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Impact Assessment of Mercury Uncertainties within the SDF PA and SDF Special Analyses

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ACRONYMS/ABBREVIATIONS

EPA	U.S. Environmental Protection Agency
Hg	Mercury
IHI	Inadvertent Human Intruder
K_d	Distribution Coefficient
MCL	Maximum Contaminant Level
PA	Performance Assessment
SA	Special Analysis
SDF	Saltstone Disposal Facility
SDU	Saltstone Disposal Unit
WAC	Waste Acceptance Criteria

1.0 BACKGROUND

The Saltstone Disposal Facility (SDF) Performance Assessment (PA) modeled the future fate and transport of multiple radionuclides and chemicals, including mercury (Hg). [SRR-CWDA-2009-00017] The subsequent Special Analyses (SAs) modeled only the radionuclides because Section 5.2 of the SDF PA demonstrated that the chemicals were consistently well below drinking water standards. [SRR-CWDA-2013-00062; SRR-CWDA-2014-00006; SRR-CWDA-2009-00017] With concentrations that were more than 10 orders of magnitude below the 2 µg/L maximum contaminant level (MCL), Hg was no exception to this conclusion. A recent interoffice memorandum simulated Hg release and transport using the latest SDF inventory values and configuration (i.e., assuming disposal within 375-foot diameter cylindrical disposal units). This recent effort further demonstrated that Hg releases are not significant with respect to the 2 µg/L MCL. [SRR-CWDA-2015-00039]

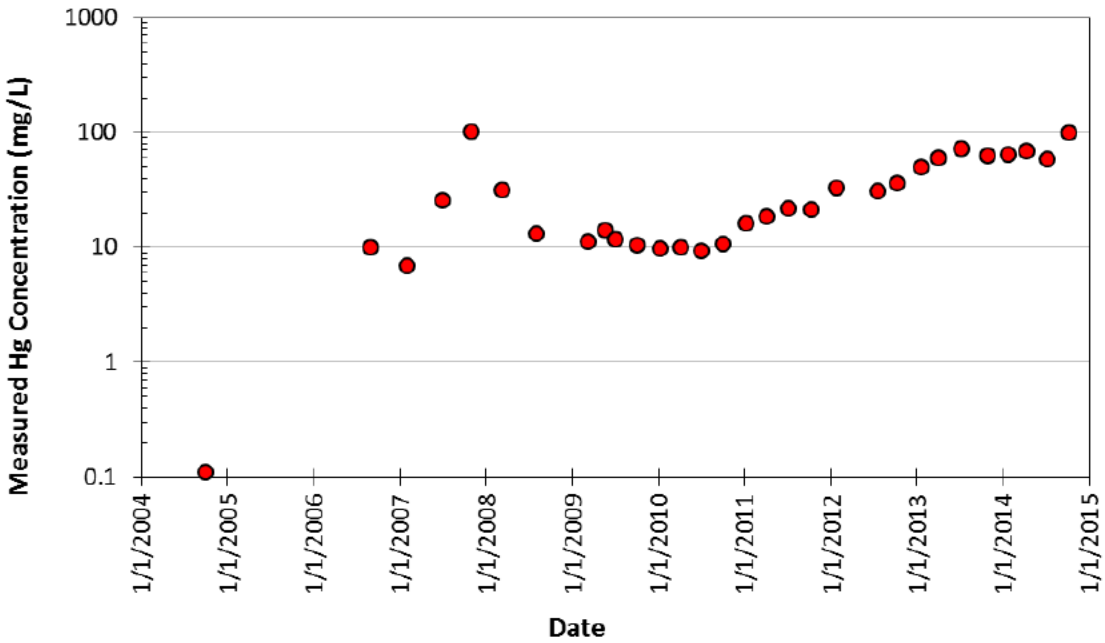
As a modeling simplification, all of the PA and SA models simulated Hg as an elemental contaminant (i.e., no credit is taken for differences in transport properties for different chemical forms of Hg, such as organic versus inorganic Hg). The distribution coefficients (K_d values)—an important species-dependent transport property—were applied using the same relatively conservative values for all Hg, regardless of the different chemical forms. Note that K_d values measure the retardation of transport through various media, such that smaller values indicate less retardation and faster transport.

All previous modeling demonstrated that under normal modeling conditions (i.e., Base Case for the PA or Evaluation Cases for the Special Analyses), the releases of Hg from Saltstone Disposal Unit (SDU) 4 dominate the concentrations, resulting in the highest concentrations occurring at points of assessment which are downstream from SDU 4 (along the 100 meter boundary of Sectors B and C and at the Inadvertent Human Intruder (IHI) Well 7, followed by IHI Well 6). Figure 1-1 provides the SDF layout considered for modeling. SDU 4 releases more Hg, relative to the other SDUs, because conservative assumptions have been made regarding the concrete degradation and the effectiveness of the vault with respect to inhibiting flow.

Figure 1-1: SDF 100-Meter Modeled Cells, Sectors, and IHI Wells

To date, SDUs 1, 4, 2A, and 2B are filled (i.e., disposal operations have ceased) and SDU 5B is more than half filled. During filling, samples have been collected from the feed tank and analyzed. Based on these analyses, the inventory of as-disposed Hg within the SDF is well known. Figure 1-2 shows the concentrations of Hg in the waste feed over time. These concentrations do not distinguish between different forms of Hg (e.g., organic versus inorganic). Note that these are waste concentrations and not disposed concentrations. As part of the disposal process, the waste feed is added to dry feeds (cement, blast furnace slag, and fly ash) to transform the liquid waste into the saltstone waste form. As such, the concentrations in the waste feed are more concentrated than in the final disposed waste form.

Figure 1-2: Concentrations of Hg (mg/L) in the Liquid Waste Feed Sent to SDF



Based on these concentrations and disposal volumes, the total inventory of Hg within SDUs 1, 4, 2A, 2B, and 5B are known, as provided in Table 1-1.

Table 1-1: Hg Inventory for SDF

SDF Unit	Hg Inventory (kg) Assumed for the SDF PA	Actual Hg Inventory (kg)
SDU 1	1.5	220
SDU 4	980	765
SDU 2A	150	340
SDU 2B	150	223
SDU 5B	150	306 [a]
Other 150-ft Diameter SDUs	150	150 [b]
375-ft Diameter SDUs	N/A	1243 [c]

Notes: Source: SRR-CWDA-2015-00039, Table 1
(a) Assumes twice the 153 kg currently disposed.
(b) Assumed values based on PA.
(c) Volume equivalent of 150 kg per 150-foot diameter SDU.

2.0 DEVELOPMENT OF INPUTS FOR SENSITIVITY MODELS

For sensitivity modeling, three parameters will be modified and the results will be evaluated. The three parameters shall be (1) the Hg K_d values, (2) the Hg inventory, and (3) the percentage of Hg inventory that is organic Hg.

2.1 Mercury K_d Values

No site-specific K_d values for organic Hg have been developed. However, a literature review of K_d values for metals in soil performed by the U.S. Environmental Protection Agency (EPA) indicated that K_ds for methylmercury (MeHg), a common form of organic Hg, have a median value of approximately 630 mL/g and a mean of approximately 500 mL/g. [EPA/600/R-05/074] It should be noted that the EPA literature review also provided K_ds for inorganic ionic Hg (i.e., Hg(II)) with a median of approximately 6,300 mL/g and a mean of approximately 4,000 mL/g; whereas the SDF PA and SAs apply more conservative values of 1,000 mL/g in clayey soil and 800 mL/g in sandy soil. [SRNL-STI-2009-00473] Further, no K_d values for MeHg within cementitious materials were identified. Therefore, some assumptions shall be applied to assign organic MeHg K_d values for modeling. First, for MeHg in clay, the mean soil K_d of 500 mL/g will be assumed. This is conservative since the EPA values may be more indicative of sandy soil than clay. Next, because the PA uses a sand K_d for Hg (800 mL/g) that was 80% of the respective clay K_d (1,000 mL/g), the sand K_d for MeHg (400 mL/g) shall also assume 80% of the respective clay K_d. Finally, because there is currently no data available for MeHg in cementitious materials, MeHg will be modeled with the same cementitious K_ds as Hg. These assumed values are provided in Table 2-1.

Table 2-1: Hg K_ds Assigned for SDF Transport Modeling (Evaluation Sensitivity Case)

Hg Form	Material	K_d (mL/g)	Reference	Notes
Hg	clayey	1.0E+03	SRNL-STI-2009-00473, Table 16	
Hg	clayey (leach)	3.2E+03	SRNL-STI-2009-00473, Table 13	Clayey K_d times Leachate Factor (3.2)
Hg	sandy	8.0E+02	SRNL-STI-2009-00473, Table 16	
Hg	sandy (leach)	2.56E+03	SRNL-STI-2009-00473, Table 13	Sandy K_d times Leachate Factor (3.2)
MeHg	clayey	5.0E+02	EPA/600/R-05/074, Table 3	Mean soil K_d from EPA literature review
MeHg	clayey (leach)	1.6E+03	SRNL-STI-2009-00473, Table 13	Clayey K_d times Leachate Factor (3.2)
MeHg	sandy	4.0E+02	EPA/600/R-05/074, Table 3	Mean soil K_d, scaled from clayey to sandy
MeHg	sandy (leach)	1.28E+03	SRNL-STI-2009-00473, Table 13	Sandy K_d times Leachate Factor (3.2)
Hg and MeHg	oxidizing young	3.0E+02	SRNL-STI-2009-00473, Table 17	Assumes MeHg=Hg in cementitious materials
Hg and MeHg	oxidizing middle	3.0E+02	SRNL-STI-2009-00473, Table 17	Assumes MeHg=Hg in cementitious materials
Hg and MeHg	oxidizing old	1.0E+02	SRNL-STI-2009-00473, Table 17	Assumes MeHg=Hg in cementitious materials
Hg and MeHg	reducing young	5.0E+03	SRNL-STI-2009-00473, Table 18	Assumes MeHg=Hg in cementitious materials
Hg and MeHg	reducing middle	5.0E+03	SRNL-STI-2009-00473, Table 18	Assumes MeHg=Hg in cementitious materials
Hg and MeHg	reducing old	1.0E+03	SRNL-STI-2009-00473, Table 18	Assumes MeHg=Hg in cementitious materials

Two assumptions about the K_d values shall be applied for conducting conservative K_d sensitivity studies. First, for soil K_d values, the assumed leachate impacts (i.e, pH buffering resulting from the SDU chemical properties leaching into the soil) shall be ignored. This shall be implemented by applying the clayey and sandy K_d values to all soils without applying the Hg leachate factor of 3.2 (from Table 13 of SRNL-STI-2009-00473). Second, no credit will be taken transport retardation within cementitious materials. The current model cannot handle 0 mL/g K_d values (it results in a divide-by-zero error), so this is modeled by applying a very small, non-zero K_d value of 1.0E-30 mL/g. Table 2-2 provides the K_d values to be used for conservative sensitivity cases.

Table 2-2: Hg K_ds Assigned for SDF Transport Modeling (Conservative Sensitivity Cases)

Hg Form	Material	K_d (mL/g)	Reference	Notes
Hg	clayey	1.0E+03	SRNL-STI-2009-00473, Table 16	
Hg	clayey (leach)	1.0E+03	SRNL-STI-2009-00473, Table 16	Assumes no leachate impacts
Hg	sandy	8.0E+02	SRNL-STI-2009-00473, Table 16	
Hg	sandy (leach)	8.0E+02	SRNL-STI-2009-00473, Table 16	Assumes no leachate impacts
MeHg	clayey	5.0E+02	EPA/600/R-05/074, Table 3	Mean soil K_d
MeHg	clayey (leach)	5.0E+02	SRNL-STI-2009-00473, Table 13	Assumes no leachate impacts
MeHg	sandy	4.0E+02	EPA/600/R-05/074, Table 3	Mean soil K_d, scaled from clayey to sandy
MeHg	sandy (leach)	4.0E+02	SRNL-STI-2009-00473, Table 13	Assumes no leachate impacts
Hg and MeHg	oxidizing young	1.0e-30	Conservative Assumption	Assumes that 1e-30 mL/g is effectively 0
Hg and MeHg	oxidizing middle	1.0e-30	Conservative Assumption	Assumes that 1e-30 mL/g is effectively 0
Hg and MeHg	oxidizing old	1.0e-30	Conservative Assumption	Assumes that 1e-30 mL/g is effectively 0
Hg and MeHg	reducing young	1.0e-30	Conservative Assumption	Assumes that 1e-30 mL/g is effectively 0
Hg and MeHg	reducing middle	1.0e-30	Conservative Assumption	Assumes that 1e-30 mL/g is effectively 0
Hg and MeHg	reducing old	1.0e-30	Conservative Assumption	Assumes that 1e-30 mL/g is effectively 0

2.2 Mercury Inventories

The first set of inventories considered will be the actual inventories, as provided in Table 1-1. For sensitivity studies, two conservative sets will be considered: two times the expected inventory and ten times the expected inventory. Note, however, that the inventories for SDUs 1, 4, 2A, 2B, and 5B are known, as previously described. Therefore, the inventories in these SDUs will not be modified for the sensitivity analyses. Table 2-3 summarizes the inventory values that will be considered for conservative inventory sensitivity cases.

Based on the values provided in this table, the resulting total Hg inventory for the entire SDF, before applying the multipliers, is 11,005 kg (or 12.1 tons). When the factor of 10 multiplier is applied, the total SDF inventory of Hg increases to 93,364 kg (or 103 tons).

Table 2-3: SDF Inventory Values for Hg Sensitivity Cases

SDU	Updated Inventory [a] (kg)	Updated Inventory × 2 [b] (kg)	Updated Inventory × 10 [b] (kg)	WAC-Based Inventory [b,c] (kg)	WAC-Based Inventory × 2 [b,d] (kg)
SDU 1	220	220	220	220	220
SDU 4	765	765	765	765	765
SDU 2A	340	340	340	340	340
SDU 2B	223	223	223	223	223
SDU 5B	306	306	306	306	306
All other 150 ft SDUs	150	300	1,500	2,413	4,826
Each 375 ft SDU	1,243	2,486	12,430	29,121	58,242

Notes: (a) Based on updated inventory from SRR-CWDA-2015-00039.
(b) For SDUs that are already filled, there is no change to the inventory.
(c) Based on a maximum concentration of 350 mg/L and a volumetric ratio of 0.628 for salt solution to saltstone.
(d) Based on a maximum concentration of 700 mg/L and a volumetric ratio of 0.628 for salt solution to saltstone.

Two additional sets of inventories shall also be considered based on the current Waste Acceptance Criteria (WAC) for the SDF. Attachment 8.1 of the WAC indicates a maximum Hg concentration of 260 mg/kg; which is converted to 325 mg/L based on an assumed aqueous waste density of 1.25 g/mL. [X-SD-Z-00001] For conservatism, the first additional inventory assumes a slightly higher concentration than the current WAC (i.e., 350 mg/L) and applies this concentration to the unfilled volume of the SDUs. The second additional inventory doubles this assumption, applying a concentration of 700 mg/L to the unfilled volumes.

Assuming that the 150-foot diameter SDUs have 2.9M gallons (11.0M liters) of fillable space, and a volumetric ratio of 0.628 for salt solution to saltstone (X-CLC-Z-00070, Table 11), the 350 mg/L of Hg equates to 2,413 kg for the 150-foot diameter SDUs. Similarly, assuming that the 375-foot diameter SDUs have 35M gallons (132M liters) of fillable space, and a volumetric ratio of 0.628 for salt solution to saltstone, the 350 mg/L of Hg equates to 29,121 kg for the 375-foot diameter SDUs. Assuming 700 mg/L of Hg doubles these values.

Because these alternative inventories are considered bounding, the resulting values do not reflect expected conditions but can be useful for informed decision-making. As such, they will only be applied to the most conservative sensitivity run (i.e., conservative K_ds and 100% MeHg) to provide extreme bounding results.

2.3 Percentage of Mercury that is Assumed to be Organic

For simplicity, three cases are considered for evaluating the percentage of Hg that is organic. For the first cases, as with the PA Base Case and the Evaluation Cases of the Special Analyses, none of the inventory shall be organic (MeHg = 0%). Next, sensitivity cases will assume that half of the Hg inventory is organic (MeHg = 50%). Finally, conservative sensitivity cases will assume that all of the Hg inventory is organic (MeHg = 100%).

2.4 Summary of Sensitivity Case Models

Based on the inputs and sensitivity cases described above, 20 Hg sensitivity cases have been developed from the GoldSim model from the FY2014 SDF SA. [SRR-CWDA-2014-00006] Table 2-4 summarizes these cases.

Table 2-4: SDF Sensitivity Cases Considered for Organic Hg Evaluations

Case	Description	K_ds	Hg Inventory	Percent of Hg that Is MeHg
Hg01	Evaluation Case (Hg = 0% MeHg)	Evaluation Case	Evaluation Case	0%
Hg02	Evaluation Case (Hg = 50% MeHg)	Evaluation Case	Evaluation Case	50%
Hg03	Evaluation Case (Hg = 100% MeHg)	Evaluation Case	Evaluation Case	100%
Hg04	Doubled Inventory (Hg = 0% MeHg)	Evaluation Case	Evaluation Case × 2	0%
Hg05	Doubled Inventory (Hg = 50% MeHg)	Evaluation Case	Evaluation Case × 2	50%
Hg06	Doubled Inventory (Hg = 100% MeHg)	Evaluation Case	Evaluation Case × 2	100%
Hg07	Ten Times Inventory (Hg = 0% MeHg)	Evaluation Case	Evaluation Case × 10	0%
Hg08	Ten Times Inventory (Hg = 50% MeHg)	Evaluation Case	Evaluation Case × 10	50%
Hg09	Ten Times Inventory (Hg = 100% MeHg)	Evaluation Case	Evaluation Case × 10	100%
Hg10	Evaluation Case (Hg = 0% MeHg), Conservative K_ds	Conservative	Evaluation Case	0%
Hg11	Evaluation Case (Hg = 50% MeHg), Conservative K_ds	Conservative	Evaluation Case	50%
Hg12	Evaluation Case (Hg = 100% MeHg), Conservative K_ds	Conservative	Evaluation Case	100%
Hg13	Doubled Inventory (Hg = 0% MeHg), Conservative K_ds	Conservative	Evaluation Case × 2	0%
Hg14	Doubled Inventory (Hg = 50% MeHg), Conservative K_ds	Conservative	Evaluation Case × 2	50%
Hg15	Doubled Inventory (Hg = 100% MeHg), Conservative K_ds	Conservative	Evaluation Case × 2	100%
Hg16	Ten Times Inventory (Hg = 0% MeHg), Conservative K_ds	Conservative	Evaluation Case × 10	0%
Hg17	Ten Times Inventory (Hg = 50% MeHg), Conservative K_ds	Conservative	Evaluation Case × 10	50%
Hg18	Ten Times Inventory (Hg = 100% MeHg), Conservative K_ds	Conservative	Evaluation Case × 10	100%
Hg19	WAC-Based Inventory (Hg = 100% MeHg), Conservative K_ds	Conservative	Based on 350 mg/L	100%
Hg20	Doubled WAC-Based Inventory (Hg = 100% MeHg), Conservative K_ds	Conservative	Based on 700 mg/L	100%

The first modeling case (Hg01) represents all of the same assumptions as previous Base Case and Evaluation Case modeling, except the most current Hg inventory values are applied. The second modeling case (Hg02) represents the most reasonable modeling assumptions in light of new information regarding organic Hg (SRNL-L3100-2015-00084), in which all values reflect expected values. Modeling Case Hg05 (doubled inventory) and Hg11 (conservative K_ds) both represent reasonably conservative variations of Modeling Case Hg02. Modeling Cases Hg18, Hg19, and Hg20 are extremely conservative and are not considered reasonable or realistic, but these are included to provide insight to maximum potential impacts from the various possible modeling assumptions.

3.0 MODELING RESULTS

Figures 3-1 and 3-2 provide the concentration results over time for the first 18 modeling cases at the 100-meter points of assessment and the IHI Wells, respectively. Collectively, the results of these 18 modeling cases can be organized into four sets. All results presented represent the maximum values regardless of specific locations (either along the 100-meter boundary or at specific IHI wells). It should be noted that during the first 1,000 years after closure, every modeling case considered showed Hg or MeHg concentrations were less than 1.0E-30 µg/L.

The first set had the lowest concentrations and includes the results from the modeling cases which applied Evaluation Case K_d values and 0% MeHg (Hg01, Hg04, and Hg07). These cases showed no impact from increasing the inventories of the unfilled SDUs. This is because the releases from SDU 4 dominated the peak concentrations, and no change was applied to the inventory values in SDU 4 because the inventory within this SDU is known. At the 100-meter points of assessment, the highest concentrations never exceeded 1.0E-30 µg/L within 10,000 years and only reached 2.0E-24 µg/L within 20,000 years. For the IHI wells, the 10,000-year results peak at 2.4E-26 µg/L and the 20,000-year results peak at 5.9E-18 µg/L. These values reflected expected conditions prior to the understanding that a significant amount of the Hg in the feed stream may be organic Hg.

The second set of results had the next lowest concentrations and includes the results from the modeling cases which applied Evaluation Case K_d values and 50% MeHg (Hg02, Hg05, and Hg08) or 100% MeHg (Hg03, Hg06, and Hg09). As with the first set of results, these cases showed no impact from increasing the inventories of the unfilled SDUs because of the continued dominance of the releases from SDU 4. At the 100-meter points of assessment, the concentrations ranged between 9.4E-28 µg/L and 1.9E-27 µg/L within 10,000 years and only reached 7.9E-16 µg/L within 20,000 years. For the IHI wells, the 10,000-year results peak at 3.6E-20 µg/L and the 20,000-year results peak at 2.8E-18 µg/L. These values reflect current expected conditions, applying a significant percentage of the total Hg inventory as MeHg.

The third set includes those modeling cases which apply the conservative K_d values and 0% MeHg (Hg10, Hg13, and Hg16). At the 100-meter points of assessment, the highest concentrations only reached 1.1E-22 µg/L within 10,000 years and 1.1E-10 µg/L within 20,000 years. For the IHI wells, the concentrations only reached 2.7E-13 µg/L within 10,000 years and 3.3E-06 µg/L within 20,000 years. These values do not reflect any expected conditions but provide insight into the combined impacts of increased inventory and conservative K_d values when organic Hg is not a factor.

The final and most conservative set of modeling results (with the highest concentrations) includes those modeling cases which apply the conservative K_d values and 50% MeHg (Hg11, Hg14, and Hg17) or 100% MeHg (Hg12, Hg15, and Hg18). At the 100-meter points of assessment, the concentrations ranged between 7.4E-15 µg/L and 2.4E-14 µg/L within 10,000 years and only reached 3.3E-04 µg/L within 20,000 years. For the IHI wells, the 10,000-year results peak at 1.0E-07 µg/L and the 20,000-year results peak at 4.8E-02 µg/L. These values do not reflect any expected conditions but are used to demonstrate that even under the most conservative conditions (i.e., conservative K_d values, increased inventory, and 50% to 100% organic Hg), the total Hg concentrations do not exceed the 2 µg/L MCL.

Figure 3-1: Maximum SDF Groundwater Concentrations of Hg (µg/L) at the 100-Meter Points of Assessment

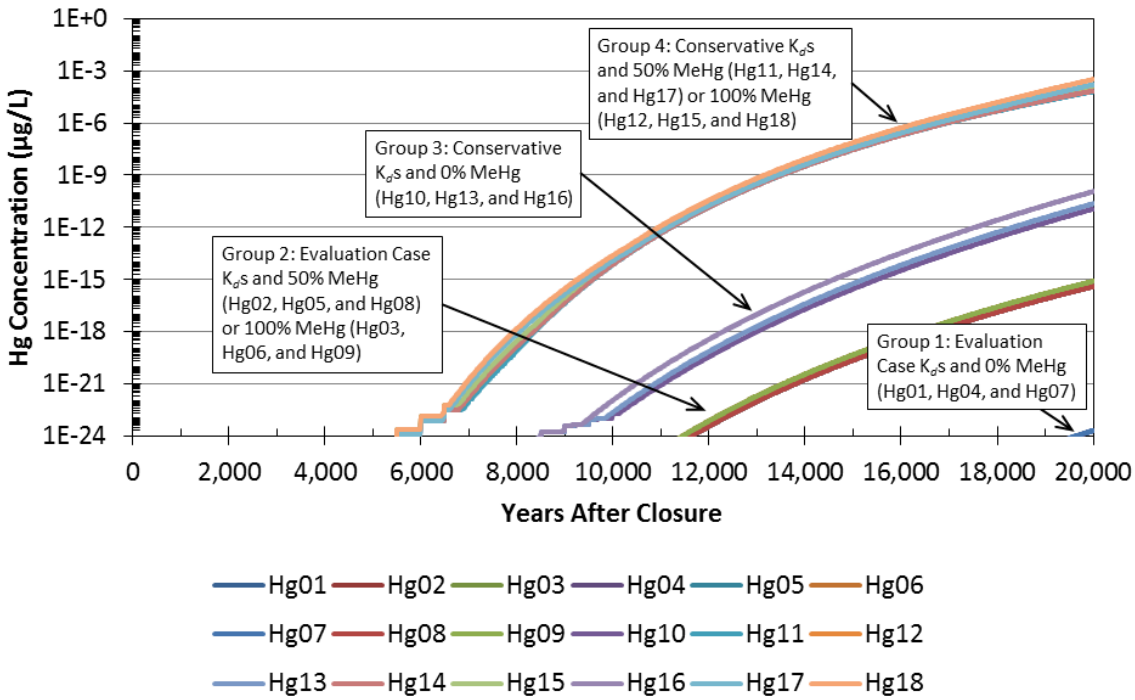
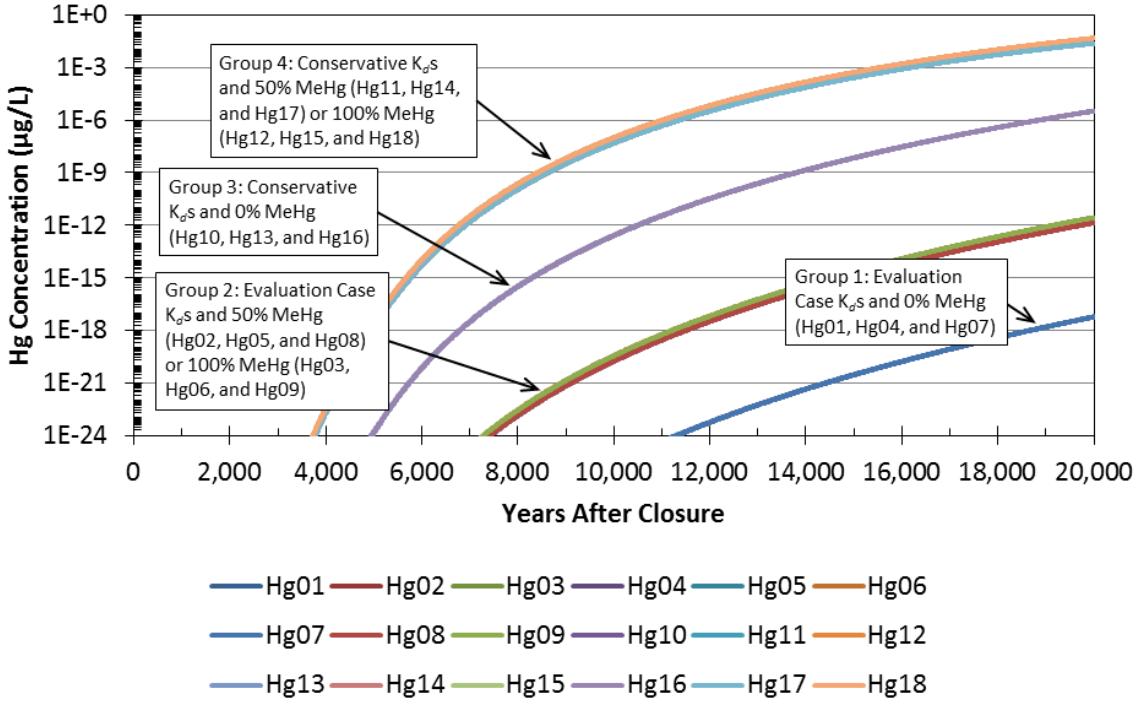


Figure 3-2: Maximum SDF Groundwater Concentrations of Hg (µg/L) at the IHI Wells



Tables 3-1 through 3-4 provide the peak values resulting from each of the first 18 modeling cases.

Table 3-1: Peak Hg Concentrations (µg/L) at the SDF 100-Meter Points of Assessment, Within 10,000 Years of Facility Closure

		MeHg Percentage		
K_d Assumptions	**Inventory Factor**	**0%**	**50%**	**100%**
Evaluation Case	**× 1**	<1.00E-30	9.4E-28	1.9E-27
Evaluation Case	**× 2**	<1.00E-30	9.4E-28	1.9E-27
Evaluation Case	**× 10**	<1.00E-30	9.4E-28	1.9E-27
Conservative	**× 1**	1.9E-23	7.4E-15	1.5E-14
Conservative	**× 2**	2.3E-23	7.6E-15	1.5E-14
Conservative	**× 10**	1.1E-22	1.2E-14	2.4E-14

Table 3-2: Peak Hg Concentrations (µg/L) at the SDF 100-Meter Points of Assessment, Within 20,000 Years of Facility Closure

		MeHg Percentage		
K_d Assumptions	**Inventory Factor**	**0%**	**50%**	**100%**
Evaluation Case	**× 1**	2.0E-24	3.9E-16	7.9E-16
Evaluation Case	**× 2**	2.0E-24	3.9E-16	7.9E-16
Evaluation Case	**× 10**	2.0E-24	3.9E-16	7.9E-16
Conservative	**× 1**	1.1E-11	6.4E-05	1.3E-04
Conservative	**× 2**	2.3E-11	7.1E-05	1.4E-04
Conservative	**× 10**	1.1E-10	1.6E-04	3.3E-04

Table 3-3: Peak Hg Concentrations (µg/L) at the SDF IHI Wells, Within 10,000 Years of Facility Closure

		MeHg Percentage		
K_d Assumptions	**Inventory Factor**	**0%**	**50%**	**100%**
Evaluation Case	**× 1**	2.4E-26	1.8E-20	3.6E-20
Evaluation Case	**× 2**	2.4E-26	1.8E-20	3.6E-20
Evaluation Case	**× 10**	2.4E-26	1.8E-20	3.6E-20
Conservative	**× 1**	2.7E-13	5.0E-08	1.0E-07
Conservative	**× 2**	2.7E-13	5.0E-08	1.0E-07
Conservative	**× 10**	2.7E-13	5.0E-08	1.0E-07

Table 3-4: Peak Hg Concentrations (µg/L) at the SDF IHI Wells, Within 20,000 Years of Facility Closure

		MeHg Percentage		
K_d Assumptions	**Inventory Factor**	**0%**	**50%**	**100%**
Evaluation Case	**× 1**	5.9E-18	1.4E-12	2.8E-12
Evaluation Case	**× 2**	5.9E-18	1.4E-12	2.8E-12
Evaluation Case	**× 10**	5.9E-18	1.4E-12	2.8E-12
Conservative	**× 1**	3.3E-06	2.4E-02	4.8E-02
Conservative	**× 2**	3.3E-06	2.4E-02	4.8E-02
Conservative	**× 10**	3.3E-06	2.4E-02	4.8E-02

3.1 Results from WAC-Based Inventory Sensitivities

Figure 3-3 provides the concentration results over time for the three most conservative sensitivity runs considered, including the WAC-based inventory values, (Hg18, Hg19, and Hg20) at the maximum 100-meter point of assessment and the IHI Wells. Table 3-5 provides the peak values resulting from each of these modeling cases. Despite being unrealistically conservative, none of these results exceed the 2 µg/L MCL for Hg within 20,000 years. Again, note that during the first 1,000 years after closure, the Hg or MeHg concentrations were less than 1.0E-30 µg/L.

Figure 3-3: Maximum SDF Groundwater Concentrations of Hg (µg/L) at the 100-Meter Points of Assessment and IHI Wells for the Three Most Bounding Sensitivities

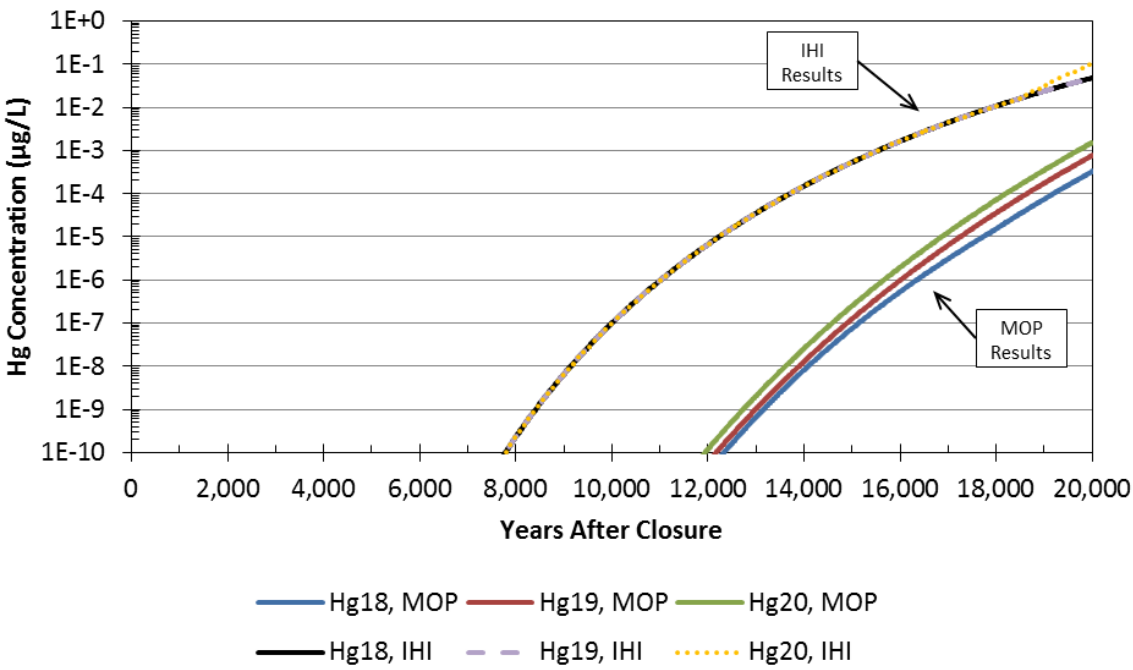


Table 3-5: Peak Hg Concentrations (µg/L) at the SDF 100-Meter Points of Assessment and IHI Wells, Within 10,000 Years and 20,000 Years of Facility Closure for the Three Most Bounding Sensitivities

Case	Conditions			Within 10,000 Years		Within 20,000 Years	
	K_d Assumptions	Inventory Factor	MeHg Percentage	Peak MOP	Peak IHI	Peak MOP	Peak IHI
Hg18	**Conservative**	**PA × 10**	100%	2.4E-14	1.0E-07	3.3E-04	4.8E-02
Hg19	**Conservative**	**WAC**	100%	5.7E-14	1.0E-07	7.7E-04	5.3E-02
Hg20	**Conservative**	**WAC × 2**	100%	1.1E-13	1.0E-07	1.5E-03	1.0E-01

4.0 CONCLUSION

Increasing the amount of organic Hg disposed within the SDF can result in substantial increases to the modeled Hg concentrations; however, none of the increases are expected to be significant enough to exceed the 2 µg/L MCL, even under extremely conservative modeling assumptions. Therefore, increasing the Hg inventories (e.g., salt solution concentrations of Hg up to 700 mg/L) and/or increasing the percentage of organic content within the Hg inventories of the SDF will not adversely impact any conclusions previously drawn from the SDF PA or the subsequent SDF Special Analyses.

5.0 REFERENCES

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