**54.8**	**89.5**	4.3E+03	33.7	12.7	4.4	1.5
Off-spec products and fines [4]	Benz(a)anthracene [6]	4.00E-04	5.4	7.5E-05	0.3	1.1	3.8	6.8	1.5E+06	273.1	68.7	14.8	1.6
Off-spec products and fines [5]	Benz(a)anthracene [6]	4.00E-04	4.4	5.9E-05	0.2	0.8	2.4	4.4	5.5E+05	113.1	28.8	7.5	1.3
Hydrorefining catalyst [3]	Benzene	6.23E-03	8.3	2.1E-01	7.2	**17.8**	**64.0**	**104.0**	2.4E+02	7.6	4.3	2.4	1.3
	Arsenic	3.00E-04	**124.9**	1.7E+00	**119.0**	**363.3**	**1039.3**	**1919.3**	8.7E+03	97.3	32.5	9.0	1.9
Unleaded gasoline tank sediment	Benzene	6.23E-03	1.7	3.0E-02	2.0	5.7	**14.8**	**24.7**	2.4E+03	39.5	15.7	5.3	1.8
HFalkylation sludge	Benzene	6.23E-03	1.6	4.6E-02	1.2	2.1	3.8	5.5	2.0E+02	7.4	4.2	2.5	1.2
Co-disposal with H/Cracking	Benzene	6.23E-03	0.9	1.5E-02	1.0	2.7	8.0	**15.6**	4.0E+02	8.2	4.3	2.3	1.3
	Arsenic	3.00E-04	0.8	3.9E-03	0.7	2.1	6.2	**13.6**	5.2E+03	13.6	5.4	2.5	1.1
Co-disposal without H/Cracking	Benzene	6.23E-03	0.8	1.3E-02	0.9	2.2	6.0	**11.0**	4.4E+02	8.7	4.3	2.3	1.1
	Arsenic	3.00E-04	0.8	4.1E-03	0.8	2.0	6.5	**13.0**	5.3E+03	13.5	5.5	2.5	1.2

1. Carcinogenic risks are presented as the ratio of the concentration at the well to the concentration corresponding to a risk of 1E-6.

   The total risk for Benzene includes a direct risk from drinking 1.4 l/day of water (HBN = 0.01 mg/l)

   and an indirect risk from showering (6.05E-5 risk per 1mg/l benzene). Arsenic and benz(a)anthracene include only direct ingestion risk.

2. NODA risk based on 20-year waste volumes and industrial landfill area distribution and the receptor well was located anywhere within 180 degrees of the plume centerline.

3. For hydrotreating and hydrorefining, all waste quantities, except those managed in Subtitle C landfills, were modeled including reclaimed waste.
4. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value and non-detect values of 0.05 mg/l were included in the analysis.
5. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value and non-detect values of 0.05 mg/l were excluded from the analysis.
6. The 1998 risk for benz(a)anthracene is based on an HBN value of 4E-4 mg/L, while the 1997 NODA risk was based on an HBN value of 2E-5 mg/L.

Table 5.8 Summary of Total Risk and DAF's 1998 TC Capped Monte Carlo Analyses
(30 Year Waste Volumes, Municipal Landfill Areas, Receptor Well Anywhere)

Waste Stream	Constituent	HBN Total[1] (mg/L)	1997 NODA 95-th Perc. Risk [2]	1998 Total Risk [1]					1998 DAF				
				50-th perc.	90-th perc.	95-th perc.	98-th perc.	99-th perc.	50-th perc.	90-th perc.	95-th perc.	98-th perc.	99-th perc.
CSO sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Contingent CSO Sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Crude Oil tank sediment	Benzene	6.23E-03	3.3	7.5E-06	1.3	5.2	**13.6**	**20.0**	3.7E+06	28.0	8.1	3.5	1.4
Hydrotreating Catalyst [3]	Benzene	6.23E-03	4.4	2.8E-06	1.4	5.4	**13.7**	**22.4**	1.6E+07	27.5	8.6	3.3	1.3
	Arsenic	3.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Off-spec products and fines [4]	Benz(a)anthracene	4.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Off-spec products and fines [5]	Benz(a)anthracene	4.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydrorefining catalyst [3]	Benzene	6.23E-03	6.3	5.6E-05	2.5	6.2	**12.1**	**18.7**	5.4E+05	10.5	4.6	2.4	1.3
	Arsenic	3.00E-04	**123.0**	4.0E-06	**36.8**	**137.3**	**606.0**	**1293.0**	2.0E+09	185.0	38.6	9.0	1.6
Unleaded gasoline tank sediment	Benzene	6.23E-03	1.0	3.3E-07	0.4	1.6	6.9	**13.0**	1.2E+08	102.5	23.2	5.4	1.5
HFalkylation sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Co-disposal with H/Cracking	Benzene	6.23E-03	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	3.00E-04	0.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Co-disposal without H/Cracking	Benzene	6.23E-03	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	3.00E-04	0.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

1. Carcinogenic risks are presented as the ratio of the concentration at the well to the concentration corresponding to a risk of 1E-6.

   The total risk for Benzene includes a direct risk from drinking 1.4 l/day of water (HBN = 0.01 mg/l)

   and an indirect risk from showering (6.05E-5 risk per 1mg/l benzene). Arsenic and benz(a)anthracene include only direct ingestion risk.

2. NODA risk based on 20-year waste volumes and industrial landfill area distribution and the receptor well was located anywhere within 180 degrees of the plume centerline.

3. For hydrotreating and hydrorefining, all waste quantities, except those managed in Subtitle C landfills, were modeled including reclaimed waste.

4. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value and non-detect values of 0.05 mg/l were included in the analysis.

5. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value and non-detect values of 0.05 mg/l were excluded from the analysis.

NA : Not applicable because TCLP values were below the TC Rule level or because TC values are not available for the constituent.

Table 5.9 Summary of Total Risk and DAF's for 1998 TC Capped Monte Carlo Analyses
(30 Year Waste Volumes, Municipal Landfill Areas, Receptor Well within Plume)

Waste Stream	Constituent	HBN Total[1] (mg/L)	1997 NODA 95-th Perc. Risk [2]	1998 Total Risk [1]					1998 DAF				
				50-th perc.	90-th perc.	95-th perc.	98-th perc.	99-th perc.	50-th perc.	90-th perc.	95-th perc.	98-th perc.	99-th perc.
CSO sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Contingent CSO Sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Crude Oil tank sediment	Benzene	6.23E-03	3.3	0.1	3.8	8.7	**17.7**	**24.5**	4.6E+02	12.7	6.3	3.0	1.3
Hydrotreating Catalyst [3]	Benzene	6.23E-03	4.4	0.1	3.9	8.9	**17.5**	**24.6**	4.2E+02	12.7	6.2	3.0	1.3
	Arsenic	3.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Off-spec products and fines [4]	Benz(a)anthracene	4.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Off-spec products and fines [5]	Benz(a)anthracene	4.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydrorefining catalyst [3]	Benzene	6.23E-03	6.3	0.2	4.6	8.4	**15.7**	**22.9**	1.8E+02	6.6	3.8	2.3	1.3
	Arsenic	3.00E-04	**123.0**	1.7	**106.8**	**318.2**	**855.0**	**1448.7**	4.7E+03	65.4	23.5	7.5	1.3
Unleaded gasoline tank sediment	Benzene	6.23E-03	1.0	0.0	1.5	3.9	8.9	**13.9**	2.1E+03	36.3	13.9	5.3	1.5
HFalkylation sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Co-disposal with H/Cracking	Benzene	6.23E-03	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	3.00E-04	0.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Co-disposal without H/Cracking	Benzene	6.23E-03	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	3.00E-04	0.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

1. Carcinogenic risks are presented as the ratio of the concentration at the well to the concentration corresponding to a risk of 1E-6.

   The total risk for Benzene includes a direct risk from drinking 1.4 l/day of water (HBN = 0.01 mg/l)

   and an indirect risk from showering (6.05E-5 risk per 1mg/l benzene). Arsenic and benz(a)anthracene include only direct ingestion risk.

2. NODA risk based on 20-year waste volumes and industrial landfill area distribution and the receptor well was located anywhere within 180 degrees of the plume centerline.

3. For hydrotreating and hydrorefining, all waste quantities, except those managed in Subtitle C landfills, were modeled including reclaimed waste.

4. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value and non-detect values of 0.05 mg/l were included in the analysis.

5. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value and non-detect values of 0.05 mg/l were excluded from the analysis.

NA : Not applicable because TCLP values were below the TC Rule level or because TC values are not available for the constituent.

Table 5.10 Impact of Increased Waste Volumes Compared With Impact of Municipal Landfill Areas on Total Risk of Select Wastestreams

Waste Stream	Scenario	1997 NODA Risk [2]		Comparison of 30 year vs. 20 year volumes and municipal vs. industrial areas								
		Two High-End Parameter	95-th perc. Total Risk [1]	90-th perc. Well Conc.	90-th perc. Total Risk [1]	90-th perc. DAF	95-th perc. Well Conc.	95-th perc. Total Risk [1]	95-th perc. DAF	99-th perc. Well Conc.	99-th perc. Total Risk [1]	99-th perc. DAF
Hydrorefining catalyst [3]	Municipal 30-year	**36.3**	8.3	1.87E-02	3.0	13.0	4.91E-02	7.9	5.2	5.15E-01	**51.5**	2.6
	Industrial 30-year	**36.3**	8.3	2.16E-02	3.5	11.5	5.66E-02	9.1	4.5	0.6272	**62.7**	2.4
	Municipal 20-year	**36.3**	8.3	1.57E-02	2.5	15.2	4.29E-02	6.9	5.7	4.38E-01	**43.8**	2.8
Unleaded gasoline tank sediment	Municipal 30-year	4.7	1.7	2.64E-03	0.4	148.8	1.17E-02	1.9	29.5	1.12E-01	**11.2**	6.7
	Industrial 30-year	4.7	1.7	2.48E-03	0.4	152.7	1.33E-02	2.1	28.2	9.55E-02	9.5	6.6
	Municipal 20-year	4.7	1.7	1.93E-03	0.3	202.6	8.83E-03	1.4	41.8	9.01E-02	9.0	8.4

1. Carcinogenic risks are presented as the ratio of the concentration at the well to the concentration corresponding to a risk of 1E-6. The total risk for Benzene includes a direct risk from drinking 1.4 l/day of water (HBN = 0.01 mg/l) and an indirect risk from showering (6.05E-5 risk per 1mg/l benzene). Arsenic and benz(a)anthracene include only direct ingestion risk.
2. NODA risk based on 20-year waste volumes and industrial landfill area distribution.
3. For hydrotreating and hydrorefining, all waste quantities, except those managed in Subtitle C landfills, were modeled including reclaimed waste.

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APPENDIX A
SENSITIVITY ANALYSES

Table A.1 Sensitivity Analysis CSO Off-site Landfill Scenario, Benzene -- Industrial Areas -- 20 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	20200	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	430	85.91	6.5	4.78E-04		2.00E-03	
Infil & Xwell	20200	2.6	2635.71	0.059	1.2	20.34	1.4	**0.46**	**102**	60.76	6.5	3.07E-03	7	1.52E-02	1
Area & Wst. Vol	**162000**	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	165.01	6.5	1.55E-02	1	1.31E-02	2
Xwell & Wst Vol	20200	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	**102**	60.76	6.5	1.08E-03	16	1.04E-02	3
Ywell & Xwell	20200	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	**102**	**0.00**	6.5	3.23E-03	5	1.03E-02	4
TCLP & xwell	20200	2.6	2635.71	**0.084**	1.2	**14.29**	1.4	0.17	**102**	60.76	6.5	1.45E-03	13	9.15E-03	5
Ywell & Wst. Vol	20200	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	2.16E-03	10	8.72E-03	6
Xwell & Zwell	20200	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	**102**	60.76	**1.3**	1.53E-03	12	8.68E-03	7
Ywell & Infil	20200	2.6	2635.71	0.059	1.2	20.34	1.4	**0.46**	430	**0.00**	6.5	4.83E-03	3	8.67E-03	8
Infil & Wst. Vol	20200	2.6	**44900**	0.059	1.2	20.34	1.4	**0.46**	430	85.91	6.5	1.34E-03	14	7.63E-03	9
Ywell & TCLP	20200	2.6	2635.71	**0.084**	1.2	**14.29**	1.4	0.17	430	**0.00**	6.5	2.87E-03	8	7.12E-03	10
Area & Xwell	**162000**	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	**102**	142.35	6.5	5.61E-03	2	5.73E-03	11
TCLP & Wst. Vol	20200	2.6	**44900**	**0.084**	1.2	**14.29**	1.4	0.17	430	85.91	6.5	6.99E-04	18	4.26E-03	12
Infil & TCLP	20200	2.6	2635.71	**0.084**	1.2	**14.29**	1.4	**0.46**	430	85.91	6.5	1.64E-03	11	4.26E-03	13
Area & Ywell	**162000**	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	3.24E-03	4	2.95E-03	14
Ywell & Zwell	20200	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	430	**0.00**	**1.3**	9.50E-04	17	2.82E-03	15
Area & TCLP	**162000**	2.6	2635.71	**0.084**	1.2	**14.29**	1.4	0.17	430	165.01	6.5	3.17E-03	6	2.59E-03	16
Area & Infil	**162000**	2.6	2635.71	0.059	1.2	20.34	1.4	**0.46**	430	165.01	6.5	2.61E-03	9	2.41E-03	17
Infil & Zwell	20200	2.6	2635.71	0.059	1.2	20.34	1.4	**0.46**	430	85.91	**1.3**	4.84E-04	19	1.65E-03	18
Wst. Vol & Zwell	20200	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	85.91	**1.3**	2.08E-04	21	1.46E-03	19
Area & Zwell	**162000**	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	430	165.01	**1.3**	1.27E-03	15	1.28E-03	20
TCLP & Zwell	20200	2.6	2635.71	**0.084**	1.2	**14.29**	1.4	0.17	430	85.91	**1.3**	2.77E-04	20	1.19E-03	21

Table A.2 Sensitivity Analysis CSO Off-site Landfill Scenario, Benzene -- Municipal Areas -- 20 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	60705	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	430	117.75	6.5	4.78E-04		2.90E-03	
Xwell & Wst Vol	60705	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	**102**	93.79	6.5	1.08E-03	16	2.15E-02	1
Infil & Wst. Vol	60705	2.6	**44900**	0.059	1.2	20.34	1.4	**0.46**	430	117.75	6.5	1.34E-03	14	1.59E-02	2
Area & Wst. Vol	**420888**	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	238.82	6.5	1.55E-02	1	1.41E-02	3
Ywell & Wst. Vol	60705	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	2.16E-03	10	1.31E-02	4
Infil & Xwell	60705	2.6	2635.71	0.059	1.2	20.34	1.4	**0.46**	**102**	93.79	6.5	3.07E-03	7	1.07E-02	5
TCLP & xwell	60705	2.6	2635.71	**0.084**	1.2	**14.29**	1.4	0.17	**102**	93.79	6.5	1.45E-03	13	1.07E-02	6
Ywell & Xwell	60705	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	**102**	**0.00**	6.5	3.23E-03	5	1.03E-02	7
TCLP & Wst. Vol	60705	2.6	**44900**	**0.084**	1.2	**14.29**	1.4	0.17	430	117.75	6.5	6.99E-04	18	1.00E-02	8
Xwell & Zwell	60705	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	**102**	93.79	**1.3**	1.53E-03	12	8.73E-03	9
Ywell & TCLP	60705	2.6	2635.71	**0.084**	1.2	**14.29**	1.4	0.17	430	**0.00**	6.5	2.87E-03	8	5.76E-03	10
Ywell & Infil	60705	2.6	2635.71	0.059	1.2	20.34	1.4	**0.46**	430	**0.00**	6.5	4.83E-03	3	5.18E-03	11
Infil & TCLP	60705	2.6	2635.71	**0.084**	1.2	**14.29**	1.4	**0.46**	430	117.75	6.5	1.64E-03	11	3.92E-03	12
Wst. Vol & Zwell	60705	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	117.75	**1.3**	2.08E-04	21	3.62E-03	13
Ywell & Zwell	60705	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	430	**0.00**	**1.3**	9.50E-04	17	2.56E-03	14
Area & Xwell	**420888**	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	**102**	217.62	6.5	5.61E-03	2	2.40E-03	15
Infil & Zwell	60705	2.6	2635.71	0.059	1.2	20.34	1.4	**0.46**	430	117.75	**1.3**	4.84E-04	19	1.75E-03	16
TCLP & Zwell	60705	2.6	2635.71	**0.084**	1.2	**14.29**	1.4	0.17	430	117.75	**1.3**	2.77E-04	20	1.62E-03	17
Area & TCLP	**420888**	2.6	2635.71	**0.084**	1.2	**14.29**	1.4	0.17	430	238.82	6.5	3.17E-03	6	1.43E-03	18
Area & Ywell	**420888**	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	3.24E-03	4	1.40E-03	19
Area & Infil	**420888**	2.6	2635.71	0.059	1.2	20.34	1.4	**0.46**	430	238.82	6.5	2.61E-03	9	1.08E-03	20
Area & Zwell	**420888**	2.6	2635.71	0.059	1.2	20.34	1.4	0.17	430	238.82	**1.3**	1.27E-03	15	8.26E-04	21

Table A.3 Sensitivity Analysis for Contingent Management of CSO Sludge, Off-Site Landfill/Benzene -- Industrial Areas -- 20 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	2500	0.059	1.2	20.34	1.4	0.17	430	85.91	6.5	4.77E-04		1.96E-03	
X-Well & Infil	20200	2.6	2500	0.059	1.2	20.34	1.4	**0.46**	**102**	60.76	6.5	3.05E-03	6	1.50E-02	1
Wst. Vol & Area	**162000**	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	165.01	6.5	1.55E-02	1	1.31E-02	2
Wst. Vol & X-Well	20200	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	**102**	60.76	6.5	1.08E-03	16	1.05E-02	3
X-Well & Y- Well	20200	2.6	2500	0.059	1.2	20.34	1.4	0.17	**102**	**0.00**	6.5	3.22E-03	4	1.01E-02	4
X-Well & TCLP	20200	2.6	2500	**0.084**	1.2	**14.29**	1.4	0.17	**102**	60.76	6.5	1.44E-03	13	8.95E-03	5
Wst. Vol & Y- Well	20200	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	2.16E-03	10	8.72E-03	6
X-Well & Z-Well	20200	2.6	2500	0.059	1.2	20.34	1.4	0.17	**102**	60.76	**1.3**	1.53E-03	12	8.53E-03	7
Y-Well & Infil	20200	2.6	2500	0.059	1.2	20.34	1.4	**0.46**	430	**0.00**	6.5	4.81E-03	3	8.46E-03	8
Wst. Vol & Infil	20200	2.6	**44900**	0.059	1.2	20.34	1.4	**0.46**	430	85.91	6.5	1.34E-03	14	7.63E-03	9
Y-Well & TCLP	20200	2.6	2500	**0.084**	1.2	**14.29**	1.4	0.17	430	**0.00**	6.5	2.86E-03	8	6.96E-03	10
X-Well & Area	**162000**	2.6	2500	0.059	1.2	20.34	1.4	0.17	**102**	142.35	6.5	5.34E-03	2	5.45E-03	11
Wst. Vol & TCLP	20200	2.6	**44900**	**0.084**	1.2	**14.29**	1.4	0.17	430	85.91	6.5	6.99E-04	18	4.26E-03	12
TCLP & Infil	20200	2.6	2500	**0.084**	1.2	**14.29**	1.4	**0.46**	430	85.91	6.5	1.63E-03	11	4.11E-03	13
Y-Well & Area	**162000**	2.6	2500	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	3.08E-03	5	2.80E-03	14
Y-Well & Z-Well	20200	2.6	2500	0.059	1.2	20.34	1.4	0.17	430	**0.00**	**1.3**	9.47E-04	17	2.76E-03	15
TCLP & Area	**162000**	2.6	2500	**0.084**	1.2	**14.29**	1.4	0.17	430	165.01	6.5	3.02E-03	7	2.45E-03	16
Infil & Area	**162000**	2.6	2500	0.059	1.2	20.34	1.4	**0.46**	430	165.01	6.5	2.47E-03	9	2.29E-03	17
Infil & Z-Well	20200	2.6	2500	0.059	1.2	20.34	1.4	**0.46**	430	85.91	**1.3**	4.81E-04	19	1.61E-03	18
Wst. Vol. & Z-Well	20200	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	85.91	**1.3**	2.08E-04	21	1.46E-03	19
Area & Z-Well	**162000**	2.6	2500	0.059	1.2	20.34	1.4	0.17	430	165.01	**1.3**	1.21E-03	15	1.22E-03	20
TCLP & Z-Well	20200	2.6	2500	**0.084**	1.2	**14.29**	1.4	0.17	430	85.91	**1.3**	2.75E-04	20	1.17E-03	

Table A.4 Sensitivity Analysis for Contingent Management of CSO Sludge, Off-Site Landfill/Benzene -- Municipal Areas -- 20 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	60705	2.6	2500	0.059	1.2	20.34	1.4	0.17	430	117.75	6.5	4.77E-04		2.79E-03	
Wst. Vol & X-Well	60705	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	**102**	93.79	6.5	1.08E-03	16	2.15E-02	1
Wst. Vol & Infil	60705	2.6	**44900**	0.059	1.2	20.34	1.4	**0.46**	430	117.75	6.5	1.34E-03	14	1.59E-02	2
Wst. Vol & Area	**420888**	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	238.82	6.5	1.55E-02	1	1.41E-02	3
Wst. Vol & Y- Well	60705	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	2.16E-03	10	1.31E-02	4
X-Well & TCLP	60705	2.6	2500	**0.084**	1.2	**14.29**	1.4	0.17	**102**	93.79	6.5	1.44E-03	13	1.02E-02	5
X-Well & Infil	60705	2.6	2500	0.059	1.2	20.34	1.4	**0.46**	**102**	93.79	6.5	3.05E-03	6	1.02E-02	6
Wst. Vol & TCLP	60705	2.6	**44900**	**0.084**	1.2	**14.29**	1.4	0.17	430	117.75	6.5	6.99E-04	18	1.00E-02	7
X-Well & Y- Well	60705	2.6	2500	0.059	1.2	20.34	1.4	0.17	**102**	**0.00**	6.5	3.22E-03	4	9.92E-03	8
X-Well & Z-Well	60705	2.6	2500	0.059	1.2	20.34	1.4	0.17	**102**	93.79	**1.3**	1.53E-03	12	8.44E-03	9
Y-Well & TCLP	60705	2.6	2500	**0.084**	1.2	**14.29**	1.4	0.17	430	**0.00**	6.5	2.86E-03	8	5.52E-03	10
Y-Well & Infil	60705	2.6	2500	0.059	1.2	20.34	1.4	**0.46**	430	**0.00**	6.5	4.81E-03	3	4.93E-03	11
TCLP & Infil	60705	2.6	2500	**0.084**	1.2	**14.29**	1.4	**0.46**	430	117.75	6.5	1.63E-03	11	3.74E-03	12
Wst. Vol. & Z-Well	60705	2.6	**44900**	0.059	1.2	20.34	1.4	0.17	430	117.75	**1.3**	2.08E-04	21	3.62E-03	13
Y-Well & Z-Well	60705	2.6	2500	0.059	1.2	20.34	1.4	0.17	430	**0.00**	**1.3**	9.47E-04	17	2.47E-03	14
X-Well & Area	**420888**	2.6	2500	0.059	1.2	20.34	1.4	0.17	**102**	217.62	6.5	5.34E-03	2	2.28E-03	15
Infil & Z-Well	60705	2.6	2500	0.059	1.2	20.34	1.4	**0.46**	430	117.75	**1.3**	4.81E-04	19	1.66E-03	16
TCLP & Z-Well	60705	2.6	2500	**0.084**	1.2	**14.29**	1.4	0.17	430	117.75	**1.3**	2.75E-04	20	1.55E-03	17
TCLP & Area	**420888**	2.6	2500	**0.084**	1.2	**14.29**	1.4	0.17	430	238.82	6.5	3.02E-03	7	1.36E-03	18
Y-Well & Area	**420888**	2.6	2500	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	3.08E-03	5	1.33E-03	19
Infil & Area	**420888**	2.6	2500	0.059	1.2	20.34	1.4	**0.46**	430	238.82	6.5	2.47E-03	9	1.03E-03	20
Area & Z-Well	**420888**	2.6	2500	0.059	1.2	20.34	1.4	0.17	430	238.82	**1.3**	1.21E-03	15	7.84E-04	21

Table A.5 Sensitivity Analysis for Crude Oil tank sediment Off-Site Landfill /Benzene -- Industrial Landfills -- 20 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	457.24	0.679	58.72	86.48	1.52	0.17	430	85.91	6.5	5.12E-03		2.11E-02	
Infil & Xwell	20200	2.6	457.24	0.679	58.72	86.48	1.52	**0.46**	**102**	60.76	6.5	3.32E-02	8	1.57E-01	1
Area & Wst. Vol	**162000**	2.6	**8315.8**	0.679	58.72	86.48	1.52	0.17	430	165.01	6.5	1.71E-01	1	1.44E-01	2
TCLP & xwell	20200	2.6	457.24	**1.7**	58.72	34.54	1.52	0.17	**102**	60.76	6.5	2.59E-02	12	1.26E-01	3
Xwell & Wst Vol	20200	2.6	**8315.8**	0.679	58.72	86.48	1.52	0.17	**102**	60.76	6.5	1.20E-02	20	1.17E-01	4
Ywell & Xwell	20200	2.6	457.24	0.679	58.72	86.48	1.52	0.17	**102**	**0.00**	6.5	3.44E-02	7	1.10E-01	5
Xwell & Wst. Conc	20200	2.6	457.24	0.679	**220**	**324.01**	1.52	0.17	**102**	60.76	6.5	1.16E-02	22	1.04E-01	6
Ywell & Wst. Vol	20200	2.6	**8315.8**	0.679	58.72	86.48	1.52	0.17	430	**0.00**	6.5	2.40E-02	14	9.75E-02	7
Ywell & TCLP	20200	2.6	457.24	**1.7**	58.72	**34.54**	1.52	0.17	430	**0.00**	6.5	5.11E-02	6	9.49E-02	8
Xwell & Zwell	20200	2.6	457.24	0.679	58.72	86.48	1.52	0.17	**102**	60.76	**1.3**	1.64E-02	16	9.18E-02	9
Ywell & Infil	20200	2.6	457.24	0.679	58.72	86.48	1.52	**0.46**	430	**0.00**	6.5	5.24E-02	4	8.79E-02	10
Ywell & Wst Conc	20200	2.6	457.24	0.679	**220**	**324.01**	1.52	0.17	430	**0.00**	6.5	2.33E-02	15	8.51E-02	11
Infil & Wst. Vol	20200	2.6	**8315.8**	0.679	58.72	86.48	1.52	**0.46**	430	85.91	6.5	5.85E-02	3	8.46E-02	12
TCLP & Wst. Vol	20200	2.6	**8315.8**	**1.7**	58.72	34.54	1.52	0.17	430	85.91	6.5	1.30E-02	19	7.83E-02	13
Area & Wst. Conc	**162000**	2.6	457.24	0.679	**220**	**324.01**	1.52	0.17	430	165.01	6.5	8.02E-02	2	7.33E-02	14
Infil & Wst. Conc	20200	2.6	457.24	0.679	**220**	**324.01**	1.52	**0.46**	430	85.91	6.5	1.44E-02	17	6.56E-02	15
Area & Xwell	**162000**	2.6	457.24	0.679	58.72	86.48	1.52	0.17	**102**	142.35	6.5	5.18E-02	5	6.10E-02	16
TCLP & Wst Conc	20200	2.6	457.24	**1.7**	**220**	**129.41**	1.52	0.17	430	85.91	6.5	1.34E-02	18	6.05E-02	17
Infil & TCLP	20200	2.6	457.24	**1.7**	58.72	**34.54**	1.52	**0.46**	430	85.91	6.5	2.71E-02	11	4.85E-02	18
Area & Ywell	**162000**	2.6	457.24	0.679	58.72	86.48	1.52	0.17	430	**0.00**	6.5	3.00E-02	9	3.16E-02	19
Wst. Vol & Wst. Conc	20200	2.6	**8315.8**	0.679	**220**	**324.01**	1.52	0.17	430	85.91	6.5	5.95E-03	24	3.01E-02	20
Ywell & Zwell	20200	2.6	457.24	0.679	58.72	86.48	1.52	0.17	430	**0.00**	**1.3**	1.02E-02	23	2.97E-02	21
Area & TCLP	**162000**	2.6	457.24	**1.7**	58.72	**34.54**	1.52	0.17	430	165.01	6.5	2.85E-02	10	2.70E-02	22
Area & Infil	**162000**	2.6	457.24	0.679	58.72	86.48	1.52	**0.46**	430	165.01	6.5	2.44E-02	13	2.63E-02	23
Infil & Zwell	20200	2.6	457.24	0.679	58.72	86.48	1.52	**0.46**	430	85.91	**1.3**	5.24E-03	25	1.68E-02	24
Wst. Vol & Zwell	20200	2.6	**8315.8**	0.679	58.72	86.48	1.52	0.17	430	85.91	**1.3**	2.31E-03	27	1.63E-02	25
TCLP & Zwell	20200	2.6	457.24	**1.7**	58.72	34.54	1.52	0.17	430	85.91	**1.3**	4.91E-03	26	1.59E-02	26
Wst Conc & Zwell	20200	2.6	457.24	0.679	**220**	**324.01**	1.52	0.17	430	85.91	**1.3**	2.22E-03	28	1.43E-02	27
Area & Zwell	**162000**	2.6	457.24	0.679	58.72	86.48	1.52	0.17	430	165.01	**1.3**	1.17E-02	21	1.37E-02	28

Table A.6 Sensitivity Analysis for Crude Oil tank sediment Off-Site Landfill /TC Capped Benzene -- Industrial Areas -- 20 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	457.24	0.5	58.72	117.44	1.52	0.17	430	85.91	6.5	3.94E-03		1.73E-02	
Infil & Xwell	20200	2.6	457.24	0.5	58.72	117.44	1.52	**0.46**	**102**	60.76	6.5	2.56E-02	8	1.35E-01	6
Area & Wst. Vol	**162000**	2.6	**8315.80**	0.5	58.72	117.44	1.52	0.17	430	165.01	6.5	1.34E-01	1	1.14E-01	4
Ywell & Xwell	20200	2.6	457.24	0.5	58.72	117.44	1.52	0.17	**102**	**0.00**	6.5	2.67E-02	7	8.91E-02	9
Xwell & Wst Vol	20200	2.6	**8315.80**	0.5	58.72	117.44	1.52	0.17	**102**	60.76	6.5	9.07E-03	18	8.65E-02	1
Xwell & Wst. Conc	20200	2.6	457.24	0.5	**220**	**440.00**	1.52	0.17	**102**	60.76	6.5	8.65E-03	19	7.93E-02	3
Ywell & Infil	20200	2.6	457.24	0.5	58.72	117.44	1.52	**0.46**	430	**0.00**	6.5	4.04E-02	4	7.66E-02	14
Xwell & Zwell	20200	2.6	457.24	0.5	58.72	117.44	1.52	0.17	**102**	60.76	**1.3**	1.27E-02	13	7.47E-02	11
Ywell & Wst. Vol	20200	2.6	**8315.80**	0.5	58.72	117.44	1.52	0.17	430	**0.00**	6.5	1.81E-02	10	7.14E-02	5
Ywell & Wst Conc	20200	2.6	457.24	0.5	**220**	**440.00**	1.52	0.17	430	**0.00**	6.5	1.74E-02	11	6.54E-02	10
Area & Wst. Conc	**162000**	2.6	457.24	0.5	**220**	**440.00**	1.52	0.17	430	165.01	6.5	7.14E-02	2	6.45E-02	12
Infil & Wst. Vol	20200	2.6	**8315.80**	0.5	58.72	117.44	1.52	**0.46**	430	85.91	6.5	1.06E-02	16	6.36E-02	2
Area & Xwell	**162000**	2.6	457.24	0.5	58.72	117.44	1.52	0.17	**102**	142.35	6.5	4.94E-02	3	5.86E-02	13
Infil & Wst. Conc	20200	2.6	457.24	0.5	**220**	**440.00**	1.52	**0.46**	430	85.91	6.5	1.07E-02	15	5.22E-02	7
Area & Ywell	**162000**	2.6	457.24	0.5	58.72	117.44	1.52	0.17	430	**0.00**	6.5	2.92E-02	5	3.06E-02	17
Area & Infil	**162000**	2.6	457.24	0.5	58.72	117.44	1.52	**0.46**	430	165.01	6.5	2.41E-02	9	2.59E-02	18
Wst. Vol & Wst. Conc	20200	2.6	**8315.80**	0.5	**220**	**440.00**	1.52	0.17	430	85.91	6.5	4.41E-03	22	2.47E-02	8
Ywell & Zwell	20200	2.6	457.24	0.5	58.72	117.44	1.52	0.17	430	**0.00**	**1.3**	7.81E-03	21	2.44E-02	19
Infil & Zwell	20200	2.6	457.24	0.5	58.72	117.44	1.52	**0.46**	430	85.91	**1.3**	4.04E-03	24	1.46E-02	20
Area & Zwell	**162000**	2.6	457.24	0.5	58.72	117.44	1.52	0.17	430	165.01	**1.3**	1.14E-02	14	1.33E-02	21
Wst. Vol & Zwell	20200	2.6	**8315.80**	0.5	58.72	117.44	1.52	0.17	430	85.91	**1.3**	1.74E-03	26	1.20E-02	15
Wst Conc & Zwell	20200	2.6	457.24	0.5	**220**	**440.00**	1.52	0.17	430	85.91	**1.3**	1.67E-03	27	1.10E-02	16

Table A.7 Sensitivity Analysis for Crude Oil tank sediment Off-Site Landfill /Benzene -- Municipal Areas -- 20 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	457.24	0.679	58.72	86.48	1.52	0.17	430	117.75	6.5	5.12E-03		2.93E-02	
Xwell & Wst Vol	60705	2.6	**8315.8**	0.679	58.72	86.48	1.52	0.17	**102**	93.79	6.5	1.20E-02	20	2.38E-01	1
Xwell & Wst. Conc	60705	2.6	457.24	0.679	**220**	**324.01**	1.52	0.17	**102**	93.79	6.5	1.16E-02	22	1.78E-01	2
TCLP & Wst. Vol	60705	2.6	**8315.8**	**1.7**	58.72	34.54	1.52	0.17	430	117.75	6.5	1.30E-02	19	1.75E-01	3
Infil & Wst. Vol	60705	2.6	**8315.8**	0.679	58.72	86.48	1.52	**0.46**	430	117.75	6.5	5.85E-02	3	1.75E-01	4
Area & Wst. Vol	**420888**	2.6	**8315.8**	0.679	58.72	86.48	1.52	0.17	430	238.82	6.5	1.71E-01	1	1.50E-01	5
Ywell & Wst. Vol	60705	2.6	**8315.8**	0.679	58.72	86.48	1.52	0.17	430	**0.00**	6.5	2.40E-02	14	1.45E-01	6
TCLP & xwell	60705	2.6	457.24	**1.7**	58.72	34.54	1.52	0.17	**102**	93.79	6.5	2.59E-02	12	1.18E-01	7
Infil & Xwell	60705	2.6	457.24	0.679	58.72	86.48	1.52	**0.46**	**102**	93.79	6.5	3.32E-02	8	1.11E-01	8
Ywell & Wst Conc	60705	2.6	457.24	0.679	**220**	**324.01**	1.52	0.17	430	**0.00**	6.5	2.33E-02	15	1.04E-01	9
Ywell & Xwell	60705	2.6	457.24	0.679	58.72	86.48	1.52	0.17	**102**	**0.00**	6.5	3.44E-02	7	1.04E-01	10
Infil & Wst. Conc	60705	2.6	457.24	0.679	**220**	**324.01**	1.52	**0.46**	430	117.75	6.5	1.44E-02	17	9.97E-02	11
TCLP & Wst Conc	60705	2.6	457.24	**1.7**	**220**	**129.41**	1.52	0.17	430	117.75	6.5	1.34E-02	18	9.48E-02	12
Xwell & Zwell	60705	2.6	457.24	0.679	58.72	86.48	1.52	0.17	**102**	93.79	**1.3**	1.64E-02	16	8.80E-02	13
Wst. Vol & Wst. Conc	60705	2.6	**8315.8**	0.679	**220**	**324.01**	1.52	0.17	430	117.75	6.5	5.95E-03	24	8.79E-02	14
Ywell & TCLP	60705	2.6	457.24	**1.7**	58.72	**34.54**	1.52	0.17	430	**0.00**	6.5	5.11E-02	6	6.28E-02	15
Ywell & Infil	60705	2.6	457.24	0.679	58.72	86.48	1.52	**0.46**	430	**0.00**	6.5	5.24E-02	4	5.47E-02	16
Area & Wst. Conc	**420888**	2.6	457.24	0.679	**220**	**324.01**	1.52	0.17	430	238.82	6.5	8.02E-02	2	5.15E-02	17
Infil & TCLP	60705	2.6	457.24	**1.7**	58.72	**34.54**	1.52	**0.46**	430	117.75	6.5	2.71E-02	11	4.12E-02	18
Wst. Vol & Zwell	60705	2.6	**8315.8**	0.679	58.72	86.48	1.52	0.17	430	117.75	**1.3**	2.31E-03	27	4.00E-02	19
Wst Conc & Zwell	60705	2.6	457.24	0.679	**220**	**324.01**	1.52	0.17	430	117.75	**1.3**	2.22E-03	28	2.88E-02	20
Area & Xwell	**420888**	2.6	457.24	0.679	58.72	86.48	1.52	0.17	**102**	217.62	6.5	5.18E-02	5	2.61E-02	21
Ywell & Zwell	60705	2.6	457.24	0.679	58.72	86.48	1.52	0.17	430	**0.00**	**1.3**	1.02E-02	23	2.59E-02	22
Infil & Zwell	60705	2.6	457.24	0.679	58.72	86.48	1.52	**0.46**	430	117.75	**1.3**	5.24E-03	25	1.84E-02	23
TCLP & Zwell	60705	2.6	457.24	**1.7**	58.72	34.54	1.52	0.17	430	117.75	**1.3**	4.91E-03	26	1.76E-02	24
Area & Ywell	**420888**	2.6	457.24	0.679	58.72	86.48	1.52	0.17	430	**0.00**	6.5	3.00E-02	9	1.53E-02	25
Area & TCLP	**420888**	2.6	457.24	**1.7**	58.72	**34.54**	1.52	0.17	430	238.82	6.5	2.85E-02	10	1.49E-02	26
Area & Infil	**420888**	2.6	457.24	0.679	58.72	86.48	1.52	**0.46**	430	238.82	6.5	2.44E-02	13	1.18E-02	27
Area & Zwell	**420888**	2.6	457.24	0.679	58.72	86.48	1.52	0.17	430	238.82	**1.3**	1.17E-02	21	9.01E-03	28

Table A.8 Sensitivity Analysis for Crude Oil tank sediment Off-Site Landfill /TC Capped Benzene -- Municipal Areas -- 20 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	457.2	0.5	58.72	117.44	1.52	0.17	430	117.75	6.5	3.94E-03		2.64E-02	
Xwell & Wst Vol	60705	2.6	**8315.8**	0.5	58.72	117.44	1.52	0.17	**102**	93.79	6.5	9.07E-03	18	1.78E-01	1
Xwell & Wst. Conc	60705	2.6	457.2	0.5	**220**	**440.00**	1.52	0.17	**102**	93.79	6.5	8.65E-03	19	1.43E-01	2
Infil & Wst. Vol	60705	2.6	**8315.8**	0.5	58.72	117.44	1.52	**0.46**	430	117.75	6.5	1.06E-02	16	1.37E-01	3
Area & Wst. Vol	**420888**	2.6	**8315.8**	0.5	58.72	117.44	1.52	0.17	430	238.82	6.5	1.34E-01	1	1.27E-01	4
Ywell & Wst. Vol	60705	2.6	**8315.8**	0.5	58.72	117.44	1.52	0.17	430	**0.00**	6.5	1.81E-02	10	1.10E-01	5
Infil & Xwell	60705	2.6	457.2	0.5	58.72	117.44	1.52	**0.46**	**102**	93.79	6.5	2.56E-02	8	1.05E-01	6
Ywell & Xwell	60705	2.6	457.2	0.5	58.72	117.44	1.52	0.17	**102**	**0.00**	6.5	2.67E-02	7	9.19E-02	7
Infil & Wst. Conc	60705	2.6	457.2	0.5	**220**	**440.00**	1.52	**0.46**	430	117.75	6.5	1.07E-02	15	8.58E-02	8
Ywell & Wst Conc	60705	2.6	457.2	0.5	**220**	**440.00**	1.52	0.17	430	**0.00**	6.5	1.74E-02	11	8.44E-02	9
Xwell & Zwell	60705	2.6	457.2	0.5	58.72	117.44	1.52	0.17	**102**	93.79	**1.3**	1.27E-02	13	7.80E-02	10
Wst. Vol & Wst. Conc	60705	2.6	**8315.8**	0.5	**220**	**440.00**	1.52	0.17	430	117.75	6.5	4.41E-03	22	6.37E-02	11
Ywell & Infil	60705	2.6	457.2	0.5	58.72	117.44	1.52	**0.46**	430	**0.00**	6.5	4.04E-02	4	5.20E-02	12
Area & Wst. Conc	**420888**	2.6	457.2	0.5	**220**	**440.00**	1.52	0.17	430	238.82	6.5	7.14E-02	2	4.89E-02	13
Wst. Vol & Zwell	60705	2.6	**8315.8**	0.5	58.72	117.44	1.52	0.17	430	117.75	**1.3**	1.74E-03	26	3.03E-02	14
Area & Xwell	**420888**	2.6	457.2	0.5	58.72	117.44	1.52	0.17	**102**	217.62	6.5	4.94E-02	3	2.59E-02	15
Wst Conc & Zwell	60705	2.6	457.2	0.5	**220**	**440.00**	1.52	0.17	430	117.75	**1.3**	1.67E-03	27	2.34E-02	16
Ywell & Zwell	60705	2.6	457.2	0.5	58.72	117.44	1.52	0.17	430	**0.00**	**1.3**	7.81E-03	21	2.33E-02	17
Infil & Zwell	60705	2.6	457.2	0.5	58.72	117.44	1.52	**0.46**	430	117.75	**1.3**	4.04E-03	24	1.75E-02	18
Area & Ywell	**420888**	2.6	457.2	0.5	58.72	117.44	1.52	0.17	430	**0.00**	6.5	2.92E-02	5	1.51E-02	19
Area & Infil	**420888**	2.6	457.2	0.5	58.72	117.44	1.52	**0.46**	430	238.82	6.5	2.41E-02	9	1.17E-02	20
Area & Zwell	**420888**	2.6	457.2	0.5	58.72	117.44	1.52	0.17	430	238.82	**1.3**	1.14E-02	14	8.92E-03	21

Table A.9 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Benzene -- Industrial Areas -- 20 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 1997 Rank
Base Case	20200	2.6	476	7.9	116.38	14.73	0.84	0.17	430	85.91	6.5	3.96E-02		4.99E-02	
Wst. Conc. & X-Well	20200	2.6	476	7.9	**500**	63.29	0.84	0.17	**102**	60.76	6.5	1.21E-01	15	6.02E-01	1
Wst. Vol & X-Well	20200	2.6	**1842.9**	7.9	116.38	14.73	0.84	0.17	**102**	60.76	6.5	1.21E-01	16	5.66E-01	2
Wst. Conc. & Y- Well	20200	2.6	476	7.9	**500**	63.29	0.84	0.17	430	**0.00**	6.5	2.39E-01	4	4.55E-01	3
Wst. Vol & Y- Well	20200	2.6	**1842.9**	7.9	116.38	14.73	0.84	0.17	430	**0.00**	6.5	2.37E-01	5	4.26E-01	4
Wst. Vol & Wst Conc	20200	2.6	**1842.9**	7.9	**500**	**63.29**	0.84	0.17	430	85.91	6.5	5.97E-02	20	2.86E-01	5
X-Well & Y- Well	20200	2.6	476	7.9	116.38	14.73	0.84	0.17	**102**	**0.00**	6.5	2.79E-01	3	2.85E-01	6
X-Well & Infil	20200	2.6	476	7.9	116.38	14.73	0.84	**0.46**	**102**	60.76	6.5	2.02E-01	6	2.77E-01	7
X-Well & Z-Well	20200	2.6	476	7.9	116.38	14.73	0.84	0.17	**102**	60.76	**1.3**	1.33E-01	12	2.41E-01	8
Wst. Conc & Infil	20200	2.6	476	7.9	**500**	63.29	0.84	**0.46**	430	85.91	6.5	1.31E-01	13	2.35E-01	9
Wst. Conc & TCLP	20200	2.6	476	**39**	**500**	**12.82**	0.84	0.17	430	85.91	6.5	1.84E-01	7	2.16E-01	10
Wst. Vol & Infil	20200	2.6	**1842.9**	7.9	116.38	14.73	0.84	**0.46**	430	85.91	6.5	1.28E-01	14	2.16E-01	11
X-Well & TCLP	20200	2.6	476	**39**	116.38	**2.98**	0.84	0.17	**102**	60.76	6.5	1.83E-01	8	2.11E-01	12
Wst. Vol & TCLP	20200	2.6	**1842.9**	**39**	116.38	**2.98**	0.84	0.17	430	85.91	6.5	1.76E-01	9	1.96E-01	13
Y-Well & TCLP	20200	2.6	476	**39**	116.38	**2.98**	0.84	0.17	430	**0.00**	6.5	3.38E-01	1	1.50E-01	14
Y-Well & Infil	20200	2.6	476	7.9	116.38	14.73	0.84	**0.46**	430	**0.00**	6.5	3.00E-01	2	1.45E-01	15
Wst. Conc & Area	**162000**	2.6	476	7.9	**500**	63.29	0.84	0.17	430	165.01	6.5	1.63E-01	10	1.33E-01	16
Wst. Vol & Area	**162000**	2.6	**1842.9**	7.9	116.38	14.73	0.84	0.17	430	165.01	6.5	1.47E-01	11	1.20E-01	17
Wst. Conc & Z-Well	20200	2.6	476	7.9	**500**	63.29	0.84	0.17	430	85.91	**1.3**	2.30E-02	26	7.64E-02	18
X-Well & Area	**162000**	2.6	476	7.9	116.38	14.73	0.84	0.17	**102**	142.35	6.5	7.27E-02	19	7.44E-02	19
Wst. Vo & Z-Well	20200	2.6	**1842.9**	7.9	116.38	14.73	0.84	0.17	430	85.91	**1.3**	2.28E-02	27	7.16E-02	20
Y-Well & Z-Well	20200	2.6	476	7.9	116.38	14.73	0.84	0.17	430	0.00	**1.3**	7.96E-02	18	7.13E-02	21
TCLP & Infil	20200	2.6	476	**39**	116.38	2.98	0.84	**0.46**	430	85.91	6.5	1.05E-01	17	6.14E-02	22
Y-Well & Area	**162000**	2.6	476	7.9	116.38	14.73	0.84	0.17	430	**0.00**	6.5	4.17E-02	21	3.79E-02	23
TCLP & Area	**162000**	2.6	476	**39**	116.38	2.98	0.84	0.17	430	165.01	6.5	3.84E-02	22	3.12E-02	24
Infil & Area	**162000**	2.6	476	7.9	116.38	14.73	0.84	**0.46**	430	165.01	6.5	3.30E-02	23	3.05E-02	25
Infil & Z-Well	20200	2.6	476	7.9	116.38	14.73	0.84	**0.46**	430	85.91	**1.3**	3.00E-02	25	2.77E-02	26
TCLP & Z-Well	20200	2.6	476	**39**	116.38	2.98	0.84	0.17	430	85.91	**1.3**	3.24E-02	24	2.52E-02	27
Area & Z-Well	**162000**	2.6	476	7.9	116.38	14.73	0.84	0.17	430	165.01	**1.3**	1.64E-02	28	1.65E-02	28

Table A.10 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Benzene (TCLP=TC Regulatory Level) -- Industrial Areas (20 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	476	0.5	116.38	232.76	0.84	0.17	430	85.91	6.5	4.05E-03		1.81E-02	
X-Well & Infil	20200	2.6	476	0.5	116.38	232.76	0.84	**0.46**	**102**	60.76	6.5	2.63E-02	8	1.43E-01	1
X-Well & Y- Well	20200	2.6	476	0.5	116.38	232.76	0.84	0.17	**102**	**0.00**	6.5	2.73E-02	7	9.25E-02	2
Wst. Conc. & X-Well	20200	2.6	476	0.5	**500**	1000.00	0.84	0.17	**102**	60.76	6.5	8.60E-03	16	8.21E-02	3
Y-Well & Infil	20200	2.6	476	0.5	116.38	232.76	0.84	**0.46**	430	**0.00**	6.5	4.14E-02	4	8.17E-02	4
Wst. Vol & X-Well	20200	2.6	**1842.9**	0.5	116.38	232.76	0.84	0.17	**102**	60.76	6.5	8.61E-03	15	8.14E-02	5
X-Well & Z-Well	20200	2.6	476	0.5	116.38	232.76	0.84	0.17	**102**	60.76	**1.3**	1.30E-02	12	7.73E-02	6
Wst. Conc & Area	**162000**	2.6	476	0.5	**500**	1000.00	0.84	0.17	430	165.01	6.5	8.87E-02	1	7.39E-02	7
Wst. Vol & Area	**162000**	2.6	**1842.9**	0.5	116.38	232.76	0.84	0.17	430	165.01	6.5	8.45E-02	2	7.02E-02	8
Wst. Conc. & Y- Well	20200	2.6	476	0.5	**500**	1000.00	0.84	0.17	430	**0.00**	6.5	1.72E-02	10	6.73E-02	9
Wst. Vol & Y- Well	20200	2.6	**1842.9**	0.5	116.38	232.76	0.84	0.17	430	**0.00**	6.5	1.72E-02	9	6.66E-02	10
X-Well & Area	**162000**	2.6	476	0.5	116.38	232.76	0.84	0.17	**102**	142.35	6.5	6.39E-02	3	6.53E-02	11
Wst. Conc & Infil	20200	2.6	476	0.5	**500**	1000.00	0.84	**0.46**	430	85.91	6.5	1.05E-02	14	5.51E-02	12
Wst. Vol & Infil	20200	2.6	**1842.9**	0.5	116.38	232.76	0.84	**0.46**	430	85.91	6.5	1.07E-02	13	5.40E-02	13
Y-Well & Area	**162000**	2.6	476	0.5	116.38	232.76	0.84	0.17	430	**0.00**	6.5	3.74E-02	5	3.42E-02	14
Infil & Area	**162000**	2.6	476	0.5	116.38	232.76	0.84	**0.46**	430	165.01	6.5	3.18E-02	6	2.93E-02	15
Y-Well & Z-Well	20200	2.6	476	0.5	116.38	232.76	0.84	0.17	430	0.00	**1.3**	8.05E-03	17	2.54E-02	16
Wst. Vol & Wst Conc	20200	2.6	**1842.9**	0.5	**500**	**1000.00**	0.84	0.17	430	85.91	6.5	3.97E-03	19	2.53E-02	17
Infil & Z-Well	20200	2.6	476	0.5	116.38	232.76	0.84	**0.46**	430	85.91	**1.3**	4.15E-03	18	1.56E-02	18
Area & Z-Well	**162000**	2.6	476	0.5	116.38	232.76	0.84	0.17	430	165.01	**1.3**	1.46E-02	11	1.48E-02	19
Wst. Conc & Z-Well	20200	2.6	476	0.5	**500**	1000.00	0.84	0.17	430	85.91	**1.3**	1.65E-03	21	1.13E-02	20
Wst. Vo & Z-Well	20200	2.6	**1842.9**	0.5	116.38	232.76	0.84	0.17	430	85.91	**1.3**	1.66E-03	20	1.12E-02	21

Table A.11 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Benzene -- Muncipal Areas -- 20 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	60705	2.6	476	7.9	116.38	14.73	0.84	0.17	430	117.75	6.5	3.96E-02		4.26E-02	
Wst. Conc. & X-Well	60705	2.6	476	7.9	**500**	63.29	0.84	0.17	**102**	93.79	6.5	1.21E-01	15	5.73E-01	1
Wst. Vol & X-Well	60705	2.6	**1842.9**	7.9	116.38	14.73	0.84	0.17	**102**	93.79	6.5	1.21E-01	16	5.24E-01	2
Wst. Vol & Wst Conc	60705	2.6	**1842.9**	7.9	**500**	**63.29**	0.84	0.17	430	117.75	6.5	5.97E-02	20	4.62E-01	3
Wst. Conc. & Y- Well	60705	2.6	476	7.9	**500**	63.29	0.84	0.17	430	**0.00**	6.5	2.39E-01	4	3.06E-01	4
Wst. Vol & Y- Well	60705	2.6	**1842.9**	7.9	116.38	14.73	0.84	0.17	430	**0.00**	6.5	2.37E-01	5	2.79E-01	5
Wst. Conc & Infil	60705	2.6	476	7.9	**500**	63.29	0.84	**0.46**	430	117.75	6.5	1.31E-01	13	2.02E-01	6
Wst. Conc & TCLP	60705	2.6	476	**39**	**500**	**12.82**	0.84	0.17	430	117.75	6.5	1.84E-01	7	1.84E-01	7
Wst. Vol & Infil	60705	2.6	**1842.9**	7.9	116.38	14.73	0.84	**0.46**	430	117.75	6.5	1.28E-01	14	1.83E-01	8
Wst. Vol & TCLP	60705	2.6	**1842.9**	**39**	116.38	**2.98**	0.84	0.17	430	117.75	6.5	1.76E-01	9	1.65E-01	9
X-Well & Y- Well	60705	2.6	476	7.9	116.38	14.73	0.84	0.17	**102**	**0.00**	6.5	2.79E-01	3	1.58E-01	10
X-Well & TCLP	60705	2.6	476	**39**	116.38	**2.98**	0.84	0.17	**102**	93.79	6.5	1.83E-01	8	1.46E-01	11
X-Well & Infil	60705	2.6	476	7.9	116.38	14.73	0.84	**0.46**	**102**	93.79	6.5	2.02E-01	6	1.39E-01	12
X-Well & Z-Well	60705	2.6	476	7.9	116.38	14.73	0.84	0.17	**102**	93.79	**1.3**	1.33E-01	12	1.36E-01	13
Wst. Conc & Z-Well	60705	2.6	476	7.9	**500**	63.29	0.84	0.17	430	117.75	**1.3**	2.30E-02	26	8.58E-02	14
Wst. Vo & Z-Well	60705	2.6	**1842.9**	7.9	116.38	14.73	0.84	0.17	430	117.75	**1.3**	2.28E-02	27	7.82E-02	16
Y-Well & TCLP	60705	2.6	476	**39**	116.38	**2.98**	0.84	0.17	430	**0.00**	6.5	3.38E-01	1	7.63E-02	15
Wst. Conc & Area	**420888**	2.6	476	7.9	**500**	63.29	0.84	0.17	430	238.82	6.5	1.63E-01	10	7.32E-02	17
Y-Well & Infil	60705	2.6	476	7.9	116.38	14.73	0.84	**0.46**	430	**0.00**	6.5	3.00E-01	2	6.76E-02	18
Wst. Vol & Area	**420888**	2.6	**1842.9**	7.9	116.38	14.73	0.84	0.17	430	238.82	6.5	1.47E-01	11	6.60E-02	19
TCLP & Infil	60705	2.6	476	**39**	116.38	2.98	0.84	**0.46**	430	117.75	6.5	1.05E-01	17	4.77E-02	20
Y-Well & Z-Well	60705	2.6	476	7.9	116.38	14.73	0.84	0.17	430	0.00	**1.3**	7.96E-02	18	3.79E-02	21
X-Well & Area	**420888**	2.6	476	7.9	116.38	14.73	0.84	0.17	**102**	217.62	6.5	7.27E-02	19	3.04E-02	22
Infil & Z-Well	60705	2.6	476	7.9	116.38	14.73	0.84	**0.46**	430	117.75	**1.3**	3.00E-02	25	2.28E-02	23
TCLP & Z-Well	60705	2.6	476	**39**	116.38	2.98	0.84	0.17	430	117.75	**1.3**	3.24E-02	24	2.15E-02	24
Y-Well & Area	**420888**	2.6	476	7.9	116.38	14.73	0.84	0.17	430	**0.00**	6.5	4.17E-02	21	1.77E-02	25
TCLP & Area	**420888**	2.6	476	**39**	116.38	2.98	0.84	0.17	430	238.82	6.5	3.84E-02	22	1.70E-02	26
Infil & Area	**420888**	2.6	476	7.9	116.38	14.73	0.84	**0.46**	430	238.82	6.5	3.30E-02	23	1.37E-02	27
Area & Z-Well	**420888**	2.6	476	7.9	116.38	14.73	0.84	0.17	430	238.82	**1.3**	1.64E-02	28	1.05E-02	28

Table A.12 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Benzene (TCLP=TC Regulatory Level) -- Muncipal Areas (20 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	476	0.5	116.38	232.76	0.84	0.17	430	117.75	6.5	4.05E-03		2.85E-02	
Wst. Conc. & X-Well	60705	2.6	476	0.5	**500**	1000.00	0.84	0.17	**102**	93.79	6.5	8.60E-03	16	1.52E-01	1
Wst. Vol & X-Well	60705	2.6	**1842.9**	0.5	116.38	232.76	0.84	0.17	**102**	93.79	6.5	8.61E-03	15	1.49E-01	2
X-Well & Infil	60705	2.6	476	0.5	116.38	232.76	0.84	**0.46**	**102**	93.79	6.5	2.63E-02	8	1.15E-01	3
X-Well & Y- Well	60705	2.6	476	0.5	116.38	232.76	0.84	0.17	**102**	**0.00**	6.5	2.73E-02	7	9.86E-02	4
Wst. Conc & Infil	60705	2.6	476	0.5	**500**	1000.00	0.84	**0.46**	430	117.75	6.5	1.05E-02	14	9.61E-02	5
Wst. Vol & Infil	60705	2.6	**1842.9**	0.5	116.38	232.76	0.84	**0.46**	430	117.75	6.5	1.07E-02	13	9.22E-02	6
Wst. Conc. & Y- Well	60705	2.6	476	0.5	**500**	1000.00	0.84	0.17	430	**0.00**	6.5	1.72E-02	10	9.06E-02	7
Wst. Vol & Y- Well	60705	2.6	**1842.9**	0.5	116.38	232.76	0.84	0.17	430	**0.00**	6.5	1.72E-02	9	8.83E-02	8
X-Well & Z-Well	60705	2.6	476	0.5	116.38	232.76	0.84	0.17	**102**	93.79	**1.3**	1.30E-02	12	8.37E-02	9
Wst. Vol & Wst Conc	60705	2.6	**1842.9**	0.5	**500**	**1000.00**	0.84	0.17	430	117.75	6.5	3.97E-03	19	6.16E-02	10
Wst. Conc & Area	**420888**	2.6	476	0.5	**500**	1000.00	0.84	0.17	430	238.82	6.5	8.87E-02	1	6.02E-02	11
Y-Well & Infil	60705	2.6	476	0.5	116.38	232.76	0.84	**0.46**	430	**0.00**	6.5	4.14E-02	4	5.78E-02	12
Wst. Vol & Area	**420888**	2.6	**1842.9**	0.5	116.38	232.76	0.84	0.17	430	238.82	6.5	8.45E-02	2	5.56E-02	13
X-Well & Area	**420888**	2.6	476	0.5	116.38	232.76	0.84	0.17	**102**	217.62	6.5	6.39E-02	3	2.94E-02	14
Y-Well & Z-Well	60705	2.6	476	0.5	116.38	232.76	0.84	0.17	430	0.00	**1.3**	8.05E-03	17	2.51E-02	15
Wst. Conc & Z-Well	60705	2.6	476	0.5	**500**	1000.00	0.84	0.17	430	117.75	**1.3**	1.65E-03	21	2.51E-02	16
Wst. Vo & Z-Well	60705	2.6	**1842.9**	0.5	116.38	232.76	0.84	0.17	430	117.75	**1.3**	1.66E-03	20	2.45E-02	17
Infil & Z-Well	60705	2.6	476	0.5	116.38	232.76	0.84	**0.46**	430	117.75	**1.3**	4.15E-03	18	1.95E-02	18
Y-Well & Area	**420888**	2.6	476	0.5	116.38	232.76	0.84	0.17	430	**0.00**	6.5	3.74E-02	5	1.72E-02	19
Infil & Area	**420888**	2.6	476	0.5	116.38	232.76	0.84	**0.46**	430	238.82	6.5	3.18E-02	6	1.34E-02	20
Area & Z-Well	**420888**	2.6	476	0.5	116.38	232.76	0.84	0.17	430	238.82	**1.3**	1.46E-02	11	1.01E-02	21

Table A.13 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Arsenic -- Industrial Areas -- 20 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	476	1.1	393.3	357.5	0.84	0.17	430	85.91	6.5	1.92E-03		1.23E-03	
Wst. Conc. & X-Well	20200	2.6	476	1.1	**1600**	1454.5	0.84	0.17	**102**	60.76	6.5	1.15E-02	5	2.24E-02	1
Wst. Vol & X-Well	20200	2.6	**1842.9**	1.1	393.3	357.5	0.84	0.17	**102**	60.76	6.5	1.12E-02	6	2.14E-02	2
Wst. Vol & Wst Conc	20200	2.6	**1842.9**	1.1	**1600**	**1454.5**	0.84	0.17	430	85.91	6.5	7.46E-03	13	1.58E-02	3
Wst. Conc. & Y- Well	20200	2.6	476	1.1	**1600**	1454.5	0.84	0.17	430	**0.00**	6.5	2.11E-02	1	1.41E-02	4
Wst. Vol & Y- Well	20200	2.6	**1842.9**	1.1	393.3	357.5	0.84	0.17	430	**0.00**	6.5	2.06E-02	2	1.35E-02	5
X-Well & Infil	20200	2.6	476	1.1	393.3	357.5	0.84	**0.46**	**102**	60.76	6.5	1.11E-02	7	1.09E-02	6
X-Well & Y- Well	20200	2.6	476	1.1	393.3	357.5	0.84	0.17	**102**	**0.00**	6.5	1.58E-02	3	8.12E-03	7
X-Well & Z-Well	20200	2.6	476	1.1	393.3	357.5	0.84	0.17	**102**	60.76	**1.3**	7.58E-03	12	7.04E-03	8
Wst. Conc & Infil	20200	2.6	476	1.1	**1600**	1454.5	0.84	**0.46**	430	85.91	6.5	8.58E-03	9	6.22E-03	9
Wst. Vol & Infil	20200	2.6	**1842.9**	1.1	393.3	357.5	0.84	**0.46**	430	85.91	6.5	8.31E-03	10	5.92E-03	10
X-Well & TCLP	20200	2.6	476	**4.9**	393.3	**80.3**	0.84	0.17	**102**	60.76	6.5	5.90E-03	14	5.74E-03	11
Wst. Conc & TCLP	20200	2.6	476	**4.9**	**1600**	**326.5**	0.84	0.17	430	85.91	6.5	2.16E-03	19	4.99E-03	12
Wst. Vol & TCLP	20200	2.6	**1842.9**	**4.9**	393.3	**80.3**	0.84	0.17	430	85.91	6.5	7.63E-03	11	4.75E-03	13
Y-Well & Infil	20200	2.6	476	1.1	393.3	357.5	0.84	**0.46**	430	**0.00**	6.5	1.17E-02	4	3.71E-03	14
Y-Well & TCLP	20200	2.6	476	**4.9**	393.3	**80.3**	0.84	0.17	430	**0.00**	6.5	9.66E-03	8	3.56E-03	15
Wst. Conc & Area	**162000**	2.6	476	1.1	**1600**	1454.5	0.84	0.17	430	165.01	6.5	3.54E-03	16	2.82E-03	16
Wst. Vol & Area	**162000**	2.6	**1842.9**	1.1	393.3	357.5	0.84	0.17	430	165.01	6.5	3.37E-03	17	2.68E-03	17
Wst. Conc & Z-Well	20200	2.6	476	1.1	**1600**	1454.5	0.84	0.17	430	85.91	**1.3**	2.02E-03	20	2.40E-03	18
Wst. Vo & Z-Well	20200	2.6	**1842.9**	1.1	393.3	357.5	0.84	0.17	430	85.91	**1.3**	1.98E-03	21	2.29E-03	19
X-Well & Area	**162000**	2.6	476	1.1	393.3	357.5	0.84	0.17	**102**	142.35	6.5	1.76E-03	22	1.80E-03	20
Y-Well & Z-Well	20200	2.6	476	1.1	393.3	357.5	0.84	0.17	430	0.00	**1.3**	4.00E-03	15	1.78E-03	21
TCLP & Infil	20200	2.6	476	**4.9**	393.3	80.3	0.84	**0.46**	430	85.91	6.5	2.89E-03	18	1.54E-03	22
Y-Well & Area	**162000**	2.6	476	1.1	393.3	357.5	0.84	0.17	430	**0.00**	6.5	9.45E-04	24	8.40E-04	23
Infil & Area	**162000**	2.6	476	1.1	393.3	357.5	0.84	**0.46**	430	165.01	6.5	8.88E-04	26	7.71E-04	24
Infil & Z-Well	20200	2.6	476	1.1	393.3	357.5	0.84	**0.46**	430	85.91	**1.3**	1.16E-03	23	7.15E-04	25
TCLP & Area	**162000**	2.6	476	**4.9**	393.3	80.3	0.84	0.17	430	165.01	6.5	8.71E-04	27	6.93E-04	26
TCLP & Z-Well	20200	2.6	476	**4.9**	393.3	80.3	0.84	0.17	430	85.91	**1.3**	9.25E-04	25	6.04E-04	27
Area & Z-Well	**162000**	2.6	476	1.1	393.3	357.5	0.84	0.17	430	165.01	**1.3**	3.80E-04	28	3.72E-04	28

Table A.14 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Arsenic -- Muncipal Areas -- 20 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	60705	2.6	476	1.1	393.3	357.5	0.84	0.17	430	117.75	6.5	1.92E-03		1.09E-03	
Wst. Vol & Wst Conc	60705	2.6	**1842.9**	1.1	**1600**	**1454.5**	0.84	0.17	430	117.75	6.5	7.46E-03	13	1.66E-02	1
Wst. Conc. & X-Well	60705	2.6	476	1.1	**1600**	1454.5	0.84	0.17	**102**	93.79	6.5	1.15E-02	5	1.55E-02	2
Wst. Vol & X-Well	60705	2.6	**1842.9**	1.1	393.3	357.5	0.84	0.17	**102**	93.79	6.5	1.12E-02	6	1.47E-02	3
Wst. Conc. & Y- Well	60705	2.6	476	1.1	**1600**	1454.5	0.84	0.17	430	**0.00**	6.5	2.11E-02	1	7.15E-03	4
Wst. Vol & Y- Well	60705	2.6	**1842.9**	1.1	393.3	357.5	0.84	0.17	430	**0.00**	6.5	2.06E-02	2	6.80E-03	5
X-Well & Infil	60705	2.6	476	1.1	393.3	357.5	0.84	**0.46**	**102**	93.79	6.5	1.11E-02	7	5.09E-03	6
Wst. Conc & Infil	60705	2.6	476	1.1	**1600**	1454.5	0.84	**0.46**	430	117.75	6.5	8.58E-03	9	5.02E-03	7
Wst. Vol & Infil	60705	2.6	**1842.9**	1.1	393.3	357.5	0.84	**0.46**	430	117.75	6.5	8.31E-03	10	4.78E-03	8
Wst. Conc & TCLP	60705	2.6	476	**4.9**	**1600**	**326.5**	0.84	0.17	430	117.75	6.5	2.16E-03	19	4.44E-03	9
Wst. Vol & TCLP	60705	2.6	**1842.9**	**4.9**	393.3	**80.3**	0.84	0.17	430	117.75	6.5	7.63E-03	11	4.22E-03	10
X-Well & Y- Well	60705	2.6	476	1.1	393.3	357.5	0.84	0.17	**102**	**0.00**	6.5	1.58E-02	3	4.10E-03	11
X-Well & TCLP	60705	2.6	476	**4.9**	393.3	**80.3**	0.84	0.17	**102**	93.79	6.5	5.90E-03	14	3.82E-03	12
X-Well & Z-Well	60705	2.6	476	1.1	393.3	357.5	0.84	0.17	**102**	93.79	**1.3**	7.58E-03	12	3.65E-03	13
Wst. Conc & Z-Well	60705	2.6	476	1.1	**1600**	1454.5	0.84	0.17	430	117.75	**1.3**	2.02E-03	20	2.25E-03	14
Wst. Vo & Z-Well	60705	2.6	**1842.9**	1.1	393.3	357.5	0.84	0.17	430	117.75	**1.3**	1.98E-03	21	2.14E-03	15
Y-Well & TCLP	60705	2.6	476	**4.9**	393.3	**80.3**	0.84	0.17	430	**0.00**	6.5	9.66E-03	8	1.76E-03	16
Y-Well & Infil	60705	2.6	476	1.1	393.3	357.5	0.84	**0.46**	430	**0.00**	6.5	1.17E-02	4	1.69E-03	17
Wst. Conc & Area	**420888**	2.6	476	1.1	**1600**	1454.5	0.84	0.17	430	238.82	6.5	3.54E-03	16	1.53E-03	18
Wst. Vol & Area	**420888**	2.6	**1842.9**	1.1	393.3	357.5	0.84	0.17	430	238.82	6.5	3.37E-03	17	1.45E-03	19
TCLP & Infil	60705	2.6	476	**4.9**	393.3	80.3	0.84	**0.46**	430	117.75	6.5	2.89E-03	18	1.24E-03	20
Y-Well & Z-Well	60705	2.6	476	1.1	393.3	357.5	0.84	0.17	430	0.00	**1.3**	4.00E-03	15	8.88E-04	21
X-Well & Area	**420888**	2.6	476	1.1	393.3	357.5	0.84	0.17	**102**	217.62	6.5	1.76E-03	22	6.87E-04	22
Infil & Z-Well	60705	2.6	476	1.1	393.3	357.5	0.84	**0.46**	430	117.75	**1.3**	1.16E-03	23	6.12E-04	23
TCLP & Z-Well	60705	2.6	476	**4.9**	393.3	80.3	0.84	0.17	430	117.75	**1.3**	9.25E-04	25	5.54E-04	24
Y-Well & Area	**420888**	2.6	476	1.1	393.3	357.5	0.84	0.17	430	**0.00**	6.5	9.45E-04	24	3.84E-04	25
TCLP & Area	**420888**	2.6	476	**4.9**	393.3	80.3	0.84	0.17	430	238.82	6.5	8.71E-04	27	3.75E-04	26
Infil & Area	**420888**	2.6	476	1.1	393.3	357.5	0.84	**0.46**	430	238.82	6.5	8.88E-04	26	3.49E-04	27
Area & Z-Well	**420888**	2.6	476	1.1	393.3	357.5	0.84	0.17	430	238.82	**1.3**	3.80E-04	28	2.33E-04	28

Table A.15 Off-Spec Products and Fines Off-site Landfill/Benz(a)anthracene --Industrial Areas -- 20 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	85.91	6.5	4.16E-06		1.02E-05	
Wst. Vol & X-Well	20200	2.15	**10460.3**	0.013	12	923.08	1.26	0.17	**102**	60.76	6.5	1.04E-04	7	6.39E-04	1
X-Well & Infil	20200	2.15	1439.68	0.013	12	923.08	1.26	**0.46**	**102**	60.76	6.5	3.19E-04	2	4.49E-04	2
Wst. Vol & Infil	20200	2.15	**10460.3**	0.013	12	923.08	1.26	**0.46**	430	85.91	6.5	2.00E-04	4	4.02E-04	3
Wst. Conc. & X-Well	20200	2.15	1439.68	0.013	**28**	**2153.85**	1.26	0.17	**102**	60.76	6.5	9.68E-05	8	3.92E-04	4
X-Well & Y- Well	20200	2.15	1439.68	0.013	12	923.08	1.26	0.17	**102**	**0.00**	6.5	2.85E-04	3	2.96E-04	5
X-Well & Z-Well	20200	2.15	1439.68	0.013	12	923.08	1.26	0.17	**102**	60.76	**1.3**	1.60E-04	5	2.87E-04	6
Y-Well & Infil	20200	2.15	1439.68	0.013	12	923.08	1.26	**0.46**	430	**0.00**	6.5	3.85E-04	1	1.54E-04	7
Wst. Conc & Infil	20200	2.15	1439.68	0.013	**28**	**2153.85**	1.26	**0.46**	430	85.91	6.5	1.49E-04	6	1.47E-04	8
Wst. Vol & Y- Well	20200	2.15	**10460.3**	0.013	12	923.08	1.26	0.17	430	0.00	6.5	3.17E-05	13	7.30E-05	9
X-Well & Area	**162000**	2.15	1439.68	0.013	12	923.08	1.26	0.17	**102**	142.35	6.5	6.13E-05	9	6.24E-05	10
Wst. Conc. & Y- Well	20200	2.15	1439.68	0.013	**28**	**2153.85**	1.26	0.17	430	0.00	6.5	3.03E-05	14	5.20E-05	11
Wst. Vol & Area	**162000**	2.15	**10460.3**	0.013	12	923.08	1.26	0.17	430	165.01	6.5	5.13E-05	10	4.43E-05	12
Infil & Area	**162000**	2.15	1439.68	0.013	12	923.08	1.26	**0.46**	430	165.01	6.5	3.71E-05	12	3.23E-05	13
Infil & Z-Well	20200	2.15	1439.68	0.013	12	923.08	1.26	**0.46**	430	85.91	**1.3**	3.84E-05	11	2.98E-05	14
Wst. Vol & Wst Conc	20200	2.15	**10460.3**	0.013	**28**	**2153.85**	1.26	0.17	430	85.91	6.5	4.73E-06	19	2.52E-05	15
Y-Well & Z-Well	20200	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	**0.00**	**1.3**	1.94E-05	16	2.32E-05	16
Wst. Conc & Area	**162000**	2.15	1439.68	0.013	**28**	**2153.85**	1.26	0.17	430	165.01	6.5	2.06E-05	15	1.75E-05	17
Wst. Vo & Z-Well	20200	2.15	**10460.3**	0.013	12	923.08	1.26	0.17	430	85.91	**1.3**	3.07E-06	20	1.68E-05	18
Wst. Conc & Z-Well	20200	2.15	1439.68	0.013	**28**	**2153.85**	1.26	0.17	430	85.91	**1.3**	2.93E-06	21	1.18E-05	19
Y-Well & Area	**162000**	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	**0.00**	6.5	9.87E-06	17	9.19E-06	20
Area & Z-Well	**162000**	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	165.01	**1.3**	6.16E-06	18	6.05E-06	21

Table A.16 Off-Spec Products and Fines Off-site Landfill/Benz(a)anthracene -- Municipal Areas -- 20 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	117.75	6.5	4.16E-06		1.01E-05	
Wst. Vol & X-Well	60705	2.15	**10460.3**	0.013	12	923.08	1.26	0.17	**102**	93.79	6.5	1.04E-04	7	6.96E-04	1
Wst. Vol & Infil	60705	2.15	**10460.3**	0.013	12	923.08	1.26	**0.46**	430	117.75	6.5	2.00E-04	4	3.47E-04	2
Wst. Conc. & X-Well	60705	2.15	1439.68	0.013	**28**	**2153.85**	1.26	0.17	**102**	93.79	6.5	9.68E-05	8	3.02E-04	3
X-Well & Infil	60705	2.15	1439.68	0.013	12	923.08	1.26	**0.46**	**102**	93.79	6.5	3.19E-04	2	2.11E-04	4
X-Well & Z-Well	60705	2.15	1439.68	0.013	12	923.08	1.26	0.17	**102**	93.79	**1.3**	1.60E-04	5	1.51E-04	5
X-Well & Y- Well	60705	2.15	1439.68	0.013	12	923.08	1.26	0.17	**102**	**0.00**	6.5	2.85E-04	3	1.49E-04	6
Wst. Conc & Infil	60705	2.15	1439.68	0.013	**28**	**2153.85**	1.26	**0.46**	430	117.75	6.5	1.49E-04	6	1.14E-04	7
Y-Well & Infil	60705	2.15	1439.68	0.013	12	923.08	1.26	**0.46**	430	**0.00**	6.5	3.85E-04	1	7.04E-05	8
Wst. Vol & Y- Well	60705	2.15	**10460.3**	0.013	12	923.08	1.26	0.17	430	0.00	6.5	3.17E-05	13	6.63E-05	9
Wst. Vol & Wst Conc	60705	2.15	**10460.3**	0.013	**28**	**2153.85**	1.26	0.17	430	117.75	6.5	4.73E-06	19	5.10E-05	10
Wst. Vol & Area	**420888**	2.15	**10460.3**	0.013	12	923.08	1.26	0.17	430	238.82	6.5	5.13E-05	10	3.65E-05	11
Wst. Conc. & Y- Well	60705	2.15	1439.68	0.013	**28**	**2153.85**	1.26	0.17	430	0.00	6.5	3.03E-05	14	3.43E-05	12
Wst. Vo & Z-Well	60705	2.15	**10460.3**	0.013	12	923.08	1.26	0.17	430	117.75	**1.3**	3.07E-06	20	2.94E-05	13
Infil & Z-Well	60705	2.15	1439.68	0.013	12	923.08	1.26	**0.46**	430	117.75	**1.3**	3.84E-05	11	2.42E-05	14
X-Well & Area	**420888**	2.15	1439.68	0.013	12	923.08	1.26	0.17	**102**	217.62	6.5	6.13E-05	9	2.38E-05	15
Wst. Conc & Z-Well	60705	2.15	1439.68	0.013	**28**	**2153.85**	1.26	0.17	430	117.75	**1.3**	2.93E-06	21	1.47E-05	16
Infil & Area	**420888**	2.15	1439.68	0.013	12	923.08	1.26	**0.46**	430	238.82	6.5	3.71E-05	12	1.45E-05	17
Wst. Conc & Area	**420888**	2.15	1439.68	0.013	**28**	**2153.85**	1.26	0.17	430	238.82	6.5	2.06E-05	15	1.26E-05	18
Y-Well & Z-Well	60705	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	**0.00**	**1.3**	1.94E-05	16	1.24E-05	19
Y-Well & Area	**420888**	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	**0.00**	6.5	9.87E-06	17	5.61E-06	20
Area & Z-Well	**420888**	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	238.82	**1.3**	6.16E-06	18	4.52E-06	21

Table A.17 Sensitivity Analysis with TCLP set to High-End Value, Off-Spec Product and Fines Off-site Landfill/Benz(a)anthracene -- Industrial Areas (20-Year Waste Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	85.91	6.5	4.16E-06		1.02E-05	
X-well	20200	2.15	1439.68	0.013	12	923.08	1.26	0.17	**102**	60.76	6.5	8.46E-05	7	2.11E-04	1
Infiltration	20200	2.15	1439.68	0.013	12	923.08	1.26	**0.46**	430	85.91	6.5	9.29E-05	1	6.41E-05	2
Y-well	20200	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	**0.00**	6.5	2.80E-05	3	3.25E-05	3
Wste Volume	20200	2.15	**10460.3**	0.013	12	923.08	1.26	0.17	430	85.91	6.5	4.68E-06	5	2.27E-05	4
Waste Concentration	20200	2.15	1439.68	0.013	**28**	**2153.85**	1.26	0.17	430	85.91	6.5	4.48E-06	2	1.62E-05	5
Area	**162000**	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	165.01	6.5	9.38E-06	4	7.95E-06	6
Z-well	20200	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	85.91	**1.3**	2.70E-06	6	7.21E-06	7

Table A.18 Sensitivity Analysis with TCLP set to High-End Value, Off-Spec Products and Fines Off-site Landfill/Benz(a)anthracene -- Municipal Area (20 Year Waste Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	117.75	6.5	4.16E-06		1.01E-05	6
X-well	60705	2.15	1439.68	0.013	12	923.08	1.26	0.17	**102**	93.79	6.5	8.46E-05	2	1.39E-04	1
Infiltration	60705	2.15	1439.68	0.013	12	923.08	1.26	**0.46**	430	117.75	6.5	9.29E-05	1	4.89E-05	2
Wste Volume	60705	2.15	**10460.3**	0.013	12	923.08	1.26	0.17	430	117.75	6.5	4.68E-06	5	3.88E-05	3
Waste Concentration	60705	2.15	1439.68	0.013	**28**	**2153.85**	1.26	0.17	430	117.75	6.5	4.48E-06	6	2.00E-05	4
Y-well	60705	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	**0.00**	6.5	2.80E-05	3	1.73E-05	5
Z-well	60705	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	117.75	**1.3**	2.70E-06	7	7.24E-06	7
Area	**420888**	2.15	1439.68	0.013	12	923.08	1.26	0.17	430	238.82	6.5	9.38E-06	4	5.52E-06	8

Table A.19 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/ Benzene -- Industrial Areas - 20 year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	1476	1.49	43.73	29.35	1.2	0.17	430	85.91	6.5	3.93E-03		4.35E-02	
Infil & Xwell	20200	2.6	1476	1.49	43.73	29.35	1.2	**0.46**	**102**	60.76	6.5	7.33E-02	7	3.19E-01	1
TCLP & xwell	20200	2.6	1476	**4.2**	43.73	10.41	1.2	0.17	**102**	60.76	6.5	6.40E-02	10	2.64E-01	2
Xwell & Wst Vol	20200	2.6	**8333.3**	1.49	43.73	29.349	1.2	0.17	**102**	60.76	6.5	2.49E-02	22	2.35E-01	3
Ywell & Xwell	20200	2.6	1476	1.49	43.73	29.35	1.2	0.17	**102**	**0.00**	6.5	7.69E-02	6	2.28E-01	4
Xwell & Wst. Conc	20200	2.6	1476	1.49	**100**	**67.11**	1.2	0.17	**102**	60.76	6.5	2.53E-02	21	2.04E-01	5
Ywell & TCLP	20200	2.6	1476	**4.2**	43.73	**10.41**	1.2	0.17	430	**0.00**	6.5	1.23E-01	3	1.96E-01	6
Ywell & Wst. Vol	20200	2.6	**8333.3**	1.49	43.73	29.349	1.2	0.17	430	**0.00**	6.5	4.98E-02	14	1.92E-01	7
Xwell & Zwell	20200	2.6	1476	1.49	43.73	29.35	1.2	0.17	**102**	60.76	**1.3**	3.65E-02	15	1.91E-01	8
Area & Wst. Vol	**162000**	2.6	**8333.3**	1.49	43.73	29.349	1.2	0.17	430	165.01	6.5	2.26E-01	1	1.88E-01	9
Ywell & Infil	20200	2.6	1476	1.49	43.73	29.35	1.2	**0.46**	430	**0.00**	6.5	1.15E-01	4	1.75E-01	10
Ywell & Wst Conc	20200	2.6	1476	1.49	**100**	**67.11**	1.2	0.17	430	**0.00**	6.5	5.09E-02	13	1.64E-01	11
TCLP & Wst. Vol	20200	2.6	**8333.3**	**4.2**	43.73	10.412	1.2	0.17	430	85.91	6.5	3.20E-02	16	1.55E-01	12
Infil & Wst. Vol	20200	2.6	**8333.3**	1.49	43.73	29.349	1.2	**0.46**	430	85.91	6.5	3.11E-02	18	1.53E-01	13
Area & Xwell	**162000**	2.6	1476	1.49	43.73	29.35	1.2	0.17	**102**	142.35	6.5	1.15E-01	5	1.18E-01	14
Infil & Wst. Conc	20200	2.6	1476	1.49	**100**	**67.11**	1.2	**0.46**	430	85.91	6.5	3.08E-02	19	1.15E-01	15
TCLP & Wst Conc	20200	2.6	1476	**4.2**	**100**	**23.81**	1.2	0.17	430	85.91	6.5	3.12E-02	17	1.11E-01	16
Area & Wst. Conc	**162000**	2.6	1476	1.49	**100**	**67.11**	1.2	0.17	430	165.01	6.5	1.25E-01	2	1.02E-01	17
Infil & TCLP	20200	2.6	1476	**4.2**	43.73	**10.41**	1.2	**0.46**	430	85.91	6.5	6.45E-02	9	9.56E-02	18
Wst. Vol & Wst. Conc	20200	2.6	**8333.3**	1.49	**100**	**67.11**	1.2	0.17	430	85.91	6.5	1.15E-02	26	7.38E-02	19
Ywell & Zwell	20200	2.6	1476	1.49	43.73	29.35	1.2	0.17	430	**0.00**	**1.3**	2.25E-02	23	6.13E-02	20
Area & Ywell	**162000**	2.6	1476	1.49	43.73	29.35	1.2	0.17	430	**0.00**	6.5	6.66E-02	8	6.07E-02	21
Area & TCLP	**162000**	2.6	1476	**4.2**	43.73	**10.41**	1.2	0.17	430	165.01	6.5	6.35E-02	11	5.15E-02	22
Area & Infil	**162000**	2.6	1476	1.49	43.73	29.35	1.2	**0.46**	430	165.01	6.5	5.46E-02	12	5.02E-02	23
Infil & Zwell	20200	2.6	1476	1.49	43.73	29.35	1.2	**0.46**	430	85.91	**1.3**	1.15E-02	25	3.37E-02	24
TCLP & Zwell	20200	2.6	1476	**4.2**	43.73	10.41	1.2	0.17	430	85.91	**1.3**	1.18E-02	24	3.30E-02	25
Wst. Vol & Zwell	20200	2.6	**8333.3**	1.49	43.73	29.35	1.2	0.17	430	85.91	**1.3**	4.79E-03	28	3.22E-02	26
Wst Conc & Zwell	20200	2.6	1476	1.49	**100**	**67.11**	1.2	0.17	430	85.91	**1.3**	4.86E-03	27	2.75E-02	27
Area & Zwell	**162000**	2.6	1476	1.49	43.73	29.35	1.2	0.17	430	165.01	**1.3**	2.61E-02	20	2.64E-02	28

able A.20 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/ Benzene (TCLP = TC Regulatory Level) -- Industrial Area (20 year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	1476	0.5	43.73	87.46	1.2	0.17	430	85.91	6.5	3.93E-03		2.06E-02	
Infil & Xwell	20200	2.6	1476	0.5	43.73	87.46	1.2	**0.46**	**102**	60.76	6.5	1.07E-02	14	1.71E-01	1
Ywell & Xwell	20200	2.6	1476	0.5	43.73	87.46	1.2	0.17	**102**	**0.00**	6.5	1.73E-02	10	1.03E-01	2
Ywell & Infil	20200	2.6	1476	0.5	43.73	87.46	1.2	**0.46**	430	**0.00**	6.5	1.28E-02	12	1.01E-01	3
Area & Wst. Vol	**162000**	2.6	**8333.3**	0.5	43.73	87.46	1.2	0.17	430	165.01	6.5	8.37E-02	3	9.96E-02	4
Area & Xwell	**162000**	2.6	1476	0.5	43.73	87.46	1.2	0.17	**102**	142.35	6.5	1.19E-01	1	9.55E-02	5
Xwell & Wst Vol	20200	2.6	**8333.3**	0.5	43.73	87.46	1.2	0.17	**102**	60.76	6.5	1.66E-03	20	8.72E-02	6
Xwell & Zwell	20200	2.6	1476	0.5	43.73	87.46	1.2	0.17	**102**	60.76	**1.3**	8.61E-03	16	8.64E-02	7
Xwell & Wst. Conc	20200	2.6	1476	0.5	**100**	**200.00**	1.2	0.17	**102**	60.76	6.5	8.64E-03	15	8.14E-02	8
Ywell & Wst. Vol	20200	2.6	**8333.3**	0.5	43.73	87.46	1.2	0.17	430	**0.00**	6.5	1.72E-02	11	7.24E-02	9
Area & Wst. Conc	**162000**	2.6	1476	0.5	**100**	**200.00**	1.2	0.17	430	165.01	6.5	5.09E-02	5	6.97E-02	10
Ywell & Wst Conc	20200	2.6	1476	0.5	**100**	**200.00**	1.2	0.17	430	**0.00**	6.5	4.25E-02	6	6.65E-02	11
Infil & Wst. Vol	20200	2.6	**8333.3**	0.5	43.73	87.46	1.2	**0.46**	430	85.91	6.5	1.07E-02	13	6.18E-02	12
Infil & Wst. Conc	20200	2.6	1476	0.5	**100**	**200.00**	1.2	**0.46**	430	85.91	6.5	2.15E-02	9	5.39E-02	13
Area & Ywell	**162000**	2.6	1476	0.5	43.73	87.46	1.2	0.17	430	**0.00**	6.5	9.35E-02	2	5.12E-02	14
Area & Infil	**162000**	2.6	1476	0.5	43.73	87.46	1.2	**0.46**	430	165.01	6.5	7.59E-03	17	4.69E-02	15
Ywell & Zwell	20200	2.6	1476	0.5	43.73	87.46	1.2	0.17	430	**0.00**	**1.3**	2.70E-02	7	2.88E-02	16
Wst. Vol & Wst. Conc	20200	2.6	**8333.3**	0.5	**100**	**200.00**	1.2	0.17	430	85.91	6.5	1.66E-03	21	2.48E-02	17
Area & Zwell	**162000**	2.6	1476	0.5	43.73	87.46	1.2	0.17	430	165.01	**1.3**	5.56E-02	4	2.21E-02	18
Infil & Zwell	20200	2.6	1476	0.5	43.73	87.46	1.2	**0.46**	430	85.91	**1.3**	2.66E-02	8	1.92E-02	19
Wst. Vol & Zwell	20200	2.6	**8333.3**	0.5	43.73	87.46	1.2	0.17	430	85.91	**1.3**	4.26E-03	18	1.21E-02	20
Wst Conc & Zwell	20200	2.6	1476	0.5	**100**	**200.00**	1.2	0.17	430	85.91	**1.3**	4.25E-03	19	1.11E-02	21

Table A.21 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/ Benzene -- Municipal Areas- 20 year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	1476	1.49	43.73	29.35	1.2	0.17	430	117.75	6.5	3.93E-03		5.80E-02	
Xwell & Wst Vol	60705	2.6	**8333.3**	1.49	43.73	29.349	1.2	0.17	**102**	93.79	6.5	2.49E-02	22	4.20E-01	1
Xwell & Wst. Conc	60705	2.6	1476	1.49	**100**	**67.11**	1.2	0.17	**102**	93.79	6.5	2.53E-02	21	3.04E-01	2
TCLP & Wst. Vol	60705	2.6	**8333.3**	**4.2**	43.73	10.412	1.2	0.17	430	117.75	6.5	3.20E-02	16	2.54E-01	3
Infil & Wst. Vol	60705	2.6	**8333.3**	1.49	43.73	29.349	1.2	**0.46**	430	117.75	6.5	3.11E-02	18	2.50E-01	4
Ywell & Wst. Vol	60705	2.6	**8333.3**	1.49	43.73	29.349	1.2	0.17	430	**0.00**	6.5	4.98E-02	14	2.47E-01	5
TCLP & xwell	60705	2.6	1476	**4.2**	43.73	10.41	1.2	0.17	**102**	93.79	6.5	6.40E-02	10	2.31E-01	6
Infil & Xwell	60705	2.6	1476	1.49	43.73	29.35	1.2	**0.46**	**102**	93.79	6.5	7.33E-02	7	2.15E-01	7
Ywell & Xwell	60705	2.6	1476	1.49	43.73	29.35	1.2	0.17	**102**	**0.00**	6.5	7.69E-02	6	2.06E-01	8
Xwell & Zwell	60705	2.6	1476	1.49	43.73	29.35	1.2	0.17	**102**	93.79	**1.3**	3.65E-02	15	1.75E-01	9
Ywell & Wst Conc	60705	2.6	1476	1.49	**100**	**67.11**	1.2	0.17	430	**0.00**	6.5	5.09E-02	13	1.73E-01	10
Wst. Vol & Wst. Conc	60705	2.6	**8333.3**	1.49	**100**	**67.11**	1.2	0.17	430	117.75	6.5	1.15E-02	26	1.66E-01	11
Infil & Wst. Conc	60705	2.6	1476	1.49	**100**	**67.11**	1.2	**0.46**	430	117.75	6.5	3.08E-02	19	1.47E-01	12
Area & Wst. Vol	**420888**	2.6	**8333.3**	1.49	43.73	29.349	1.2	0.17	430	238.82	6.5	2.26E-01	1	1.41E-01	13
TCLP & Wst Conc	60705	2.6	1476	**4.2**	**100**	**23.81**	1.2	0.17	430	117.75	6.5	3.12E-02	17	1.40E-01	14
Ywell & TCLP	60705	2.6	1476	**4.2**	43.73	**10.41**	1.2	0.17	430	**0.00**	6.5	1.23E-01	3	1.22E-01	15
Ywell & Infil	60705	2.6	1476	1.49	43.73	29.35	1.2	**0.46**	430	**0.00**	6.5	1.15E-01	4	1.05E-01	16
Infil & TCLP	60705	2.6	1476	**4.2**	43.73	**10.41**	1.2	**0.46**	430	117.75	6.5	6.45E-02	9	7.88E-02	17
Wst. Vol & Zwell	60705	2.6	**8333.3**	1.49	43.73	29.35	1.2	0.17	430	117.75	**1.3**	4.79E-03	28	6.85E-02	18
Area & Wst. Conc	**420888**	2.6	1476	1.49	**100**	**67.11**	1.2	0.17	430	238.82	6.5	1.25E-01	2	6.31E-02	19
Ywell & Zwell	60705	2.6	1476	1.49	43.73	29.35	1.2	0.17	430	**0.00**	**1.3**	2.25E-02	23	5.13E-02	20
Area & Xwell	**420888**	2.6	1476	1.49	43.73	29.35	1.2	0.17	**102**	217.62	6.5	1.15E-01	5	5.02E-02	21
Wst Conc & Zwell	60705	2.6	1476	1.49	**100**	**67.11**	1.2	0.17	430	117.75	**1.3**	4.86E-03	27	4.81E-02	22
Infil & Zwell	60705	2.6	1476	1.49	43.73	29.35	1.2	**0.46**	430	117.75	**1.3**	1.15E-02	25	3.56E-02	23
TCLP & Zwell	60705	2.6	1476	**4.2**	43.73	10.41	1.2	0.17	430	117.75	**1.3**	1.18E-02	24	3.43E-02	24
Area & Ywell	**420888**	2.6	1476	1.49	43.73	29.35	1.2	0.17	430	**0.00**	6.5	6.66E-02	8	2.93E-02	25
Area & TCLP	**420888**	2.6	1476	**4.2**	43.73	**10.41**	1.2	0.17	430	238.82	6.5	6.35E-02	11	2.84E-02	26
Area & Infil	**420888**	2.6	1476	1.49	43.73	29.35	1.2	**0.46**	430	238.82	6.5	5.46E-02	12	2.26E-02	27
Area & Zwell	**420888**	2.6	1476	1.49	43.73	29.35	1.2	0.17	430	238.82	6.5	2.61E-02	20	1.73E-02	28

Table A.22 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/ Benzene (TCLP = Regulatory Level) -- Municipal Areas (20 year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	1476	0.5	43.73	87.46	1.2	0.17	430	117.75	6.5	3.93E-03		3.69E-02	
Xwell & Wst Vol	60705	2.6	**8333.3**	0.5	43.73	87.46	1.2	0.17	**102**	93.79	6.5	1.66E-03	20	1.72E-01	1
Infil & Xwell	60705	2.6	1476	0.5	43.73	87.46	1.2	**0.46**	**102**	93.79	6.5	1.07E-02	14	1.61E-01	2
Xwell & Wst. Conc	60705	2.6	1476	0.5	**100**	**200.00**	1.2	0.17	**102**	93.79	6.5	8.64E-03	15	1.48E-01	3
Ywell & Xwell	60705	2.6	1476	0.5	43.73	87.46	1.2	0.17	**102**	**0.00**	6.5	1.73E-02	10	1.25E-01	4
Infil & Wst. Vol	60705	2.6	**8333.3**	0.5	43.73	87.46	1.2	**0.46**	430	117.75	6.5	1.07E-02	13	1.23E-01	5
Xwell & Zwell	60705	2.6	1476	0.5	43.73	87.46	1.2	0.17	**102**	93.79	**1.3**	8.61E-03	16	1.06E-01	6
Ywell & Wst. Vol	60705	2.6	**8333.3**	0.5	43.73	87.46	1.2	0.17	430	**0.00**	6.5	1.72E-02	11	1.04E-01	7
Area & Wst. Vol	**420888**	2.6	**8333.3**	0.5	43.73	87.46	1.2	0.17	430	238.82	6.5	8.37E-02	3	9.91E-02	8
Infil & Wst. Conc	60705	2.6	1476	0.5	**100**	**200.00**	1.2	**0.46**	430	117.75	6.5	2.15E-02	9	9.17E-02	9
Ywell & Wst Conc	60705	2.6	1476	0.5	**100**	**200.00**	1.2	0.17	430	**0.00**	6.5	4.25E-02	6	8.78E-02	10
Ywell & Infil	60705	2.6	1476	0.5	43.73	87.46	1.2	**0.46**	430	**0.00**	6.5	1.28E-02	12	8.29E-02	11
Wst. Vol & Wst. Conc	60705	2.6	**8333.3**	0.5	**100**	**200.00**	1.2	0.17	430	117.75	6.5	1.66E-03	21	6.27E-02	12
Area & Wst. Conc	**420888**	2.6	1476	0.5	**100**	**200.00**	1.2	0.17	430	238.82	6.5	5.09E-02	5	5.50E-02	13
Area & Xwell	**420888**	2.6	1476	0.5	43.73	87.46	1.2	0.17	**102**	217.62	6.5	1.19E-01	1	4.79E-02	14
Ywell & Zwell	60705	2.6	1476	0.5	43.73	87.46	1.2	0.17	430	**0.00**	**1.3**	2.70E-02	7	3.25E-02	15
Wst. Vol & Zwell	60705	2.6	**8333.3**	0.5	43.73	87.46	1.2	0.17	430	117.75	**1.3**	4.26E-03	18	2.88E-02	16
Area & Ywell	**420888**	2.6	1476	0.5	43.73	87.46	1.2	0.17	430	**0.00**	6.5	9.35E-02	2	2.81E-02	17
Infil & Zwell	60705	2.6	1476	0.5	43.73	87.46	1.2	**0.46**	430	117.75	**1.3**	2.66E-02	8	2.79E-02	18
Wst Conc & Zwell	60705	2.6	1476	0.5	**100**	**200.00**	1.2	0.17	430	117.75	**1.3**	4.25E-03	19	2.44E-02	19
Area & Infil	**420888**	2.6	1476	0.5	43.73	87.46	1.2	**0.46**	430	238.82	6.5	7.59E-03	17	2.22E-02	20
Area & Zwell	**420888**	2.6	1476	0.5	43.73	87.46	1.2	0.17	430	238.82	**1.3**	5.56E-02	4	1.65E-02	21

Table A.23 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/Arsenic -- Industrial Waste Volumes (20 year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	1476	13.71	493.3	35.98	1.2	0.17	430	85.91	6.5	1.17E-02		6.82E-03	
Xwell & Wst Vol	20200	2.6	**8333.3**	13.71	493.3	35.981	1.2	0.17	**102**	60.76	6.5	1.14E-01	2	1.77E-01	1
Ywell & Wst. Vol	20200	2.6	**8333.3**	13.71	493.3	35.981	1.2	0.17	430	**0.00**	6.5	2.04E-01	1	1.11E-01	2
Infil & Xwell	20200	2.6	1476	13.71	493.3	35.98	1.2	**0.46**	**102**	60.76	6.5	6.62E-02	7	6.06E-02	3
Wst. Vol & Wst. Conc	20200	2.6	**8333.3**	13.71	**730**	**53.25**	1.2	0.17	430	85.91	6.5	5.72E-02	9	5.59E-02	4
Infil & Wst. Vol	20200	2.6	**8333.3**	13.71	493.3	35.981	1.2	**0.46**	430	85.91	6.5	7.63E-02	4	4.81E-02	5
Xwell & Wst. Conc	20200	2.6	1476	13.71	**730**	**53.25**	1.2	0.17	**102**	60.76	6.5	4.47E-02	12	4.72E-02	6
Ywell & Xwell	20200	2.6	1476	13.71	493.3	35.98	1.2	0.17	**102**	**0.00**	6.5	9.95E-02	3	4.52E-02	7
Xwell & Zwell	20200	2.6	1476	13.71	493.3	35.98	1.2	0.17	**102**	60.76	**1.3**	4.80E-02	11	3.92E-02	8
TCLP & Wst. Vol	20200	2.6	**8333.3**	**34**	493.3	14.509	1.2	0.17	430	85.91	6.5	6.00E-02	8	3.85E-02	9
TCLP & xwell	20200	2.6	1476	**34**	493.3	14.51	1.2	0.17	**102**	60.76	6.5	3.29E-02	13	3.19E-02	10
Ywell & Wst Conc	20200	2.6	1476	13.71	**730**	**53.25**	1.2	0.17	430	**0.00**	6.5	7.49E-02	5	2.92E-02	11
Area & Wst. Vol	**162000**	2.6	**8333.3**	13.71	493.3	35.981	1.2	0.17	430	165.01	6.5	2.73E-02	14	2.17E-02	12
Ywell & Infil	20200	2.6	1476	13.71	493.3	35.98	1.2	**0.46**	430	**0.00**	6.5	6.71E-02	6	2.06E-02	13
Ywell & TCLP	20200	2.6	1476	**34**	493.3	**14.51**	1.2	0.17	430	**0.00**	6.5	5.38E-02	10	1.98E-02	14
Wst. Vol & Zwell	20200	2.6	**8333.3**	13.71	493.3	35.98	1.2	0.17	430	85.91	**1.3**	1.96E-02	17	1.87E-02	15
Infil & Wst. Conc	20200	2.6	1476	13.71	**730**	**53.25**	1.2	**0.46**	430	85.91	6.5	2.34E-02	16	1.26E-02	16
TCLP & Wst Conc	20200	2.6	1476	**34**	**730**	**21.47**	1.2	0.17	430	85.91	6.5	1.76E-02	18	1.01E-02	17
Area & Xwell	**162000**	2.6	1476	13.71	493.3	35.98	1.2	0.17	**102**	142.35	6.5	9.76E-03	20	9.99E-03	18
Ywell & Zwell	20200	2.6	1476	13.71	493.3	35.98	1.2	0.17	430	**0.00**	**1.3**	2.45E-02	15	9.92E-03	19
Infil & TCLP	20200	2.6	1476	**34**	493.3	**14.51**	1.2	**0.46**	430	85.91	6.5	1.61E-02	19	8.54E-03	20
Area & Wst. Conc	**162000**	2.6	1476	13.71	**730**	**53.25**	1.2	0.17	430	165.01	6.5	7.16E-03	22	5.70E-03	21
Wst Conc & Zwell	20200	2.6	1476	13.71	**730**	**53.25**	1.2	0.17	430	85.91	**1.3**	7.17E-03	21	4.96E-03	22
Area & Ywell	**162000**	2.6	1476	13.71	493.3	35.98	1.2	0.17	430	**0.00**	6.5	5.25E-03	24	4.67E-03	23
Area & Infil	**162000**	2.6	1476	13.71	493.3	35.98	1.2	**0.46**	430	165.01	6.5	4.95E-03	26	4.29E-03	24
Infil & Zwell	20200	2.6	1476	13.71	493.3	35.98	1.2	**0.46**	430	85.91	**1.3**	6.66E-03	23	3.98E-03	25
Area & TCLP	**162000**	2.6	1476	**34**	493.3	**14.51**	1.2	0.17	430	165.01	6.5	4.84E-03	27	3.85E-03	26
TCLP & Zwell	20200	2.6	1476	**34**	493.3	14.51	1.2	0.17	430	85.91	**1.3**	5.15E-03	25	3.35E-03	27
Area & Zwell	**162000**	2.6	1476	13.71	493.3	35.98	1.2	0.17	430	165.01	**1.3**	2.11E-03	28	2.07E-03	28

Table A.24 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/TC Capped Arsenic -- Industrial Areas (20 year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	20200	2.6	1476	5	493.3	98.66	1.2	0.17	430	85.91	6.5	1.03E-02		6.81E-03	
Xwell & Wst Vol	20200	2.6	**8333.3**	5	493.3	98.66	1.2	0.17	**102**	60.76	6.5	6.30E-02	4	1.63E-01	1
Ywell & Wst. Vol	20200	2.6	**8333.3**	5	493.3	98.66	1.2	0.17	430	**0.00**	6.5	1.18E-01	1	1.05E-01	2
Infil & Xwell	20200	2.6	1476	5	493.3	98.66	1.2	**0.46**	**102**	60.76	6.5	5.92E-02	6	6.05E-02	3
Wst. Vol & Wst. Conc	20200	2.6	**8333.3**	5	**730**	**146.00**	1.2	0.17	430	85.91	6.5	3.05E-02	10	5.10E-02	4
Infil & Wst. Vol	20200	2.6	**8333.3**	5	493.3	98.66	1.2	**0.46**	430	85.91	6.5	5.28E-02	7	4.75E-02	5
Xwell & Wst. Conc	20200	2.6	1476	5	**730**	**146.00**	1.2	0.17	**102**	60.76	6.5	3.43E-02	9	4.68E-02	6
Ywell & Xwell	20200	2.6	1476	5	493.3	98.66	1.2	0.17	**102**	**0.00**	6.5	8.29E-02	2	4.50E-02	7
Xwell & Zwell	20200	2.6	1476	5	493.3	98.66	1.2	0.17	**102**	60.76	**1.3**	3.98E-02	8	3.91E-02	8
Ywell & Wst Conc	20200	2.6	1476	5	**730**	**146.00**	1.2	0.17	430	**0.00**	6.5	6.04E-02	5	2.91E-02	9
Area & Wst. Vol	**162000**	2.6	**8333.3**	5	493.3	98.66	1.2	0.17	430	165.01	6.5	2.73E-02	11	2.17E-02	10
Ywell & Infil	20200	2.6	1476	5	493.3	98.66	1.2	**0.46**	430	**0.00**	6.5	6.36E-02	3	2.04E-02	11
Wst. Vol & Zwell	20200	2.6	**8333.3**	5	493.3	98.66	1.2	0.17	430	85.91	**1.3**	1.14E-02	14	1.78E-02	12
Infil & Wst. Conc	20200	2.6	1476	5	**730**	**146.00**	1.2	**0.46**	430	85.91	6.5	2.14E-02	12	1.26E-02	13
Area & Xwell	**162000**	2.6	1476	5	493.3	98.66	1.2	0.17	**102**	142.35	6.5	9.75E-03	15	9.99E-03	14
Ywell & Zwell	20200	2.6	1476	5	493.3	98.66	1.2	0.17	430	**0.00**	**1.3**	2.13E-02	13	9.90E-03	15
Area & Wst. Conc	**162000**	2.6	1476	5	**730**	**146.00**	1.2	0.17	430	165.01	6.5	7.16E-03	16	5.69E-03	16
Wst Conc & Zwell	20200	2.6	1476	5	**730**	**146.00**	1.2	0.17	430	85.91	**1.3**	5.76E-03	18	4.93E-03	17
Area & Ywell	**162000**	2.6	1476	5	493.3	98.66	1.2	0.17	430	**0.00**	6.5	5.25E-03	19	4.67E-03	18
Area & Infil	**162000**	2.6	1476	5	493.3	98.66	1.2	**0.46**	430	165.01	6.5	4.95E-03	20	4.29E-03	19
Infil & Zwell	20200	2.6	1476	5	493.3	98.66	1.2	**0.46**	430	85.91	**1.3**	6.32E-03	17	3.98E-03	20
Area & Zwell	**162000**	2.6	1476	5	493.3	98.66	1.2	0.17	430	165.01	**1.3**	2.11E-03	21	2.07E-03	21

Table A.25 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/Arsenic, -- Municipal Areas- 20 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	1476	13.71	493.3	35.98	1.2	0.17	430	117.75	6.5	1.17E-02		5.50E-03	
Xwell & Wst Vol	60705	2.6	**8333.3**	13.71	493.3	35.981	1.2	0.17	**102**	93.79	6.5	1.14E-01	2	1.18E-01	1
Ywell & Wst. Vol	60705	2.6	**8333.3**	13.71	493.3	35.981	1.2	0.17	430	**0.00**	6.5	2.04E-01	1	5.52E-02	2
Wst. Vol & Wst. Conc	60705	2.6	**8333.3**	13.71	**730**	**53.25**	1.2	0.17	430	117.75	6.5	5.72E-02	9	4.58E-02	3
Infil & Wst. Vol	60705	2.6	**8333.3**	13.71	493.3	35.981	1.2	**0.46**	430	117.75	6.5	7.63E-02	4	3.66E-02	4
TCLP & Wst. Vol	60705	2.6	**8333.3**	**34**	493.3	14.509	1.2	0.17	430	117.75	6.5	6.00E-02	8	3.10E-02	5
Xwell & Wst. Conc	60705	2.6	1476	13.71	**730**	**53.25**	1.2	0.17	**102**	93.79	6.5	4.47E-02	12	3.10E-02	6
Infil & Xwell	60705	2.6	1476	13.71	493.3	35.98	1.2	**0.46**	**102**	217.62	6.5	6.62E-02	7	2.80E-02	7
Ywell & Xwell	60705	2.6	1476	13.71	493.3	35.98	1.2	0.17	**102**	**0.00**	6.5	9.95E-02	3	2.28E-02	8
TCLP & xwell	60705	2.6	1476	**34**	493.3	14.51	1.2	0.17	**102**	93.79	6.5	3.29E-02	13	2.10E-02	9
Xwell & Zwell	60705	2.6	1476	13.71	493.3	35.98	1.2	0.17	**102**	93.79	**1.3**	4.80E-02	11	2.01E-02	10
Wst. Vol & Zwell	60705	2.6	**8333.3**	13.71	493.3	35.98	1.2	0.17	430	117.75	**1.3**	1.96E-02	17	1.57E-02	11
Ywell & Wst Conc	60705	2.6	1476	13.71	**730**	**53.25**	1.2	0.17	430	**0.00**	6.5	7.49E-02	5	1.45E-02	12
Area & Wst. Vol	**420888**	2.6	**8333.3**	13.71	493.3	35.981	1.2	0.17	430	238.82	6.5	2.73E-02	14	1.17E-02	13
Ywell & TCLP	60705	2.6	1476	**34**	493.3	**14.51**	1.2	0.17	430	**0.00**	6.5	5.38E-02	10	9.79E-03	14
Infil & Wst. Conc	60705	2.6	1476	13.71	**730**	**53.25**	1.2	**0.46**	430	238.82	6.5	2.34E-02	16	9.61E-03	15
Ywell & Infil	60705	2.6	1476	13.71	493.3	35.98	1.2	**0.46**	430	**0.00**	6.5	6.71E-02	6	9.37E-03	16
TCLP & Wst Conc	60705	2.6	1476	**34**	**730**	**21.47**	1.2	0.17	430	238.82	6.5	1.76E-02	18	8.13E-03	17
Infil & TCLP	60705	2.6	1476	**34**	493.3	**14.51**	1.2	**0.46**	430	117.75	6.5	1.61E-02	19	6.49E-03	18
Ywell & Zwell	60705	2.6	1476	13.71	493.3	35.98	1.2	0.17	430	**0.00**	**1.3**	2.45E-02	15	4.93E-03	19
Wst Conc & Zwell	60705	2.6	1476	13.71	**730**	**53.25**	1.2	0.17	430	117.75	**1.3**	7.17E-03	21	4.12E-03	20
Area & Xwell	**420888**	2.6	1476	13.71	493.3	35.98	1.2	0.17	**102**	217.62	6.5	9.76E-03	20	3.83E-03	21
Infil & Zwell	60705	2.6	1476	13.71	493.3	35.98	1.2	**0.46**	430	238.82	**1.3**	6.66E-03	23	3.21E-03	22
Area & Wst. Conc	**420888**	2.6	1476	13.71	**730**	**53.25**	1.2	0.17	430	238.82	6.5	7.16E-03	22	3.05E-03	23
TCLP & Zwell	60705	2.6	1476	**34**	493.3	14.51	1.2	0.17	430	117.75	**1.3**	5.15E-03	25	2.79E-03	24
Area & Ywell	**420888**	2.6	1476	13.71	493.3	35.98	1.2	0.17	430	**0.00**	6.5	5.25E-03	24	2.14E-03	25
Area & TCLP	**420888**	2.6	1476	**34**	493.3	**14.51**	1.2	0.17	430	238.82	6.5	4.84E-03	27	2.06E-03	26
Area & Infil	**420888**	2.6	1476	13.71	493.3	35.98	1.2	**0.46**	430	238.82	6.5	4.95E-03	26	1.93E-03	27
Area & Zwell	**420888**	2.6	1476	13.71	493.3	35.98	1.2	0.17	430	238.82	6.5	2.11E-03	28	1.28E-03	28

Table A.26 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/TC Capped Arsenic - Municipal Areas- 20 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	1476	5	493.3	98.66	1.2	0.17	430	117.75	6.5	1.03E-02		5.49E-03	
Xwell & Wst Vol	60705	2.6	**8333.3**	5	493.3	98.66	1.2	0.17	**102**	93.79	6.5	6.30E-02	4	1.17E-01	1
Ywell & Wst. Vol	60705	2.6	**8333.3**	5	493.3	98.66	1.2	0.17	430	**0.00**	6.5	1.18E-01	1	5.49E-02	2
Wst. Vol & Wst. Conc	60705	2.6	**8333.3**	5	**730**	**146.00**	1.2	0.17	430	117.75	6.5	3.05E-02	10	4.53E-02	3
Infil & Wst. Vol	60705	2.6	**8333.3**	5	493.3	98.66	1.2	**0.46**	430	117.75	6.5	5.28E-02	7	3.66E-02	4
Xwell & Wst. Conc	60705	2.6	1476	5	**730**	**146.00**	1.2	0.17	**102**	93.79	6.5	3.43E-02	9	3.10E-02	5
Infil & Xwell	60705	2.6	1476	5	493.3	98.66	1.2	**0.46**	**102**	93.79	6.5	5.92E-02	6	2.80E-02	6
Ywell & Xwell	60705	2.6	1476	5	493.3	98.66	1.2	0.17	**102**	**0.00**	6.5	8.29E-02	2	2.28E-02	7
Xwell & Zwell	60705	2.6	1476	5	493.3	98.66	1.2	0.17	**102**	93.79	**1.3**	3.98E-02	8	2.01E-02	8
Wst. Vol & Zwell	60705	2.6	**8333.3**	5	493.3	98.66	1.2	0.17	430	117.75	**1.3**	1.14E-02	14	1.56E-02	9
Ywell & Wst Conc	60705	2.6	1476	5	**730**	**146.00**	1.2	0.17	430	**0.00**	6.5	6.04E-02	5	1.45E-02	10
Area & Wst. Vol	**420888**	2.6	**8333.3**	5	493.3	98.66	1.2	0.17	430	238.82	6.5	2.73E-02	11	1.17E-02	11
Infil & Wst. Conc	60705	2.6	1476	5	**730**	**146.00**	1.2	**0.46**	430	117.75	6.5	2.14E-02	12	9.60E-03	12
Ywell & Infil	60705	2.6	1476	5	493.3	98.66	1.2	**0.46**	430	**0.00**	6.5	6.36E-02	3	9.30E-03	13
Ywell & Zwell	60705	2.6	1476	5	493.3	98.66	1.2	0.17	430	**0.00**	**1.3**	2.13E-02	13	4.93E-03	14
Wst Conc & Zwell	60705	2.6	1476	5	**730**	**146.00**	1.2	0.17	430	117.75	**1.3**	5.76E-03	18	4.12E-03	15
Area & Xwell	**420888**	2.6	1476	5	493.3	98.66	1.2	0.17	**102**	217.62	6.5	9.75E-03	15	3.83E-03	16
Infil & Zwell	60705	2.6	1476	5	493.3	98.66	1.2	**0.46**	430	117.75	**1.3**	6.32E-03	17	3.16E-03	17
Area & Wst. Conc	**420888**	2.6	1476	5	**730**	**146.00**	1.2	0.17	430	238.82	6.5	7.16E-03	16	3.05E-03	18
Area & Ywell	**420888**	2.6	1476	5	493.3	98.66	1.2	0.17	430	**0.00**	6.5	5.25E-03	19	2.14E-03	19
Area & Infil	**420888**	2.6	1476	5	493.3	98.66	1.2	**0.46**	430	238.82	6.5	4.95E-03	20	1.93E-03	20
Area & Zwell	**420888**	2.6	1476	5	493.3	98.66	1.2	0.17	430	238.82	**1.3**	2.11E-03	21	1.28E-03	21

Table A.27 Sensitivity Analysis for Unleaded Gasoline tank sediment Off-site Industrial Landfill Scenario/ Benzene (20 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1998 9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	89.29	0.75	51.9	69.20	1.4	0.17	430	85.91	6.5	6.69E-03	
Xwell & Wst Vol	20200	2.6	**1038.57**	0.75	51.9	69.2	1.4	0.17	**102**	60.76	6.5	9.94E-02	1
Ywell & Wst. Vol	20200	2.6	**1038.57**	0.75	51.9	69.2	1.4	0.17	430	**0.00**	6.5	7.94E-02	2
Infil & Wst. Vol	20200	2.6	**1038.57**	0.75	51.9	69.2	1.4	**0.46**	430	85.91	6.5	5.41E-02	3
Xwell & Wst. Conc	20200	2.6	89.29	0.75	**110**	**146.67**	1.4	0.17	**102**	60.76	6.5	4.70E-02	4
Area & Wst. Vol	**162000**	2.6	**1038.57**	0.75	51.9	69.2	1.4	0.17	430	165.01	6.5	4.50E-02	5
TCLP & Wst. Vol	20200	2.6	**1038.57**	**1.6**	51.9	32.438	1.4	0.17	430	85.91	6.5	4.47E-02	6
Infil & Xwell	20200	2.6	89.29	0.75	51.9	69.20	1.4	**0.46**	**102**	60.76	6.5	3.80E-02	7
Ywell & Xwell	20200	2.6	89.29	0.75	51.9	69.20	1.4	0.17	**102**	**0.00**	6.5	3.79E-02	8
Ywell & Wst Conc	20200	2.6	89.29	0.75	**110**	**146.67**	1.4	0.17	430	**0.00**	6.5	3.50E-02	9
Wst. Vol & Wst. Conc	20200	2.6	**1038.57**	0.75	**110**	**146.67**	1.4	0.17	430	85.91	6.5	3.25E-02	10
Xwell & Zwell	20200	2.6	89.29	0.75	51.9	69.20	1.4	0.17	**102**	60.76	**1.3**	3.21E-02	11
TCLP & xwell	20200	2.6	89.29	**1.6**	51.9	32.44	1.4	0.17	**102**	60.76	6.5	2.87E-02	12
Ywell & TCLP	20200	2.6	89.29	**1.6**	51.9	**32.44**	1.4	0.17	430	**0.00**	6.5	2.04E-02	13
Ywell & Infil	20200	2.6	89.29	0.75	51.9	69.20	1.4	**0.46**	430	**0.00**	6.5	1.96E-02	14
Infil & Wst. Conc	20200	2.6	89.29	0.75	**110**	**146.67**	1.4	**0.46**	430	85.91	6.5	1.69E-02	15
TCLP & Wst Conc	20200	2.6	89.29	**1.6**	**110**	**68.75**	1.4	0.17	430	85.91	6.5	1.42E-02	16
Wst. Vol & Zwell	20200	2.6	**1038.57**	0.75	51.9	69.20	1.4	0.17	430	85.91	**1.3**	1.33E-02	17
Area & Xwell	**162000**	2.6	89.29	0.75	51.9	69.20	1.4	0.17	**102**	142.35	6.5	1.02E-02	18
Ywell & Zwell	20200	2.6	89.29	0.75	51.9	69.20	1.4	0.17	430	**0.00**	**1.3**	9.55E-03	19
Area & Wst. Conc	**162000**	2.6	89.29	0.75	**110**	**146.67**	1.4	0.17	430	165.01	6.5	9.06E-03	20
Infil & TCLP	20200	2.6	89.29	**1.6**	51.9	**32.44**	1.4	**0.46**	430	85.91	6.5	8.51E-03	21
Wst Conc & Zwell	20200	2.6	89.29	0.75	**110**	**146.67**	1.4	0.17	430	85.91	**1.3**	5.88E-03	22
Area & Ywell	**162000**	2.6	89.29	0.75	51.9	69.20	1.4	0.17	430	**0.00**	6.5	5.22E-03	23
Area & TCLP	**162000**	2.6	89.29	**1.6**	51.9	**32.44**	1.4	0.17	430	165.01	6.5	4.32E-03	24
Area & Infil	**162000**	2.6	89.29	0.75	51.9	69.20	1.4	**0.46**	430	165.01	6.5	4.21E-03	25
Infil & Zwell	20200	2.6	89.29	0.75	51.9	69.20	1.4	**0.46**	430	85.91	**1.3**	3.79E-03	26
TCLP & Zwell	20200	2.6	89.29	**1.6**	51.9	32.44	1.4	0.17	430	85.91	**1.3**	3.44E-03	27
Area & Zwell	**162000**	2.6	89.29	0.75	51.9	69.20	1.4	0.17	430	165.01	6.5	2.28E-03	28

Table A.28 Sensitivity Analysis for Unleaded Gasoline tank sediment Off-site Industrial Landfill Scenario/TC Capped Benzene (20 year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1998 9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	89.29	0.5	51.9	103.80	1.4	0.17	430	85.91	6.5	6.26E-03	
Xwell & Wst Vol	20200	2.6	**1038.57**	0.5	51.9	103.8	1.4	0.17	**102**	60.76	6.5	7.24E-02	1
Ywell & Wst. Vol	20200	2.6	**1038.57**	0.5	51.9	103.8	1.4	0.17	430	**0.00**	6.5	5.85E-02	2
Infil & Wst. Vol	20200	2.6	**1038.57**	0.5	51.9	103.8	1.4	**0.46**	430	85.91	6.5	4.26E-02	3
Area & Wst. Vol	**162000**	2.6	**1038.57**	0.5	51.9	103.8	1.4	0.17	430	165.01	6.5	4.11E-02	4
Xwell & Wst. Conc	20200	2.6	89.29	0.5	**110**	**220.00**	1.4	0.17	**102**	60.76	6.5	4.00E-02	5
Infil & Xwell	20200	2.6	89.29	0.5	51.9	103.80	1.4	**0.46**	**102**	60.76	6.5	3.72E-02	6
Ywell & Xwell	20200	2.6	89.29	0.5	51.9	103.80	1.4	0.17	**102**	**0.00**	6.5	3.49E-02	7
Ywell & Wst Conc	20200	2.6	89.29	0.5	**110**	**220.00**	1.4	0.17	430	**0.00**	6.5	3.04E-02	8
Xwell & Zwell	20200	2.6	89.29	0.5	51.9	103.80	1.4	0.17	**102**	60.76	**1.3**	2.95E-02	9
Wst. Vol & Wst. Conc	20200	2.6	**1038.57**	0.5	**110**	**220.00**	1.4	0.17	430	85.91	6.5	2.30E-02	10
Ywell & Infil	20200	2.6	89.29	0.5	51.9	103.80	1.4	**0.46**	430	**0.00**	6.5	1.94E-02	11
Infil & Wst. Conc	20200	2.6	89.29	0.5	**110**	**220.00**	1.4	**0.46**	430	85.91	6.5	1.59E-02	12
Area & Xwell	**162000**	2.6	89.29	0.5	51.9	103.80	1.4	0.17	**102**	142.35	6.5	1.02E-02	13
Wst. Vol & Zwell	20200	2.6	**1038.57**	0.5	51.9	103.80	1.4	0.17	430	85.91	**1.3**	9.80E-03	14
Area & Wst. Conc	**162000**	2.6	89.29	0.5	**110**	**220.00**	1.4	0.17	430	165.01	6.5	8.96E-03	15
Ywell & Zwell	20200	2.6	89.29	0.5	51.9	103.80	1.4	0.17	430	**0.00**	**1.3**	8.92E-03	16
Area & Ywell	**162000**	2.6	89.29	0.5	51.9	103.80	1.4	0.17	430	**0.00**	6.5	5.18E-03	17
Wst Conc & Zwell	20200	2.6	89.29	0.5	**110**	**220.00**	1.4	0.17	430	85.91	**1.3**	5.10E-03	18
Area & Infil	**162000**	2.6	89.29	0.5	51.9	103.80	1.4	**0.46**	430	165.01	6.5	4.15E-03	19
Infil & Zwell	20200	2.6	89.29	0.5	51.9	103.80	1.4	**0.46**	430	85.91	**1.3**	3.72E-03	20
Area & Zwell	**162000**	2.6	89.29	0.5	51.9	103.80	1.4	0.17	430	165.01	**1.3**	2.26E-03	21

Table A.29 Sensitivity Analysis for Unleaded Gasoline tank sediment Off-site Municipal Landfill Scenario/ Benzene (20 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1998 9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	89.29	0.75	51.9	69.20	1.4	0.17	430	117.75	6.5	5.86E-03	
Xwell & Wst Vol	60705	2.6	**1038.57**	0.75	51.9	69.2	1.4	0.17	**102**	93.79	6.5	1.41E-01	1
Ywell & Wst. Vol	60705	2.6	**1038.57**	0.75	51.9	69.2	1.4	0.17	430	**0.00**	6.5	7.97E-02	2
Infil & Wst. Vol	60705	2.6	**1038.57**	0.75	51.9	69.2	1.4	**0.46**	430	117.75	6.5	6.53E-02	3
Wst. Vol & Wst. Conc	60705	2.6	**1038.57**	0.75	**110**	**146.67**	1.4	0.17	430	117.75	6.5	6.30E-02	5
TCLP & Wst. Vol	60705	2.6	**1038.57**	**1.6**	51.9	32.438	1.4	0.17	430	117.75	6.5	5.80E-02	4
Xwell & Wst. Conc	60705	2.6	89.29	0.75	**110**	**146.67**	1.4	0.17	**102**	93.79	6.5	4.08E-02	6
Area & Wst. Vol	**420888**	2.6	**1038.57**	0.75	51.9	69.2	1.4	0.17	430	238.82	6.5	2.69E-02	7
Wst. Vol & Zwell	60705	2.6	**1038.57**	0.75	51.9	69.20	1.4	0.17	430	117.75	**1.3**	2.22E-02	13
Ywell & Xwell	60705	2.6	89.29	0.75	51.9	69.20	1.4	0.17	**102**	**0.00**	6.5	2.17E-02	8
Ywell & Wst Conc	60705	2.6	89.29	0.75	**110**	**146.67**	1.4	0.17	430	**0.00**	6.5	2.16E-02	9
TCLP & xwell	60705	2.6	89.29	**1.6**	51.9	32.44	1.4	0.17	**102**	93.79	6.5	2.02E-02	10
Infil & Xwell	60705	2.6	89.29	0.75	51.9	69.20	1.4	**0.46**	**102**	93.79	6.5	1.91E-02	11
Xwell & Zwell	60705	2.6	89.29	0.75	51.9	69.20	1.4	0.17	**102**	93.79	**1.3**	1.86E-02	12
Infil & Wst. Conc	60705	2.6	89.29	0.75	**110**	**146.67**	1.4	**0.46**	430	117.75	6.5	1.39E-02	14
TCLP & Wst Conc	60705	2.6	89.29	**1.6**	**110**	**68.75**	1.4	0.17	430	117.75	6.5	1.25E-02	15
Ywell & TCLP	60705	2.6	89.29	**1.6**	51.9	**32.44**	1.4	0.17	430	**0.00**	6.5	1.06E-02	16
Ywell & Infil	60705	2.6	89.29	0.75	51.9	69.20	1.4	**0.46**	430	**0.00**	6.5	9.23E-03	17
Infil & TCLP	60705	2.6	89.29	**1.6**	51.9	**32.44**	1.4	**0.46**	430	117.75	6.5	6.62E-03	18
Wst Conc & Zwell	60705	2.6	89.29	0.75	**110**	**146.67**	1.4	0.17	430	117.75	**1.3**	6.06E-03	19
Ywell & Zwell	60705	2.6	89.29	0.75	51.9	69.20	1.4	0.17	430	**0.00**	**1.3**	5.20E-03	20
Area & Wst. Conc	**420888**	2.6	89.29	0.75	**110**	**146.67**	1.4	0.17	430	238.82	6.5	4.98E-03	21
Area & Xwell	**420888**	2.6	89.29	0.75	51.9	69.20	1.4	0.17	**102**	217.62	6.5	4.20E-03	22
Infil & Zwell	60705	2.6	89.29	0.75	51.9	69.20	1.4	**0.46**	430	117.75	**1.3**	3.13E-03	23
TCLP & Zwell	60705	2.6	89.29	**1.6**	51.9	32.44	1.4	0.17	430	117.75	**1.3**	2.98E-03	24
Area & Ywell	**420888**	2.6	89.29	0.75	51.9	69.20	1.4	0.17	430	**0.00**	6.5	2.45E-03	25
Area & TCLP	**420888**	2.6	89.29	**1.6**	51.9	**32.44**	1.4	0.17	430	238.82	6.5	2.37E-03	26
Area & Infil	**420888**	2.6	89.29	0.75	51.9	69.20	1.4	**0.46**	430	238.82	6.5	1.88E-03	27
Area & Zwell	**420888**	2.6	89.29	0.75	51.9	69.20	1.4	0.17	430	238.82	6.5	1.44E-03	28

Table A.30 Sensitivity Analysis for Unleaded Gasoline tank sediment Off-site Municipal Landfill Scenario/TC Capped Benzene (20 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1998 9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	89.29	0.5	51.9	103.80	1.4	0.17	430	117.75	6.5	5.77E-03	
Xwell & Wst Vol	60705	2.6	**1038.57**	0.5	51.9	103.8	1.4	0.17	**102**	93.79	6.5	1.14E-01	1
Ywell & Wst. Vol	60705	2.6	**1038.57**	0.5	51.9	103.8	1.4	0.17	430	**0.00**	6.5	6.52E-02	2
Infil & Wst. Vol	60705	2.6	**1038.57**	0.5	51.9	103.8	1.4	**0.46**	430	117.75	6.5	5.79E-02	3
Wst. Vol & Wst. Conc	60705	2.6	**1038.57**	0.5	**110**	**220.00**	1.4	0.17	430	117.75	6.5	4.79E-02	5
Xwell & Wst. Conc	60705	2.6	89.29	0.5	**110**	**220.00**	1.4	0.17	**102**	93.79	6.5	3.89E-02	4
Area & Wst. Vol	**420888**	2.6	**1038.57**	0.5	51.9	103.8	1.4	0.17	430	238.82	6.5	2.63E-02	6
Ywell & Xwell	60705	2.6	89.29	0.5	51.9	103.80	1.4	0.17	**102**	**0.00**	6.5	2.13E-02	7
Ywell & Wst Conc	60705	2.6	89.29	0.5	**110**	**220.00**	1.4	0.17	430	**0.00**	6.5	2.08E-02	8
Infil & Xwell	60705	2.6	89.29	0.5	51.9	103.80	1.4	**0.46**	**102**	93.79	6.5	1.90E-02	9
Xwell & Zwell	60705	2.6	89.29	0.5	51.9	103.80	1.4	0.17	**102**	93.79	**1.3**	1.83E-02	10
Wst. Vol & Zwell	60705	2.6	**1038.57**	0.5	51.9	103.80	1.4	0.17	430	117.75	**1.3**	1.81E-02	11
Infil & Wst. Conc	60705	2.6	89.29	0.5	**110**	**220.00**	1.4	**0.46**	430	117.75	6.5	1.37E-02	12
Ywell & Infil	60705	2.6	89.29	0.5	51.9	103.80	1.4	**0.46**	430	**0.00**	6.5	9.21E-03	13
Wst Conc & Zwell	60705	2.6	89.29	0.5	**110**	**220.00**	1.4	0.17	430	117.75	**1.3**	5.82E-03	14
Ywell & Zwell	60705	2.6	89.29	0.5	51.9	103.80	1.4	0.17	430	**0.00**	**1.3**	5.13E-03	15
Area & Wst. Conc	**420888**	2.6	89.29	0.5	**110**	**220.00**	1.4	0.17	430	238.82	6.5	4.94E-03	16
Area & Xwell	**420888**	2.6	89.29	0.5	51.9	103.80	1.4	0.17	**102**	217.62	6.5	4.15E-03	17
Infil & Zwell	60705	2.6	89.29	0.5	51.9	103.80	1.4	**0.46**	430	117.75	**1.3**	3.11E-03	18
Area & Ywell	**420888**	2.6	89.29	0.5	51.9	103.80	1.4	0.17	430	**0.00**	6.5	2.42E-03	19
Area & Infil	**420888**	2.6	89.29	0.5	51.9	103.80	1.4	**0.46**	430	238.82	6.5	1.86E-03	20
Area & Zwell	**420888**	2.6	89.29	0.5	51.9	103.80	1.4	0.17	430	238.82	**1.3**	1.43E-03	21

Table A.31 Sensitivity Analysis for HF Alkylation Off-Site Landfill/Benzene -- Industrial Areas -- 20 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	20200	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	430	85.91	6.5	6.42E-04		4.00E-03	
Infil & Xwell	20200	2.6	24542.4	0.076	4.3	56.58	1.18	**0.46**	**102**	60.76	6.5	4.22E-03	11	3.73E-02	1
Area & Xwell	**162000**	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	**102**	142.35	6.5	2.30E-02	5	3.70E-02	2
Area & TCLP	**162000**	2.6	24542.4	**0.18**	4.3	**23.89**	1.18	0.17	430	165.01	6.5	3.64E-02	2	3.34E-02	3
TCLP & xwell	20200	2.6	24542.4	**0.18**	4.3	23.89	1.18	0.17	**102**	60.76	6.5	2.84E-03	15	3.06E-02	4
Area & Infil	**162000**	2.6	24542.4	0.076	4.3	56.58	1.18	**0.46**	430	165.01	6.5	3.98E-02	1	2.87E-02	5
Ywell & TCLP	20200	2.6	24542.4	**0.18**	4.3	**23.89**	1.18	0.17	430	**0.00**	6.5	6.82E-04	24	2.55E-02	6
Ywell & Infil	20200	2.6	24542.4	0.076	4.3	56.58	1.18	**0.46**	430	**0.00**	6.5	1.27E-03	23	2.23E-02	7
Area & Ywell	**162000**	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	430	**0.00**	6.5	2.26E-02	6	2.18E-02	8
Infil & TCLP	20200	2.6	24542.4	**0.18**	4.3	**23.89**	1.18	**0.46**	430	85.91	6.5	6.81E-03	8	2.17E-02	9
Area & Wst. Conc	**162000**	2.6	24542.4	0.076	**14**	**184.21**	1.18	0.17	430	165.01	6.5	3.02E-02	3	2.07E-02	10
Ywell & Xwell	20200	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	**102**	**0.00**	6.5	2.79E-04	27	1.95E-02	11
Area & Wst. Vol	**162000**	2.6	**38247.5**	0.076	4.3	56.58	1.18	0.17	430	165.01	6.5	2.43E-02	4	1.92E-02	12
Xwell & Zwell	20200	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	**102**	60.76	**1.3**	1.42E-03	22	1.63E-02	13
Xwell & Wst Vol	20200	2.6	**38247.5**	0.076	4.3	56.58	1.18	0.17	**102**	60.76	6.5	1.48E-03	20	1.37E-02	14
Xwell & Wst. Conc	20200	2.6	24542.4	0.076	**14**	**184.21**	1.18	0.17	**102**	60.76	6.5	1.45E-03	21	1.36E-02	15
Ywell & Wst. Vol	20200	2.6	**38247.5**	0.076	4.3	56.58	1.18	0.17	430	**0.00**	6.5	6.11E-04	26	1.15E-02	16
Ywell & Wst Conc	20200	2.6	24542.4	0.076	**14**	**184.21**	1.18	0.17	430	**0.00**	6.5	6.74E-04	25	1.14E-02	17
Infil & Wst. Conc	20200	2.6	24542.4	0.076	**14**	**184.21**	1.18	**0.46**	430	85.91	6.5	6.35E-03	9	1.03E-02	18
Infil & Wst. Vol	20200	2.6	**38247.5**	0.076	4.3	56.58	1.18	**0.46**	430	85.91	6.5	4.31E-03	10	1.02E-02	19
TCLP & Wst Conc	20200	2.6	24542.4	**0.18**	**14**	**77.78**	1.18	0.17	430	85.91	6.5	3.18E-03	13	9.33E-03	20
Area & Zwell	**162000**	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	430	165.01	6.5	8.69E-03	7	9.24E-03	21
TCLP & Wst. Vol	20200	2.6	**38247.5**	**0.18**	4.3	23.89	1.18	0.17	430	85.91	6.5	2.90E-03	14	9.23E-03	22
Ywell & Zwell	20200	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	430	**0.00**	**1.3**	2.73E-04	28	5.58E-03	23
Infil & Zwell	20200	2.6	24542.4	0.076	4.3	56.58	1.18	**0.46**	430	85.91	**1.3**	3.88E-03	12	4.44E-03	24
TCLP & Zwell	20200	2.6	24542.4	**0.18**	4.3	23.89	1.18	0.17	430	85.91	**1.3**	2.05E-03	16	4.26E-03	25
Wst. Vol & Wst. Conc	20200	2.6	**38247.5**	0.076	**14**	**184.21**	1.18	0.17	430	85.91	6.5	1.71E-03	18	3.98E-03	26
Wst. Vol & Zwell	20200	2.6	**38247.5**	0.076	4.3	56.58	1.18	0.17	430	85.91	**1.3**	1.54E-03	19	1.92E-03	27
Wst Conc & Zwell	20200	2.6	24542.4	0.076	**14**	**184.21**	1.18	0.17	430	85.91	**1.3**	1.74E-03	17	1.91E-03	28

Table A.32 Sensitivity Analysis for HF Alkylation Off-Site Landfill/Benzene -- Municipal Areas -- 20 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	430	117.75	6.5	6.42E-04		9.65E-03	
TCLP & xwell	60705	2.6	24542.4	**0.18**	4.3	23.89	1.18	0.17	**102**	93.79	6.5	2.84E-03	15	6.06E-02	1
Infil & Xwell	60705	2.6	24542.4	0.076	4.3	56.58	1.18	**0.46**	**102**	93.79	6.5	4.22E-03	11	5.18E-02	2
Infil & TCLP	60705	2.6	24542.4	**0.18**	4.3	**23.89**	1.18	**0.46**	430	117.75	6.5	6.81E-03	8	4.18E-02	3
Ywell & TCLP	60705	2.6	24542.4	**0.18**	4.3	**23.89**	1.18	0.17	430	**0.00**	6.5	6.82E-04	24	3.66E-02	4
Area & Xwell	**420888**	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	**102**	217.62	6.5	2.30E-02	5	3.41E-02	5
Area & TCLP	**420888**	2.6	24542.4	**0.18**	4.3	**23.89**	1.18	0.17	430	238.82	6.5	3.64E-02	2	3.13E-02	6
Ywell & Xwell	60705	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	**102**	**0.00**	6.5	2.79E-04	27	3.07E-02	7
Xwell & Wst. Conc	60705	2.6	24542.4	0.076	**14**	**184.21**	1.18	0.17	**102**	93.79	6.5	1.45E-03	21	2.99E-02	8
Ywell & Infil	60705	2.6	24542.4	0.076	4.3	56.58	1.18	**0.46**	430	**0.00**	6.5	1.27E-03	23	2.93E-02	9
Xwell & Wst Vol	60705	2.6	**38247.5**	0.076	4.3	56.58	1.18	0.17	**102**	93.79	6.5	1.48E-03	20	2.89E-02	10
Area & Wst. Conc	**420888**	2.6	24542.4	0.076	**14**	**184.21**	1.18	0.17	430	238.82	6.5	3.02E-02	3	2.77E-02	11
Xwell & Zwell	60705	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	**102**	93.79	**1.3**	1.42E-03	22	2.57E-02	12
Infil & Wst. Conc	60705	2.6	24542.4	0.076	**14**	**184.21**	1.18	**0.46**	430	117.75	6.5	6.35E-03	9	2.41E-02	13
Area & Wst. Vol	**420888**	2.6	**38247.5**	0.076	4.3	56.58	1.18	0.17	430	238.82	6.5	2.43E-02	4	2.34E-02	14
TCLP & Wst Conc	60705	2.6	24542.4	**0.18**	**14**	**77.78**	1.18	0.17	430	117.75	6.5	3.18E-03	13	2.31E-02	15
Area & Infil	**420888**	2.6	24542.4	0.076	4.3	56.58	1.18	**0.46**	430	238.82	6.5	3.98E-02	1	2.27E-02	16
Infil & Wst. Vol	60705	2.6	**38247.5**	0.076	4.3	56.58	1.18	**0.46**	430	117.75	6.5	4.31E-03	10	2.26E-02	17
TCLP & Wst. Vol	60705	2.6	**38247.5**	**0.18**	4.3	23.89	1.18	0.17	430	117.75	6.5	2.90E-03	14	2.18E-02	18
Area & Ywell	**420888**	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	430	**0.00**	6.5	2.26E-02	6	2.10E-02	19
Ywell & Wst Conc	60705	2.6	24542.4	0.076	**14**	**184.21**	1.18	0.17	430	**0.00**	6.5	6.74E-04	25	1.85E-02	20
Ywell & Wst. Vol	60705	2.6	**38247.5**	0.076	4.3	56.58	1.18	0.17	430	**0.00**	6.5	6.11E-04	26	1.77E-02	21
Area & Zwell	**420888**	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	430	238.82	6.5	8.69E-03	7	1.22E-02	22
Wst. Vol & Wst. Conc	60705	2.6	**38247.5**	0.076	**14**	**184.21**	1.18	0.17	430	117.75	6.5	1.71E-03	18	1.04E-02	23
TCLP & Zwell	60705	2.6	24542.4	**0.18**	4.3	23.89	1.18	0.17	430	117.75	**1.3**	2.05E-03	16	1.01E-02	24
Infil & Zwell	60705	2.6	24542.4	0.076	4.3	56.58	1.18	**0.46**	430	117.75	**1.3**	3.88E-03	12	9.93E-03	25
Ywell & Zwell	60705	2.6	24542.4	0.076	4.3	56.58	1.18	0.17	430	**0.00**	**1.3**	2.73E-04	28	8.45E-03	26
Wst Conc & Zwell	60705	2.6	24542.4	0.076	**14**	**184.21**	1.18	0.17	430	117.75	**1.3**	1.74E-03	17	5.11E-03	27
Wst. Vol & Zwell	60705	2.6	**38247.5**	0.076	4.3	56.58	1.18	0.17	430	117.75	**1.3**	1.54E-03	19	4.89E-03	28

Table A.33 Sensitivity Analysis CSO Off-site Landfill Scenario, Benzene -- Industrial Areas, 30 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	20200	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	430	85.91	6.5	4.78E-04		2.27E-03	
Infil & Xwell	20200	2.6	3953.57	0.059	1.2	20.34	1.4	**0.46**	**102**	60.76	6.5	3.07E-03	7	1.82E-02	1
Area & Wst. Vol	**162000**	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	165.01	6.5	1.55E-02	1	1.42E-02	2
Ywell & Xwell	20200	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	**102**	**0.00**	6.5	3.23E-03	5	1.15E-02	3
Xwell & Wst Vol	20200	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	**102**	60.76	6.5	1.08E-03	16	1.07E-02	4
Ywell & Infil	20200	2.6	3953.57	0.059	1.2	20.34	1.4	**0.46**	430	**0.00**	6.5	4.83E-03	3	1.06E-02	5
TCLP & xwell	20200	2.6	3953.57	**0.084**	1.2	**14.29**	1.4	0.17	**102**	60.76	6.5	1.45E-03	13	1.05E-02	6
Xwell & Zwell	20200	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	**102**	60.76	**1.3**	1.53E-03	12	9.65E-03	7
Ywell & Wst. Vol	20200	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	2.16E-03	10	8.93E-03	8
Area & Xwell	**162000**	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	**102**	142.35	6.5	5.61E-03	2	8.32E-03	9
Ywell & TCLP	20200	2.6	3953.57	**0.084**	1.2	**14.29**	1.4	0.17	430	**0.00**	6.5	2.87E-03	8	8.29E-03	10
Infil & Wst. Vol	20200	2.6	**67350**	0.059	1.2	20.34	1.4	**0.46**	430	85.91	6.5	1.34E-03	14	7.86E-03	11
Infil & TCLP	20200	2.6	3953.57	**0.084**	1.2	**14.29**	1.4	**0.46**	430	85.91	6.5	1.64E-03	11	5.40E-03	12
TCLP & Wst. Vol	20200	2.6	**67350**	**0.084**	1.2	**14.29**	1.4	0.17	430	85.91	6.5	6.99E-04	18	4.33E-03	13
Area & Ywell	**162000**	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	3.24E-03	4	4.32E-03	14
Area & TCLP	**162000**	2.6	3953.57	**0.084**	1.2	**14.29**	1.4	0.17	430	165.01	6.5	3.17E-03	6	3.81E-03	15
Area & Infil	**162000**	2.6	3953.57	0.059	1.2	20.34	1.4	**0.46**	430	165.01	6.5	2.61E-03	9	3.59E-03	16
Ywell & Zwell	20200	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	430	**0.00**	**1.3**	9.50E-04	17	3.18E-03	17
Infil & Zwell	20200	2.6	3953.57	0.059	1.2	20.34	1.4	**0.46**	430	85.91	**1.3**	4.84E-04	19	2.01E-03	18
Area & Zwell	**162000**	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	430	165.01	**1.3**	1.27E-03	15	1.87E-03	19
Wst. Vol & Zwell	20200	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	85.91	**1.3**	2.08E-04	21	1.49E-03	20
TCLP & Zwell	20200	2.6	3953.57	**0.084**	1.2	**14.29**	1.4	0.17	430	85.91	**1.3**	2.77E-04	20	1.39E-03	21

Table A.34 Sensitivity Analysis CSO Off-site Landfill Scenario, Benzene -- Municipal Areas, 30 year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	430	117.75	6.5	4.78E-04		3.74E-03	
Xwell & Wst Vol	60705	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	**102**	93.79	6.5	1.08E-03	16	2.21E-02	1
Infil & Wst. Vol	60705	2.6	**67350**	0.059	1.2	20.34	1.4	**0.46**	430	117.75	6.5	1.34E-03	14	1.69E-02	2
Area & Wst. Vol	**420888**	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	238.82	6.5	1.55E-02	1	1.66E-02	3
Infil & Xwell	60705	2.6	3953.57	0.059	1.2	20.34	1.4	**0.46**	**102**	93.79	6.5	3.07E-03	7	1.52E-02	4
TCLP & xwell	60705	2.6	3953.57	**0.084**	1.2	**14.29**	1.4	0.17	**102**	93.79	6.5	1.45E-03	13	1.39E-02	5
Ywell & Wst. Vol	60705	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	2.16E-03	10	1.36E-02	6
Ywell & Xwell	60705	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	**102**	**0.00**	6.5	3.23E-03	5	1.29E-02	7
Xwell & Zwell	60705	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	**102**	93.79	**1.3**	1.53E-03	12	1.09E-02	8
TCLP & Wst. Vol	60705	2.6	**67350**	**0.084**	1.2	**14.29**	1.4	0.17	430	117.75	6.5	6.99E-04	18	1.05E-02	9
Ywell & TCLP	60705	2.6	3953.57	**0.084**	1.2	**14.29**	1.4	0.17	430	**0.00**	6.5	2.87E-03	8	7.74E-03	10
Ywell & Infil	60705	2.6	3953.57	0.059	1.2	20.34	1.4	**0.46**	430	**0.00**	6.5	4.83E-03	3	7.45E-03	11
Infil & TCLP	60705	2.6	3953.57	**0.084**	1.2	**14.29**	1.4	**0.46**	430	117.75	6.5	1.64E-03	11	5.73E-03	12
Wst. Vol & Zwell	60705	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	117.75	**1.3**	2.08E-04	21	3.75E-03	13
Area & Xwell	**420888**	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	**102**	217.62	6.5	5.61E-03	2	3.58E-03	14
Ywell & Zwell	60705	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	430	**0.00**	**1.3**	9.50E-04	17	3.30E-03	15
Infil & Zwell	60705	2.6	3953.57	0.059	1.2	20.34	1.4	**0.46**	430	117.75	**1.3**	4.84E-04	19	2.51E-03	16
TCLP & Zwell	60705	2.6	3953.57	**0.084**	1.2	**14.29**	1.4	0.17	430	117.75	**1.3**	2.77E-04	20	2.16E-03	17
Area & TCLP	**420888**	2.6	3953.57	**0.084**	1.2	**14.29**	1.4	0.17	430	238.82	6.5	3.17E-03	6	2.14E-03	18
Area & Ywell	**420888**	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	3.24E-03	4	2.09E-03	19
Area & Infil	**420888**	2.6	3953.57	0.059	1.2	20.34	1.4	**0.46**	430	238.82	6.5	2.61E-03	9	1.62E-03	20
Area & Zwell	**420888**	2.6	3953.57	0.059	1.2	20.34	1.4	0.17	430	238.82	**1.3**	1.27E-03	15	1.23E-03	21

Table A.35 Sensitivity Analysis for Contingent Management of CSO Sludge, Off-Site Landfill/Benzene -- Industrial Areas, 30 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	3750	0.059	1.2	20.34	1.4	0.17	430	85.91	6.5	4.77E-04		2.23E-03	
X-Well & Infil	20200	2.6	3750	0.059	1.2	20.34	1.4	**0.46**	**102**	60.76	6.5	3.05E-03	6	1.78E-02	1
Wst. Vol & Area	**162000**	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	165.01	6.5	1.55E-02	1	1.42E-02	2
X-Well & Y- Well	20200	2.6	3750	0.059	1.2	20.34	1.4	0.17	**102**	**0.00**	6.5	3.22E-03	4	1.14E-02	3
Wst. Vol & X-Well	20200	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	**102**	60.76	6.5	1.08E-03	16	1.07E-02	4
X-Well & TCLP	20200	2.6	3750	**0.084**	1.2	**14.29**	1.4	0.17	**102**	60.76	6.5	1.44E-03	13	1.03E-02	5
Y-Well & Infil	20200	2.6	3750	0.059	1.2	20.34	1.4	**0.46**	430	**0.00**	6.5	4.81E-03	3	1.03E-02	6
X-Well & Z-Well	20200	2.6	3750	0.059	1.2	20.34	1.4	0.17	**102**	60.76	**1.3**	1.53E-03	12	9.53E-03	7
Wst. Vol & Y- Well	20200	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	2.16E-03	10	8.93E-03	8
Y-Well & TCLP	20200	2.6	3750	**0.084**	1.2	**14.29**	1.4	0.17	430	**0.00**	6.5	2.86E-03	8	8.16E-03	9
X-Well & Area	**162000**	2.6	3750	0.059	1.2	20.34	1.4	0.17	**102**	142.35	6.5	5.34E-03	2	7.93E-03	10
Wst. Vol & Infil	20200	2.6	**67350**	0.059	1.2	20.34	1.4	**0.46**	430	85.91	6.5	1.34E-03	14	7.85E-03	11
TCLP & Infil	20200	2.6	3750	**0.084**	1.2	**14.29**	1.4	**0.46**	430	85.91	6.5	1.63E-03	11	5.25E-03	12
Wst. Vol & TCLP	20200	2.6	**67350**	**0.084**	1.2	**14.29**	1.4	0.17	430	85.91	6.5	6.99E-04	18	4.33E-03	13
Y-Well & Area	**162000**	2.6	3750	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	3.08E-03	5	4.11E-03	14
TCLP & Area	**162000**	2.6	3750	**0.084**	1.2	**14.29**	1.4	0.17	430	165.01	6.5	3.02E-03	7	3.63E-03	15
Infil & Area	**162000**	2.6	3750	0.059	1.2	20.34	1.4	**0.46**	430	165.01	6.5	2.47E-03	9	3.41E-03	16
Y-Well & Z-Well	20200	2.6	3750	0.059	1.2	20.34	1.4	0.17	430	**0.00**	**1.3**	9.47E-04	17	3.14E-03	17
Infil & Z-Well	20200	2.6	3750	0.059	1.2	20.34	1.4	**0.46**	430	85.91	**1.3**	4.81E-04	19	1.97E-03	18
Area & Z-Well	**162000**	2.6	3750	0.059	1.2	20.34	1.4	0.17	430	165.01	**1.3**	1.21E-03	15	1.79E-03	19
Wst. Vol. & Z-Well	20200	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	85.91	**1.3**	2.08E-04	21	1.49E-03	20
TCLP & Z-Well	20200	2.6	3750	**0.084**	1.2	**14.29**	1.4	0.17	430	85.91	**1.3**	2.75E-04	20	1.37E-03	21

Table A.36 Sensitivity Analysis for Contingent Management of CSO Sludge, Off-Site Landfill/Benzene -- Municipal Areas, 30 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	3750	0.059	1.2	20.34	1.4	0.17	430	117.75	6.5	4.77E-04		3.64E-03	
Wst. Vol & X-Well	60705	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	**102**	93.79	6.5	1.08E-03	16	2.21E-02	1
Wst. Vol & Infil	60705	2.6	**67350**	0.059	1.2	20.34	1.4	**0.46**	430	117.75	6.5	1.34E-03	14	1.69E-02	2
Wst. Vol & Area	**420888**	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	238.82	6.5	1.55E-02	1	1.66E-02	3
X-Well & Infil	60705	2.6	3750	0.059	1.2	20.34	1.4	**0.46**	**102**	93.79	6.5	3.05E-03	6	1.46E-02	4
Wst. Vol & Y- Well	60705	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	2.16E-03	10	1.36E-02	5
X-Well & TCLP	60705	2.6	3750	**0.084**	1.2	**14.29**	1.4	0.17	**102**	93.79	6.5	1.44E-03	13	1.35E-02	6
X-Well & Y- Well	60705	2.6	3750	0.059	1.2	20.34	1.4	0.17	**102**	**0.00**	6.5	3.22E-03	4	1.25E-02	7
X-Well & Z-Well	60705	2.6	3750	0.059	1.2	20.34	1.4	0.17	**102**	93.79	**1.3**	1.53E-03	12	1.06E-02	8
Wst. Vol & TCLP	60705	2.6	**67350**	**0.084**	1.2	**14.29**	1.4	0.17	430	117.75	6.5	6.99E-04	18	1.05E-02	9
Y-Well & TCLP	60705	2.6	3750	**0.084**	1.2	**14.29**	1.4	0.17	430	**0.00**	6.5	2.86E-03	8	7.47E-03	10
Y-Well & Infil	60705	2.6	3750	0.059	1.2	20.34	1.4	**0.46**	430	**0.00**	6.5	4.81E-03	3	7.13E-03	11
TCLP & Infil	60705	2.6	3750	**0.084**	1.2	**14.29**	1.4	**0.46**	430	117.75	6.5	1.63E-03	11	5.46E-03	12
Wst. Vol. & Z-Well	60705	2.6	**67350**	0.059	1.2	20.34	1.4	0.17	430	117.75	**1.3**	2.08E-04	21	3.75E-03	13
X-Well & Area	**420888**	2.6	3750	0.059	1.2	20.34	1.4	0.17	**102**	217.62	6.5	5.34E-03	2	3.41E-03	14
Y-Well & Z-Well	60705	2.6	3750	0.059	1.2	20.34	1.4	0.17	430	**0.00**	**1.3**	9.47E-04	17	3.21E-03	15
Infil & Z-Well	60705	2.6	3750	0.059	1.2	20.34	1.4	**0.46**	430	117.75	**1.3**	4.81E-04	19	2.40E-03	16
TCLP & Z-Well	60705	2.6	3750	**0.084**	1.2	**14.29**	1.4	0.17	430	117.75	**1.3**	2.75E-04	20	2.09E-03	17
TCLP & Area	**420888**	2.6	3750	**0.084**	1.2	**14.29**	1.4	0.17	430	238.82	6.5	3.02E-03	7	2.03E-03	18
Y-Well & Area	**420888**	2.6	3750	0.059	1.2	20.34	1.4	0.17	430	**0.00**	6.5	3.08E-03	5	1.99E-03	19
Infil & Area	**420888**	2.6	3750	0.059	1.2	20.34	1.4	**0.46**	430	238.82	6.5	2.47E-03	9	1.54E-03	20
Area & Z-Well	**420888**	2.6	3750	0.059	1.2	20.34	1.4	0.17	430	238.82	**1.3**	1.21E-03	15	1.17E-03	21

Table A.37 Sensitivity Analysis for Crude Oil tank sediment Off-Site Landfill /Benzene -- Industrial Landfills, 30 year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	685.86	0.679	58.72	86.48	1.52	0.17	430	85.91	6.5	5.12E-03		2.43E-02	
Infil & Xwell	20200	2.6	685.86	0.679	58.72	86.48	1.52	**0.46**	**102**	60.76	6.5	3.32E-02	8	1.91E-01	1
Area & Wst. Vol	**162000**	2.6	**12473.7**	0.679	58.72	86.48	1.52	0.17	430	165.01	6.5	1.71E-01	1	1.57E-01	2
TCLP & xwell	20200	2.6	685.86	**1.7**	58.72	34.54	1.52	0.17	**102**	60.76	6.5	2.59E-02	12	1.56E-01	3
Ywell & Xwell	20200	2.6	685.86	0.679	58.72	86.48	1.52	0.17	**102**	**0.00**	6.5	3.44E-02	7	1.24E-01	4
Ywell & TCLP	20200	2.6	685.86	**1.7**	58.72	**34.54**	1.52	0.17	430	**0.00**	6.5	5.11E-02	6	1.20E-01	5
Xwell & Wst Vol	20200	2.6	**12473.7**	0.679	58.72	86.48	1.52	0.17	**102**	60.76	6.5	1.20E-02	20	1.13E-01	6
Xwell & Wst. Conc	20200	2.6	685.86	0.679	**220**	**324.01**	1.52	0.17	**102**	60.76	6.5	1.16E-02	22	1.10E-01	7
Ywell & Infil	20200	2.6	685.86	0.679	58.72	86.48	1.52	**0.46**	430	**0.00**	6.5	5.24E-02	4	1.09E-01	8
Xwell & Zwell	20200	2.6	685.86	0.679	58.72	86.48	1.52	0.17	**102**	60.76	**1.3**	1.64E-02	16	1.04E-01	9
Ywell & Wst. Vol	20200	2.6	**12473.7**	0.679	58.72	86.48	1.52	0.17	430	**0.00**	6.5	2.40E-02	14	9.45E-02	10
Area & Wst. Conc	**162000**	2.6	685.86	0.679	**220**	**324.01**	1.52	0.17	430	165.01	6.5	8.02E-02	2	9.23E-02	11
Ywell & Wst Conc	20200	2.6	685.86	0.679	**220**	**324.01**	1.52	0.17	430	**0.00**	6.5	2.33E-02	15	8.95E-02	12
Area & Xwell	**162000**	2.6	685.86	0.679	58.72	86.48	1.52	0.17	**102**	142.35	6.5	5.18E-02	5	8.64E-02	13
Infil & Wst. Vol	20200	2.6	**12473.7**	0.679	58.72	86.48	1.52	**0.46**	430	85.91	6.5	5.85E-02	3	8.63E-02	14
TCLP & Wst. Vol	20200	2.6	**12473.7**	**1.7**	58.72	34.54	1.52	0.17	430	85.91	6.5	1.30E-02	19	8.40E-02	15
Infil & Wst. Conc	20200	2.6	685.86	0.679	**220**	**324.01**	1.52	**0.46**	430	85.91	6.5	1.44E-02	17	7.23E-02	16
TCLP & Wst Conc	20200	2.6	685.86	**1.7**	**220**	**129.41**	1.52	0.17	430	85.91	6.5	1.34E-02	18	6.67E-02	17
Infil & TCLP	20200	2.6	685.86	**1.7**	58.72	**34.54**	1.52	**0.46**	430	85.91	6.5	2.71E-02	11	6.65E-02	18
Area & Ywell	**162000**	2.6	685.86	0.679	58.72	86.48	1.52	0.17	430	**0.00**	6.5	3.00E-02	9	4.53E-02	19
Area & TCLP	**162000**	2.6	685.86	**1.7**	58.72	**34.54**	1.52	0.17	430	165.01	6.5	2.85E-02	10	4.01E-02	20
Area & Infil	**162000**	2.6	685.86	0.679	58.72	86.48	1.52	**0.46**	430	165.01	6.5	2.44E-02	13	3.89E-02	21
Ywell & Zwell	20200	2.6	685.86	0.679	58.72	86.48	1.52	0.17	430	**0.00**	**1.3**	1.02E-02	23	3.41E-02	22
Wst. Vol & Wst. Conc	20200	2.6	**12473.7**	0.679	**220**	**324.01**	1.52	0.17	430	85.91	6.5	5.95E-03	24	3.36E-02	23
Infil & Zwell	20200	2.6	685.86	0.679	58.72	86.48	1.52	**0.46**	430	85.91	**1.3**	5.24E-03	25	2.09E-02	24
TCLP & Zwell	20200	2.6	685.86	**1.7**	58.72	34.54	1.52	0.17	430	85.91	**1.3**	4.91E-03	26	2.01E-02	25
Area & Zwell	**162000**	2.6	685.86	0.679	58.72	86.48	1.52	0.17	430	165.01	**1.3**	1.17E-02	21	1.96E-02	26
Wst. Vol & Zwell	20200	2.6	**12473.7**	0.679	58.72	86.48	1.52	0.17	430	85.91	**1.3**	2.31E-03	27	1.58E-02	27
Wst Conc & Zwell	20200	2.6	685.86	0.679	**220**	**324.01**	1.52	0.17	430	85.91	**1.3**	2.22E-03	28	1.50E-02	28

Table A.38 Sensitivity Analysis for Crude Oil tank sediment Off-Site Landfill /TC Capped Benzene -- Industrial Areas, 30 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	685.86	0.5	58.72	117.44	1.52	0.17	430	85.91	6.5	3.94E-03		4.96E-02	
Xwell & Wst Vol	20200	2.6	**12473.70**	0.5	58.72	117.44	1.52	0.17	**102**	60.76	6.5	9.07E-03	18	2.03E-01	1
Infil & Wst. Vol	20200	2.6	**12473.70**	0.5	58.72	117.44	1.52	**0.46**	430	85.91	6.5	1.06E-02	16	1.82E-01	2
Xwell & Wst. Conc	20200	2.6	685.86	0.5	**220**	**440.00**	1.52	0.17	**102**	60.76	6.5	8.65E-03	19	1.70E-01	3
Infil & Xwell	20200	2.6	685.86	0.5	58.72	117.44	1.52	**0.46**	**102**	60.76	6.5	2.56E-02	8	1.45E-01	4
Infil & Wst. Conc	20200	2.6	685.86	0.5	**220**	**440.00**	1.52	**0.46**	430	85.91	6.5	1.07E-02	15	1.27E-01	5
Area & Wst. Vol	**162000**	2.6	**12473.70**	0.5	58.72	117.44	1.52	0.17	430	165.01	6.5	1.34E-01	1	1.22E-01	6
Ywell & Wst. Vol	20200	2.6	**12473.70**	0.5	58.72	117.44	1.52	0.17	430	**0.00**	6.5	1.81E-02	10	1.14E-01	7
Ywell & Xwell	20200	2.6	685.86	0.5	58.72	117.44	1.52	0.17	**102**	**0.00**	6.5	2.67E-02	7	1.13E-01	8
Xwell & Zwell	20200	2.6	685.86	0.5	58.72	117.44	1.52	0.17	**102**	60.76	**1.3**	1.27E-02	13	1.01E-01	9
Wst. Vol & Wst. Conc	20200	2.6	**12473.70**	0.5	**220**	**440.00**	1.52	0.17	430	85.91	6.5	4.41E-03	22	9.68E-02	10
Ywell & Wst Conc	20200	2.6	685.86	0.5	**220**	**440.00**	1.52	0.17	430	**0.00**	6.5	1.74E-02	11	9.35E-02	11
Area & Xwell	**162000**	2.6	685.86	0.5	58.72	117.44	1.52	0.17	**102**	142.35	6.5	4.94E-02	3	8.07E-02	12
Area & Wst. Conc	**162000**	2.6	685.86	0.5	**220**	**440.00**	1.52	0.17	430	165.01	6.5	7.14E-02	2	7.87E-02	13
Ywell & Infil	20200	2.6	685.86	0.5	58.72	117.44	1.52	**0.46**	430	**0.00**	6.5	4.04E-02	4	7.06E-02	14
Wst. Vol & Zwell	20200	2.6	**12473.70**	0.5	58.72	117.44	1.52	0.17	430	85.91	**1.3**	1.74E-03	26	4.74E-02	15
Area & Ywell	**162000**	2.6	685.86	0.5	58.72	117.44	1.52	0.17	430	**0.00**	6.5	2.92E-02	5	4.28E-02	16
Wst Conc & Zwell	20200	2.6	685.86	0.5	**220**	**440.00**	1.52	0.17	430	85.91	**1.3**	1.67E-03	27	3.89E-02	17
Area & Infil	**162000**	2.6	685.86	0.5	58.72	117.44	1.52	**0.46**	430	165.01	6.5	2.41E-02	9	3.81E-02	18
Infil & Zwell	20200	2.6	685.86	0.5	58.72	117.44	1.52	**0.46**	430	85.91	**1.3**	4.04E-03	24	3.01E-02	19
Ywell & Zwell	20200	2.6	685.86	0.5	58.72	117.44	1.52	0.17	430	**0.00**	**1.3**	7.81E-03	21	2.91E-02	20
Area & Zwell	**162000**	2.6	685.86	0.5	58.72	117.44	1.52	0.17	430	165.01	**1.3**	1.14E-02	14	1.85E-02	21

Table A.39 Sensitivity Analysis for Crude Oil tank sediment Off-Site Landfill /Benzene -- Municipal Landfills, 30 year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	685.86	0.679	58.72	86.48	1.52	0.17	430	117.75	6.5	5.12E-03		3.80E-02	
Xwell & Wst Vol	60705	2.6	**12437.7**	0.679	58.72	86.48	1.52	0.17	**102**	93.79	6.5	1.20E-02	20	2.39E-01	1
Xwell & Wst. Conc	60705	2.6	685.86	0.679	**220**	**324.01**	1.52	0.17	**102**	93.79	6.5	1.16E-02	22	1.99E-01	2
Infil & Wst. Vol	60705	2.6	**12437.7**	0.679	58.72	86.48	1.52	**0.46**	430	117.75	6.5	5.85E-02	3	1.89E-01	3
TCLP & Wst. Vol	60705	2.6	**12437.7**	**1.7**	58.72	34.54	1.52	0.17	430	117.75	6.5	1.30E-02	19	1.89E-01	4
Area & Wst. Vol	**420888**	2.6	**12437.7**	0.679	58.72	86.48	1.52	0.17	430	238.82	6.5	1.71E-01	1	1.79E-01	5
TCLP & xwell	60705	2.6	685.86	**1.7**	58.72	34.54	1.52	0.17	**102**	93.79	6.5	2.59E-02	12	1.65E-01	6
Infil & Xwell	60705	2.6	685.86	0.679	58.72	86.48	1.52	**0.46**	**102**	93.79	6.5	3.32E-02	8	1.53E-01	7
Ywell & Wst. Vol	60705	2.6	**12437.7**	0.679	58.72	86.48	1.52	0.17	430	**0.00**	6.5	2.40E-02	14	1.48E-01	8
Ywell & Xwell	60705	2.6	685.86	0.679	58.72	86.48	1.52	0.17	**102**	**0.00**	6.5	3.44E-02	7	1.32E-01	9
Infil & Wst. Conc	60705	2.6	685.86	0.679	**220**	**324.01**	1.52	**0.46**	430	117.75	6.5	1.44E-02	17	1.22E-01	10
Ywell & Wst Conc	60705	2.6	685.86	0.679	**220**	**324.01**	1.52	0.17	430	**0.00**	6.5	2.33E-02	15	1.18E-01	11
TCLP & Wst Conc	60705	2.6	685.86	**1.7**	**220**	**129.41**	1.52	0.17	430	117.75	6.5	1.34E-02	18	1.18E-01	12
Xwell & Zwell	60705	2.6	685.86	0.679	58.72	86.48	1.52	0.17	**102**	93.79	**1.3**	1.64E-02	16	1.12E-01	13
Ywell & TCLP	60705	2.6	685.86	**1.7**	58.72	**34.54**	1.52	0.17	430	**0.00**	6.5	5.11E-02	6	8.89E-02	14
Wst. Vol & Wst. Conc	60705	2.6	**12437.7**	0.679	**220**	**324.01**	1.52	0.17	430	117.75	6.5	5.95E-03	24	8.77E-02	15
Ywell & Infil	60705	2.6	685.86	0.679	58.72	86.48	1.52	**0.46**	430	**0.00**	6.5	5.24E-02	4	7.66E-02	16
Area & Wst. Conc	**420888**	2.6	685.86	0.679	**220**	**324.01**	1.52	0.17	430	238.82	6.5	8.02E-02	2	7.19E-02	17
Infil & TCLP	60705	2.6	685.86	**1.7**	58.72	**34.54**	1.52	**0.46**	430	117.75	6.5	2.71E-02	11	6.09E-02	18
Wst. Vol & Zwell	60705	2.6	**12437.7**	0.679	58.72	86.48	1.52	0.17	430	117.75	**1.3**	2.31E-03	27	4.09E-02	19
Area & Xwell	**420888**	2.6	685.86	0.679	58.72	86.48	1.52	0.17	**102**	217.62	6.5	5.18E-02	5	3.89E-02	20
Ywell & Zwell	60705	2.6	685.86	0.679	58.72	86.48	1.52	0.17	430	**0.00**	**1.3**	1.02E-02	23	3.35E-02	21
Wst Conc & Zwell	60705	2.6	685.86	0.679	**220**	**324.01**	1.52	0.17	430	117.75	**1.3**	2.22E-03	28	3.26E-02	22
Infil & Zwell	60705	2.6	685.86	0.679	58.72	86.48	1.52	**0.46**	430	117.75	**1.3**	5.24E-03	25	2.58E-02	23
TCLP & Zwell	60705	2.6	685.86	**1.7**	58.72	34.54	1.52	0.17	430	117.75	**1.3**	4.91E-03	26	2.49E-02	24
Area & Ywell	**420888**	2.6	685.86	0.679	58.72	86.48	1.52	0.17	430	**0.00**	6.5	3.00E-02	9	2.27E-02	25
Area & TCLP	**420888**	2.6	685.86	**1.7**	58.72	**34.54**	1.52	0.17	430	238.82	6.5	2.85E-02	10	2.23E-02	26
Area & Infil	**420888**	2.6	685.86	0.679	58.72	86.48	1.52	**0.46**	430	238.82	6.5	2.44E-02	13	1.77E-02	27
Area & Zwell	**420888**	2.6	685.86	0.679	58.72	86.48	1.52	0.17	430	238.82	**1.3**	1.17E-02	21	1.34E-02	28

Table A.40 Sensitivity Analysis for Crude Oil tank sediment Off-Site Landfill /TC Capped Benzene -- Municipal Areas, 30 Year Active Life

Two-Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	685.9	0.5	58.72	117.44	1.52	0.17	430	117.75	6.5	3.94E-03		3.30E-02	
Xwell & Wst Vol	60705	2.6	**12437.7**	0.5	58.72	117.44	1.52	0.17	**102**	93.79	6.5	9.07E-03	18	1.86E-01	1
Xwell & Wst. Conc	60705	2.6	685.9	0.5	**220**	**440.00**	1.52	0.17	**102**	93.79	6.5	8.65E-03	19	1.57E-01	2
Area & Wst. Vol	**420888**	2.6	**12437.7**	0.5	58.72	117.44	1.52	0.17	430	238.82	6.5	1.34E-01	1	1.47E-01	3
Infil & Wst. Vol	60705	2.6	**12437.7**	0.5	58.72	117.44	1.52	**0.46**	430	117.75	6.5	1.06E-02	16	1.45E-01	4
Infil & Xwell	60705	2.6	685.9	0.5	58.72	117.44	1.52	**0.46**	**102**	93.79	6.5	2.56E-02	8	1.39E-01	5
Ywell & Wst. Vol	60705	2.6	**12437.7**	0.5	58.72	117.44	1.52	0.17	430	**0.00**	6.5	1.81E-02	10	1.14E-01	6
Ywell & Xwell	60705	2.6	685.9	0.5	58.72	117.44	1.52	0.17	**102**	**0.00**	6.5	2.67E-02	7	1.13E-01	7
Infil & Wst. Conc	60705	2.6	685.9	0.5	**220**	**440.00**	1.52	**0.46**	430	117.75	6.5	1.07E-02	15	1.01E-01	8
Xwell & Zwell	60705	2.6	685.9	0.5	58.72	117.44	1.52	0.17	**102**	93.79	**1.3**	1.27E-02	13	9.55E-02	9
Ywell & Wst Conc	60705	2.6	685.9	0.5	**220**	**440.00**	1.52	0.17	430	**0.00**	6.5	1.74E-02	11	9.35E-02	10
Ywell & Infil	60705	2.6	685.9	0.5	58.72	117.44	1.52	**0.46**	430	**0.00**	6.5	4.04E-02	4	7.07E-02	11
Area & Wst. Conc	**420888**	2.6	685.9	0.5	**220**	**440.00**	1.52	0.17	430	238.82	6.5	7.14E-02	2	6.65E-02	12
Wst. Vol & Wst. Conc	60705	2.6	**12437.7**	0.5	**220**	**440.00**	1.52	0.17	430	117.75	6.5	4.41E-03	22	6.46E-02	13
Area & Xwell	**420888**	2.6	685.9	0.5	58.72	117.44	1.52	0.17	**102**	217.62	6.5	4.94E-02	3	3.83E-02	14
Wst. Vol & Zwell	60705	2.6	**12437.7**	0.5	58.72	117.44	1.52	0.17	430	117.75	**1.3**	1.74E-03	26	3.15E-02	15
Ywell & Zwell	60705	2.6	685.9	0.5	58.72	117.44	1.52	0.17	430	**0.00**	**1.3**	7.81E-03	21	2.91E-02	16
Wst Conc & Zwell	60705	2.6	685.9	0.5	**220**	**440.00**	1.52	0.17	430	117.75	**1.3**	1.67E-03	27	2.59E-02	17
Infil & Zwell	60705	2.6	685.9	0.5	58.72	117.44	1.52	**0.46**	430	117.75	**1.3**	4.04E-03	24	2.38E-02	18
Area & Ywell	**420888**	2.6	685.9	0.5	58.72	117.44	1.52	0.17	430	**0.00**	6.5	2.92E-02	5	2.24E-02	19
Area & Infil	**420888**	2.6	685.9	0.5	58.72	117.44	1.52	**0.46**	430	238.82	6.5	2.41E-02	9	1.76E-02	20
Area & Zwell	**420888**	2.6	685.9	0.5	58.72	117.44	1.52	0.17	430	238.82	**1.3**	1.14E-02	14	1.32E-02	21

Table A.41 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Benzene -- Industrial Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	1997 Rank
Base Case	20200	2.6	714	7.9	116.38	14.73	0.84	0.17	430	85.91	6.5	3.96E-02		7.19E-02	
Wst. Conc. & X-Well	20200	2.6	714	7.9	**500**	63.29	0.84	0.17	**102**	60.76	6.5	1.21E-01	15	7.41E-01	1
Wst. Vol & X-Well	20200	2.6	**2763.9**	7.9	116.38	14.73	0.84	0.17	**102**	60.76	6.5	1.21E-01	16	7.05E-01	2
Wst. Conc. & Y- Well	20200	2.6	714	7.9	**500**	63.29	0.84	0.17	430	**0.00**	6.5	2.39E-01	4	5.70E-01	3
Wst. Vol & Y- Well	20200	2.6	**2763.9**	7.9	116.38	14.73	0.84	0.17	430	**0.00**	6.5	2.37E-01	5	5.40E-01	4
X-Well & Infil	20200	2.6	714	7.9	116.38	14.73	0.84	**0.46**	**102**	60.76	6.5	2.02E-01	6	4.12E-01	5
X-Well & Y- Well	20200	2.6	714	7.9	116.38	14.73	0.84	0.17	**102**	**0.00**	6.5	2.79E-01	3	4.06E-01	6
X-Well & Z-Well	20200	2.6	714	7.9	116.38	14.73	0.84	0.17	**102**	60.76	**1.3**	1.33E-01	12	3.43E-01	7
Wst. Conc & Infil	20200	2.6	714	7.9	**500**	63.29	0.84	**0.46**	430	85.91	6.5	1.31E-01	13	3.20E-01	8
X-Well & TCLP	20200	2.6	714	**39**	116.38	**2.98**	0.84	0.17	**102**	60.76	6.5	1.83E-01	8	3.16E-01	9
Wst. Vol & Wst Conc	20200	2.6	**2763.9**	7.9	**500**	**63.29**	0.84	0.17	430	85.91	6.5	5.97E-02	20	3.14E-01	10
Wst. Conc & TCLP	20200	2.6	714	**39**	**500**	**12.82**	0.84	0.17	430	85.91	6.5	1.84E-01	7	3.14E-01	11
Wst. Vol & Infil	20200	2.6	**2763.9**	7.9	116.38	14.73	0.84	**0.46**	430	85.91	6.5	1.28E-01	14	2.98E-01	12
Wst. Vol & TCLP	20200	2.6	**2763.9**	**39**	116.38	**2.98**	0.84	0.17	430	85.91	6.5	1.76E-01	9	2.85E-01	13
Y-Well & TCLP	20200	2.6	714	**39**	116.38	**2.98**	0.84	0.17	430	**0.00**	6.5	3.38E-01	1	2.24E-01	14
Y-Well & Infil	20200	2.6	714	7.9	116.38	14.73	0.84	**0.46**	430	**0.00**	6.5	3.00E-01	2	2.15E-01	15
Wst. Conc & Area	**162000**	2.6	714	7.9	**500**	63.29	0.84	0.17	430	165.01	6.5	1.63E-01	10	1.97E-01	16
Wst. Vol & Area	**162000**	2.6	**2763.9**	7.9	116.38	14.73	0.84	0.17	430	165.01	6.5	1.47E-01	11	1.78E-01	17
X-Well & Area	**162000**	2.6	714	7.9	116.38	14.73	0.84	0.17	**102**	142.35	6.5	7.27E-02	19	1.11E-01	18
Y-Well & Z-Well	20200	2.6	714	7.9	116.38	14.73	0.84	0.17	430	0.00	**1.3**	7.96E-02	18	1.03E-01	19
Wst. Conc & Z-Well	20200	2.6	714	7.9	**500**	63.29	0.84	0.17	430	85.91	**1.3**	2.30E-02	26	9.56E-02	20
TCLP & Infil	20200	2.6	714	**39**	116.38	2.98	0.84	**0.46**	430	85.91	6.5	1.05E-01	17	9.24E-02	21
Wst. Vo & Z-Well	20200	2.6	**2763.9**	7.9	116.38	14.73	0.84	0.17	430	85.91	**1.3**	2.28E-02	27	9.07E-02	22
Y-Well & Area	**162000**	2.6	714	7.9	116.38	14.73	0.84	0.17	430	**0.00**	6.5	4.17E-02	21	5.69E-02	23
TCLP & Area	**162000**	2.6	714	**39**	116.38	2.98	0.84	0.17	430	165.01	6.5	3.84E-02	22	4.68E-02	24
Infil & Area	**162000**	2.6	714	7.9	116.38	14.73	0.84	**0.46**	430	165.01	6.5	3.30E-02	23	4.58E-02	25
Infil & Z-Well	20200	2.6	714	7.9	116.38	14.73	0.84	**0.46**	430	85.91	**1.3**	3.00E-02	25	4.11E-02	26
TCLP & Z-Well	20200	2.6	714	**39**	116.38	2.98	0.84	0.17	430	85.91	**1.3**	3.24E-02	24	3.77E-02	27
Area & Z-Well	**162000**	2.6	714	7.9	116.38	14.73	0.84	0.17	430	165.01	**1.3**	1.64E-02	28	2.48E-02	28

Table A.42 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Benzene (TCLP=TC Regulatory Level) -- Industrial Areas (30 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	714	0.5	116.38	232.76	0.84	0.17	430	85.91	6.5	4.05E-03		2.01E-02	
X-Well & Infil	20200	2.6	714	0.5	116.38	232.76	0.84	**0.46**	**102**	60.76	6.5	2.63E-02	8	1.66E-01	1
X-Well & Y- Well	20200	2.6	714	0.5	116.38	232.76	0.84	0.17	**102**	**0.00**	6.5	2.73E-02	7	1.01E-01	2
Y-Well & Infil	20200	2.6	714	0.5	116.38	232.76	0.84	**0.46**	430	**0.00**	6.5	4.14E-02	4	9.71E-02	3
X-Well & Area	**162000**	2.6	714	0.5	116.38	232.76	0.84	0.17	**102**	142.35	6.5	6.39E-02	3	8.88E-02	4
Wst. Conc & Area	**162000**	2.6	714	0.5	**500**	1000.00	0.84	0.17	430	165.01	6.5	8.87E-02	1	8.78E-02	5
X-Well & Z-Well	20200	2.6	714	0.5	116.38	232.76	0.84	0.17	**102**	60.76	**1.3**	1.30E-02	12	8.46E-02	6
Wst. Vol & Area	**162000**	2.6	**2763.9**	0.5	116.38	232.76	0.84	0.17	430	165.01	6.5	8.45E-02	2	8.43E-02	7
Wst. Vol & X-Well	20200	2.6	**2763.9**	0.5	116.38	232.76	0.84	0.17	**102**	60.76	6.5	8.61E-03	15	8.17E-02	8
Wst. Conc. & X-Well	20200	2.6	714	0.5	**500**	1000.00	0.84	0.17	**102**	60.76	6.5	8.60E-03	16	8.17E-02	9
Wst. Conc. & Y- Well	20200	2.6	714	0.5	**500**	1000.00	0.84	0.17	430	**0.00**	6.5	1.72E-02	10	6.85E-02	10
Wst. Vol & Y- Well	20200	2.6	**2763.9**	0.5	116.38	232.76	0.84	0.17	430	**0.00**	6.5	1.72E-02	9	6.84E-02	11
Wst. Conc & Infil	20200	2.6	714	0.5	**500**	1000.00	0.84	**0.46**	430	85.91	6.5	1.05E-02	14	5.91E-02	12
Wst. Vol & Infil	20200	2.6	**2763.9**	0.5	116.38	232.76	0.84	**0.46**	430	85.91	6.5	1.07E-02	13	5.80E-02	13
Y-Well & Area	**162000**	2.6	714	0.5	116.38	232.76	0.84	0.17	430	**0.00**	6.5	3.74E-02	5	4.74E-02	14
Infil & Area	**162000**	2.6	714	0.5	116.38	232.76	0.84	**0.46**	430	165.01	6.5	3.18E-02	6	4.29E-02	15
Y-Well & Z-Well	20200	2.6	714	0.5	116.38	232.76	0.84	0.17	430	0.00	**1.3**	8.05E-03	17	2.82E-02	16
Wst. Vol & Wst Conc	20200	2.6	**2763.9**	0.5	**500**	**1000.00**	0.84	0.17	430	85.91	6.5	3.97E-03	19	2.51E-02	17
Area & Z-Well	**162000**	2.6	714	0.5	116.38	232.76	0.84	0.17	430	165.01	**1.3**	1.46E-02	11	2.05E-02	18
Infil & Z-Well	20200	2.6	714	0.5	116.38	232.76	0.84	**0.46**	430	85.91	**1.3**	4.15E-03	18	1.85E-02	19
Wst. Conc & Z-Well	20200	2.6	714	0.5	**500**	1000.00	0.84	0.17	430	85.91	**1.3**	1.65E-03	21	1.15E-02	20
Wst. Vo & Z-Well	20200	2.6	**2763.9**	0.5	116.38	232.76	0.84	0.17	430	85.91	**1.3**	1.66E-03	20	1.14E-02	21

Table A-43 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Benzene -- Municipal Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	60705	2.6	714	7.9	116.38	14.73	0.84	0.17	430	117.75	6.5	3.96E-02		6.36E-02	
Wst. Conc. & X-Well	60705	2.6	714	7.9	**500**	63.29	0.84	0.17	**102**	93.79	6.5	1.21E-01	15	7.97E-01	1
Wst. Vol & X-Well	60705	2.6	**2763.9**	7.9	116.38	14.73	0.84	0.17	**102**	93.79	6.5	1.21E-01	16	7.34E-01	2
Wst. Vol & Wst Conc	60705	2.6	**2763.9**	7.9	**500**	**63.29**	0.84	0.17	430	117.75	6.5	5.97E-02	20	5.66E-01	3
Wst. Conc. & Y- Well	60705	2.6	714	7.9	**500**	63.29	0.84	0.17	430	**0.00**	6.5	2.39E-01	4	4.31E-01	4
Wst. Vol & Y- Well	60705	2.6	**2763.9**	7.9	116.38	14.73	0.84	0.17	430	**0.00**	6.5	2.37E-01	5	3.95E-01	5
Wst. Conc & Infil	60705	2.6	714	7.9	**500**	63.29	0.84	**0.46**	430	117.75	6.5	1.31E-01	13	2.99E-01	6
Wst. Conc & TCLP	60705	2.6	714	**39**	**500**	**12.82**	0.84	0.17	430	117.75	6.5	1.84E-01	7	2.74E-01	7
Wst. Vol & Infil	60705	2.6	**2763.9**	7.9	116.38	14.73	0.84	**0.46**	430	117.75	6.5	1.28E-01	14	2.70E-01	8
Wst. Vol & TCLP	60705	2.6	**2763.9**	**39**	116.38	**2.98**	0.84	0.17	430	117.75	6.5	1.76E-01	9	2.47E-01	9
X-Well & Y- Well	60705	2.6	714	7.9	116.38	14.73	0.84	0.17	**102**	**0.00**	6.5	2.79E-01	3	2.36E-01	10
X-Well & TCLP	60705	2.6	714	**39**	116.38	**2.98**	0.84	0.17	**102**	93.79	6.5	1.83E-01	8	2.19E-01	11
X-Well & Infil	60705	2.6	714	7.9	116.38	14.73	0.84	**0.46**	**102**	93.79	6.5	2.02E-01	6	2.08E-01	12
X-Well & Z-Well	60705	2.6	714	7.9	116.38	14.73	0.84	0.17	**102**	93.79	**1.3**	1.33E-01	12	2.02E-01	13
Wst. Conc & Z-Well	60705	2.6	714	7.9	**500**	63.29	0.84	0.17	430	117.75	**1.3**	2.30E-02	26	1.21E-01	14
Y-Well & TCLP	60705	2.6	714	**39**	116.38	**2.98**	0.84	0.17	430	**0.00**	6.5	3.38E-01	1	1.14E-01	15
Wst. Vo & Z-Well	60705	2.6	**2763.9**	7.9	116.38	14.73	0.84	0.17	430	117.75	**1.3**	2.28E-02	27	1.11E-01	16
Wst. Conc & Area	**420888**	2.6	714	7.9	**500**	63.29	0.84	0.17	430	238.82	6.5	1.63E-01	10	1.10E-01	17
Y-Well & Infil	60705	2.6	714	7.9	116.38	14.73	0.84	**0.46**	430	**0.00**	6.5	3.00E-01	2	1.01E-01	18
Wst. Vol & Area	**420888**	2.6	**2763.9**	7.9	116.38	14.73	0.84	0.17	430	238.82	6.5	1.47E-01	11	9.88E-02	19
TCLP & Infil	60705	2.6	714	**39**	116.38	2.98	0.84	**0.46**	430	117.75	6.5	1.05E-01	17	7.17E-02	20
Y-Well & Z-Well	60705	2.6	714	7.9	116.38	14.73	0.84	0.17	430	0.00	**1.3**	7.96E-02	18	5.66E-02	21
X-Well & Area	**420888**	2.6	714	7.9	116.38	14.73	0.84	0.17	**102**	217.62	6.5	7.27E-02	19	4.56E-02	22
Infil & Z-Well	60705	2.6	714	7.9	116.38	14.73	0.84	**0.46**	430	117.75	**1.3**	3.00E-02	25	3.41E-02	23
TCLP & Z-Well	60705	2.6	714	**39**	116.38	2.98	0.84	0.17	430	117.75	**1.3**	3.24E-02	24	3.22E-02	24
Y-Well & Area	**420888**	2.6	714	7.9	116.38	14.73	0.84	0.17	430	**0.00**	6.5	4.17E-02	21	2.66E-02	25
TCLP & Area	**420888**	2.6	714	**39**	116.38	2.98	0.84	0.17	430	238.82	6.5	3.84E-02	22	2.56E-02	26
Infil & Area	**420888**	2.6	714	7.9	116.38	14.73	0.84	**0.46**	430	238.82	6.5	3.30E-02	23	2.04E-02	27
Area & Z-Well	**420888**	2.6	714	7.9	116.38	14.73	0.84	0.17	430	238.82	**1.3**	1.64E-02	28	1.57E-02	28

Table A-44 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Benzene (TCLP=TC Regulatory Level) -- Municipal Areas (30 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	714	0.5	116.38	232.76	0.84	0.17	430	117.75	6.5	4.05E-03		3.52E-02	
Wst. Conc. & X-Well	60705	2.6	714	0.5	**500**	1000.00	0.84	0.17	**102**	93.79	6.5	8.60E-03	16	1.64E-01	1
Wst. Vol & X-Well	60705	2.6	**2763.9**	0.5	116.38	232.76	0.84	0.17	**102**	93.79	6.5	8.61E-03	15	1.61E-01	2
X-Well & Infil	60705	2.6	714	0.5	116.38	232.76	0.84	**0.46**	**102**	93.79	6.5	2.63E-02	8	1.51E-01	3
X-Well & Y- Well	60705	2.6	714	0.5	116.38	232.76	0.84	0.17	**102**	**0.00**	6.5	2.73E-02	7	1.20E-01	4
Wst. Conc & Infil	60705	2.6	714	0.5	**500**	1000.00	0.84	**0.46**	430	117.75	6.5	1.05E-02	14	1.11E-01	5
Wst. Vol & Infil	60705	2.6	**2763.9**	0.5	116.38	232.76	0.84	**0.46**	430	117.75	6.5	1.07E-02	13	1.07E-01	6
X-Well & Z-Well	60705	2.6	714	0.5	116.38	232.76	0.84	0.17	**102**	93.79	**1.3**	1.30E-02	12	1.01E-01	7
Wst. Conc. & Y- Well	60705	2.6	714	0.5	**500**	1000.00	0.84	0.17	430	**0.00**	6.5	1.72E-02	10	9.86E-02	8
Wst. Vol & Y- Well	60705	2.6	**2763.9**	0.5	116.38	232.76	0.84	0.17	430	**0.00**	6.5	1.72E-02	9	9.67E-02	9
Wst. Conc & Area	**420888**	2.6	714	0.5	**500**	1000.00	0.84	0.17	430	238.82	6.5	8.87E-02	1	7.95E-02	10
Y-Well & Infil	60705	2.6	714	0.5	116.38	232.76	0.84	**0.46**	430	**0.00**	6.5	4.14E-02	4	7.73E-02	11
Wst. Vol & Area	**420888**	2.6	**2763.9**	0.5	116.38	232.76	0.84	0.17	430	238.82	6.5	8.45E-02	2	7.43E-02	12
Wst. Vol & Wst Conc	60705	2.6	**2763.9**	0.5	**500**	**1000.00**	0.84	0.17	430	117.75	6.5	3.97E-03	19	6.45E-02	13
X-Well & Area	**420888**	2.6	714	0.5	116.38	232.76	0.84	0.17	**102**	217.62	6.5	6.39E-02	3	4.33E-02	14
Y-Well & Z-Well	60705	2.6	714	0.5	116.38	232.76	0.84	0.17	430	0.00	**1.3**	8.05E-03	17	3.10E-02	15
Wst. Conc & Z-Well	60705	2.6	714	0.5	**500**	1000.00	0.84	0.17	430	117.75	**1.3**	1.65E-03	21	2.73E-02	16
Wst. Vo & Z-Well	60705	2.6	**2763.9**	0.5	116.38	232.76	0.84	0.17	430	117.75	**1.3**	1.66E-03	20	2.68E-02	17
Infil & Z-Well	60705	2.6	714	0.5	116.38	232.76	0.84	**0.46**	430	117.75	**1.3**	4.15E-03	18	2.60E-02	18
Y-Well & Area	**420888**	2.6	714	0.5	116.38	232.76	0.84	0.17	430	**0.00**	6.5	3.74E-02	5	2.54E-02	19
Infil & Area	**420888**	2.6	714	0.5	116.38	232.76	0.84	**0.46**	430	238.82	6.5	3.18E-02	6	2.00E-02	20
Area & Z-Well	**420888**	2.6	714	0.5	116.38	232.76	0.84	0.17	430	238.82	**1.3**	1.46E-02	11	1.50E-02	21

Table A-45 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Arsenic -- Industrial Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	20200	2.6	714	1.1	393.3	357.5	0.84	0.17	430	85.91	6.5	1.92E-03		1.84E-03	
Wst. Conc. & X-Well	20200	2.6	714	1.1	**1600**	1454.5	0.84	0.17	**102**	60.76	6.5	1.15E-02	5	3.23E-02	1
Wst. Vol & X-Well	20200	2.6	**2763.9**	1.1	393.3	357.5	0.84	0.17	**102**	60.76	6.5	1.12E-02	6	3.10E-02	2
Wst. Vol & Wst Conc	20200	2.6	**2763.9**	1.1	**1600**	**1454.5**	0.84	0.17	430	85.91	6.5	7.46E-03	13	2.09E-02	3
Wst. Conc. & Y- Well	20200	2.6	714	1.1	**1600**	1454.5	0.84	0.17	430	**0.00**	6.5	2.11E-02	1	2.07E-02	4
Wst. Vol & Y- Well	20200	2.6	**2763.9**	1.1	393.3	357.5	0.84	0.17	430	**0.00**	6.5	2.06E-02	2	1.98E-02	5
X-Well & Infil	20200	2.6	714	1.1	393.3	357.5	0.84	**0.46**	**102**	60.76	6.5	1.11E-02	7	1.63E-02	6
X-Well & Y- Well	20200	2.6	714	1.1	393.3	357.5	0.84	0.17	**102**	**0.00**	6.5	1.58E-02	3	1.21E-02	7
X-Well & Z-Well	20200	2.6	714	1.1	393.3	357.5	0.84	0.17	**102**	60.76	**1.3**	7.58E-03	12	1.05E-02	8
Wst. Conc & Infil	20200	2.6	714	1.1	**1600**	1454.5	0.84	**0.46**	430	85.91	6.5	8.58E-03	9	9.27E-03	9
Wst. Vol & Infil	20200	2.6	**2763.9**	1.1	393.3	357.5	0.84	**0.46**	430	85.91	6.5	8.31E-03	10	8.83E-03	10
X-Well & TCLP	20200	2.6	714	**4.9**	393.3	**80.3**	0.84	0.17	**102**	60.76	6.5	5.90E-03	14	8.61E-03	11
Wst. Conc & TCLP	20200	2.6	714	**4.9**	**1600**	**326.5**	0.84	0.17	430	85.91	6.5	2.16E-03	19	7.47E-03	12
Wst. Vol & TCLP	20200	2.6	**2763.9**	**4.9**	393.3	**80.3**	0.84	0.17	430	85.91	6.5	7.63E-03	11	7.11E-03	13
Y-Well & Infil	20200	2.6	714	1.1	393.3	357.5	0.84	**0.46**	430	**0.00**	6.5	1.17E-02	4	5.56E-03	14
Y-Well & TCLP	20200	2.6	714	**4.9**	393.3	**80.3**	0.84	0.17	430	**0.00**	6.5	9.66E-03	8	5.34E-03	15
Wst. Conc & Area	**162000**	2.6	714	1.1	**1600**	1454.5	0.84	0.17	430	165.01	6.5	3.54E-03	16	4.22E-03	16
Wst. Vol & Area	**162000**	2.6	**2763.9**	1.1	393.3	357.5	0.84	0.17	430	165.01	6.5	3.37E-03	17	4.02E-03	17
Wst. Conc & Z-Well	20200	2.6	714	1.1	**1600**	1454.5	0.84	0.17	430	85.91	**1.3**	2.02E-03	20	3.50E-03	18
Wst. Vo & Z-Well	20200	2.6	**2763.9**	1.1	393.3	357.5	0.84	0.17	430	85.91	**1.3**	1.98E-03	21	3.35E-03	19
X-Well & Area	**162000**	2.6	714	1.1	393.3	357.5	0.84	0.17	**102**	142.35	6.5	1.76E-03	22	2.70E-03	20
Y-Well & Z-Well	20200	2.6	714	1.1	393.3	357.5	0.84	0.17	430	0.00	**1.3**	4.00E-03	15	2.67E-03	21
TCLP & Infil	20200	2.6	714	**4.9**	393.3	80.3	0.84	**0.46**	430	85.91	6.5	2.89E-03	18	2.31E-03	22
Y-Well & Area	**162000**	2.6	714	1.1	393.3	357.5	0.84	0.17	430	**0.00**	6.5	9.45E-04	24	1.26E-03	23
Infil & Area	**162000**	2.6	714	1.1	393.3	357.5	0.84	**0.46**	430	165.01	6.5	8.88E-04	26	1.16E-03	24
Infil & Z-Well	20200	2.6	714	1.1	393.3	357.5	0.84	**0.46**	430	85.91	**1.3**	1.16E-03	23	1.07E-03	25
TCLP & Area	**162000**	2.6	714	**4.9**	393.3	80.3	0.84	0.17	430	165.01	6.5	8.71E-04	27	1.04E-03	26
TCLP & Z-Well	20200	2.6	714	**4.9**	393.3	80.3	0.84	0.17	430	85.91	**1.3**	9.25E-04	25	9.05E-04	27
Area & Z-Well	**162000**	2.6	714	1.1	393.3	357.5	0.84	0.17	430	165.01	**1.3**	3.80E-04	28	5.59E-04	28

Table A-46 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Arsenic -- Municipal Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	60705	2.6	714	1.1	393.3	357.5	0.84	0.17	430	117.75	6.5	1.92E-03		1.64E-03	
Wst. Vol & Wst Conc	60705	2.6	**2763.9**	1.1	**1600**	**1454.5**	0.84	0.17	430	117.75	6.5	7.46E-03	13	2.41E-02	1
Wst. Conc. & X-Well	60705	2.6	714	1.1	**1600**	1454.5	0.84	0.17	**102**	93.79	6.5	1.15E-02	5	2.31E-02	2
Wst. Vol & X-Well	60705	2.6	**2763.9**	1.1	393.3	357.5	0.84	0.17	**102**	93.79	6.5	1.12E-02	6	2.20E-02	3
Wst. Conc. & Y- Well	60705	2.6	714	1.1	**1600**	1454.5	0.84	0.17	430	**0.00**	6.5	2.11E-02	1	1.07E-02	4
Wst. Vol & Y- Well	60705	2.6	**2763.9**	1.1	393.3	357.5	0.84	0.17	430	**0.00**	6.5	2.06E-02	2	1.02E-02	5
X-Well & Infil	60705	2.6	714	1.1	393.3	357.5	0.84	**0.46**	**102**	93.79	6.5	1.11E-02	7	7.63E-03	6
Wst. Conc & Infil	60705	2.6	714	1.1	**1600**	1454.5	0.84	**0.46**	430	117.75	6.5	8.58E-03	9	7.52E-03	7
Wst. Vol & Infil	60705	2.6	**2763.9**	1.1	393.3	357.5	0.84	**0.46**	430	117.75	6.5	8.31E-03	10	7.16E-03	8
Wst. Conc & TCLP	60705	2.6	714	**4.9**	**1600**	**326.5**	0.84	0.17	430	117.75	6.5	2.16E-03	19	6.65E-03	9
Wst. Vol & TCLP	60705	2.6	**2763.9**	**4.9**	393.3	**80.3**	0.84	0.17	430	117.75	6.5	7.63E-03	11	6.34E-03	10
X-Well & Y- Well	60705	2.6	714	1.1	393.3	357.5	0.84	0.17	**102**	**0.00**	6.5	1.58E-02	3	6.14E-03	11
X-Well & TCLP	60705	2.6	714	**4.9**	393.3	**80.3**	0.84	0.17	**102**	93.79	6.5	5.90E-03	14	5.73E-03	12
X-Well & Z-Well	60705	2.6	714	1.1	393.3	357.5	0.84	0.17	**102**	93.79	**1.3**	7.58E-03	12	5.48E-03	13
Wst. Conc & Z-Well	60705	2.6	714	1.1	**1600**	1454.5	0.84	0.17	430	117.75	**1.3**	2.02E-03	20	3.36E-03	14
Wst. Vo & Z-Well	60705	2.6	**2763.9**	1.1	393.3	357.5	0.84	0.17	430	117.75	**1.3**	1.98E-03	21	3.20E-03	15
Y-Well & TCLP	60705	2.6	714	**4.9**	393.3	**80.3**	0.84	0.17	430	**0.00**	6.5	9.66E-03	8	2.64E-03	16
Y-Well & Infil	60705	2.6	714	1.1	393.3	357.5	0.84	**0.46**	430	**0.00**	6.5	1.17E-02	4	2.53E-03	17
Wst. Conc & Area	**420888**	2.6	714	1.1	**1600**	1454.5	0.84	0.17	430	238.82	6.5	3.54E-03	16	2.29E-03	18
Wst. Vol & Area	**420888**	2.6	**2763.9**	1.1	393.3	357.5	0.84	0.17	430	238.82	6.5	3.37E-03	17	2.18E-03	19
TCLP & Infil	60705	2.6	714	**4.9**	393.3	80.3	0.84	**0.46**	430	117.75	6.5	2.89E-03	18	1.85E-03	20
Y-Well & Z-Well	60705	2.6	714	1.1	393.3	357.5	0.84	0.17	430	0.00	**1.3**	4.00E-03	15	1.33E-03	21
X-Well & Area	**420888**	2.6	714	1.1	393.3	357.5	0.84	0.17	**102**	217.62	6.5	1.76E-03	22	1.03E-03	22
Infil & Z-Well	60705	2.6	714	1.1	393.3	357.5	0.84	**0.46**	430	117.75	**1.3**	1.16E-03	23	9.18E-04	23
TCLP & Z-Well	60705	2.6	714	**4.9**	393.3	80.3	0.84	0.17	430	117.75	**1.3**	9.25E-04	25	8.31E-04	24
Y-Well & Area	**420888**	2.6	714	1.1	393.3	357.5	0.84	0.17	430	**0.00**	6.5	9.45E-04	24	5.76E-04	25
TCLP & Area	**420888**	2.6	714	**4.9**	393.3	80.3	0.84	0.17	430	238.82	6.5	8.71E-04	27	5.63E-04	26
Infil & Area	**420888**	2.6	714	1.1	393.3	357.5	0.84	**0.46**	430	238.82	6.5	8.88E-04	26	5.24E-04	27
Area & Z-Well	**420888**	2.6	714	1.1	393.3	357.5	0.84	0.17	430	238.82	**1.3**	3.80E-04	28	3.49E-04	28

Table A.47 Off-Spec Products and Fines Off-site Landfill/Benz(a)anthracene --Industrial Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.15	2159.52	0.013	12	923.08	1.26	0.17	430	85.91	6.5	4.16E-06		1.31E-05	
Wst. Vol & X-Well	20200	2.15	**15690.5**	0.013	12	923.08	1.26	0.17	**102**	60.76	6.5	1.04E-04	7	7.02E-04	1
X-Well & Infil	20200	2.15	2159.52	0.013	12	923.08	1.26	**0.46**	**102**	60.76	6.5	3.19E-04	2	6.63E-04	2
Wst. Vol & Infil	20200	2.15	**15690.5**	0.013	12	923.08	1.26	**0.46**	430	85.91	6.5	2.00E-04	4	5.43E-04	3
Wst. Conc. & X-Well	20200	2.15	2159.52	0.013	**28**	**2153.85**	1.26	0.17	**102**	60.76	6.5	9.68E-05	8	4.89E-04	4
X-Well & Z-Well	20200	2.15	2159.52	0.013	12	923.08	1.26	0.17	**102**	60.76	**1.3**	1.60E-04	5	4.17E-04	5
X-Well & Y- Well	20200	2.15	2159.52	0.013	12	923.08	1.26	0.17	**102**	**0.00**	6.5	2.85E-04	3	4.09E-04	6
Y-Well & Infil	20200	2.15	2159.52	0.013	12	923.08	1.26	**0.46**	430	**0.00**	6.5	3.85E-04	1	2.30E-04	7
Wst. Conc & Infil	20200	2.15	2159.52	0.013	**28**	**2153.85**	1.26	**0.46**	430	85.91	6.5	1.49E-04	6	2.15E-04	8
X-Well & Area	**162000**	2.15	2159.52	0.013	12	923.08	1.26	0.17	**102**	142.35	6.5	6.13E-05	9	9.27E-05	9
Wst. Vol & Y- Well	20200	2.15	**15690.5**	0.013	12	923.08	1.26	0.17	430	0.00	6.5	3.17E-05	13	7.77E-05	10
Wst. Conc. & Y- Well	20200	2.15	2159.52	0.013	**28**	**2153.85**	1.26	0.17	430	0.00	6.5	3.03E-05	14	6.07E-05	11
Wst. Vol & Area	**162000**	2.15	**15690.5**	0.013	12	923.08	1.26	0.17	430	165.01	6.5	5.13E-05	10	5.79E-05	12
Infil & Area	**162000**	2.15	2159.52	0.013	12	923.08	1.26	**0.46**	430	165.01	6.5	3.71E-05	12	4.84E-05	13
Infil & Z-Well	20200	2.15	2159.52	0.013	12	923.08	1.26	**0.46**	430	85.91	**1.3**	3.84E-05	11	4.45E-05	14
Y-Well & Z-Well	20200	2.15	2159.52	0.013	12	923.08	1.26	0.17	430	**0.00**	**1.3**	1.94E-05	16	3.02E-05	15
Wst. Vol & Wst Conc	20200	2.15	**15690.5**	0.013	**28**	**2153.85**	1.26	0.17	430	85.91	6.5	4.73E-06	19	2.60E-05	16
Wst. Conc & Area	**162000**	2.15	2159.52	0.013	**28**	**2153.85**	1.26	0.17	430	165.01	6.5	2.06E-05	15	2.50E-05	17
Wst. Vo & Z-Well	20200	2.15	**15690.5**	0.013	12	923.08	1.26	0.17	430	85.91	**1.3**	3.07E-06	20	1.80E-05	18
Wst. Conc & Z-Well	20200	2.15	2159.52	0.013	**28**	**2153.85**	1.26	0.17	430	85.91	**1.3**	2.93E-06	21	1.38E-05	19
Y-Well & Area	**162000**	2.15	2159.52	0.013	12	923.08	1.26	0.17	430	**0.00**	6.5	9.87E-06	17	1.35E-05	20
Area & Z-Well	**162000**	2.15	2159.52	0.013	12	923.08	1.26	0.17	430	165.01	**1.3**	6.16E-06	18	8.90E-06	21

Table A.48 Off-Spec Products and Fines Off-site Landfill/Benz(a)anthracene -- Municipal Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	60705	2.15	2159.52	0.013	12	923.08	1.26	0.17	430	117.75	6.5	4.16E-06		1.42E-05	
Wst. Vol & X-Well	60705	2.15	**15690.5**	0.013	12	923.08	1.26	0.17	**102**	93.79	6.5	1.04E-04	7	8.56E-04	1
Wst. Vol & Infil	60705	2.15	**15690.5**	0.013	12	923.08	1.26	**0.46**	430	117.75	6.5	2.00E-04	4	5.09E-04	2
Wst. Conc. & X-Well	60705	2.15	2159.52	0.013	**28**	**2153.85**	1.26	0.17	**102**	93.79	6.5	9.68E-05	8	4.23E-04	3
X-Well & Infil	60705	2.15	2159.52	0.013	12	923.08	1.26	**0.46**	**102**	93.79	6.5	3.19E-04	2	3.15E-04	4
X-Well & Z-Well	60705	2.15	2159.52	0.013	12	923.08	1.26	0.17	**102**	93.79	**1.3**	1.60E-04	5	2.26E-04	5
X-Well & Y- Well	60705	2.15	2159.52	0.013	12	923.08	1.26	0.17	**102**	**0.00**	6.5	2.85E-04	3	2.18E-04	6
Wst. Conc & Infil	60705	2.15	2159.52	0.013	**28**	**2153.85**	1.26	**0.46**	430	117.75	6.5	1.49E-04	6	1.70E-04	7
Y-Well & Infil	60705	2.15	2159.52	0.013	12	923.08	1.26	**0.46**	430	**0.00**	6.5	3.85E-04	1	1.06E-04	8
Wst. Vol & Y- Well	60705	2.15	**15690.5**	0.013	12	923.08	1.26	0.17	430	0.00	6.5	3.17E-05	13	7.71E-05	9
Wst. Vol & Wst Conc	60705	2.15	**15690.5**	0.013	**28**	**2153.85**	1.26	0.17	430	117.75	6.5	4.73E-06	19	5.52E-05	10
Wst. Vol & Area	**420888**	2.15	**15690.5**	0.013	12	923.08	1.26	0.17	430	238.82	6.5	5.13E-05	10	5.19E-05	11
Wst. Conc. & Y- Well	60705	2.15	2159.52	0.013	**28**	**2153.85**	1.26	0.17	430	0.00	6.5	3.03E-05	14	4.52E-05	12
Infil & Z-Well	60705	2.15	2159.52	0.013	12	923.08	1.26	**0.46**	430	117.75	**1.3**	3.84E-05	11	3.62E-05	13
X-Well & Area	**420888**	2.15	2159.52	0.013	12	923.08	1.26	0.17	**102**	217.62	6.5	6.13E-05	9	3.56E-05	14
Wst. Vo & Z-Well	60705	2.15	**15690.5**	0.013	12	923.08	1.26	0.17	430	117.75	**1.3**	3.07E-06	20	3.45E-05	15
Infil & Area	**420888**	2.15	2159.52	0.013	12	923.08	1.26	**0.46**	430	238.82	6.5	3.71E-05	12	2.17E-05	16
Wst. Conc & Z-Well	60705	2.15	2159.52	0.013	**28**	**2153.85**	1.26	0.17	430	117.75	**1.3**	2.93E-06	21	1.95E-05	17
Wst. Conc & Area	**420888**	2.15	2159.52	0.013	**28**	**2153.85**	1.26	0.17	430	238.82	6.5	2.06E-05	15	1.86E-05	18
Y-Well & Z-Well	60705	2.15	2159.52	0.013	12	923.08	1.26	0.17	430	**0.00**	**1.3**	1.94E-05	16	1.76E-05	19
Y-Well & Area	**420888**	2.15	2159.52	0.013	12	923.08	1.26	0.17	430	**0.00**	6.5	9.87E-06	17	8.35E-06	20
Area & Z-Well	**420888**	2.15	2159.52	0.013	12	923.08	1.26	0.17	430	238.82	**1.3**	6.16E-06	18	6.74E-06	21

Table A.49 Sensitivity Analysis with TCLP set to High-End Value, Off-Spec Products and Fines Off-site Landfill/Benz(a)anthracene -- Industrial Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Quant.	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
													9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.15	2160	2159.52	0.013	12	923.08	1.26	0.17	430	85.91	6.5	4.16E-06		1.31E-05	
X-well	20200	2.15	1814	2159.52	0.013	12	923.08	1.26	0.17	**102**	60.76	6.5	8.46E-05	7	2.91E-04	1
Infiltration	20200	2.15	1814	2159.52	0.013	12	923.08	1.26	**0.46**	430	85.91	6.5	9.29E-05	1	9.56E-05	2
Y-well	20200	2.15	1814	2159.52	0.013	12	923.08	1.26	0.17	430	**0.00**	6.5	2.80E-05	3	4.18E-05	3
Wste Volume	20200	2.15	**13180**	**15690.5**	0.013	12	923.08	1.26	0.17	430	85.91	6.5	4.68E-06	5	2.41E-05	4
Waste Concentration	20200	2.15	1814	2159.52	0.013	**28**	**2153.85**	1.26	0.17	430	85.91	6.5	4.48E-06	2	1.89E-05	5
Area	**162000**	2.15	15690	2159.52	0.013	12	923.08	1.26	0.17	430	165.01	6.5	9.38E-06	4	1.17E-05	6
Z-well	20200	2.15	1814	2159.52	0.013	12	923.08	1.26	0.17	430	85.91	**1.3**	2.70E-06	6	9.34E-06	7

Table A.50 Sensitivity Analysis with TCLP set to High-End Value, Off-Spec Products and Fines Off-site Landfill/Benz(a)anthracene -- Municipal Areas, 30 Year Acti

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Quant.	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
													9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.15	1814	2159.52	0.013	12	923.08	1.26	0.17	430	117.75	6.5	4.16E-06		1.42E-05	
X-well	60705	2.15	1814	2159.52	0.013	12	923.08	1.26	0.17	**102**	93.79	6.5	8.46E-05	2	2.03E-04	1
Infiltration	60705	2.15	1814	2159.52	0.013	12	923.08	1.26	**0.46**	430	117.75	6.5	9.29E-05	1	7.32E-05	2
Wste Volume	60705	2.15	**13180**	**15690.5**	0.013	12	923.08	1.26	0.17	430	117.75	6.5	4.68E-06	5	4.52E-05	3
Waste Concentration	60705	2.15	1814	2159.52	0.013	**28**	**2153.85**	1.26	0.17	430	117.75	6.5	4.48E-06	6	2.64E-05	4
Y-well	60705	2.15	1814	2159.52	0.013	12	923.08	1.26	0.17	430	**0.00**	6.5	2.80E-05	3	2.43E-05	5
Z-well	60705	2.15	1814	2159.52	0.013	12	923.08	1.26	0.17	430	117.75	**1.3**	2.70E-06	7	1.03E-05	6
Area	**420888**	2.15	15690	2159.52	0.013	12	923.08	1.26	0.17	430	238.82	6.5	9.38E-06	4	8.22E-06	7

Table A.51 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/ Benzene -- Industrial Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	2214	1.49	43.73	29.35	1.2	0.17	430	85.91	6.5	3.93E-03		5.07E-02	
Infil & Xwell	20200	2.6	2214	1.49	43.73	29.35	1.2	**0.46**	**102**	60.76	6.5	7.33E-02	7	3.93E-01	1
TCLP & xwell	20200	2.6	2214	**4.2**	43.73	10.41	1.2	0.17	**102**	60.76	6.5	6.40E-02	10	3.37E-01	2
Ywell & Xwell	20200	2.6	2214	1.49	43.73	29.35	1.2	0.17	**102**	**0.00**	6.5	7.69E-02	6	2.61E-01	3
Ywell & TCLP	20200	2.6	2214	**4.2**	43.73	**10.41**	1.2	0.17	430	**0.00**	6.5	1.23E-01	3	2.55E-01	4
Xwell & Wst. Conc	20200	2.6	2214	1.49	**100**	**67.11**	1.2	0.17	**102**	60.76	6.5	2.53E-02	21	2.35E-01	5
Area & Wst. Vol	**162000**	2.6	**12500**	1.49	43.73	29.349	1.2	0.17	430	165.01	6.5	2.26E-01	1	2.30E-01	6
Ywell & Infil	20200	2.6	2214	1.49	43.73	29.35	1.2	**0.46**	430	**0.00**	6.5	1.15E-01	4	2.23E-01	7
Xwell & Wst Vol	20200	2.6	**12500**	1.49	43.73	29.349	1.2	0.17	**102**	60.76	6.5	2.49E-02	22	2.20E-01	8
Xwell & Zwell	20200	2.6	2214	1.49	43.73	29.35	1.2	0.17	**102**	60.76	**1.3**	3.65E-02	15	2.18E-01	9
Ywell & Wst. Vol	20200	2.6	**12500**	1.49	43.73	29.349	1.2	0.17	430	**0.00**	6.5	4.98E-02	14	1.97E-01	10
Ywell & Wst Conc	20200	2.6	2214	1.49	**100**	**67.11**	1.2	0.17	430	**0.00**	6.5	5.09E-02	13	1.78E-01	11
TCLP & Wst. Vol	20200	2.6	**12500**	**4.2**	43.73	10.412	1.2	0.17	430	85.91	6.5	3.20E-02	16	1.70E-01	12
Area & Xwell	**162000**	2.6	2214	1.49	43.73	29.35	1.2	0.17	**102**	142.35	6.5	1.15E-01	5	1.68E-01	13
Infil & Wst. Vol	20200	2.6	**12500**	1.49	43.73	29.349	1.2	**0.46**	430	85.91	6.5	3.11E-02	18	1.66E-01	14
Area & Wst. Conc	**162000**	2.6	2214	1.49	**100**	**67.11**	1.2	0.17	430	165.01	6.5	1.25E-01	2	1.38E-01	15
Infil & TCLP	20200	2.6	2214	**4.2**	43.73	**10.41**	1.2	**0.46**	430	85.91	6.5	6.45E-02	9	1.34E-01	16
Infil & Wst. Conc	20200	2.6	2214	1.49	**100**	**67.11**	1.2	**0.46**	430	85.91	6.5	3.08E-02	19	1.34E-01	17
TCLP & Wst Conc	20200	2.6	2214	**4.2**	**100**	**23.81**	1.2	0.17	430	85.91	6.5	3.12E-02	17	1.32E-01	18
Area & Ywell	**162000**	2.6	2214	1.49	43.73	29.35	1.2	0.17	430	**0.00**	6.5	6.66E-02	8	8.77E-02	19
Area & TCLP	**162000**	2.6	2214	**4.2**	43.73	**10.41**	1.2	0.17	430	165.01	6.5	6.35E-02	11	7.69E-02	20
Area & Infil	**162000**	2.6	2214	1.49	43.73	29.35	1.2	**0.46**	430	165.01	6.5	5.46E-02	12	7.47E-02	21
Wst. Vol & Wst. Conc	20200	2.6	**12500**	1.49	**100**	**67.11**	1.2	0.17	430	85.91	6.5	1.15E-02	26	7.31E-02	22
Ywell & Zwell	20200	2.6	2214	1.49	43.73	29.35	1.2	0.17	430	**0.00**	**1.3**	2.25E-02	23	7.13E-02	23
TCLP & Zwell	20200	2.6	2214	**4.2**	43.73	10.41	1.2	0.17	430	85.91	**1.3**	1.18E-02	24	4.29E-02	24
Infil & Zwell	20200	2.6	2214	1.49	43.73	29.35	1.2	**0.46**	430	85.91	**1.3**	1.15E-02	25	4.26E-02	25
Area & Zwell	**162000**	2.6	2214	1.49	43.73	29.35	1.2	0.17	430	165.01	**1.3**	2.61E-02	20	3.80E-02	26
Wst. Vol & Zwell	20200	2.6	**12500**	1.49	43.73	29.35	1.2	0.17	430	85.91	**1.3**	4.79E-03	28	3.29E-02	27
Wst Conc & Zwell	20200	2.6	2214	1.49	**100**	**67.11**	1.2	0.17	430	85.91	**1.3**	4.86E-03	27	2.99E-02	28

A.52 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/ Benzene (TCLP = TC Regulatory Level) -- Industrial Areas (30 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	2214	0.5	43.73	87.46	1.2	0.17	430	85.91	6.5	3.93E-03		2.21E-02	
Infil & Xwell	20200	2.6	2214	0.5	43.73	87.46	1.2	**0.46**	**102**	60.76	6.5	1.07E-02	14	1.91E-01	1
Area & Xwell	**162000**	2.6	2214	0.5	43.73	87.46	1.2	0.17	**102**	142.35	6.5	1.19E-01	1	1.23E-01	2
Ywell & Infil	20200	2.6	2214	0.5	43.73	87.46	1.2	**0.46**	430	**0.00**	6.5	1.28E-02	12	1.15E-01	3
Area & Wst. Vol	**162000**	2.6	**125000**	0.5	43.73	87.46	1.2	0.17	430	165.01	6.5	8.37E-02	3	1.11E-01	4
Ywell & Xwell	20200	2.6	2214	0.5	43.73	87.46	1.2	0.17	**102**	**0.00**	6.5	1.73E-02	10	1.10E-01	5
Xwell & Zwell	20200	2.6	2214	0.5	43.73	87.46	1.2	0.17	**102**	60.76	**1.3**	8.61E-03	16	9.18E-02	6
Xwell & Wst Vol	20200	2.6	**125000**	0.5	43.73	87.46	1.2	0.17	**102**	60.76	6.5	1.66E-03	20	8.63E-02	7
Area & Wst. Conc	**162000**	2.6	2214	0.5	**100**	**200.00**	1.2	0.17	430	165.01	6.5	5.09E-02	5	8.37E-02	8
Xwell & Wst. Conc	20200	2.6	2214	0.5	**100**	**200.00**	1.2	0.17	**102**	60.76	6.5	8.64E-03	15	8.18E-02	9
Ywell & Wst. Vol	20200	2.6	**125000**	0.5	43.73	87.46	1.2	0.17	430	**0.00**	6.5	1.72E-02	11	7.24E-02	10
Ywell & Wst Conc	20200	2.6	2214	0.5	**100**	**200.00**	1.2	0.17	430	**0.00**	6.5	4.25E-02	6	6.84E-02	11
Area & Ywell	**162000**	2.6	2214	0.5	43.73	87.46	1.2	0.17	430	**0.00**	6.5	9.35E-02	2	6.72E-02	12
Area & Infil	**162000**	2.6	2214	0.5	43.73	87.46	1.2	**0.46**	430	165.01	6.5	7.59E-03	17	6.61E-02	13
Infil & Wst. Vol	20200	2.6	**125000**	0.5	43.73	87.46	1.2	**0.46**	430	85.91	6.5	1.07E-02	13	6.32E-02	14
Infil & Wst. Conc	20200	2.6	2214	0.5	**100**	**200.00**	1.2	**0.46**	430	85.91	6.5	2.15E-02	9	5.78E-02	15
Ywell & Zwell	20200	2.6	2214	0.5	43.73	87.46	1.2	0.17	430	**0.00**	**1.3**	2.70E-02	7	3.09E-02	16
Area & Zwell	**162000**	2.6	2214	0.5	43.73	87.46	1.2	0.17	430	165.01	**1.3**	5.56E-02	4	2.89E-02	17
Wst. Vol & Wst. Conc	20200	2.6	**125000**	0.5	**100**	**200.00**	1.2	0.17	430	85.91	6.5	1.66E-03	21	2.49E-02	18
Infil & Zwell	20200	2.6	2214	0.5	43.73	87.46	1.2	**0.46**	430	85.91	**1.3**	2.66E-02	8	2.18E-02	19
Wst. Vol & Zwell	20200	2.6	**125000**	0.5	43.73	87.46	1.2	0.17	430	85.91	**1.3**	4.26E-03	18	1.21E-02	20
Wst Conc & Zwell	20200	2.6	2214	0.5	**100**	**200.00**	1.2	0.17	430	85.91	**1.3**	4.25E-03	19	1.14E-02	21

Table A.53 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/ Benzene -- Municipal Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	2214	1.49	43.73	29.35	1.2	0.17	430	117.75	6.5	3.93E-03		7.63E-02	
Xwell & Wst Vol	60705	2.6	**12500**	1.49	43.73	29.349	1.2	0.17	**102**	93.79	6.5	2.49E-02	22	4.59E-01	1
Xwell & Wst. Conc	60705	2.6	2214	1.49	**100**	**67.11**	1.2	0.17	**102**	93.79	6.5	2.53E-02	21	3.59E-01	2
TCLP & xwell	60705	2.6	2214	**4.2**	43.73	10.41	1.2	0.17	**102**	93.79	6.5	6.40E-02	10	3.29E-01	3
TCLP & Wst. Vol	60705	2.6	**12500**	**4.2**	43.73	10.412	1.2	0.17	430	117.75	6.5	3.20E-02	16	3.10E-01	4
Infil & Xwell	60705	2.6	2214	1.49	43.73	29.35	1.2	**0.46**	**102**	93.79	6.5	7.33E-02	7	3.00E-01	5
Infil & Wst. Vol	60705	2.6	**12500**	1.49	43.73	29.349	1.2	**0.46**	430	117.75	6.5	3.11E-02	18	2.97E-01	6
Ywell & Wst. Vol	60705	2.6	**12500**	1.49	43.73	29.349	1.2	0.17	430	**0.00**	6.5	4.98E-02	14	2.74E-01	7
Ywell & Xwell	60705	2.6	2214	1.49	43.73	29.35	1.2	0.17	**102**	**0.00**	6.5	7.69E-02	6	2.66E-01	8
Xwell & Zwell	60705	2.6	2214	1.49	43.73	29.35	1.2	0.17	**102**	93.79	**1.3**	3.65E-02	15	2.26E-01	9
Ywell & Wst Conc	60705	2.6	2214	1.49	**100**	**67.11**	1.2	0.17	430	**0.00**	6.5	5.09E-02	13	2.08E-01	10
Area & Wst. Vol	**420888**	2.6	**12500**	1.49	43.73	29.349	1.2	0.17	430	238.82	6.5	2.26E-01	1	1.92E-01	11
Infil & Wst. Conc	60705	2.6	2214	1.49	**100**	**67.11**	1.2	**0.46**	430	117.75	6.5	3.08E-02	19	1.92E-01	12
TCLP & Wst Conc	60705	2.6	2214	**4.2**	**100**	**23.81**	1.2	0.17	430	117.75	6.5	3.12E-02	17	1.88E-01	13
Ywell & TCLP	60705	2.6	2214	**4.2**	43.73	**10.41**	1.2	0.17	430	**0.00**	6.5	1.23E-01	3	1.76E-01	14
Wst. Vol & Wst. Conc	60705	2.6	**12500**	1.49	**100**	**67.11**	1.2	0.17	430	117.75	6.5	1.15E-02	26	1.75E-01	15
Ywell & Infil	60705	2.6	2214	1.49	43.73	29.35	1.2	**0.46**	430	**0.00**	6.5	1.15E-01	4	1.49E-01	16
Infil & TCLP	60705	2.6	2214	**4.2**	43.73	**10.41**	1.2	**0.46**	430	117.75	6.5	6.45E-02	9	1.17E-01	17
Area & Wst. Conc	**420888**	2.6	2214	1.49	**100**	**67.11**	1.2	0.17	430	238.82	6.5	1.25E-01	2	9.20E-02	18
Wst. Vol & Zwell	60705	2.6	**12500**	1.49	43.73	29.35	1.2	0.17	430	117.75	**1.3**	4.79E-03	28	7.59E-02	19
Area & Xwell	**420888**	2.6	2214	1.49	43.73	29.35	1.2	0.17	**102**	217.62	6.5	1.15E-01	5	7.48E-02	20
Ywell & Zwell	60705	2.6	2214	1.49	43.73	29.35	1.2	0.17	430	**0.00**	**1.3**	2.25E-02	23	6.73E-02	21
Wst Conc & Zwell	60705	2.6	2214	1.49	**100**	**67.11**	1.2	0.17	430	117.75	**1.3**	4.86E-03	27	5.78E-02	22
Infil & Zwell	60705	2.6	2214	1.49	43.73	29.35	1.2	**0.46**	430	117.75	**1.3**	1.15E-02	25	5.04E-02	23
TCLP & Zwell	60705	2.6	2214	**4.2**	43.73	10.41	1.2	0.17	430	117.75	**1.3**	1.18E-02	24	4.93E-02	24
Area & Ywell	**420888**	2.6	2214	1.49	43.73	29.35	1.2	0.17	430	**0.00**	6.5	6.66E-02	8	4.36E-02	25
Area & TCLP	**420888**	2.6	2214	**4.2**	43.73	**10.41**	1.2	0.17	430	238.82	6.5	6.35E-02	11	4.25E-02	26
Area & Infil	**420888**	2.6	2214	1.49	43.73	29.35	1.2	**0.46**	430	238.82	6.5	5.46E-02	12	3.39E-02	27
Area & Zwell	**420888**	2.6	2214	1.49	43.73	29.35	1.2	0.17	430	238.82	6.5	2.61E-02	20	2.57E-02	28

Table A.54 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/ Benzene (TCLP = TC Regulatory Level) -- Municipal Areas (30 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	2214	0.5	43.73	87.46	1.2	0.17	430	117.75	6.5	3.93E-03		4.33E-02	
Infil & Xwell	60705	2.6	2214	0.5	43.73	87.46	1.2	**0.46**	**102**	93.79	6.5	1.07E-02	14	1.99E-01	1
Xwell & Wst. Conc	60705	2.6	2214	0.5	**100**	**200.00**	1.2	0.17	**102**	93.79	6.5	8.64E-03	15	1.79E-01	2
Xwell & Wst Vol	60705	2.6	**125000**	0.5	43.73	87.46	1.2	0.17	**102**	93.79	6.5	1.66E-03	20	1.61E-01	3
Ywell & Xwell	60705	2.6	2214	0.5	43.73	87.46	1.2	0.17	**102**	**0.00**	6.5	1.73E-02	10	1.44E-01	4
Infil & Wst. Vol	60705	2.6	**125000**	0.5	43.73	87.46	1.2	**0.46**	430	117.75	6.5	1.07E-02	13	1.34E-01	5
Xwell & Zwell	60705	2.6	2214	0.5	43.73	87.46	1.2	0.17	**102**	93.79	**1.3**	8.61E-03	16	1.29E-01	6
Area & Wst. Vol	**420888**	2.6	**125000**	0.5	43.73	87.46	1.2	0.17	430	238.82	6.5	8.37E-02	3	1.21E-01	7
Ywell & Wst. Vol	60705	2.6	**125000**	0.5	43.73	87.46	1.2	0.17	430	**0.00**	6.5	1.72E-02	11	1.09E-01	8
Infil & Wst. Conc	60705	2.6	2214	0.5	**100**	**200.00**	1.2	**0.46**	430	117.75	6.5	2.15E-02	9	1.07E-01	9
Ywell & Infil	60705	2.6	2214	0.5	43.73	87.46	1.2	**0.46**	430	**0.00**	6.5	1.28E-02	12	1.05E-01	10
Ywell & Wst Conc	60705	2.6	2214	0.5	**100**	**200.00**	1.2	0.17	430	**0.00**	6.5	4.25E-02	6	9.63E-02	11
Area & Wst. Conc	**420888**	2.6	2214	0.5	**100**	**200.00**	1.2	0.17	430	238.82	6.5	5.09E-02	5	7.35E-02	12
Area & Xwell	**420888**	2.6	2214	0.5	43.73	87.46	1.2	0.17	**102**	217.62	6.5	1.19E-01	1	6.86E-02	13
Wst. Vol & Wst. Conc	60705	2.6	**125000**	0.5	**100**	**200.00**	1.2	0.17	430	117.75	6.5	1.66E-03	21	6.57E-02	14
Area & Ywell	**420888**	2.6	2214	0.5	43.73	87.46	1.2	0.17	430	**0.00**	6.5	9.35E-02	2	4.05E-02	15
Ywell & Zwell	60705	2.6	2214	0.5	43.73	87.46	1.2	0.17	430	**0.00**	**1.3**	2.70E-02	7	3.81E-02	16
Infil & Zwell	60705	2.6	2214	0.5	43.73	87.46	1.2	**0.46**	430	117.75	**1.3**	2.66E-02	8	3.53E-02	17
Wst. Vol & Zwell	60705	2.6	**125000**	0.5	43.73	87.46	1.2	0.17	430	117.75	**1.3**	4.26E-03	18	3.00E-02	18
Wst Conc & Zwell	60705	2.6	2214	0.5	**100**	**200.00**	1.2	0.17	430	117.75	**1.3**	4.25E-03	19	2.67E-02	19
Area & Zwell	**420888**	2.6	2214	0.5	43.73	87.46	1.2	0.17	430	238.82	**1.3**	5.56E-02	4	2.38E-02	20
Area & Infil	**420888**	2.6	2214	0.5	43.73	87.46	1.2	**0.46**	430	238.82	6.5	7.59E-03	17	1.87E-02	21

Table A.55 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/Arsenic -- Industrial Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	2214	13.71	493.3	35.98	1.2	0.17	430	85.91	6.5	1.17E-02		1.02E-02	
Xwell & Wst Vol	20200	2.6	**12500**	13.71	493.3	35.981	1.2	0.17	**102**	60.76	6.5	1.14E-01	2	2.61E-01	1
Ywell & Wst. Vol	20200	2.6	**12500**	13.71	493.3	35.981	1.2	0.17	430	**0.00**	6.5	2.04E-01	1	1.64E-01	2
Infil & Xwell	20200	2.6	2214	13.71	493.3	35.98	1.2	**0.46**	**102**	60.76	6.5	6.62E-02	7	9.08E-02	3
Wst. Vol & Wst. Conc	20200	2.6	**12500**	13.71	**730**	**53.25**	1.2	0.17	430	85.91	6.5	5.72E-02	9	8.21E-02	4
Infil & Wst. Vol	20200	2.6	**12500**	13.71	493.3	35.981	1.2	**0.46**	430	85.91	6.5	7.63E-02	4	7.20E-02	5
Xwell & Wst. Conc	20200	2.6	2214	13.71	**730**	**53.25**	1.2	0.17	**102**	60.76	6.5	4.47E-02	12	7.06E-02	6
Ywell & Xwell	20200	2.6	2214	13.71	493.3	35.98	1.2	0.17	**102**	**0.00**	6.5	9.95E-02	3	6.77E-02	7
Xwell & Zwell	20200	2.6	2214	13.71	493.3	35.98	1.2	0.17	**102**	60.76	**1.3**	4.80E-02	11	5.88E-02	8
TCLP & Wst. Vol	20200	2.6	**12500**	**34**	493.3	14.509	1.2	0.17	430	85.91	6.5	6.00E-02	8	5.76E-02	9
TCLP & xwell	20200	2.6	2214	**34**	493.3	14.51	1.2	0.17	**102**	60.76	6.5	3.29E-02	13	4.79E-02	10
Ywell & Wst Conc	20200	2.6	2214	13.71	**730**	**53.25**	1.2	0.17	430	**0.00**	6.5	7.49E-02	5	4.38E-02	11
Area & Wst. Vol	**162000**	2.6	**12500**	13.71	493.3	35.981	1.2	0.17	430	165.01	6.5	2.73E-02	14	3.26E-02	12
Ywell & TCLP	20200	2.6	2214	**34**	493.3	**14.51**	1.2	0.17	430	**0.00**	6.5	5.38E-02	10	2.97E-02	13
Wst. Vol & Zwell	20200	2.6	**12500**	13.71	493.3	35.98	1.2	0.17	430	85.91	**1.3**	1.96E-02	17	2.78E-02	14
Infil & Wst. Conc	20200	2.6	2214	13.71	**730**	**53.25**	1.2	**0.46**	430	85.91	6.5	2.34E-02	16	1.90E-02	15
TCLP & Wst Conc	20200	2.6	2214	**34**	**730**	**21.47**	1.2	0.17	430	85.91	6.5	1.76E-02	18	1.51E-02	16
Area & Xwell	**162000**	2.6	2214	13.71	493.3	35.98	1.2	0.17	**102**	142.35	6.5	9.76E-03	20	1.50E-02	17
Ywell & Zwell	20200	2.6	2214	13.71	493.3	35.98	1.2	0.17	430	**0.00**	**1.3**	2.45E-02	15	1.49E-02	18
Ywell & Infil	20200	2.6	2214	13.71	493.3	35.98	1.2	**0.46**	430	**0.00**	6.5	6.71E-02	6	1.32E-02	19
Infil & TCLP	20200	2.6	2214	**34**	493.3	**14.51**	1.2	**0.46**	430	85.91	6.5	1.61E-02	19	1.28E-02	20
Area & Wst. Conc	**162000**	2.6	2214	13.71	**730**	**53.25**	1.2	0.17	430	165.01	6.5	7.16E-03	22	8.54E-03	21
Wst Conc & Zwell	20200	2.6	2214	13.71	**730**	**53.25**	1.2	0.17	430	85.91	**1.3**	7.17E-03	21	7.43E-03	22
Area & Ywell	**162000**	2.6	2214	13.71	493.3	35.98	1.2	0.17	430	**0.00**	6.5	5.25E-03	24	7.01E-03	23
Area & Infil	**162000**	2.6	2214	13.71	493.3	35.98	1.2	**0.46**	430	165.01	6.5	4.95E-03	26	6.44E-03	24
Infil & Zwell	20200	2.6	2214	13.71	493.3	35.98	1.2	**0.46**	430	85.91	**1.3**	6.66E-03	23	5.96E-03	25
Area & TCLP	**162000**	2.6	2214	**34**	493.3	**14.51**	1.2	0.17	430	165.01	6.5	4.84E-03	27	5.77E-03	26
TCLP & Zwell	20200	2.6	2214	**34**	493.3	14.51	1.2	0.17	430	85.91	**1.3**	5.15E-03	25	5.03E-03	27
Area & Zwell	**162000**	2.6	2214	13.71	493.3	35.98	1.2	0.17	430	165.01	**1.3**	2.11E-03	28	3.10E-03	28

Table A.56 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/TC Capped Arsenic -- Industrial Areas (30 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	2214	5	493.3	98.66	1.2	0.17	430	85.91	6.5	1.03E-02		1.02E-02	
Xwell & Wst Vol	20200	2.6	**12500**	5	493.3	98.66	1.2	0.17	**102**	60.76	6.5	6.30E-02	4	2.26E-01	
Ywell & Wst. Vol	20200	2.6	**12500**	5	493.3	98.66	1.2	0.17	430	**0.00**	6.5	1.18E-01	1	1.49E-01	1
Infil & Xwell	20200	2.6	2214	5	493.3	98.66	1.2	**0.46**	**102**	60.76	6.5	5.92E-02	6	9.05E-02	2
Wst. Vol & Wst. Conc	20200	2.6	**12500**	5	**730**	**146.00**	1.2	0.17	430	85.91	6.5	3.05E-02	10	7.03E-02	3
Infil & Wst. Vol	20200	2.6	**12500**	5	493.3	98.66	1.2	**0.46**	430	85.91	6.5	5.28E-02	7	6.99E-02	4
Xwell & Wst. Conc	20200	2.6	2214	5	**730**	**146.00**	1.2	0.17	**102**	60.76	6.5	3.43E-02	9	6.94E-02	5
Ywell & Xwell	20200	2.6	2214	5	493.3	98.66	1.2	0.17	**102**	**0.00**	6.5	8.29E-02	2	6.72E-02	6
Xwell & Zwell	20200	2.6	2214	5	493.3	98.66	1.2	0.17	**102**	60.76	**1.3**	3.98E-02	8	5.83E-02	7
Ywell & Wst Conc	20200	2.6	2214	5	**730**	**146.00**	1.2	0.17	430	**0.00**	6.5	6.04E-02	5	4.34E-02	8
Area & Wst. Vol	**162000**	2.6	**12500**	5	493.3	98.66	1.2	0.17	430	165.01	6.5	2.73E-02	11	3.25E-02	9
Ywell & Infil	20200	2.6	2214	5	493.3	98.66	1.2	**0.46**	430	**0.00**	6.5	6.36E-02	3	3.10E-02	10
Wst. Vol & Zwell	20200	2.6	**12500**	5	493.3	98.66	1.2	0.17	430	85.91	**1.3**	1.14E-02	14	2.52E-02	11
Infil & Wst. Conc	20200	2.6	2214	5	**730**	**146.00**	1.2	**0.46**	430	85.91	6.5	2.14E-02	12	1.89E-02	12
Area & Xwell	**162000**	2.6	2214	5	493.3	98.66	1.2	0.17	**102**	142.35	6.5	9.75E-03	15	1.50E-02	13
Ywell & Zwell	20200	2.6	2214	5	493.3	98.66	1.2	0.17	430	**0.00**	**1.3**	2.13E-02	13	1.48E-02	14
Area & Wst. Conc	**162000**	2.6	2214	5	**730**	**146.00**	1.2	0.17	430	165.01	6.5	7.16E-03	16	8.54E-03	17
Wst Conc & Zwell	20200	2.6	2214	5	**730**	**146.00**	1.2	0.17	430	85.91	**1.3**	5.76E-03	18	7.36E-03	18
Area & Ywell	**162000**	2.6	2214	5	493.3	98.66	1.2	0.17	430	**0.00**	6.5	5.25E-03	19	7.01E-03	19
Area & Infil	**162000**	2.6	2214	5	493.3	98.66	1.2	**0.46**	430	165.01	6.5	4.95E-03	20	6.46E-03	20
Infil & Zwell	20200	2.6	2214	5	493.3	98.66	1.2	**0.46**	430	85.91	**1.3**	6.32E-03	17	5.96E-03	21
Area & Zwell	**162000**	2.6	2214	5	493.3	98.66	1.2	0.17	430	165.01	**1.3**	2.11E-03	21	3.10E-03	22

Table A.57 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/Arsenic -- Municipal Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	60705	2.6	2214	13.71	493.3	35.98	1.2	0.17	430	117.75	6.5	1.17E-02		8.24E-03	
Xwell & Wst Vol	60705	2.6	**12500**	13.71	493.3	35.981	1.2	0.17	**102**	93.79	6.5	1.14E-01	2	1.77E-01	1
Ywell & Wst. Vol	60705	2.6	**12500**	13.71	493.3	35.981	1.2	0.17	430	**0.00**	6.5	2.04E-01	1	8.27E-02	2
Wst. Vol & Wst. Conc	60705	2.6	**12500**	13.71	**730**	**53.25**	1.2	0.17	430	117.75	6.5	5.72E-02	9	6.86E-02	3
Infil & Wst. Vol	60705	2.6	**12500**	13.71	493.3	35.981	1.2	**0.46**	430	117.75	6.5	7.63E-02	4	5.49E-02	4
Xwell & Wst. Conc	60705	2.6	2214	13.71	**730**	**53.25**	1.2	0.17	**102**	93.79	6.5	4.47E-02	12	4.65E-02	5
TCLP & Wst. Vol	60705	2.6	**12500**	**34**	493.3	14.509	1.2	0.17	430	117.75	6.5	6.00E-02	8	4.65E-02	6
Infil & Xwell	60705	2.6	2214	13.71	493.3	35.98	1.2	**0.46**	**102**	217.62	6.5	6.62E-02	7	4.20E-02	7
Ywell & Xwell	60705	2.6	2214	13.71	493.3	35.98	1.2	0.17	**102**	**0.00**	6.5	9.95E-02	3	3.42E-02	8
TCLP & xwell	60705	2.6	2214	**34**	493.3	14.51	1.2	0.17	**102**	93.79	6.5	3.29E-02	13	3.15E-02	9
Xwell & Zwell	60705	2.6	2214	13.71	493.3	35.98	1.2	0.17	**102**	93.79	**1.3**	4.80E-02	11	3.02E-02	10
Wst. Vol & Zwell	60705	2.6	**12500**	13.71	493.3	35.98	1.2	0.17	430	117.75	**1.3**	1.96E-02	17	2.35E-02	11
Ywell & Wst Conc	60705	2.6	2214	13.71	**730**	**53.25**	1.2	0.17	430	**0.00**	6.5	7.49E-02	5	2.17E-02	12
Area & Wst. Vol	**420888**	2.6	**12500**	13.71	493.3	35.981	1.2	0.17	430	238.82	6.5	2.73E-02	14	1.75E-02	13
Ywell & TCLP	60705	2.6	2214	**34**	493.3	**14.51**	1.2	0.17	430	**0.00**	6.5	5.38E-02	10	1.47E-02	14
Infil & Wst. Conc	60705	2.6	2214	13.71	**730**	**53.25**	1.2	**0.46**	430	238.82	6.5	2.34E-02	16	1.44E-02	15
Ywell & Infil	60705	2.6	2214	13.71	493.3	35.98	1.2	**0.46**	430	**0.00**	6.5	6.71E-02	6	1.42E-02	16
TCLP & Wst Conc	60705	2.6	2214	**34**	**730**	**21.47**	1.2	0.17	430	238.82	6.5	1.76E-02	18	1.22E-02	17
Infil & TCLP	60705	2.6	2214	**34**	493.3	**14.51**	1.2	**0.46**	430	117.75	6.5	1.61E-02	19	9.74E-03	18
Ywell & Zwell	60705	2.6	2214	13.71	493.3	35.98	1.2	0.17	430	**0.00**	**1.3**	2.45E-02	15	7.40E-03	19
Wst Conc & Zwell	60705	2.6	2214	13.71	**730**	**53.25**	1.2	0.17	430	117.75	**1.3**	7.17E-03	21	6.19E-03	20
Area & Xwell	**420888**	2.6	2214	13.71	493.3	35.98	1.2	0.17	**102**	217.62	6.5	9.76E-03	20	5.74E-03	21
Infil & Zwell	60705	2.6	2214	13.71	493.3	35.98	1.2	**0.46**	430	238.82	**1.3**	6.66E-03	23	4.82E-03	22
Area & Wst. Conc	**420888**	2.6	2214	13.71	**730**	**53.25**	1.2	0.17	430	238.82	6.5	7.16E-03	22	4.58E-03	23
TCLP & Zwell	60705	2.6	2214	**34**	493.3	14.51	1.2	0.17	430	117.75	**1.3**	5.15E-03	25	4.18E-03	24
Area & Ywell	**420888**	2.6	2214	13.71	493.3	35.98	1.2	0.17	430	**0.00**	6.5	5.25E-03	24	3.21E-03	25
Area & TCLP	**420888**	2.6	2214	**34**	493.3	**14.51**	1.2	0.17	430	238.82	6.5	4.84E-03	27	3.10E-03	26
Area & Infil	**420888**	2.6	2214	13.71	493.3	35.98	1.2	**0.46**	430	238.82	6.5	4.95E-03	26	2.91E-03	27
Area & Zwell	**420888**	2.6	2214	13.71	493.3	35.98	1.2	0.17	430	238.82	6.5	2.11E-03	28	1.92E-03	28

Table A.58 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/TC Capped Arsenic -- Municipal Areas (30 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	2214	5	493.3	98.66	1.2	0.17	430	117.75	6.5	1.03E-02		8.24E-03	
Xwell & Wst Vol	60705	2.6	**12500**	5	493.3	98.66	1.2	0.17	**102**	93.79	6.5	6.30E-02	4	1.73E-01	1
Ywell & Wst. Vol	60705	2.6	**12500**	5	493.3	98.66	1.2	0.17	430	**0.00**	6.5	1.18E-01	1	8.17E-02	2
Wst. Vol & Wst. Conc	60705	2.6	**12500**	5	**730**	**146.00**	1.2	0.17	430	117.75	6.5	3.05E-02	10	6.68E-02	3
Infil & Wst. Vol	60705	2.6	**12500**	5	493.3	98.66	1.2	**0.46**	430	117.75	6.5	5.28E-02	7	5.48E-02	4
Xwell & Wst. Conc	60705	2.6	2214	5	**730**	**146.00**	1.2	0.17	**102**	93.79	6.5	3.43E-02	9	4.64E-02	5
Infil & Xwell	60705	2.6	2214	5	493.3	98.66	1.2	**0.46**	**102**	93.79	6.5	5.92E-02	6	4.20E-02	6
Ywell & Xwell	60705	2.6	2214	5	493.3	98.66	1.2	0.17	**102**	**0.00**	6.5	8.29E-02	2	3.41E-02	7
Xwell & Zwell	60705	2.6	2214	5	493.3	98.66	1.2	0.17	**102**	93.79	**1.3**	3.98E-02	8	3.01E-02	8
Wst. Vol & Zwell	60705	2.6	**12500**	5	493.3	98.66	1.2	0.17	430	117.75	**1.3**	1.14E-02	14	2.32E-02	9
Ywell & Wst Conc	60705	2.6	2214	5	**730**	**146.00**	1.2	0.17	430	**0.00**	6.5	6.04E-02	5	2.17E-02	10
Area & Wst. Vol	**420888**	2.6	**12500**	5	493.3	98.66	1.2	0.17	430	238.82	6.5	2.73E-02	11	1.75E-02	11
Infil & Wst. Conc	60705	2.6	2214	5	**730**	**146.00**	1.2	**0.46**	430	117.75	6.5	2.14E-02	12	1.44E-02	12
Ywell & Infil	60705	2.6	2214	5	493.3	98.66	1.2	**0.46**	430	**0.00**	6.5	6.36E-02	3	1.41E-02	13
Ywell & Zwell	60705	2.6	2214	5	493.3	98.66	1.2	0.17	430	**0.00**	**1.3**	2.13E-02	13	7.40E-03	14
Wst Conc & Zwell	60705	2.6	2214	5	**730**	**146.00**	1.2	0.17	430	117.75	**1.3**	5.76E-03	18	6.18E-03	15
Area & Xwell	**420888**	2.6	2214	5	493.3	98.66	1.2	0.17	**102**	217.62	6.5	9.75E-03	15	5.74E-03	16
Infil & Zwell	60705	2.6	2214	5	493.3	98.66	1.2	**0.46**	430	117.75	**1.3**	6.32E-03	17	4.82E-03	17
Area & Wst. Conc	**420888**	2.6	2214	5	**730**	**146.00**	1.2	0.17	430	238.82	6.5	7.16E-03	16	4.58E-03	18
Area & Ywell	**420888**	2.6	2214	5	493.3	98.66	1.2	0.17	430	**0.00**	6.5	5.25E-03	19	3.21E-03	19
Area & Infil	**420888**	2.6	2214	5	493.3	98.66	1.2	**0.46**	430	238.82	6.5	4.95E-03	20	2.91E-03	20
Area & Zwell	**420888**	2.6	2214	5	493.3	98.66	1.2	0.17	430	238.82	**1.3**	2.11E-03	21	1.92E-03	21

Table A.59 Sensitivity Analysis for Unleaded Gasoline tank sediment Off-site Industrial Landfill Scenario/ Benzene
(30 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1998 9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	85.91	6.5	9.40E-03	
Xwell & Wst Vol	20200	2.6	**1557.85**	0.75	51.9	69.2	1.4	0.17	**102**	60.76	6.5	1.08E-01	1
Ywell & Wst. Vol	20200	2.6	**1557.85**	0.75	51.9	69.2	1.4	0.17	430	**0.00**	6.5	8.75E-02	2
Infil & Wst. Vol	20200	2.6	**1557.85**	0.75	51.9	69.2	1.4	**0.46**	430	85.91	6.5	6.38E-02	3
Area & Wst. Vol	**162000**	2.6	**1557.85**	0.75	51.9	69.2	1.4	0.17	430	165.01	6.5	6.17E-02	4
Xwell & Wst. Conc	20200	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	**102**	60.76	6.5	6.01E-02	5
Infil & Xwell	20200	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	**102**	60.76	6.5	5.58E-02	6
TCLP & Wst. Vol	20200	2.6	**1557.85**	**1.6**	51.9	32.438	1.4	0.17	430	85.91	6.5	5.27E-02	7
Ywell & Xwell	20200	2.6	133.92	0.75	51.9	69.20	1.4	0.17	**102**	**0.00**	6.5	5.23E-02	8
Ywell & Wst Conc	20200	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	430	**0.00**	6.5	4.55E-02	9
Xwell & Zwell	20200	2.6	133.92	0.75	51.9	69.20	1.4	0.17	**102**	60.76	**1.3**	4.42E-02	10
TCLP & xwell	20200	2.6	133.92	**1.6**	51.9	32.44	1.4	0.17	**102**	60.76	6.5	4.18E-02	11
Wst. Vol & Wst. Conc	20200	2.6	**1557.85**	0.75	**110**	**146.67**	1.4	0.17	430	85.91	6.5	3.43E-02	12
Ywell & TCLP	20200	2.6	133.92	**1.6**	51.9	**32.44**	1.4	0.17	430	**0.00**	6.5	3.00E-02	13
Ywell & Infil	20200	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	430	**0.00**	6.5	2.92E-02	14
Infil & Wst. Conc	20200	2.6	133.92	0.75	**110**	**146.67**	1.4	**0.46**	430	85.91	6.5	2.39E-02	16
TCLP & Wst Conc	20200	2.6	133.92	**1.6**	**110**	**68.75**	1.4	0.17	430	85.91	6.5	1.99E-02	17
Area & Xwell	**162000**	2.6	133.92	0.75	51.9	69.20	1.4	0.17	**102**	142.35	6.5	1.53E-02	19
Wst. Vol & Zwell	20200	2.6	**1557.85**	0.75	51.9	69.20	1.4	0.17	430	85.91	**1.3**	1.47E-02	20
Area & Wst. Conc	**162000**	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	430	165.01	6.5	1.35E-02	22
Ywell & Zwell	20200	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	**0.00**	**1.3**	1.34E-02	23
Infil & TCLP	20200	2.6	133.92	**1.6**	51.9	**32.44**	1.4	**0.46**	430	85.91	6.5	1.27E-02	24
Area & Ywell	**162000**	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	**0.00**	6.5	7.82E-03	26
Wst Conc & Zwell	20200	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	430	85.91	**1.3**	7.64E-03	27
Area & TCLP	**162000**	2.6	133.92	**1.6**	51.9	**32.44**	1.4	0.17	430	165.01	6.5	6.49E-03	28
Area & Infil	**162000**	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	430	165.01	6.5	6.33E-03	29
Infil & Zwell	20200	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	430	85.91	**1.3**	5.59E-03	30
TCLP & Zwell	20200	2.6	133.92	**1.6**	51.9	32.44	1.4	0.17	430	85.91	**1.3**	5.05E-03	32
Area & Zwell	**162000**	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	165.01	6.5	3.41E-03	35

Table A.60 Sensitivity Analysis for Unleaded Gasoline tank sediment Off-site Industrial Landfill Scenario/TC Capped Benzene (30 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1998 9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	133.92	0.5	51.9	103.80	1.4	0.17	430	85.91	6.5	8.46E-03	
Xwell & Wst Vol	20200	2.6	**1557.85**	0.5	51.9	103.8	1.4	0.17	**102**	60.76	6.5	7.71E-02	1
Ywell & Wst. Vol	20200	2.6	**1557.85**	0.5	51.9	103.8	1.4	0.17	430	**0.00**	6.5	6.28E-02	2
Area & Wst. Vol	**162000**	2.6	**1557.85**	0.5	51.9	103.8	1.4	0.17	430	165.01	6.5	5.41E-02	3
Infil & Xwell	20200	2.6	133.92	0.5	51.9	103.80	1.4	**0.46**	**102**	60.76	6.5	5.33E-02	4
Xwell & Wst. Conc	20200	2.6	133.92	0.5	**110**	**220.00**	1.4	0.17	**102**	60.76	6.5	4.90E-02	5
Infil & Wst. Vol	20200	2.6	**1557.85**	0.5	51.9	103.8	1.4	**0.46**	430	85.91	6.5	4.85E-02	6
Ywell & Xwell	20200	2.6	133.92	0.5	51.9	103.80	1.4	0.17	**102**	**0.00**	6.5	4.63E-02	7
Xwell & Zwell	20200	2.6	133.92	0.5	51.9	103.80	1.4	0.17	**102**	60.76	**1.3**	3.90E-02	8
Ywell & Wst Conc	20200	2.6	133.92	0.5	**110**	**220.00**	1.4	0.17	430	**0.00**	6.5	3.78E-02	9
Ywell & Infil	20200	2.6	133.92	0.5	51.9	103.80	1.4	**0.46**	430	**0.00**	6.5	2.84E-02	10
Wst. Vol & Wst. Conc	20200	2.6	**1557.85**	0.5	**110**	**220.00**	1.4	0.17	430	85.91	6.5	2.38E-02	11
Infil & Wst. Conc	20200	2.6	133.92	0.5	**110**	**220.00**	1.4	**0.46**	430	85.91	6.5	2.16E-02	12
Area & Xwell	**162000**	2.6	133.92	0.5	51.9	103.80	1.4	0.17	**102**	142.35	6.5	1.52E-02	13
Area & Wst. Conc	**162000**	2.6	133.92	0.5	**110**	**220.00**	1.4	0.17	430	165.01	6.5	1.33E-02	14
Ywell & Zwell	20200	2.6	133.92	0.5	51.9	103.80	1.4	0.17	430	**0.00**	**1.3**	1.20E-02	15
Wst. Vol & Zwell	20200	2.6	**1557.85**	0.5	51.9	103.80	1.4	0.17	430	85.91	**1.3**	1.05E-02	16
Area & Ywell	**162000**	2.6	133.92	0.5	51.9	103.80	1.4	0.17	430	**0.00**	6.5	7.76E-03	17
Wst Conc & Zwell	20200	2.6	133.92	0.5	**110**	**220.00**	1.4	0.17	430	85.91	**1.3**	6.34E-03	18
Area & Infil	**162000**	2.6	133.92	0.5	51.9	103.80	1.4	**0.46**	430	165.01	6.5	6.25E-03	19
Infil & Zwell	20200	2.6	133.92	0.5	51.9	103.80	1.4	**0.46**	430	85.91	**1.3**	5.38E-03	20
Area & Zwell	**162000**	2.6	133.92	0.5	51.9	103.80	1.4	0.17	430	165.01	**1.3**	3.38E-03	21

Table A.61 Sensitivity Analysis for Unleaded Gasoline tank sediment Off-site Municipal Landfill Scenario/ Benzene
(30 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1998 9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	117.75	6.5	8.70E-03	
Xwell & Wst Vol	60705	2.6	**1557.85**	0.75	51.9	69.2	1.4	0.17	**102**	93.79	6.5	1.70E-01	1
Ywell & Wst. Vol	60705	2.6	**1557.85**	0.75	51.9	69.2	1.4	0.17	430	**0.00**	6.5	9.76E-02	2
Infil & Wst. Vol	60705	2.6	**1557.85**	0.75	51.9	69.2	1.4	**0.46**	430	117.75	6.5	8.67E-02	3
TCLP & Wst. Vol	60705	2.6	**1557.85**	**1.6**	51.9	32.438	1.4	0.17	430	117.75	6.5	7.71E-02	4
Wst. Vol & Wst. Conc	60705	2.6	**1557.85**	0.75	**110**	**146.67**	1.4	0.17	430	117.75	6.5	7.17E-02	5
Xwell & Wst. Conc	60705	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	**102**	93.79	6.5	5.84E-02	6
Area & Wst. Vol	**420888**	2.6	**1557.85**	0.75	51.9	69.2	1.4	0.17	430	238.82	6.5	3.96E-02	7
Ywell & Xwell	60705	2.6	133.92	0.75	51.9	69.20	1.4	0.17	**102**	**0.00**	6.5	3.22E-02	8
Ywell & Wst Conc	60705	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	430	**0.00**	6.5	3.12E-02	9
TCLP & xwell	60705	2.6	133.92	**1.6**	51.9	32.44	1.4	0.17	**102**	93.79	6.5	3.02E-02	10
Infil & Xwell	60705	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	**102**	93.79	6.5	2.86E-02	11
Xwell & Zwell	60705	2.6	133.92	0.75	51.9	69.20	1.4	0.17	**102**	93.79	**1.3**	2.76E-02	12
Wst. Vol & Zwell	60705	2.6	**1557.85**	0.75	51.9	69.20	1.4	0.17	430	117.75	**1.3**	2.71E-02	13
Infil & Wst. Conc	60705	2.6	133.92	0.75	**110**	**146.67**	1.4	**0.46**	430	117.75	6.5	2.06E-02	14
TCLP & Wst Conc	60705	2.6	133.92	**1.6**	**110**	**68.75**	1.4	0.17	430	117.75	6.5	1.85E-02	15
Ywell & TCLP	60705	2.6	133.92	**1.6**	51.9	**32.44**	1.4	0.17	430	**0.00**	6.5	1.58E-02	16
Ywell & Infil	60705	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	430	**0.00**	6.5	1.39E-02	17
Infil & TCLP	60705	2.6	133.92	**1.6**	51.9	**32.44**	1.4	**0.46**	430	117.75	6.5	9.91E-03	18
Wst Conc & Zwell	60705	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	430	117.75	**1.3**	8.75E-03	19
Ywell & Zwell	60705	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	**0.00**	**1.3**	7.73E-03	20
Area & Wst. Conc	**420888**	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	430	238.82	6.5	7.47E-03	21
Area & Xwell	**420888**	2.6	133.92	0.75	51.9	69.20	1.4	0.17	**102**	217.62	6.5	6.29E-03	22
Infil & Zwell	60705	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	430	117.75	**1.3**	4.69E-03	23
TCLP & Zwell	60705	2.6	133.92	**1.6**	51.9	32.44	1.4	0.17	430	117.75	**1.3**	4.45E-03	24
Area & Ywell	**420888**	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	**0.00**	6.5	3.67E-03	25
Area & TCLP	**420888**	2.6	133.92	**1.6**	51.9	**32.44**	1.4	0.17	430	238.82	6.5	3.55E-03	26
Area & Infil	**420888**	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	430	238.82	6.5	2.83E-03	27
Area & Zwell	**420888**	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	238.82	6.5	2.16E-03	28

Table A.62 Sensitivity Analysis for Unleaded Gasoline tank sediment Off-site Municipal Landfill Scenario/TC Capped Benzene (30 Year Active Life)

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1998 9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	133.92	0.5	51.9	103.80	1.4	0.17	430	117.75	6.5	8.49E-03	
Xwell & Wst Vol	60705	2.6	**1557.85**	0.5	51.9	103.8	1.4	0.17	**102**	93.79	6.5	1.31E-01	1
Ywell & Wst. Vol	60705	2.6	**1557.85**	0.5	51.9	103.8	1.4	0.17	430	**0.00**	6.5	7.66E-02	2
Infil & Wst. Vol	60705	2.6	**1557.85**	0.5	51.9	103.8	1.4	**0.46**	430	117.75	6.5	7.37E-02	3
Xwell & Wst. Conc	60705	2.6	133.92	0.5	**110**	**220.00**	1.4	0.17	**102**	93.79	6.5	5.38E-02	4
Wst. Vol & Wst. Conc	60705	2.6	**1557.85**	0.5	**110**	**220.00**	1.4	0.17	430	117.75	6.5	5.29E-02	5
Area & Wst. Vol	**420888**	2.6	**1557.85**	0.5	51.9	103.8	1.4	0.17	430	238.82	6.5	3.80E-02	6
Ywell & Xwell	60705	2.6	133.92	0.5	51.9	103.80	1.4	0.17	**102**	**0.00**	6.5	3.12E-02	7
Ywell & Wst Conc	60705	2.6	133.92	0.5	**110**	**220.00**	1.4	0.17	430	**0.00**	6.5	2.91E-02	8
Infil & Xwell	60705	2.6	133.92	0.5	51.9	103.80	1.4	**0.46**	**102**	93.79	6.5	2.84E-02	9
Xwell & Zwell	60705	2.6	133.92	0.5	51.9	103.80	1.4	0.17	**102**	93.79	**1.3**	2.67E-02	10
Wst. Vol & Zwell	60705	2.6	**1557.85**	0.5	51.9	103.80	1.4	0.17	430	117.75	**1.3**	2.13E-02	11
Infil & Wst. Conc	60705	2.6	133.92	0.5	**110**	**220.00**	1.4	**0.46**	430	117.75	6.5	2.02E-02	12
Ywell & Infil	60705	2.6	133.92	0.5	51.9	103.80	1.4	**0.46**	430	**0.00**	6.5	1.39E-02	13
Wst Conc & Zwell	60705	2.6	133.92	0.5	**110**	**220.00**	1.4	0.17	430	117.75	**1.3**	8.16E-03	14
Ywell & Zwell	60705	2.6	133.92	0.5	51.9	103.80	1.4	0.17	430	**0.00**	**1.3**	7.54E-03	15
Area & Wst. Conc	**420888**	2.6	133.92	0.5	**110**	**220.00**	1.4	0.17	430	238.82	6.5	7.40E-03	16
Area & Xwell	**420888**	2.6	133.92	0.5	51.9	103.80	1.4	0.17	**102**	217.62	6.5	6.24E-03	17
Infil & Zwell	60705	2.6	133.92	0.5	51.9	103.80	1.4	**0.46**	430	117.75	**1.3**	4.63E-03	18
Area & Ywell	**420888**	2.6	133.92	0.5	51.9	103.80	1.4	0.17	430	**0.00**	6.5	3.64E-03	19
Area & Infil	**420888**	2.6	133.92	0.5	51.9	103.80	1.4	**0.46**	430	238.82	6.5	2.80E-03	20
Area & Zwell	**420888**	2.6	133.92	0.5	51.9	103.80	1.4	0.17	430	238.82	**1.3**	2.15E-03	21

Table A.63 Sensitivity Analysis for HF Alkylation Off-Site Landfill/Benzene -- Industrial Areas, 30 year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	430	85.91	6.5	6.42E-04		4.00E-03	
Area & Xwell	**162000**	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	**102**	142.35	6.5	2.30E-02	5	3.92E-02	1
Area & TCLP	**162000**	2.6	36813.6	**0.18**	4.3	**23.89**	1.18	0.17	430	165.01	6.5	3.64E-02	2	3.78E-02	2
Infil & Xwell	20200	2.6	36813.6	0.076	4.3	56.58	1.18	**0.46**	**102**	60.76	6.5	4.22E-03	11	3.78E-02	3
Area & Infil	**162000**	2.6	36813.6	0.076	4.3	56.58	1.18	**0.46**	430	165.01	6.5	3.98E-02	1	3.19E-02	4
TCLP & xwell	20200	2.6	36813.6	**0.18**	4.3	23.89	1.18	0.17	**102**	60.76	6.5	2.84E-03	15	3.17E-02	5
Ywell & TCLP	20200	2.6	36813.6	**0.18**	4.3	**23.89**	1.18	0.17	430	**0.00**	6.5	6.82E-04	24	2.62E-02	6
Area & Ywell	**162000**	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	430	**0.00**	6.5	2.26E-02	6	2.33E-02	7
Infil & TCLP	20200	2.6	36813.6	**0.18**	4.3	**23.89**	1.18	**0.46**	430	85.91	6.5	6.81E-03	8	2.28E-02	8
Ywell & Infil	20200	2.6	36813.6	0.076	4.3	56.58	1.18	**0.46**	430	**0.00**	6.5	1.27E-03	23	2.26E-02	9
Area & Wst. Conc	**162000**	2.6	36813.6	0.076	**14**	**184.21**	1.18	0.17	430	165.01	6.5	3.02E-02	3	2.12E-02	10
Area & Wst. Vol	**162000**	2.6	**57371.3**	0.076	4.3	56.58	1.18	0.17	430	165.01	6.5	2.43E-02	4	2.01E-02	11
Ywell & Xwell	20200	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	**102**	**0.00**	6.5	2.79E-04	27	1.96E-02	12
Xwell & Zwell	20200	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	**102**	60.76	**1.3**	1.42E-03	22	1.63E-02	13
Xwell & Wst. Conc	20200	2.6	36813.6	0.076	**14**	**184.21**	1.18	0.17	**102**	60.76	6.5	1.45E-03	21	1.36E-02	14
Xwell & Wst Vol	20200	2.6	**57371.3**	0.076	4.3	56.58	1.18	0.17	**102**	60.76	6.5	1.48E-03	20	1.35E-02	15
Ywell & Wst. Vol	20200	2.6	**57371.3**	0.076	4.3	56.58	1.18	0.17	430	**0.00**	6.5	6.11E-04	26	1.13E-02	16
Ywell & Wst Conc	20200	2.6	36813.6	0.076	**14**	**184.21**	1.18	0.17	430	**0.00**	6.5	6.74E-04	25	1.07E-02	17
Infil & Wst. Conc	20200	2.6	36813.6	0.076	**14**	**184.21**	1.18	**0.46**	430	85.91	6.5	6.35E-03	9	1.04E-02	18
Infil & Wst. Vol	20200	2.6	**57371.3**	0.076	4.3	56.58	1.18	**0.46**	430	85.91	6.5	4.31E-03	10	1.03E-02	19
Area & Zwell	**162000**	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	430	165.01	6.5	8.69E-03	7	9.90E-03	20
TCLP & Wst. Vol	20200	2.6	**57371.3**	**0.18**	4.3	23.89	1.18	0.17	430	85.91	6.5	2.90E-03	14	9.32E-03	21
TCLP & Wst Conc	20200	2.6	36813.6	**0.18**	**14**	**77.78**	1.18	0.17	430	85.91	6.5	3.18E-03	13	9.27E-03	22
Ywell & Zwell	20200	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	430	**0.00**	**1.3**	2.73E-04	28	5.59E-03	23
Infil & Zwell	20200	2.6	36813.6	0.076	4.3	56.58	1.18	**0.46**	430	85.91	**1.3**	3.88E-03	12	4.51E-03	24
TCLP & Zwell	20200	2.6	36813.6	**0.18**	4.3	23.89	1.18	0.17	430	85.91	**1.3**	2.05E-03	16	4.39E-03	25
Wst. Vol & Wst. Conc	20200	2.6	**57371.3**	0.076	**14**	**184.21**	1.18	0.17	430	85.91	6.5	1.71E-03	18	3.99E-03	26
Wst. Vol & Zwell	20200	2.6	**57371.3**	0.076	4.3	56.58	1.18	0.17	430	85.91	**1.3**	1.54E-03	19	1.90E-03	27
Wst Conc & Zwell	20200	2.6	36813.6	0.076	**14**	**184.21**	1.18	0.17	430	85.91	**1.3**	1.74E-03	17	1.80E-03	28

Table A.64 Sensitivity Analysis for HF Alkylation Off-Site Landfill/Benzene -- Municipal Areas, 30 Year Active Life

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
												9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	430	117.75	6.5	6.42E-04		9.91E-03	
TCLP & xwell	60705	2.6	36813.6	**0.18**	4.3	23.89	1.18	0.17	**102**	93.79	6.5	2.84E-03	15	6.36E-02	1
Infil & Xwell	60705	2.6	36813.6	0.076	4.3	56.58	1.18	**0.46**	**102**	93.79	6.5	4.22E-03	11	5.44E-02	2
Infil & TCLP	60705	2.6	36813.6	**0.18**	4.3	**23.89**	1.18	**0.46**	430	117.75	6.5	6.81E-03	8	4.62E-02	3
Area & TCLP	**420888**	2.6	36813.6	**0.18**	4.3	**23.89**	1.18	0.17	430	238.82	6.5	3.64E-02	2	3.90E-02	4
Area & Xwell	**420888**	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	**102**	217.62	6.5	2.30E-02	5	3.90E-02	5
Ywell & TCLP	60705	2.6	36813.6	**0.18**	4.3	**23.89**	1.18	0.17	430	**0.00**	6.5	6.82E-04	24	3.87E-02	6
Ywell & Xwell	60705	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	**102**	**0.00**	6.5	2.79E-04	27	3.15E-02	7
Ywell & Infil	60705	2.6	36813.6	0.076	4.3	56.58	1.18	**0.46**	430	**0.00**	6.5	1.27E-03	23	3.11E-02	8
Xwell & Wst. Conc	60705	2.6	36813.6	0.076	**14**	**184.21**	1.18	0.17	**102**	93.79	6.5	1.45E-03	21	3.00E-02	9
Area & Wst. Conc	**420888**	2.6	36813.6	0.076	**14**	**184.21**	1.18	0.17	430	238.82	6.5	3.02E-02	3	2.95E-02	10
Xwell & Wst Vol	60705	2.6	**57371.3**	0.076	4.3	56.58	1.18	0.17	**102**	93.79	6.5	1.48E-03	20	2.89E-02	11
Area & Infil	**420888**	2.6	36813.6	0.076	4.3	56.58	1.18	**0.46**	430	238.82	6.5	3.98E-02	1	2.76E-02	12
Xwell & Zwell	60705	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	**102**	93.79	**1.3**	1.42E-03	22	2.63E-02	13
Area & Wst. Vol	**420888**	2.6	**57371.3**	0.076	4.3	56.58	1.18	0.17	430	238.82	6.5	2.43E-02	4	2.59E-02	14
Infil & Wst. Conc	60705	2.6	36813.6	0.076	**14**	**184.21**	1.18	**0.46**	430	117.75	6.5	6.35E-03	9	2.44E-02	15
Area & Ywell	**420888**	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	430	**0.00**	6.5	2.26E-02	6	2.41E-02	16
TCLP & Wst Conc	60705	2.6	36813.6	**0.18**	**14**	**77.78**	1.18	0.17	430	117.75	6.5	3.18E-03	13	2.39E-02	17
Infil & Wst. Vol	60705	2.6	**57371.3**	0.076	4.3	56.58	1.18	**0.46**	430	117.75	6.5	4.31E-03	10	2.36E-02	18
TCLP & Wst. Vol	60705	2.6	**57371.3**	**0.18**	4.3	23.89	1.18	0.17	430	117.75	6.5	2.90E-03	14	2.26E-02	19
Ywell & Wst Conc	60705	2.6	36813.6	0.076	**14**	**184.21**	1.18	0.17	430	**0.00**	6.5	6.74E-04	25	1.84E-02	20
Ywell & Wst. Vol	60705	2.6	**57371.3**	0.076	4.3	56.58	1.18	0.17	430	**0.00**	6.5	6.11E-04	26	1.80E-02	21
Area & Zwell	**420888**	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	430	238.82	6.5	8.69E-03	7	1.40E-02	22
TCLP & Zwell	60705	2.6	36813.6	**0.18**	4.3	23.89	1.18	0.17	430	117.75	**1.3**	2.05E-03	16	1.07E-02	23
Infil & Zwell	60705	2.6	36813.6	0.076	4.3	56.58	1.18	**0.46**	430	117.75	**1.3**	3.88E-03	12	1.05E-02	24
Wst. Vol & Wst. Conc	60705	2.6	**57371.3**	0.076	**14**	**184.21**	1.18	0.17	430	117.75	6.5	1.71E-03	18	1.03E-02	25
Ywell & Zwell	60705	2.6	36813.6	0.076	4.3	56.58	1.18	0.17	430	**0.00**	**1.3**	2.73E-04	28	8.67E-03	26
Wst Conc & Zwell	60705	2.6	36813.6	0.076	**14**	**184.21**	1.18	0.17	430	117.75	**1.3**	1.74E-03	17	5.07E-03	27
Wst. Vol & Zwell	60705	2.6	**57371.3**	0.076	4.3	56.58	1.18	0.17	430	117.75	**1.3**	1.54E-03	19	4.96E-03	28

APPENDIX B
EXPOSURE DURATION SENSITIVITY

Table B.1 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/ Benzene -- Industrial Areas -- Including Exposure Duration as a Parameter

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	20200	2.6	2214	1.49	43.73	29.35	0.17	430	85.91	6.5	3.93E-03		5.07E-02	
Infil & Xwell	20200	2.6	2214	1.49	43.73	29.35	**0.46**	**102**	60.76	6.5	7.33E-02	7	3.93E-01	1
TCLP & xwell	20200	2.6	2214	**4.2**	43.73	10.41	0.17	**102**	60.76	6.5	6.40E-02	10	3.37E-01	2
Ywell & Xwell	20200	2.6	2214	1.49	43.73	29.35	0.17	**102**	**0.00**	6.5	7.69E-02	6	2.61E-01	3
Ywell & TCLP	20200	2.6	2214	**4.2**	43.73	**10.41**	0.17	430	**0.00**	6.5	1.23E-01	3	2.55E-01	4
Xwell & Wst. Conc	20200	2.6	2214	1.49	**100**	**67.11**	0.17	**102**	60.76	6.5	2.53E-02	21	2.35E-01	5
Area & Wst. Vol	**162000**	2.6	**12500**	1.49	43.73	29.349	0.17	430	165.01	6.5	2.26E-01	1	2.30E-01	6
Ywell & Infil	20200	2.6	2214	1.49	43.73	29.35	**0.46**	430	**0.00**	6.5	1.15E-01	4	2.23E-01	7
Xwell & Wst Vol	20200	2.6	**12500**	1.49	43.73	29.349	0.17	**102**	60.76	6.5	2.49E-02	22	2.20E-01	8
Xwell & Zwell	20200	2.6	2214	1.49	43.73	29.35	0.17	**102**	60.76	**1.3**	3.65E-02	15	2.18E-01	9
Ywell & Wst. Vol	20200	2.6	**12500**	1.49	43.73	29.349	0.17	430	**0.00**	6.5	4.98E-02	14	1.97E-01	10
Ywell & Wst Conc	20200	2.6	2214	1.49	**100**	**67.11**	0.17	430	**0.00**	6.5	5.09E-02	13	1.78E-01	11
TCLP & Wst. Vol	20200	2.6	**12500**	**4.2**	43.73	10.412	0.17	430	85.91	6.5	3.20E-02	16	1.70E-01	12
Area & Xwell	**162000**	2.6	2214	1.49	43.73	29.35	0.17	**102**	142.35	6.5	1.15E-01	5	1.68E-01	13
Infil & Wst. Vol	20200	2.6	**12500**	1.49	43.73	29.349	**0.46**	430	85.91	6.5	3.11E-02	18	1.66E-01	14
Area & Wst. Conc	**162000**	2.6	2214	1.49	**100**	**67.11**	0.17	430	165.01	6.5	1.25E-01	2	1.38E-01	15
Infil & TCLP	20200	2.6	2214	**4.2**	43.73	**10.41**	**0.46**	430	85.91	6.5	6.45E-02	9	1.34E-01	16
Infil & Wst. Conc	20200	2.6	2214	1.49	**100**	**67.11**	**0.46**	430	85.91	6.5	3.08E-02	19	1.34E-01	17
TCLP & Wst Conc	20200	2.6	2214	**4.2**	**100**	**23.81**	0.17	430	85.91	6.5	3.12E-02	17	1.32E-01	18
Exposure & Y-well	20200	2.6	2214	1.49	43.73	29.35	0.17	430	**0.00**	6.5	NA	NA	1.09E-01	19
Area & Ywell	**162000**	2.6	2214	1.49	43.73	29.35	0.17	430	**0.00**	6.5	6.66E-02	8	8.77E-02	20
Area & TCLP	**162000**	2.6	2214	**4.2**	43.73	**10.41**	0.17	430	165.01	6.5	6.35E-02	11	7.69E-02	21
Area & Infil	**162000**	2.6	2214	1.49	43.73	29.35	**0.46**	430	165.01	6.5	5.46E-02	12	7.47E-02	22
Wst. Vol & Wst. Conc	20200	2.6	**12500**	1.49	**100**	**67.11**	0.17	430	85.91	6.5	1.15E-02	26	7.31E-02	23
Ywell & Zwell	20200	2.6	2214	1.49	43.73	29.35	0.17	430	**0.00**	**1.3**	2.25E-02	23	7.13E-02	24
Exposure & Wst. Vol.	20200	2.6	**12500**	1.49	43.73	29.35	0.17	430	85.91	6.5	NA	NA	5.84E-02	25
Exposure & TCLP	20200	2.6	2214	**4.2**	43.73	**10.41**	0.17	430	85.91	6.5	NA	NA	5.54E-02	26
Exposure & Wst. Conc.	20200	2.6	2214	1.49	**100**	**67.11**	0.17	430	85.91	6.5	NA	NA	5.20E-02	27
Exposure & Area	**162000**	2.6	2214	1.49	43.73	29.35	0.17	430	165.01	6.5	NA	NA	5.06E-02	28
TCLP & Zwell	20200	2.6	2214	**4.2**	43.73	10.41	0.17	430	85.91	**1.3**	1.18E-02	24	4.29E-02	29
Infil & Zwell	20200	2.6	2214	1.49	43.73	29.35	**0.46**	430	85.91	**1.3**	1.15E-02	25	4.26E-02	30
Area & Zwell	**162000**	2.6	2214	1.49	43.73	29.35	0.17	430	165.01	**1.3**	2.61E-02	20	3.80E-02	31
Exposure & X-well	20200	2.6	2214	1.49	43.73	29.35	0.17	**102**	60.76	6.5	NA	NA	3.80E-02	32
Wst. Vol & Zwell	20200	2.6	**12500**	1.49	43.73	29.35	0.17	430	85.91	**1.3**	4.79E-03	28	3.29E-02	33
Wst Conc & Zwell	20200	2.6	2214	1.49	**100**	**67.11**	0.17	430	85.91	**1.3**	4.86E-03	27	2.99E-02	34
Exposure & Infil	20200	2.6	2214	1.49	43.73	29.35	**0.46**	430	85.91	6.5	NA	NA	2.97E-02	35
Exposure & Z-well	20200	2.6	2214	1.49	43.73	29.35	0.17	430	85.91	**1.3**	NA	NA	1.84E-02	36

Table B.2 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/ Benzene -- Municipal Landfills -- Including Exposure Duration as a Parameter

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
											9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	2214	1.49	43.73	29.35	0.17	430	117.75	6.5	3.93E-03		7.63E-02	
Xwell & Wst Vol	60705	2.6	**12500**	1.49	43.73	29.349	0.17	**102**	93.79	6.5	2.49E-02	22	4.59E-01	1
Xwell & Wst. Conc	60705	2.6	2214	1.49	**100**	**67.11**	0.17	**102**	93.79	6.5	2.53E-02	21	3.59E-01	2
TCLP & xwell	60705	2.6	2214	**4.2**	43.73	10.41	0.17	**102**	93.79	6.5	6.40E-02	10	3.29E-01	3
TCLP & Wst. Vol	60705	2.6	**12500**	**4.2**	43.73	10.412	0.17	430	117.75	6.5	3.20E-02	16	3.10E-01	4
Infil & Xwell	60705	2.6	2214	1.49	43.73	29.35	**0.46**	**102**	93.79	6.5	7.33E-02	7	3.00E-01	5
Infil & Wst. Vol	60705	2.6	**12500**	1.49	43.73	29.349	**0.46**	430	117.75	6.5	3.11E-02	18	2.97E-01	6
Ywell & Wst. Vol	60705	2.6	**12500**	1.49	43.73	29.349	0.17	430	**0.00**	6.5	4.98E-02	14	2.74E-01	7
Ywell & Xwell	60705	2.6	2214	1.49	43.73	29.35	0.17	**102**	**0.00**	6.5	7.69E-02	6	2.66E-01	8
Xwell & Zwell	60705	2.6	2214	1.49	43.73	29.35	0.17	**102**	93.79	**1.3**	3.65E-02	15	2.26E-01	9
Ywell & Wst Conc	60705	2.6	2214	1.49	**100**	**67.11**	0.17	430	**0.00**	6.5	5.09E-02	13	2.08E-01	10
Area & Wst. Vol	**420888**	2.6	**12500**	1.49	43.73	29.349	0.17	430	238.82	6.5	2.26E-01	1	1.92E-01	11
Infil & Wst. Conc	60705	2.6	2214	1.49	**100**	**67.11**	**0.46**	430	117.75	6.5	3.08E-02	19	1.92E-01	12
TCLP & Wst Conc	60705	2.6	2214	**4.2**	**100**	**23.81**	0.17	430	117.75	6.5	3.12E-02	17	1.88E-01	13
Ywell & TCLP	60705	2.6	2214	**4.2**	43.73	**10.41**	0.17	430	**0.00**	6.5	1.23E-01	3	1.76E-01	14
Wst. Vol & Wst. Conc	60705	2.6	**12500**	1.49	**100**	**67.11**	0.17	430	117.75	6.5	1.15E-02	26	1.75E-01	15
Ywell & Infil	60705	2.6	2214	1.49	43.73	29.35	**0.46**	430	**0.00**	6.5	1.15E-01	4	1.49E-01	16
Exposure & Wst. Vol.	60705	2.6	**12500**	1.49	43.73	29.35	0.17	430	117.75	6.5	NA	NA	1.43E-01	17
Exposure & X-well	60705	2.6	2214	1.49	43.73	29.35	0.17	**102**	93.79	6.5	NA	NA	1.40E-01	18
Infil & TCLP	60705	2.6	2214	**4.2**	43.73	**10.41**	**0.46**	430	117.75	6.5	6.45E-02	9	1.17E-01	19
Area & Wst. Conc	**420888**	2.6	2214	1.49	**100**	**67.11**	0.17	430	238.82	6.5	1.25E-01	2	9.20E-02	20
Exposure & Wst. Conc.	60705	2.6	2214	1.49	**100**	**67.11**	0.17	430	117.75	6.5	NA	NA	8.64E-02	21
Exposure & Y-well	60705	2.6	2214	1.49	43.73	29.35	0.17	430	**0.00**	6.5	NA	NA	8.55E-02	22
Wst. Vol & Zwell	60705	2.6	**12500**	1.49	43.73	29.35	0.17	430	117.75	**1.3**	4.79E-03	28	7.59E-02	23
Area & Xwell	**420888**	2.6	2214	1.49	43.73	29.35	0.17	**102**	217.62	6.5	1.15E-01	5	7.48E-02	24
Ywell & Zwell	60705	2.6	2214	1.49	43.73	29.35	0.17	430	**0.00**	**1.3**	2.25E-02	23	6.73E-02	25
Wst Conc & Zwell	60705	2.6	2214	1.49	**100**	**67.11**	0.17	430	117.75	**1.3**	4.86E-03	27	5.78E-02	26
Exposure & TCLP	60705	2.6	2214	**4.2**	43.73	10.41	0.17	430	117.75	6.5	NA	NA	5.29E-02	27
Infil & Zwell	60705	2.6	2214	1.49	43.73	29.35	**0.46**	430	117.75	**1.3**	1.15E-02	25	5.04E-02	28
TCLP & Zwell	60705	2.6	2214	**4.2**	43.73	10.41	0.17	430	117.75	**1.3**	1.18E-02	24	4.93E-02	29
Exposure & Infil	60705	2.6	2214	1.49	43.73	29.35	**0.46**	430	117.75	6.5	NA	NA	4.74E-02	30
Area & Ywell	**420888**	2.6	2214	1.49	43.73	29.35	0.17	430	**0.00**	6.5	6.66E-02	8	4.36E-02	31
Area & TCLP	**420888**	2.6	2214	**4.2**	43.73	**10.41**	0.17	430	238.82	6.5	6.35E-02	11	4.25E-02	32
Area & Infil	**420888**	2.6	2214	1.49	43.73	29.35	**0.46**	430	238.82	6.5	5.46E-02	12	3.39E-02	33
Area & Zwell	**420888**	2.6	2214	1.49	43.73	29.35	0.17	430	238.82	6.5	2.61E-02	20	2.57E-02	34
Exposure & Area	**420888**	2.6	2214	1.49	43.73	29.35	0.17	430	238.82	6.5	NA	NA	2.42E-02	35
Exposure & Z-well	60705	2.6	2214	1.49	43.73	29.35	0.17	430	117.75	**1.3**	NA	NA	2.36E-02	36

Table B.3 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/Arsenic -- Industrial Areas -- Including Exposure Duration as a Parameter

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
											9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	20200	2.6	2214	13.71	493.3	35.98	0.17	430	85.91	6.5	1.17E-02		1.02E-02	
Xwell & Wst Vol	20200	2.6	**12500**	13.71	493.3	35.981	0.17	**102**	60.76	6.5	1.14E-01	2	2.61E-01	1
Ywell & Wst. Vol	20200	2.6	**12500**	13.71	493.3	35.981	0.17	430	**0.00**	6.5	2.04E-01	1	1.64E-01	2
Infil & Xwell	20200	2.6	2214	13.71	493.3	35.98	**0.46**	**102**	60.76	6.5	6.62E-02	7	9.08E-02	3
Wst. Vol & Wst. Conc	20200	2.6	**12500**	13.71	**730**	**53.25**	0.17	430	85.91	6.5	5.72E-02	9	8.21E-02	4
Infil & Wst. Vol	20200	2.6	**12500**	13.71	493.3	35.981	**0.46**	430	85.91	6.5	7.63E-02	4	7.20E-02	5
Xwell & Wst. Conc	20200	2.6	2214	13.71	**730**	**53.25**	0.17	**102**	60.76	6.5	4.47E-02	12	7.06E-02	6
Ywell & Xwell	20200	2.6	2214	13.71	493.3	35.98	0.17	**102**	**0.00**	6.5	9.95E-02	3	6.77E-02	7
Xwell & Zwell	20200	2.6	2214	13.71	493.3	35.98	0.17	**102**	60.76	**1.3**	4.80E-02	11	5.88E-02	8
TCLP & Wst. Vol	20200	2.6	**12500**	**34**	493.3	14.5088	0.17	430	85.91	6.5	6.00E-02	8	5.76E-02	9
Exposure & Wst. Vol.	20200	2.6	**12500**	13.71	493.3	35.98	0.17	430	85.91	6.5	NA	NA	5.66E-02	10
TCLP & xwell	20200	2.6	2214	**34**	493.3	14.51	0.17	**102**	60.76	6.5	3.29E-02	13	4.79E-02	11
Exposure & X-well	20200	2.6	2214	13.71	493.3	35.98	0.17	**102**	60.76	6.5	NA	NA	4.78E-02	12
Ywell & Wst Conc	20200	2.6	2214	13.71	**730**	**53.25**	0.17	430	**0.00**	6.5	7.49E-02	5	4.38E-02	13
Area & Wst. Vol	**162000**	2.6	**12500**	13.71	493.3	35.981	0.17	430	165.01	6.5	2.73E-02	14	3.26E-02	14
Ywell & Infil	20200	2.6	2214	13.71	493.3	35.98	**0.46**	430	**0.00**	6.5	6.71E-02	6	3.12E-02	15
Ywell & TCLP	20200	2.6	2214	**34**	493.3	**14.51**	0.17	430	**0.00**	6.5	5.38E-02	10	2.97E-02	16
Exposure & Y-well	20200	2.6	2214	13.71	493.3	35.98	0.17	430	**0.00**	6.5	NA	NA	2.96E-02	17
Wst. Vol & Zwell	20200	2.6	**12500**	13.71	493.3	35.98	0.17	430	85.91	**1.3**	1.96E-02	17	2.78E-02	18
Infil & Wst. Conc	20200	2.6	2214	13.71	**730**	**53.25**	**0.46**	430	85.91	6.5	2.34E-02	16	1.90E-02	19
TCLP & Wst Conc	20200	2.6	2214	**34**	**730**	**21.47**	0.17	430	85.91	6.5	1.76E-02	18	1.51E-02	20
Exposure & Wst. Conc.	20200	2.6	2214	13.71	**730**	**53.25**	0.17	430	85.91	6.5	NA	NA	1.51E-02	21
Area & Xwell	**162000**	2.6	2214	13.71	493.3	35.98	0.17	**102**	142.35	6.5	9.76E-03	20	1.50E-02	22
Ywell & Zwell	20200	2.6	2214	13.71	493.3	35.98	0.17	430	**0.00**	**1.3**	2.45E-02	15	1.49E-02	23
Infil & TCLP	20200	2.6	2214	**34**	493.3	**14.51**	**0.46**	430	85.91	6.5	1.61E-02	19	1.28E-02	24
Exposure & Infil	20200	2.6	2214	13.71	493.3	35.98	**0.46**	430	85.91	6.5	NA	NA	1.28E-02	25
Exposure & TCLP	20200	2.6	2214	**34**	493.3	14.51	0.17	430	85.91	6.5	NA	NA	1.02E-02	26
Area & Wst. Conc	**162000**	2.6	2214	13.71	**730**	**53.25**	0.17	430	165.01	6.5	7.16E-03	22	8.54E-03	27
Wst Conc & Zwell	20200	2.6	2214	13.71	**730**	**53.25**	0.17	430	85.91	**1.3**	7.17E-03	21	7.43E-03	28
Area & Ywell	**162000**	2.6	2214	13.71	493.3	35.98	0.17	430	**0.00**	6.5	5.25E-03	24	7.01E-03	29
Area & Infil	**162000**	2.6	2214	13.71	493.3	35.98	**0.46**	430	165.01	6.5	4.95E-03	26	6.46E-03	30
Infil & Zwell	20200	2.6	2214	13.71	493.3	35.98	**0.46**	430	85.91	**1.3**	6.66E-03	23	5.96E-03	31
Area & TCLP	**162000**	2.6	2214	**34**	493.3	**14.51**	0.17	430	165.01	6.5	4.84E-03	27	5.77E-03	32
Exposure & Area	**162000**	2.6	2214	13.71	493.3	35.98	0.17	430	165.01	6.5	NA	NA	5.77E-03	33
TCLP & Zwell	20200	2.6	2214	**34**	493.3	14.51	0.17	430	85.91	**1.3**	5.15E-03	25	5.03E-03	34
Exposure & Z-well	20200	2.6	2214	13.71	493.3	35.98	0.17	430	85.91	**1.3**	NA	NA	5.02E-03	35
Area & Zwell	**162000**	2.6	2214	13.71	493.3	35.98	0.17	430	165.01	6.5	2.11E-03	28	3.10E-03	36

Table B.4 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/Arsenic -- Municipal Areas -- Including Exposure Duration as a Parameter

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997		1998	
											9-year Avg. Conc. (mg/L)	Rank	9-year Avg. Conc. (mg/L)	Rank
Base Case	60705	2.6	2214	13.71	493.3	35.98	0.17	430	117.75	6.5	1.17E-02		8.24E-03	
Xwell & Wst Vol	60705	2.6	**12500**	13.71	493.3	35.981	0.17	**102**	93.79	6.5	1.14E-01	2	1.77E-01	1
Ywell & Wst. Vol	60705	2.6	**12500**	13.71	493.3	35.981	0.17	430	**0.00**	6.5	2.04E-01	1	8.27E-02	2
Wst. Vol & Wst. Conc	60705	2.6	**12500**	13.71	**730**	**53.25**	0.17	430	117.75	6.5	5.72E-02	9	6.86E-02	3
Infil & Wst. Vol	60705	2.6	**12500**	13.71	493.3	35.981	**0.46**	430	117.75	6.5	7.63E-02	4	5.49E-02	4
Xwell & Wst. Conc	60705	2.6	2214	13.71	**730**	**53.25**	0.17	**102**	93.79	6.5	4.47E-02	12	4.65E-02	5
TCLP & Wst. Vol	60705	2.6	**12500**	**34**	493.3	14.5088	0.17	430	117.75	6.5	6.00E-02	8	4.65E-02	6
Exposure & Wst. Vol.	60705	2.6	**12500**	13.71	493.3	35.98	0.17	430	117.75	6.5	NA	NA	4.64E-02	7
Infil & Xwell	60705	2.6	2214	13.71	493.3	35.98	**0.46**	**102**	93.79	6.5	6.62E-02	7	4.20E-02	8
Ywell & Xwell	60705	2.6	2214	13.71	493.3	35.98	0.17	**102**	**0.00**	6.5	9.95E-02	3	3.42E-02	9
TCLP & xwell	60705	2.6	2214	**34**	493.3	14.51	0.17	**102**	93.79	6.5	3.29E-02	13	3.15E-02	10
Exposure & X-well	60705	2.6	2214	13.71	493.3	35.98	0.17	**102**	93.79	6.5	NA	NA	3.14E-02	11
Xwell & Zwell	60705	2.6	2214	13.71	493.3	35.98	0.17	**102**	93.79	**1.3**	4.80E-02	11	3.02E-02	12
Wst. Vol & Zwell	60705	2.6	**12500**	13.71	493.3	35.98	0.17	430	117.75	**1.3**	1.96E-02	17	2.35E-02	13
Ywell & Wst Conc	60705	2.6	2214	13.71	**730**	**53.25**	0.17	430	**0.00**	6.5	7.49E-02	5	2.17E-02	14
Area & Wst. Vol	**420888**	2.6	**12500**	13.71	493.3	35.981	0.17	430	238.82	6.5	2.73E-02	14	1.75E-02	15
Ywell & TCLP	60705	2.6	2214	**34**	493.3	**14.51**	0.17	430	**0.00**	6.5	5.38E-02	10	1.47E-02	16
Exposure & Y-well	60705	2.6	2214	13.71	493.3	35.98	0.17	430	**0.00**	6.5	NA	NA	1.46E-02	17
Infil & Wst. Conc	60705	2.6	2214	13.71	**730**	**53.25**	**0.46**	430	117.75	6.5	2.34E-02	16	1.44E-02	18
Ywell & Infil	60705	2.6	2214	13.71	493.3	35.98	**0.46**	430	**0.00**	6.5	6.71E-02	6	1.42E-02	19
TCLP & Wst Conc	60705	2.6	2214	**34**	**730**	**21.47**	0.17	430	117.75	6.5	1.76E-02	18	1.22E-02	20
Exposure & Wst. Conc.	60705	2.6	2214	13.71	**730**	**53.25**	0.17	430	117.75	6.5	NA	NA	1.22E-02	21
Exposure & Infil	60705	2.6	2214	13.71	493.3	35.98	**0.46**	430	117.75	6.5	NA	NA	9.76E-03	22
Infil & TCLP	60705	2.6	2214	**34**	493.3	**14.51**	**0.46**	430	117.75	6.5	1.61E-02	19	9.74E-03	23
Expousre & TCLP	60705	2.6	2214	**34**	493.3	14.51	0.17	430	117.75	6.5	NA	NA	8.24E-03	24
Ywell & Zwell	60705	2.6	2214	13.71	493.3	35.98	0.17	430	**0.00**	**1.3**	2.45E-02	15	7.40E-03	25
Wst Conc & Zwell	60705	2.6	2214	13.71	**730**	**53.25**	0.17	430	117.75	**1.3**	7.17E-03	21	6.19E-03	26
Area & Xwell	**420888**	2.6	2214	13.71	493.3	35.98	0.17	**102**	217.62	6.5	9.76E-03	20	5.74E-03	27
Infil & Zwell	60705	2.6	2214	13.71	493.3	35.98	**0.46**	430	117.75	**1.3**	6.66E-03	23	4.82E-03	28
Area & Wst. Conc	**420888**	2.6	2214	13.71	**730**	**53.25**	0.17	430	238.82	6.5	7.16E-03	22	4.58E-03	29
TCLP & Zwell	60705	2.6	2214	**34**	493.3	14.51	0.17	430	117.75	**1.3**	5.15E-03	25	4.18E-03	30
Exposure & Z-well	60705	2.6	2214	13.71	493.3	35.98	0.17	430	117.75	**1.3**	NA	NA	4.18E-03	31
Area & Ywell	**420888**	2.6	2214	13.71	493.3	35.98	0.17	430	**0.00**	6.5	5.25E-03	24	3.21E-03	32
Area & TCLP	**420888**	2.6	2214	**34**	493.3	**14.51**	0.17	430	238.82	6.5	4.84E-03	27	3.10E-03	33
Exposure & Area	**420888**	2.6	2214	13.71	493.3	35.98	0.17	430	238.82	6.5	NA	NA	3.10E-03	34
Area & Infil	**420888**	2.6	2214	13.71	493.3	35.98	**0.46**	430	238.82	6.5	4.95E-03	26	2.91E-03	35
Area & Zwell	**420888**	2.6	2214	13.71	493.3	35.98	0.17	430	238.82	6.5	2.11E-03	28	1.92E-03	36

Table B.5 Sensitivity Analysis for Unleaded Gasoline Tank Sludge Off-site Landfill Scenario/ Benzene -- Industrial Areas -- Including Exposure Duration as a Parameter

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	20200	2.6	133.92	0.75	51.9	69.20	0.17	430	85.91	6.5	3.93E-03		9.40E-03	
Xwell & Wst Vol	20200	2.6	**1557.85**	0.75	51.9	69.2	0.17	**102**	60.76	6.5	2.49E-02	22	1.08E-01	1
Ywell & Wst. Vol	20200	2.6	**1557.85**	0.75	51.9	69.2	0.17	430	**0.00**	6.5	4.98E-02	14	8.75E-02	2
Infil & Wst. Vol	20200	2.6	**1557.85**	0.75	51.9	69.2	**0.46**	430	85.91	6.5	3.11E-02	18	6.38E-02	3
Area & Wst. Vol	**162000**	2.6	**1557.85**	0.75	51.9	69.2	0.17	430	165.01	6.5	2.26E-01	1	6.17E-02	4
Xwell & Wst. Conc	20200	2.6	133.92	0.75	**110**	**146.67**	0.17	**102**	60.76	6.5	2.53E-02	21	6.01E-02	5
Infil & Xwell	20200	2.6	133.92	0.75	51.9	69.20	**0.46**	**102**	60.76	6.5	7.33E-02	7	5.58E-02	6
TCLP & Wst. Vol	20200	2.6	**1557.85**	**1.6**	51.9	32.438	0.17	430	85.91	6.5	3.20E-02	16	5.27E-02	7
Ywell & Xwell	20200	2.6	133.92	0.75	51.9	69.20	0.17	**102**	**0.00**	6.5	7.69E-02	6	5.23E-02	8
Ywell & Wst Conc	20200	2.6	133.92	0.75	**110**	**146.67**	0.17	430	**0.00**	6.5	5.09E-02	13	4.55E-02	9
Xwell & Zwell	20200	2.6	133.92	0.75	51.9	69.20	0.17	**102**	60.76	**1.3**	3.65E-02	15	4.42E-02	10
TCLP & xwell	20200	2.6	133.92	**1.6**	51.9	32.44	0.17	**102**	60.76	6.5	6.40E-02	10	4.18E-02	11
Wst. Vol & Wst. Conc	20200	2.6	**1557.85**	0.75	**110**	**146.67**	0.17	430	85.91	6.5	1.15E-02	26	3.43E-02	12
Ywell & TCLP	20200	2.6	133.92	**1.6**	51.9	**32.44**	0.17	430	**0.00**	6.5	1.23E-01	3	3.00E-02	13
Ywell & Infil	20200	2.6	133.92	0.75	51.9	69.20	**0.46**	430	**0.00**	6.5	1.15E-01	4	2.92E-02	14
Exposure & Wst. Vol.	20200	2.6	**1557.85**	0.75	51.9	69.20	0.17	430	85.91	6.5	NA	NA	2.52E-02	15
Infil & Wst. Conc	20200	2.6	133.92	0.75	**110**	**146.67**	**0.46**	430	85.91	6.5	3.08E-02	19	2.39E-02	16
TCLP & Wst Conc	20200	2.6	133.92	**1.6**	**110**	**68.75**	0.17	430	85.91	6.5	3.12E-02	17	1.99E-02	17
Exposure & X-well	20200	2.6	133.92	0.75	51.9	69.20	0.17	**102**	60.76	6.5	NA	NA	1.77E-02	18
Area & Xwell	**162000**	2.6	133.92	0.75	51.9	69.20	0.17	**102**	142.35	6.5	1.15E-01	5	1.53E-02	19
Wst. Vol & Zwell	20200	2.6	**1557.85**	0.75	51.9	69.20	0.17	430	85.91	**1.3**	4.79E-03	28	1.47E-02	20
Exposure & Y-well	20200	2.6	133.92	0.75	51.9	69.20	0.17	430	**0.00**	6.5	NA	NA	1.45E-02	21
Area & Wst. Conc	**162000**	2.6	133.92	0.75	**110**	**146.67**	0.17	430	165.01	6.5	1.25E-01	2	1.35E-02	22
Ywell & Zwell	20200	2.6	133.92	0.75	51.9	69.20	0.17	430	**0.00**	**1.3**	2.25E-02	23	1.34E-02	23
Infil & TCLP	20200	2.6	133.92	**1.6**	51.9	**32.44**	**0.46**	430	85.91	6.5	6.45E-02	9	1.27E-02	24
Exposure & Wst. Conc.	20200	2.6	133.92	0.75	**110**	**146.67**	0.17	430	85.91	6.5	NA	NA	9.84E-03	25
Area & Ywell	**162000**	2.6	133.92	0.75	51.9	69.20	0.17	430	**0.00**	6.5	6.66E-02	8	7.82E-03	26
Wst Conc & Zwell	20200	2.6	133.92	0.75	**110**	**146.67**	0.17	430	85.91	**1.3**	4.86E-03	27	7.64E-03	27
Area & TCLP	**162000**	2.6	133.92	**1.6**	51.9	**32.44**	0.17	430	165.01	6.5	6.35E-02	11	6.49E-03	28
Area & Infil	**162000**	2.6	133.92	0.75	51.9	69.20	**0.46**	430	165.01	6.5	5.46E-02	12	6.33E-03	29
Infil & Zwell	20200	2.6	133.92	0.75	51.9	69.20	**0.46**	430	85.91	**1.3**	1.15E-02	25	5.59E-03	30
Exposure & TCLP	20200	2.6	133.92	**1.6**	51.9	32.44	0.17	430	85.91	6.5	NA	NA	5.22E-03	31
TCLP & Zwell	20200	2.6	133.92	**1.6**	51.9	32.44	0.17	430	85.91	**1.3**	1.18E-02	24	5.05E-03	32
Exposure & Infil	20200	2.6	133.92	0.75	51.9	69.20	**0.46**	430	85.91	6.5	NA	NA	5.02E-03	33
Exposure & Area	**162000**	2.6	133.92	0.75	51.9	69.20	0.17	430	165.01	6.5	NA	NA	3.52E-03	34
Area & Zwell	**162000**	2.6	133.92	0.75	51.9	69.20	0.17	430	165.01	6.5	2.61E-02	20	3.41E-03	35
Exposure & Z-well	20200	2.6	133.92	0.75	51.9	69.20	0.17	430	85.91	**1.3**	NA	NA	2.44E-03	36

Table B.6 Sensitivity Analysis for Unleaded Gasoline Tank Sludge Off-site Landfill Scenario/ Benzene -- Municipal Areas -- Including Exposure Duration as a Parameter

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	60705	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	117.75	6.5	3.93E-03		8.70E-03	
Xwell & Wst Vol	60705	2.6	**1557.85**	0.75	51.9	69.2	1.4	0.17	**102**	93.79	6.5	2.49E-02	22	1.70E-01	1
Ywell & Wst. Vol	60705	2.6	**1557.85**	0.75	51.9	69.2	1.4	0.17	430	**0.00**	6.5	4.98E-02	14	9.76E-02	2
Infil & Wst. Vol	60705	2.6	**1557.85**	0.75	51.9	69.2	1.4	**0.46**	430	117.75	6.5	3.11E-02	18	8.67E-02	3
TCLP & Wst. Vol	60705	2.6	**1557.85**	**1.6**	51.9	32.438	1.4	0.17	430	117.75	6.5	3.20E-02	16	7.71E-02	4
Wst. Vol & Wst. Conc	60705	2.6	**1557.85**	0.75	**110**	**146.67**	1.4	0.17	430	117.75	6.5	1.15E-02	26	7.17E-02	5
Xwell & Wst. Conc	60705	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	**102**	93.79	6.5	2.53E-02	21	5.84E-02	6
Area & Wst. Vol	**420888**	2.6	**1557.85**	0.75	51.9	69.2	1.4	0.17	430	238.82	6.5	2.26E-01	1	3.96E-02	7
Exposure & Wst. Vol.	60705	2.6	**1557.85**	0.75	51.9	69.20	1.4	0.17	430	117.75	6.5	NA	NA	3.87E-02	8
Ywell & Xwell	60705	2.6	133.92	0.75	51.9	69.20	1.4	0.17	**102**	**0.00**	6.5	7.69E-02	6	3.22E-02	9
Ywell & Wst Conc	60705	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	430	**0.00**	6.5	5.09E-02	13	3.12E-02	10
TCLP & xwell	60705	2.6	133.92	**1.6**	51.9	32.44	1.4	0.17	**102**	93.79	6.5	6.40E-02	10	3.02E-02	11
Infil & Xwell	60705	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	**102**	93.79	6.5	7.33E-02	7	2.86E-02	12
Xwell & Zwell	60705	2.6	133.92	0.75	51.9	69.20	1.4	0.17	**102**	93.79	**1.3**	3.65E-02	15	2.76E-02	13
Wst. Vol & Zwell	60705	2.6	**1557.85**	0.75	51.9	69.20	1.4	0.17	430	117.75	**1.3**	4.79E-03	28	2.71E-02	14
Infil & Wst. Conc	60705	2.6	133.92	0.75	**110**	**146.67**	1.4	**0.46**	430	117.75	6.5	3.08E-02	19	2.06E-02	15
TCLP & Wst Conc	60705	2.6	133.92	**1.6**	**110**	**68.75**	1.4	0.17	430	117.75	6.5	3.12E-02	17	1.85E-02	16
Ywell & TCLP	60705	2.6	133.92	**1.6**	51.9	**32.44**	1.4	0.17	430	**0.00**	6.5	1.23E-01	3	1.58E-02	17
Ywell & Infil	60705	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	430	**0.00**	6.5	1.15E-01	4	1.39E-02	18
Exposure & X-well	60705	2.6	133.92	0.75	51.9	69.20	1.4	0.17	**102**	93.79	6.5	NA	NA	1.30E-02	19
Infil & TCLP	60705	2.6	133.92	**1.6**	51.9	**32.44**	1.4	**0.46**	430	117.75	6.5	6.45E-02	9	9.91E-03	20
Exposure & Wst. Conc.	60705	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	430	117.75	6.5	NA	NA	9.39E-03	21
Wst Conc & Zwell	60705	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	430	117.75	**1.3**	4.86E-03	27	8.75E-03	22
Exposure & Y-well	60705	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	**0.00**	6.5	NA	NA	7.93E-03	23
Ywell & Zwell	60705	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	**0.00**	**1.3**	2.25E-02	23	7.73E-03	24
Area & Wst. Conc	**420888**	2.6	133.92	0.75	**110**	**146.67**	1.4	0.17	430	238.82	6.5	1.25E-01	2	7.47E-03	25
Area & Xwell	**420888**	2.6	133.92	0.75	51.9	69.20	1.4	0.17	**102**	217.62	6.5	1.15E-01	5	6.29E-03	26
Infil & Zwell	60705	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	430	117.75	**1.3**	1.15E-02	25	4.69E-03	27
Exposure & TCLP	60705	2.6	133.92	**1.6**	51.9	32.44	1.4	0.17	430	117.75	6.5	NA	NA	4.48E-03	28
TCLP & Zwell	60705	2.6	133.92	**1.6**	51.9	32.44	1.4	0.17	430	117.75	**1.3**	1.18E-02	24	4.45E-03	29
Exposure & Infil	60705	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	430	117.75	6.5	NA	NA	4.01E-03	30
Area & Ywell	**420888**	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	**0.00**	6.5	6.66E-02	8	3.67E-03	31
Area & TCLP	**420888**	2.6	133.92	**1.6**	51.9	**32.44**	1.4	0.17	430	238.82	6.5	6.35E-02	11	3.55E-03	32
Area & Infil	**420888**	2.6	133.92	0.75	51.9	69.20	1.4	**0.46**	430	238.82	6.5	5.46E-02	12	2.83E-03	33
Exposure & Z-well	60705	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	117.75	**1.3**	NA	NA	2.21E-03	34
Area & Zwell	**420888**	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	238.82	6.5	2.61E-02	20	2.16E-03	35
Exposure & Area	**420888**	2.6	133.92	0.75	51.9	69.20	1.4	0.17	430	238.82	6.5	NA	NA	2.03E-03	36

Table B.7 Sensitivity Analysis for HF Alkylation Off-Site Landfill/Benzene -- Industrial Landfills -- Including Exposure Duration as a Parameter

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Quant. (MT)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	20200	2.6	28960	36813.6	0.076	4.3	56.58	0.17	430	85.91	6.5	6.42E-04		4.00E-03	
Area & Xwell	**162000**	2.6	28960	36813.6	0.076	4.3	56.58	0.17	**102**	142.35	6.5	2.30E-02	5	3.92E-02	1
Area & TCLP	**162000**	2.6	28960	36813.6	**0.18**	4.3	**23.89**	0.17	430	165.01	6.5	3.64E-02	2	3.78E-02	2
Infil & Xwell	20200	2.6	28960	36813.6	0.076	4.3	56.58	**0.46**	**102**	60.76	6.5	4.22E-03	11	3.78E-02	3
Area & Infil	**162000**	2.6	28960	36813.6	0.076	4.3	56.58	**0.46**	430	165.01	6.5	3.98E-02	1	3.19E-02	4
TCLP & xwell	20200	2.6	28960	36813.6	**0.18**	4.3	23.89	0.17	**102**	60.76	6.5	2.84E-03	15	3.17E-02	5
Ywell & TCLP	20200	2.6	28960	36813.6	**0.18**	4.3	**23.89**	0.17	430	**0.00**	6.5	6.82E-04	24	2.62E-02	6
Area & Ywell	**162000**	2.6	28960	36813.6	0.076	4.3	56.58	0.17	430	**0.00**	6.5	2.26E-02	6	2.33E-02	7
Infil & TCLP	20200	2.6	28960	36813.6	**0.18**	4.3	**23.89**	**0.46**	430	85.91	6.5	6.81E-03	8	2.28E-02	8
Ywell & Infil	20200	2.6	28960	36813.6	0.076	4.3	56.58	**0.46**	430	**0.00**	6.5	1.27E-03	23	2.26E-02	9
Area & Wst. Conc	**162000**	2.6	28960	36813.6	0.076	**14**	**184.21**	0.17	430	165.01	6.5	3.02E-02	3	2.12E-02	10
Area & Wst. Vol	**162000**	2.6	**45132**	**57371.3**	0.076	4.3	56.58	0.17	430	165.01	6.5	2.43E-02	4	2.01E-02	11
Ywell & Xwell	20200	2.6	28960	36813.6	0.076	4.3	56.58	0.17	**102**	**0.00**	6.5	2.79E-04	27	1.96E-02	12
Exposure & Area	**162000**	2.6	28960	36813.6	0.076	4.3	56.58	0.17	430	165.01	6.5	NA	NA	1.65E-02	13
Xwell & Zwell	20200	2.6	28960	36813.6	0.076	4.3	56.58	0.17	**102**	60.76	**1.3**	1.42E-03	22	1.63E-02	14
Xwell & Wst. Conc	20200	2.6	28960	36813.6	0.076	**14**	**184.21**	0.17	**102**	60.76	6.5	1.45E-03	21	1.36E-02	15
Xwell & Wst Vol	20200	2.6	**45132**	**57371.3**	0.076	4.3	56.58	0.17	**102**	60.76	6.5	1.48E-03	20	1.35E-02	16
Ywell & Wst. Vol	20200	2.6	**45132**	**57371.3**	0.076	4.3	56.58	0.17	430	**0.00**	6.5	6.11E-04	26	1.13E-02	17
Ywell & Wst Conc	20200	2.6	28960	36813.6	0.076	**14**	**184.21**	0.17	430	**0.00**	6.5	6.74E-04	25	1.07E-02	18
Exposure & X-well	20200	2.6	28960	36813.6	0.076	4.3	56.58	0.17	**102**	60.76	6.5	NA	NA	1.06E-02	19
Infil & Wst. Conc	20200	2.6	28960	36813.6	0.076	**14**	**184.21**	**0.46**	430	85.91	6.5	6.35E-03	9	1.04E-02	20
Infil & Wst. Vol	20200	2.6	**45132**	**57371.3**	0.076	4.3	56.58	**0.46**	430	85.91	6.5	4.31E-03	10	1.03E-02	21
Area & Zwell	**162000**	2.6	28960	36813.6	0.076	4.3	56.58	0.17	430	165.01	6.5	8.69E-03	7	9.90E-03	22
TCLP & Wst. Vol	20200	2.6	**45132**	**57371.3**	**0.18**	4.3	23.89	0.17	430	85.91	6.5	2.90E-03	14	9.32E-03	23
TCLP & Wst Conc	20200	2.6	28960	36813.6	**0.18**	**14**	**77.78**	0.17	430	85.91	6.5	3.18E-03	13	9.27E-03	24
Exposure & Y-well	20200	2.6	28960	36813.6	0.076	4.3	56.58	0.17	430	**0.00**	6.5	NA	NA	8.78E-03	25
Exposure & Infil	20200	2.6	28960	36813.6	0.076	4.3	56.58	**0.46**	430	85.91	6.5	NA	NA	8.01E-03	26
Exposure & TCLP	20200	2.6	28960	36813.6	**0.18**	4.3	23.89	0.17	430	85.91	6.5	NA	NA	7.23E-03	27
Ywell & Zwell	20200	2.6	28960	36813.6	0.076	4.3	56.58	0.17	430	**0.00**	**1.3**	2.73E-04	28	5.59E-03	28
Infil & Zwell	20200	2.6	28960	36813.6	0.076	4.3	56.58	**0.46**	430	85.91	**1.3**	3.88E-03	12	4.51E-03	29
TCLP & Zwell	20200	2.6	28960	36813.6	**0.18**	4.3	23.89	0.17	430	85.91	**1.3**	2.05E-03	16	4.39E-03	30
Wst. Vol & Wst. Conc	20200	2.6	**45132**	**57371.3**	0.076	**14**	**184.21**	0.17	430	85.91	6.5	1.71E-03	18	3.99E-03	31
Exposure & Wst. Conc.	20200	2.6	28960	36813.6	0.076	**14**	**184.21**	0.17	430	85.91	6.5	NA	NA	3.83E-03	32
Exposure & Wst. Vol.	20200	2.6	**45132**	**57371.3**	0.076	4.3	56.58	0.17	430	85.91	6.5	NA	NA	3.33E-03	33
Wst. Vol & Zwell	20200	2.6	**45132**	**57371.3**	0.076	4.3	56.58	0.17	430	85.91	**1.3**	1.54E-03	19	1.90E-03	34
Wst Conc & Zwell	20200	2.6	28960	36813.6	0.076	**14**	**184.21**	0.17	430	85.91	**1.3**	1.74E-03	17	1.80E-03	35
Exposure & Z-well	20200	2.6	28960	36813.6	0.076	4.3	56.58	0.17	430	85.91	**1.3**	NA	NA	1.48E-03	36

Table B.8 Sensitivity Analysis for HF Alkylation Off-Site Landfill/Benzene -- Municipal Landfills -- Including Exposure Duration as a Parameter

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	1997 9-year Avg. Conc. (mg/L)	1997 Rank	1998 9-year Avg. Conc. (mg/L)	1998 Rank
Base Case	60705	2.6	36813.6	0.076	4.3	56.58	0.17	430	117.75	6.5	6.42E-04		9.91E-03	
TCLP & xwell	60705	2.6	36813.6	**0.18**	4.3	23.89	0.17	**102**	93.79	6.5	2.84E-03	15	6.36E-02	1
Infil & Xwell	60705	2.6	36813.6	0.076	4.3	56.58	**0.46**	**102**	93.79	6.5	4.22E-03	11	5.44E-02	2
Infil & TCLP	60705	2.6	36813.6	**0.18**	4.3	**23.89**	**0.46**	430	117.75	6.5	6.81E-03	8	4.62E-02	3
Area & TCLP	**420888**	2.6	36813.6	**0.18**	4.3	**23.89**	0.17	430	238.82	6.5	3.64E-02	2	3.90E-02	4
Area & Xwell	**420888**	2.6	36813.6	0.076	4.3	56.58	0.17	**102**	217.62	6.5	2.30E-02	5	3.90E-02	5
Ywell & TCLP	60705	2.6	36813.6	**0.18**	4.3	**23.89**	0.17	430	**0.00**	6.5	6.82E-04	24	3.87E-02	6
Ywell & Xwell	60705	2.6	36813.6	0.076	4.3	56.58	0.17	**102**	**0.00**	6.5	2.79E-04	27	3.15E-02	7
Ywell & Infil	60705	2.6	36813.6	0.076	4.3	56.58	**0.46**	430	**0.00**	6.5	1.27E-03	23	3.11E-02	8
Xwell & Wst. Conc	60705	2.6	36813.6	0.076	**14**	**184.21**	0.17	**102**	93.79	6.5	1.45E-03	21	3.00E-02	9
Area & Wst. Conc	**420888**	2.6	36813.6	0.076	**14**	**184.21**	0.17	430	238.82	6.5	3.02E-02	3	2.95E-02	10
Xwell & Wst Vol	60705	2.6	**57371.3**	0.076	4.3	56.58	0.17	**102**	93.79	6.5	1.48E-03	20	2.89E-02	11
Area & Infil	**420888**	2.6	36813.6	0.076	4.3	56.58	**0.46**	430	238.82	6.5	3.98E-02	1	2.76E-02	12
Xwell & Zwell	60705	2.6	36813.6	0.076	4.3	56.58	0.17	**102**	93.79	**1.3**	1.42E-03	22	2.63E-02	13
Area & Wst. Vol	**420888**	2.6	**57371.3**	0.076	4.3	56.58	0.17	430	238.82	6.5	2.43E-02	4	2.59E-02	14
Infil & Wst. Conc	60705	2.6	36813.6	0.076	**14**	**184.21**	**0.46**	430	117.75	6.5	6.35E-03	9	2.44E-02	15
Area & Ywell	**420888**	2.6	36813.6	0.076	4.3	56.58	0.17	430	**0.00**	6.5	2.26E-02	6	2.41E-02	16
TCLP & Wst Conc	60705	2.6	36813.6	**0.18**	**14**	**77.78**	0.17	430	117.75	6.5	3.18E-03	13	2.39E-02	17
Infil & Wst. Vol	60705	2.6	**57371.3**	0.076	4.3	56.58	**0.46**	430	117.75	6.5	4.31E-03	10	2.36E-02	18
Exposure & X-well	60705	2.6	36813.6	0.076	4.3	56.58	0.17	**102**	93.79	6.5	NA	NA	2.35E-02	19
TCLP & Wst. Vol	60705	2.6	**57371.3**	**0.18**	4.3	23.89	0.17	430	117.75	6.5	2.90E-03	14	2.26E-02	20
Exposure & Area	**420888**	2.6	36813.6	0.076	4.3	56.58	0.17	430	238.82	6.5	NA	NA	1.90E-02	21
Exposure & TCLP	60705	2.6	36813.6	**0.18**	4.3	23.89	0.17	430	117.75	6.5	NA	NA	1.87E-02	22
Ywell & Wst Conc	60705	2.6	36813.6	0.076	**14**	**184.21**	0.17	430	**0.00**	6.5	6.74E-04	25	1.84E-02	23
Ywell & Wst. Vol	60705	2.6	**57371.3**	0.076	4.3	56.58	0.17	430	**0.00**	6.5	6.11E-04	26	1.80E-02	24
Exposure & Infil	60705	2.6	36813.6	0.076	4.3	56.58	**0.46**	430	117.75	6.5	NA	NA	1.73E-02	25
Exposure & Y-well	60705	2.6	36813.6	0.076	4.3	56.58	0.17	430	**0.00**	6.5	NA	NA	1.45E-02	26
Area & Zwell	**420888**	2.6	36813.6	0.076	4.3	56.58	0.17	430	238.82	6.5	8.69E-03	7	1.40E-02	27
TCLP & Zwell	60705	2.6	36813.6	**0.18**	4.3	23.89	0.17	430	117.75	**1.3**	2.05E-03	16	1.07E-02	28
Infil & Zwell	60705	2.6	36813.6	0.076	4.3	56.58	**0.46**	430	117.75	**1.3**	3.88E-03	12	1.05E-02	29
Wst. Vol & Wst. Conc	60705	2.6	**57371.3**	0.076	**14**	**184.21**	0.17	430	117.75	6.5	1.71E-03	18	1.03E-02	30
Ywell & Zwell	60705	2.6	36813.6	0.076	4.3	56.58	0.17	430	**0.00**	**1.3**	2.73E-04	28	8.67E-03	31
Exposure & Wst. Conc.	60705	2.6	36813.6	0.076	**14**	**184.21**	0.17	430	117.75	6.5	NA	NA	8.03E-03	32
Exposure & Wst. Vol.	60705	2.6	**57371.3**	0.076	4.3	56.58	0.17	430	117.75	6.5	NA	NA	8.02E-03	33
Wst Conc & Zwell	60705	2.6	36813.6	0.076	**14**	**184.21**	0.17	430	117.75	**1.3**	1.74E-03	17	5.07E-03	34
Wst. Vol & Zwell	60705	2.6	**57371.3**	0.076	4.3	56.58	0.17	430	117.75	**1.3**	1.54E-03	19	4.96E-03	35
Exposure & Z-well	60705	2.6	36813.6	0.076	4.3	56.58	0.17	430	117.75	**1.3**	NA	NA	4.04E-03	36

APPENDIX C
DETERMINISTIC DAF'S

Table C.1 Comparison of DAFs for the Two High-End Parameter Analysis (20-year Waste Volumes, Industrial Landfills)

Waste Stream	Constituent	1997 NODA			1998		
		TCLP	Max. 9-year Avg. Well Conc.	DAF *	TCLP	Max. 9-year Avg. Well Conc.	DAF *
CSO sludge	Benzene	0.059	1.55E-02	3.8	0.059	1.52E-02	3.9
Contingent CSO Sludge	Benzene	0.059	1.55E-02	3.8	0.059	1.50E-02	3.9
Crude Oil tank sediment	Benzene	0.679	1.71E-01	4.0	0.679	1.57E-01	4.3
Hydrotreating Catalyst	Benzene	7.9	3.38E-01	23.4	7.9	6.02E-01	13.1
	Arsenic	1.1	2.11E-02	52.3	1.1	2.24E-02	49.0
Off-spec products and fines (1-param)	Benz(a)anthracene	0.013	9.29E-05	139.9	0.013	2.11E-04	61.8
Off-spec products and fines (2-param)	Benz(a)anthracene	0.013	3.85E-04	33.8	0.013	6.39E-04	20.3
Hydrorefining catalyst	Benzene	1.49	2.26E-01	6.6	1.49	3.19E-01	4.7
	Arsenic	13.71	2.04E-01	67.2	13.71	1.77E-01	77.5
Unleaded gasoline tank sediment	Benzene	0.75	N/A	N/A	0.75	9.94E-02	7.5
HFalkylation sludge	Benzene	0.076	3.98E-02	1.9	0.076	3.73E-02	2.0

* DAF = leachate concentration (TCLP)/Well Conc.

NA - Not Applicable. The two parameter high-end sensitivity analysis was not performed for this waste stream.

Table C.2 Comparison of DAFs for the Two High-End Parameter Analysis (20-year Waste Volumes, Municipal Landfills)

Waste Stream	Constituent	1997 NODA			1998		
		TCLP	Max. 9-year Avg. Well Conc.	DAF *	TCLP	Max. 9-year Avg. Well Conc.	DAF *
CSO sludge	Benzene	0.059	1.55E-02	3.8	0.059	2.15E-02	2.8
Contingent CSO Sludge	Benzene	0.059	1.55E-02	3.8	0.059	2.15E-02	2.8
Crude Oil tank sediment	Benzene	0.679	1.71E-01	4.0	0.679	2.38E-01	2.9
Hydrotreating Catalyst	Benzene	7.9	3.38E-01	23.4	7.9	5.73E-01	13.8
	Arsenic	1.1	2.11E-02	52.3	1.1	1.66E-02	66.1
Off-spec products and fines (1-param)	Benz(a)anthracene	0.013	9.29E-05	139.9	0.013	1.39E-04	93.7
Off-spec products and fines (2-param)	Benz(a)anthracene	0.013	3.85E-04	33.8	0.013	6.96E-04	18.7
Hydrorefining catalyst	Benzene	1.49	2.26E-01	6.6	1.49	4.20E-01	3.6
	Arsenic	13.71	2.04E-01	67.2	13.71	1.18E-01	116.0
Unleaded gasoline tank sediment	Benzene	0.75	N/A	N/A	0.75	1.41E-01	5.3
HFalkylation sludge	Benzene	0.076	3.98E-02	1.9	0.18	6.06E-02	3.0

* DAF = leachate concentration (TCLP)/Well Conc.

NA - Not Applicable. The two parameter high-end sensitivity analysis was not performed for this waste stream.

Table C.3 Comparison of DAFs for the Two High-End Parameter Analysis (30-year Waste Volumes, Industrial Landfills)

Waste Stream	Constituent	1997 NODA			1998		
		TCLP	Max. 9-year Avg. Well Conc.	DAF *	TCLP	Max. 9-year Avg. Well Conc.	DAF *
CSO sludge	Benzene	0.059	1.55E-02	3.8	0.059	1.82E-02	3.2
Contingent CSO Sludge	Benzene	0.059	1.55E-02	3.8	0.059	1.78E-02	3.3
Crude Oil tank sediment	Benzene	0.679	1.71E-01	4.0	0.679	1.91E-01	3.6
Hydrotreating Catalyst	Benzene	39	3.38E-01	115.5	7.9	7.41E-01	10.7
	Arsenic	1.1	2.11E-02	52.3	1.1	3.23E-02	34.0
Off-spec products and fines (1-param)	Benz(a)anthracene	0.013	9.29E-05	139.9	0.013	2.91E-04	44.7
Off-spec products and fines (2-param)	Benz(a)anthracene	0.013	3.85E-04	33.8	0.013	7.02E-04	18.5
Hydrorefining catalyst	Benzene	1.49	2.26E-01	6.6	1.49	3.93E-01	3.8
	Arsenic	13.71	2.04E-01	67.2	13.71	2.61E-01	52.6
Unleaded gasoline tank sediment	Benzene	0.75	N/A	N/A	0.75	1.08E-01	6.9
HFalkylation sludge	Benzene	0.076	3.98E-02	1.9	0.076	3.92E-02	1.9

* DAF = leachate concentration (TCLP)/Well Conc.

NA - Not Applicable. The two parameter high-end sensitivity analysis was not performed for this waste stream.

Table C.4 Comparison of DAFs for the Two High-End Parameter Analysis (30-year Waste Volumes, Municipal Landfills)

Waste Stream	Constituent	1997 NODA			1998		
		TCLP	Max. 9-year Avg. Well Conc.	DAF *	TCLP	Max. 9-year Avg. Well Conc.	DAF *
CSO sludge	Benzene	0.059	1.55E-02	3.8	0.059	2.21E-02	2.7
Contingent CSO Sludge	Benzene	0.059	1.55E-02	3.8	0.059	2.21E-02	2.7
Crude Oil tank sediment	Benzene	0.679	1.71E-01	4.0	0.679	2.39E-01	2.8
Hydrotreating Catalyst	Benzene	93	3.38E-01	275.5	7.9	7.97E-01	9.9
	Arsenic	1.1	2.11E-02	52.3	1.1	2.41E-02	45.6
Off-spec products and fines (1-param)	Benz(a)anthracene	0.013	9.29E-05	139.9	0.013	2.03E-04	64.0
Off-spec products and fines (2-param)	Benz(a)anthracene	0.013	3.85E-04	33.8	0.013	8.56E-04	15.2
Hydrorefining catalyst	Benzene	1.49	2.26E-01	6.6	1.49	4.59E-01	3.2
	Arsenic	13.71	2.04E-01	67.2	13.71	1.77E-01	77.5
Unleaded gasoline tank sediment	Benzene	0.75	N/A	N/A	0.75	1.70E-01	4.4
HFalkylation sludge	Benzene	0.076	3.98E-02	1.9	0.18	6.36E-02	2.8

* DAF = leachate concentration (TCLP)/Well Conc.

NA - Not Applicable. The two parameter high-end sensitivity analysis was not performed for this waste stream.

Table C.5 Comparison of DAFs for the Central Tendency Scenario (20-yr Waste Volume, Industrial Landfills)

Waste Stream	Constituent	1997 NODA			1998		
		TCLP	Max. 9-year Avg. Well Conc.	DAF *	TCLP	Max. 9-year Avg. Well Conc.	DAF *
CSO sludge	Benzene	0.059	4.78E-04	123.4	0.059	2.00E-03	29.5
Contingent CSO Sludge	Benzene	0.059	4.77E-04	123.7	0.059	1.96E-03	30.1
Crude Oil Tank Sludge	Benzene	0.679	5.12E-03	132.6	0.679	2.11E-02	32.2
Hydrotreating Catalyst	Benzene	7.9	3.96E-02	199.5	7.9	4.99E-02	158.3
	Arsenic	1.1	1.92E-03	572.9	1.1	1.23E-03	894.3
Off-spec products and fines (1-param)	Benz(a)anthracene	0.013	4.16E-06	3125.0	0.013	1.02E-05	1274.5
Off-spec products and fines (2-param)	Benz(a)anthracene	0.013	4.16E-06	3125.0	0.013	1.02E-05	1274.5
Hydrorefining catalyst	Benzene	1.49	3.93E-03	379.1	1.49	4.35E-02	34.3
	Arsenic	13.71	1.17E-02	1171.8	13.71	6.82E-03	2010.3
Unleaded gasoline tank sludge	Benzene	0.75	N/A	N/A	0.75	6.69E-03	112.1
HFalkylation sludge	Benzene	0.076	6.42E-04	118.4	0.076	4.00E-03	19.0

* DAF = leachate concentration (TCLP)/Well Conc.

NA - Not Applicable. The two parameter high-end sensitivity analysis was not performed for this waste stream.

Table C.6 Comparison of DAFs for the Central Tendency Scenario (20-yr Waste Volume, Municipal Landfills)

Waste Stream	Constituent	1997 NODA			1998		
		TCLP	Max. 9-year Avg. Well Conc.	DAF *	TCLP	Max. 9-year Avg. Well Conc.	DAF *
CSO sludge	Benzene	0.059	4.78E-04	123.4	0.059	2.90E-03	20.3
Contingent CSO Sludge	Benzene	0.059	4.77E-04	123.7	0.059	2.79E-03	21.1
Crude Oil Tank Sludge	Benzene	0.679	5.12E-03	132.6	0.679	2.93E-02	23.2
Hydrotreating Catalyst	Benzene	7.9	3.96E-02	199.5	7.9	4.26E-02	185.4
	Arsenic	1.1	1.92E-03	572.9	1.1	1.09E-03	1009.2
Off-spec products and fines (1-param)	Benz(a)anthracene	0.013	4.16E-06	3125.0	0.013	1.01E-05	1287.1
Off-spec products and fines (2-param)	Benz(a)anthracene	0.013	4.16E-06	3125.0	0.013	1.01E-05	1287.1
Hydrorefining catalyst	Benzene	1.49	3.93E-03	379.1	1.49	5.80E-02	25.7
	Arsenic	13.71	1.17E-02	1171.8	13.71	5.50E-03	2492.7
Unleaded gasoline tank sludge	Benzene	0.75	N/A	N/A	0.75	5.86E-03	128.0
HFalkylation sludge	Benzene	0.076	6.42E-04	118.4	0.18	9.65E-03	18.7

* DAF = leachate concentration (TCLP)/Well Conc.

NA - Not Applicable. The two parameter high-end sensitivity analysis was not performed for this waste stream.

Table C.7 Comparison of DAFs for the Central Tendency Scenario (30-yr Waste Volume, Industrial Landfills)

Waste Stream	Constituent	1997 NODA			1998		
		TCLP	Max. 9-year Avg. Well Conc.	DAF *	TCLP	Max. 9-year Avg. Well Conc.	DAF *
CSO sludge	Benzene	0.059	4.78E-04	123.4	0.059	2.27E-03	26.0
Contingent CSO Sludge	Benzene	0.059	4.77E-04	123.7	0.059	2.23E-03	26.5
Crude Oil Tank Sludge	Benzene	0.679	5.12E-03	132.6	0.679	2.43E-02	27.9
Hydrotreating Catalyst	Benzene	7.9	3.96E-02	199.5	7.9	7.19E-02	109.9
	Arsenic	1.1	1.92E-03	572.9	1.1	1.84E-03	597.8
Off-spec products and fines (1-param)	Benz(a)anthracene	0.013	4.16E-06	3125.0	0.013	1.31E-05	992.4
Off-spec products and fines (2-param)	Benz(a)anthracene	0.013	4.16E-06	3125.0	0.013	1.31E-05	992.4
Hydrorefining catalyst	Benzene	1.49	3.93E-03	379.1	1.49	5.07E-02	29.4
	Arsenic	13.71	1.17E-02	1171.8	13.71	1.02E-02	1344.1
Unleaded gasoline tank sludge	Benzene	0.75	N/A	N/A	0.75	9.40E-03	79.8
HFalkylation sludge	Benzene	0.076	6.42E-04	118.4	0.076	4.00E-03	19.0

* DAF = leachate concentration (TCLP)/Well Conc.

NA - Not Applicable. The two parameter high-end sensitivity analysis was not performed for this waste stream.

Table C.8 Comparison of DAFs for the Central Tendency Scenario (30-yr Waste Volume, Municipal Landfills)

Waste Stream	Constituent	1997 NODA			1998		
		TCLP	Max. 9-year Avg. Well Conc.	DAF *	TCLP	Max. 9-year Avg. Well Conc.	DAF *
CSO sludge	Benzene	0.059	4.78E-04	123.4	0.059	3.74E-03	15.8
Contingent CSO Sludge	Benzene	0.059	4.77E-04	123.7	0.059	3.64E-03	16.2
Crude Oil Tank Sludge	Benzene	0.679	5.12E-03	132.6	0.679	3.80E-02	17.9
Hydrotreating Catalyst	Benzene	7.9	3.96E-02	199.5	7.9	6.36E-02	124.2
	Arsenic	1.1	1.92E-03	572.9	1.1	1.64E-03	670.7
Off-spec products and fines (1-param)	Benz(a)anthracene	0.013	4.16E-06	3125.0	0.013	1.42E-05	915.5
Off-spec products and fines (2-param)	Benz(a)anthracene	0.013	4.16E-06	3125.0	0.013	1.42E-05	915.5
Hydrorefining catalyst	Benzene	1.49	3.93E-03	379.1	1.49	7.63E-02	19.5
	Arsenic	13.71	1.17E-02	1171.8	13.71	8.24E-03	1663.8
Unleaded gasoline tank sludge	Benzene	0.75	N/A	N/A	0.75	8.70E-03	86.2
HFalkylation sludge	Benzene	0.076	6.42E-04	118.4	0.18	9.91E-03	18.2

* DAF = leachate concentration (TCLP)/Well Conc.

NA - Not Applicable. The two parameter high-end sensitivity analysis was not performed for this waste stream.

APPENDIX D
MONTE CARLO RECEPTOR WELL CONCENTRATIONS

Table D.1 Summary of Receptor Well Concentrations for 1998 Monte Carlo Analyses (30 Year Waste Volumes, Municipal Landfill Areas, Receptor Well Anywhere)

Waste Stream	Constituent	HBN Total (mg/L)	50-th percentile Well Conc. (mg/l)	90-th percentile Well Conc. (mg/l)	95-th percentile Well Conc. (mg/l)	98-th percentile Well Conc. (mg/l)	99-th percentile Well Conc. (mg/l)
CSO sludge	Benzene	6.23E-03	3.44E-07	5.31E-03	1.12E-02	2.0E-02	2.55E-02
Contingent CSO Sludge	Benzene	6.23E-03	9.47E-08	2.58E-03	6.38E-03	1.4E-02	1.95E-02
Crude Oil tank sediment	Benzene	6.23E-03	2.73E-07	1.13E-02	4.47E-02	1.4E-01	2.28E-01
Hydrotreating Catalyst [1]	Benzene	6.23E-03	1.13E-07	1.44E-02	6.90E-02	3.1E-01	7.62E-01
	Arsenic	3.00E-04	2.04E-13	8.73E-04	3.45E-03	9.9E-03	1.92E-02
Off-spec products and fines [2]	Benz(a)anthracene	4.00E-04	0.00E+00	1.42E-05	1.36E-04	7.7E-04	1.77E-03
Off-spec products and fines [3]	Benz(a)anthracene	4.00E-04	0.00E+00	1.29E-05	1.10E-04	6.2E-04	1.13E-03
Hydrorefining catalyst [1]	Benzene	6.23E-03	3.94E-07	1.87E-02	4.91E-02	2.1E-01	5.15E-01
	Arsenic	3.00E-04	1.08E-09	1.16E-02	4.38E-02	2.0E-01	4.73E-01
Unleaded gasoline tank sediment	Benzene	6.23E-03	1.76E-09	2.64E-03	1.17E-02	5.1E-02	1.12E-01
HFalkylation sludge	Benzene	6.23E-03	1.20E-07	3.97E-03	9.58E-03	1.9E-02	2.73E-02
Co-disposal with H/Cracking	Benzene	6.23E-03	6.30E-10	1.81E-03	7.55E-03	2.7E-02	6.22E-02
	Arsenic	3.00E-04	1.18E-23	5.77E-05	2.53E-04	9.2E-04	1.97E-03
Co-disposal without H/Cracking	Benzene	6.23E-03	5.00E-10	1.58E-03	6.83E-03	2.6E-02	5.32E-02
	Arsenic	3.00E-04	1.32E-23	6.02E-05	2.64E-04	9.4E-04	1.81E-03

1. For hydrotreating and hydrorefining, all waste quantities, except those managed in Subtitle C landfills, were modeled including reclaimed waste.
2. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value and non-detect values of 0.05 mg/l were included in the analysis.
3. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value and non-detect values of 0.05 mg/l were excluded from the analysis.

Table D.2 Summary of Receptor Well Concentrations for 1998 Monte Carlo Analyses (30 Year Waste Volumes, Municipal Landfill Areas, Receptor Well within Plume)

Waste Stream	Constituent	HBN Total (mg/L)	50-th percentile Well Conc. (mg/l)	90-th percentile Well Conc. (mg/l)	95-th percentile Well Conc. (mg/l)	98-th percentile Well Conc. (mg/l)	99-th percentile Well Conc. (mg/l)
CSO sludge	Benzene	6.23E-03	3.10E-04	7.96E-03	1.35E-02	2.03E-02	2.53E-02
Contingent CSO Sludge	Benzene	6.23E-03	2.11E-04	5.20E-03	9.36E-03	1.56E-02	2.11E-02
Crude Oil tank sediment	Benzene	6.23E-03	6.01E-04	3.47E-02	8.81E-02	0.2076	3.26E-01
Hydrotreating Catalyst [1]	Benzene	6.23E-03	9.43E-04	6.63E-02	2.04E-01	0.6707	1.29E+00
	Arsenic	3.00E-04	3.84E-05	2.79E-03	6.88E-03	1.64E-02	2.68E-02
Off-spec products and fines [2]	Benz(a)anthracene	4.00E-04	2.99E-08	1.21E-04	4.33E-04	1.53E-03	2.72E-03
Off-spec products and fines [3]	Benz(a)anthracene	4.00E-04	2.35E-08	9.46E-05	3.40E-04	9.75E-04	1.74E-03
Hydrorefining catalyst [1]	Benzene	6.23E-03	1.31E-03	4.49E-02	0.1107	0.3985	6.48E-01
	Arsenic	3.00E-04	5.14E-04	3.57E-02	1.09E-01	0.3118	5.76E-01
Unleaded gasoline tank sediment	Benzene	6.23E-03	1.85E-04	1.24E-02	3.52E-02	0.09226	1.54E-01
HFalkylation sludge	Benzene	6.23E-03	2.89E-04	7.72E-03	1.30E-02	2.35E-02	3.40E-02
Co-disposal with H/Cracking	Benzene	6.23E-03	9.24E-05	6.48E-03	1.71E-02	4.97E-02	9.70E-02
	Arsenic	3.00E-04	1.16E-06	2.25E-04	6.19E-04	1.87E-03	4.09E-03
Co-disposal without H/Cracking	Benzene	6.23E-03	8.25E-05	5.41E-03	1.36E-02	3.73E-02	6.83E-02
	Arsenic	3.00E-04	1.23E-06	2.34E-04	6.05E-04	1.96E-03	3.89E-03

1. For hydrotreating and hydrorefining, all waste quantities, except those managed in Subtitle C landfills, were modeled including reclaimed waste.
2. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value and non-detect values of 0.05 mg/l were included in the analysis.
3. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value and non-detect values of 0.05 mg/l were excluded from the analysis.

Table D.3 Summary of Receptor Well Concentrations for 1998 TC Capped Monte Carlo Analyses (30 Year Waste Volumes, Municipal Landfill Areas, Receptor Well Anywhere)

Waste Stream	Constituent	HBN Total (mg/L)	50-th percentile Well Conc. (mg/l)	90-th percentile Well Conc. (mg/l)	95-th percentile Well Conc. (mg/l)	98-th percentile Well Conc. (mg/l)	99-th percentile Well Conc. (mg/l)
CSO sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA
Contingent CSO Sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA
Crude Oil tank sediment	Benzene	6.23E-03	4.68E-08	7.85E-03	3.21E-02	8.5E-02	0.1247
Hydrotreating Catalyst [1]	Benzene	6.23E-03	1.73E-08	8.91E-03	3.35E-02	8.5E-02	0.1397
	Arsenic	3.00E-04	NA	NA	NA	NA	NA
Off-spec products and fines [2]	Benz(a)anthracene	4.00E-04	NA	NA	NA	NA	NA
Off-spec products and fines [3]	Benz(a)anthracene	4.00E-04	NA	NA	NA	NA	NA
Hydrorefining catalyst [1]	Benzene	6.23E-03	3.51E-07	1.53E-02	3.88E-02	7.5E-02	0.1167
	Arsenic	3.00E-04	1.21E-09	1.11E-02	4.12E-02	1.8E-01	0.3879
Unleaded gasoline tank sediment	Benzene	6.23E-03	2.03E-09	2.45E-03	1.02E-02	4.3E-02	8.11E-02
HFalkylation sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA
Co-disposal with H/Cracking	Benzene	6.23E-03	NA	NA	NA	NA	NA
	Arsenic	3.00E-04	NA	NA	NA	NA	NA
Co-disposal without H/Cracking	Benzene	6.23E-03	NA	NA	NA	NA	NA
	Arsenic	3.00E-04	NA	NA	NA	NA	NA

1. For hydrotreating and hydrorefining, all waste quantities, except those managed in Subtitle C landfills, were modeled including reclaimed waste.
2. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value and non-detect values of 0.05 mg/l were included in the analysis.
3. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value and non-detect values of 0.05 mg/l were excluded from the analysis.

NA : Not applicable because TCLP values were below the TC Rule level or because TC values are not available for the constituent.

Table D.4 Summary of Receptor Well Concentrations for 1998 TC Capped Monte Carlo Analyses (30 Year Waste Volumes, Municipal Landfill Areas, Receptor Well within Plume)

Waste Stream	Constituent	HBN Total (mg/L)	50-th percentile Well Conc. (mg/l)	90-th percentile Well Conc. (mg/l)	95-th percentile Well Conc. (mg/l)	98-th percentile Well Conc. (mg/l)	99-th percentile Well Conc. (mg/l)
CSO sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA
Contingent CSO Sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA
Crude Oil tank sediment	Benzene	6.23E-03	4.7E-04	2.34E-02	5.43E-02	1.1E-01	1.52E-01
Hydrotreating Catalyst [1]	Benzene	6.23E-03	6.4E-04	2.41E-02	5.52E-02	1.1E-01	1.53E-01
	Arsenic	3.00E-04	NA	NA	NA	NA	NA
Off-spec products and fines [2]	Benz(a)anthracene	4.00E-04	NA	NA	NA	NA	NA
Off-spec products and fines [3]	Benz(a)anthracene	4.00E-04	NA	NA	NA	NA	NA
Hydrorefining catalyst [1]	Benzene	6.23E-03	1.1E-03	2.86E-02	5.23E-02	9.8E-02	1.43E-01
	Arsenic	3.00E-04	5.1E-04	3.20E-02	9.55E-02	2.6E-01	4.35E-01
Unleaded gasoline tank sediment	Benzene	6.23E-03	1.4E-04	9.32E-03	2.44E-02	5.6E-02	8.65E-02
HFalkylation sludge	Benzene	6.23E-03	NA	NA	NA	NA	NA
Co-disposal with H/Cracking	Benzene	6.23E-03	NA	NA	NA	NA	NA
	Arsenic	3.00E-04	NA	NA	NA	NA	NA
Co-disposal without H/Cracking	Benzene	6.23E-03	NA	NA	NA	NA	NA
	Arsenic	3.00E-04	NA	NA	NA	NA	NA

1. For hydrotreating and hydrorefining, all waste quantities, except those managed in Subtitle C landfills, were modeled including reclaimed waste.
2. The TCLP conc. was estimated and was assumed to represent mean or expected TCLP value and non-detect values of 0.05 mg/l were included in the analysis.
3. The TCLP conc. was estimated and assumed to represent maximum or high-end TCLP value and non-detect values of 0.05 mg/l were excluded from the analysis.

NA : Not applicable because TCLP values were below the TC Rule level or because TC values are not available for the constituent.