

APPENDIX A
Responsiveness Summary

RESPONSIVENESS SUMMARY for the Cedar Creek OU1 - Plant 2 Site

This Responsiveness Summary provides both a summary of the public comments U.S. EPA received regarding the Proposed Plan for the Cedar Creek Plant 2 Site and U.S. EPA's responses to those comments. The Proposed Plan was released to the public in early October 2007, and the public comment period ran from October 8 2007, through November 9, 2007. Wisconsin Department of Natural Resources (WDNR) provided support on the Proposed Plan. U.S. EPA held a public meeting regarding the Proposed Plan on October 10, 2007, at the Cedarburg City Hall in Cedarburg, Wisconsin. WDNR participated in the public meeting, assisted in responding to questions, and provided support at the meeting.

U.S. EPA received written comments (via regular and electronic mail) and verbal comments (at the public meeting) during the public comment period. In total, U.S. EPA received comments from approximately 9 different people. Copies of all the comments received during the public meeting (including the verbal comments reflected in the transcript of the public meeting) are included in the Administrative Record for the Site. U.S. EPA carefully considered all comments prior to selecting the final Site remedy documented in the ROD.

This Responsiveness Summary does not repeat verbatim each individual comment. Rather, the comments are summarized and grouped by the type of issue raised. The comments fell within several different categories: support for the proposed remedy, future use of the Site, concerns during the Site cleanup and requests for a different alternative.

The Responsiveness Summary contains a summary of the comments U.S. EPA received and U.S. EPA's responses to those comments, grouped by category.

I. SUPPORT FOR THE PROPOSED REMEDY

A majority of the comments expressed support of the cleanup of the Cedar Creek Plant 2 Site and indicated that the need for protection to human health and the environment from any contaminants existing on the Site is a high priority.

II. FUTURE USE OF THE SITE

Reuse of the property continues to be part of the City of Cedarburg's plan for the neighborhood. The City is considering the possibility of using the Site for a new library. Most of the comments agreed with the library as a possible development option.

III. CONCERNS DURING SITE CLEANUP

A couple comments expressed concern with leaving portions of the concrete slab as a cap, indicating that we should be sure you clean it up so it can have multiple uses generations into the future. Another comment suggested that we don't want to cover something up that might come back to haunt us down the road. They would like the cleanup done right.

In addition, there was a concern that capping it at the height it is now could cause water runoff onto neighboring properties. They would like to see it brought down to the natural level of the ground.

IV. PREFERENCE FOR DIFFERENT ALTERNATIVE

One comment indicated their preference for removing the entire concrete slab and any contamination under the slab in order to protect future generations. Based upon U.S. EPA's evaluation of all of the cleanup options, Alternative 4 provided the best level of protection to humans and the environment. As the risk assessment and evaluations in this document have shown, there are no additional risks associated with the using the concrete slab as a possible cap. Therefore, a cleanup option that would remove the entire concrete slab was not included as a possible option.

V. COMMENTS

Comment 1

Comment: "The only thing I am concerned about with the options is the reliance upon leaving the portions of the concrete slab as a cap."

Response: Based upon U.S. EPA's evaluation of all of the cleanup options, Alternative 4 provided the best level of protection to humans and the environment. As the risk assessment and evaluations in this document have shown, there are no additional risks associated with the using the concrete slab as a possible cap.

Comment 2

Comment: "I am concerned that we're capping it at the height it is now, so I am worried about runoff. I would like to see something done to bring it down to the natural level of the ground."

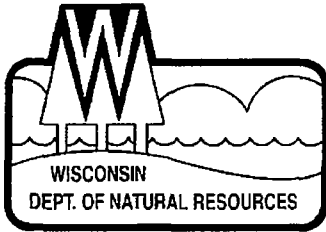
Response: Whatever development is completed at the Site, it will have to include certain measures to control runoff during storm events, so that it will not cause flooding problems on nearby properties.

Comment 3

Comment: "Do an adequate job in the cleanup. Let's do things the right way."

Response: U.S. EPA's goal is to make sure we protect people's health by reducing or eliminating exposure to soil with high levels of PCBs, preventing exposure to contaminated groundwater, and ensuring that contamination levels in groundwater are reduced. U.S. EPA believes that Alternative 4 will provide the best level of protection by addressing the highest levels of contamination on the Site. The groundwater will be monitored on a regular basis to make sure that contaminant levels are decreasing or remain stable.

APPENDIX B
Concurrence Letter from WDNR



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Matthew J. Frank, Secretary

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Mr. Richard C. Karl, Director
Superfund Division
USEPA Region 5
77 West Jackson Blvd.
Mail Code: SR-6J
Chicago, IL 60604-3507

RE: Concurrence with the Record of Decision for Operable Unit 1 (OU1)
(Soil Contamination only) of the Cedar Creek Site, Cedarburg, WI


Dear Mr. Karl,

I am sending you this letter to document that the Wisconsin Department of Natural Resources has reviewed the Record of Decision for the Cedar Creek Site, Operable Unit 1 (OU1) (aka Mercury Marine Plant 2) for the final action for soil contamination. We have concluded that we can concur with the selected remedy for soil remediation at the site with continued groundwater monitoring for a future final remedy for the groundwater pathway.

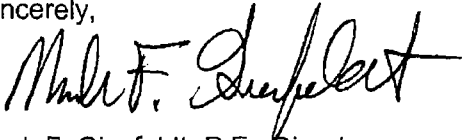
The selected remedy consists of excavating soil material from the Plant 2 property that has concentrations in the soil that exceed the site-specific clean up levels for polychlorinated biphenyls (PCBs) and volatile organic compounds (VOCs). This remedy would include removal of affected soils around the perimeter and beneath the existing concrete building slab to prevent potential future exposure or releases. In addition, the remedy would include periodic groundwater monitoring, installation of new groundwater monitoring wells and institutional controls (restrictive covenants) to restrict future site use and prohibit the use of site groundwater for potable purposes. A final remedy for groundwater will be determined at a later date, based on the results of the periodic monitoring. Under this alternative, the following soils would be targeted for removal:

- Surface soils surrounding the concrete slab and up to the fence line to the north and south and sidewalks adjacent to St. John and Madison Avenues to the east and west (respectively) would be excavated to a depth of approximately 2 feet below ground surface (bgs) to address the presence of PCB-affected surface and shallow subsurface soils. Removal would include shallow subsurface soils around the perimeter of the Site with PCB concentrations above 1 ppm
- Soils beneath the concrete slab, to the extent necessary, to support installation of foundations and/or utilities associated with possible redevelopment of the Site
- Soils with higher concentrations of PCBs would be removed to prevent potential future exposure or releases. These soils are in targeted areas where former operations evidenced elevated PCB impacts; more specifically, in areas limited to the footprint of some former sumps, pits, and/or trenches, where elevated PCB concentrations (> 50 ppm) were detected in subsurface soils. Excavation has been assumed to bedrock

- Shallow soils (up to 4 feet in depth) beneath Sumps 3 and 5, as well as at sample location B2 (in the vicinity of a former drainage ditch, Figure 4-2), where the highest VOC concentrations were detected. (Elevated metals concentrations were also detected at location B2)

We are hopeful that your staff will continue to work in close consultation with our staff during the implementation of the Record of Decision. We appreciate your efforts thus far and look forward to working with you and your staff until the site is remediated. If you have any questions regarding this letter please contact Jim Schmidt at (414)263-8561.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark F. Giesfeldt". The signature is written in a cursive, flowing style.

Mark F. Giesfeldt, P.E., Director
Bureau for Remediation and Redevelopment

APPENDIX C
ARARs and TBCs

Table 2-1

**Mercury Marine Plant 2
Cedarburg, WI
Focused Feasibility Study**

Federal ARARs/TBCs

Regulation	Citation	Description	Applicability/ Appropriateness	Rationale
FEDERAL CHEMICAL-SPECIFIC ARARS				
Clean Water Act [Federal Water Pollution Control Act, as amended]	40 CFR 122, 125, 129, 131; Section 301, 303, 306, 307, 401, 404; 33 USC 1251; 33 USC 1314	Provides federal, state and local discharge requirements to control pollutants to navigable waters (also includes NPDES).	ARAR	Establishes relevant and appropriate water quality criteria to protect against adverse effects, if dewatering is necessary.
Safe Drinking Water Act (SDWA)	40 CFR 141	Provides Maximum Contaminant Levels (MCLs) for groundwater pollutants.	ARAR	Establishes relevant and appropriate groundwater quality criteria to protect against adverse effects.
Resource Conservation and Recovery Act (RCRA)	40 CFR 261, 262, 264, 268; 42 U.S.C. 6901 et seq.	Identifies and lists certain materials as hazardous wastes and sets management standards for such wastes.	ARAR	Potentially applicable in consideration of management of materials removed from a site if they contain any listed hazardous waste or exhibit a characteristic of a hazard.
FEDERAL ACTION-SPECIFIC ARARS				
NPDES Program Requirements	40 CFR 122, Subpart B; 40 CFR 125; 40 CFR 301, 303, and 307	NPDES Program Permit Requirements. Establishes permitting requirements for point source discharges; regulates discharge of water into navigable waters including the quantity and quality of discharge.	TBC	These requirements will be considered if dewatering is necessary and treated water is discharged from the site.
	33 USC 1342; 40 CFR 122.26 (c)(1)(ii)(C); 40 CFR 122.44(k); 40 CFR 125.1-.3, .100-.104	Best management practices to control pollutants in stormwater discharges during construction activities. Best Available Technology (BAT) effluent limits for toxic and non-conventional pollutants; Best Conventional Technology (BCT) limits for conventional pollutants; water-quality based effluent limitations. Best management practices to prevent release of toxics to surface water from ancillary areas or spills.	ARAR	Best management practices for erosion and sedimentation control will be adopted to minimize the potential for rainfall or flood-induced migration of soils from disturbed areas.
Federal Criteria, Advisories, and Guidance	American Conference of Governmental Industrial Hygienists (ACGIH)	Threshold Limit Value (TLV). These standards were issued as consensus standards for controlling air quality in workplace environments.	TBC	TLVs could be used for assessing the potential for site inhalation risks during remediation.

Table 2-1

Mercury Marine Plant 2
Cedarburg, WI
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Federal ARARs/TBCs

Regulation	Citation	Description	Applicability/ Appropriateness	Rationale
FEDERAL ACTION-SPECIFIC ARARS (Cont'd)				
Clean Air Act	40 CFR 52	Air emission rates for chemical constituents. Establishes filing requirements and standards for constituent emission rates in accordance with National Ambient Air Quality Standards (NAAQS).	TBC	To be considered for remedial alternatives that include removal of soil or treatment within the site.
RCRA	40 CFR 260 - 282	Pertains to management of hazardous wastes.	ARAR	The substantive requirements of these regulations may apply to actions within the site.
	40 CFR 264/265, Subpart D	Contingency Plan and emergency procedures. Outlines requirements for contingency plan and emergency procedures.	TBC	May be considered for on-site activities related to development of contingency plans and emergency procedures to be implemented during site work.
	40 CFR 264/265, Subpart I	Use and management of containers. Requires all hazardous waste to be stored and managed in appropriate containers.	TBC	May be considered for on-site activities requiring hazardous waste storage.
	40 CFR 264/265, Subpart N	Landfills. Details the design, operation, monitoring, inspection, recordkeeping, closure, and permit requirements for a RCRA landfill.	TBC	May be considered for on-site consolidation of soil following removal.
	40 CFR 268	Land Disposal Restrictions. Identifies treatment standards and prohibitions of hazardous waste in a land disposal unit.	ARAR	May apply to disposition of removed soil.
	40 CFR 261.24	Identifies concentrations of contamination which, if present, make a waste hazardous due to toxicity. The analytical test set forth in Appendix II of 40 CFR part 261 is referred to as the Toxicity Characteristic Leaching Procedure (TCLP).	ARAR	TCLP will be used to determine whether soils and sediments are characteristic hazardous waste.

Table 2-1

Mercury Marine Plant 2
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Federal ARARs/TBCs

Regulation	Citation	Description	Applicability/ Appropriateness	Rationale
FEDERAL ACTION-SPECIFIC ARARS (Cont'd)				
Toxic Substances Control Act (TSCA)	40 CFR 761.50(a)(3)	Prohibits discharge of water containing PCBs to navigable waters unless PCB concentration is less than approximately 3 ppb or in accordance with discharge limits of NPDES permit.	ARAR	Criteria will be considered in establishing discharge criteria for water treatment effluent.
	40 CFR 761.61(c) 40 CFR 761.65	Establishes cleanup options and storage options for PCB remediation waste, including PCB-contaminated soils. Options include risk-based approval by USEPA. Risk-based approval option must demonstrate that cleanup or storage plan will not pose an unreasonable risk of injury to health or the environment.	ARAR	Applicable to remedial actions that involve PCB-contaminated wastes.
	40 CFR 761.79	Establishes decontamination standards and procedures for removing PCBs from non-porous surfaces.	ARAR	Applicable to decontamination of equipment used in excavation and restoration activities.
	40 CFR 761.40	Requirements regarding the marking of PCB containers and PCB storage areas.	ARAR	Applicable to remedial actions that involve PCB-contaminated wastes.
	40 CFR 761, Subpart G	Policy used to determine adequacy of cleanup of spills resulting from the release of materials containing PCBs at concentration of 50 ppm or greater.	TBC	Will be considered in the event of PCB spills occurring during the work.
Hazardous Materials Transportation Act, as amended	49 CFR 107, 171, 179	General information, regulations and definitions. Department of Transportation rules for transportation of hazardous materials, including procedures for the packaging, labeling, manifesting, and transporting of hazardous materials.	ARAR	Applicable for material shipment off-site.
USEPA Guidance - Office of Solid Waste and Emergency Response (OSWER)	EPA/540/R-95/052, OSWER Directive No. 9355.7-04, May 1995	<i>Land Use in the CERCLA Remedy Selection Process</i> . Presents information for considering land use in making remedy selection decisions at NPL sites.	TBC	Guidance will be considered during evaluation of remedial alternatives.

Table 2-1

Mercury Marine Plant 2
Cedarburg, WI
Focused Feasibility Study

Federal ARARs/TBCs

Regulation	Citation	Description	Applicability/ Appropriateness	Rationale
FEDERAL ACTION-SPECIFIC ARARS (Cont'd)				
Comprehensive Environmental Recovery, Compensation and Liability Act (CERCLA)	42 USC 103 Section 9621(d)(4)(C)	Technical impracticability waiver.	ARAR	Applicable if attainment of cleanup goals cannot be achieved due to technical impracticability from an engineering perspective.
	42 USC 9601 Section 121(e)	Waives the requirement to obtain federal, state, and local permits for on-site CERCLA actions.	ARAR	Applicable to CERCLA actions.
USEPA Guidance - OSWER	OSWER Directive 9200.4-14	<i>Consistent Implementation of the FY1993 Guidance on Technical Impracticability of Ground-Water Restoration at Superfund Sites</i>	TBC	Clarifies how to determine when ARAR-based cleanup levels may be waived for reasons of technical impracticability.
	OSWER Directive 9234.2-25, September 1993	<i>Guidance for Evaluating the Technical Impracticability of Groundwater Restoration</i> . Establishes USEPA's policy and procedures for demonstrating technical impracticability of groundwater remediation.	TBC	This guidance may be considered for potential actions at the site.
	OSWER Directive 9200.4-17P, 1997	<i>Use of Monitored Natural Attenuation (MNA) at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites</i> . Provides guidance regarding the use of MNA for the cleanup of soil and groundwater.	TBC	This guidance may be considered for potential actions at the site.
	OSWER 9355.7-03B-P, June 2001	<i>Comprehensive Five-Year Review Guidance</i> . Provides guidance on conducting five-year reviews for sites at which hazardous substances, pollutants, or contaminants remain on-site above levels that allow for unrestricted use and unlimited exposure.	TBC	Guidance will be considered during preparation of any post remediation monitoring plans.

Table 2-1

**Mercury Marine Plant 2
Cedarburg, WI
Focused Feasibility Study**

Federal ARARs/TBCs

Regulation	Citation	Description	Applicability/ Appropriateness	Rationale
FEDERAL ACTION-SPECIFIC ARARS (Cont'd)				
OSHA	29 CFR 1910	General Industry Standards. These regulations specify the 8-hour time-weighted average concentration for exposure of site workers to various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	ARAR	Applicable for on-site remedial actions.
	29 CFR 1926	Safety and Health Standards. This regulation specifies the type of safety equipment to be used on-site and procedures to be followed during site remediation.	ARAR	These requirements apply to all site contractors and subcontractors and must be followed during all site work.
	29 CFR 1904	Recordkeeping, Reporting, and Related Regulations. This regulation outlines the recordkeeping and reporting requirements for an employer under OSHA.	ARAR	Applicable for on-site remedial actions performed.
FEDERAL LOCATION-SPECIFIC ARARS				
USEPA Guidance - OSWER	OSWER Directive 9355.7-04, May 1995	<i>Land Use in CERCLA Remedy Selection Process.</i> Identifies considerations for incorporating anticipated future land use in the remedy selection process.	TBC	Provides guidance for consideration of future site land use in selection of a site remedy.
National Historic Preservation Act, 16 USC 470 et seq.	36 CFR 800, 36 CFR 65, and 40 CFR 6.301	Proposed remedial actions must take into account effect on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed undertaking.	ARAR	Relevant and appropriate if activities will affect historic properties or landmarks at/near the site.
Historic Sites, Buildings and Antiquities Act, 16 USC 461 et seq.	36 CFR 62.6	National Landmarks. Proposed remedial actions shall consider the existence of national landmarks and avoid undesirable impacts upon such landmarks.	TBC	May be considered if activities will affect historical areas.

Table 2-2

Mercury Marine Plant 2
Cedarburg, WI
Focused Feasibility Study

State ARARs/TBCs

Regulation	Citation	Description	Applicability/ Appropriateness	Rationale
STATE CHEMICAL-SPECIFIC ARARS				
Soil Cleanup Standards	WAC NR 720	Allows for the calculation of site-specific risk- based cleanup standards based on the intended reuse of the property. Generally applied to unsaturated material or soils.	ARAR	Applicable.
Standards for Selecting Remedial Actions	WAC NR 722	Establishes standards for selection of remedial actions. Generally applied to soil cleanup programs.	ARAR	Applicable.
Groundwater Quality Standards	WAC NR 140	Establishes groundwater quality standards and evaluation and response procedures.	ARAR	Applicable.
STATE ACTION-SPECIFIC ARARS				
Management of PCBs and Products Containing PCBs	WAC NR 157	Establishes procedures for the storage, collection, transportation, processing, and final disposal of PCBs and materials containing PCBs at any level. It refers to NR 500 and 600 series.	ARAR	Applicable for removal, transport, and disposal of contaminated soils.
Wisconsin Pollutant Discharge Elimination System	WAC NR 200	Technology-based effluent limits (NR 220–297). Requires compliance with permit limitations for discharge to navigable waters, including water quality effluent limits, water quality standards, national performance standards, and toxic and pretreatment effluent standards.	ARAR	Applicable for remedial alternatives involving discharges.
Water Quality Antidegradation	WAC NR 207	Establishes implementation procedures for the antidegradation policy in s. NR 102.05(1)(a).	ARAR	Applicable to proposed new or increased discharges.
Water Quality Antidegradation: Waste Load Allocated, Water Quality-related Effluent Standards and Limitations	WAC NR 212–220	Establishes permit limitations for effluent discharges.	ARAR	Applicable for remedial alternatives involving effluent discharges.
Wisconsin's General Permit Program for Certain Water Regulatory Permits	WAC NR 322	Establishes minimum design standards and specifications for projects permitted under a general permit.	ARAR	Potentially applicable for implementation of a given remedial alternative.

Table 2-2

**Mercury Marine Plant 2
Cedarburg, WI
Focused Feasibility Study**

State ARARs/TBCs

Regulation	Citation	Description	Applicability/ Appropriateness	Rationale
STATE ACTION-SPECIFIC ARARs (Cont'd)				
Wisconsin State Air Pollutant Control Regulations	WAC NR 400-499	Establishes concentration levels, by chemical, for new sources. Manages construction and operation permits.	ARAR	Applicable for removal and disposal of soils.
Solid Waste Management	WAC NR 500-520	Provides definitions, submittal requirements, exemptions and other general information relating to solid waste facilities which are subject to regulations under s. 2789.01(35) Stats. Applicable for off-site siting processes. Applicable to new and existing facilities.	ARAR	Applicable for implementation of a given remedial alternative.
Hazardous Waste Management	WAC NR 600-685	Provides definitions, general permit application information, incorporation by reference citations and general information concerning the hazardous waste management program. Establishes procedures for handling, storage, and disposal of hazardous wastes.	ARAR	Applicable for removal, transport, and disposal of contaminated soils. Applicable to treatment units.
Identification and Listing of Hazardous Waste	WAC NR 605	Establishes criteria for identifying the characteristics of hazardous waste to determine if the waste is subject to regulation.	ARAR	Applicable for removal, transport, and disposal of contaminated soils.
Investigation and Remediation of Environmental Contamination	WAC NR 700	Establishes standards and procedures that allow for site-specific flexibility, pertaining to the identification, investigation, and remediation of sites and facilities which are subject to regulation under s. 144.442, 144.76, or 144.77, Stats.	ARAR	Applicable for implementation of a given remedial alternative.
Notification of the Discharge of Hazardous Substances	WAC NR 706	Notification procedures and responsibilities by discharger of hazardous substances including containment, cleanup, disposal, and restoration.	ARAR	Applicable for removal, transport, and disposal of contaminated soils.
Low-hazard Solid Waste Exemption	Wis. Stats. Ch. 289.43	Solid waste law that allows issuance of exemption from siting requirements in NR 500-520. Excavated soils may be considered "exempt" after treatment if "new" product is created.	ARAR	Potentially applicable if ex-situ treatment option is selected.

Table 2-2

Mercury Marine Plant 2
Cedarburg, WI
Focused Feasibility Study

State ARARs/TBCs

Regulation	Citation	Description	Applicability/ Appropriateness	Rationale
STATE ACTION-SPECIFIC ARARS (Cont'd)				
EPA TSCA Coordinated Approval	The State of Wisconsin Approval Process for Dredging of Commercial Ports, WDNR 2004	USEPA Region 5 works with WDNR on review of application to waive disposal requirements in NR 500 landfills and allow disposal of TSCA-level sediments (>50 ppm) in a Wisconsin licensed solid waste landfill.	TBC	Applicable in evaluating disposal options of soils.
STATE LOCATION-SPECIFIC ARARS				
Beneficial Reuse Solid Waste Exemption	WAC NR 500.08	Establishes criteria for possible beneficial use of solid wastes after treatment. Applies for on-site reuse options only.	ARAR	Applicable for disposal of treated soils meeting disposal criteria.
Landfill Siting and Approval Process	Wis. Stats. Ch. 289	State statute for solid waste facilities. Addresses the upland disposal of solid waste. Landfill facilities are prohibited from shoreland and floodplain zone areas except by permits issued from WDNR.	ARAR	Applicable for implementation of any given remedial alternative disposal option.

APPENDIX D
Comparison to Standards (Tables 4-3 – 4-4)

Table 4-3

Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Comparison of Maximum Detected Concentrations in Soil to Residential RCLs

Constituents	RCL	Detection Frequency	Detected Maximum Concentration	Maximum Detected Location	COPC
VOLATILE ORGANIC COMPOUNDS (Concentrations in mg/kg)					
1,1,1-Trichloroethane	1.20E+03	2/42	0.041	PTSB2	No
1,2,4-Trichlorobenzene	1.58E+02	2/50	0.083	SB-03-22	No
(1,2,4 & 1,3,5) Trimethylbenzene	3.30E+01	2/2	0.8	S-4	No
1,2-Dichlorobenzene	6.00E+02	1/42	0.11	PTSBH4	No
1,3-Dichlorobenzene	5.30E+02 (e)	1/42	0.03	PTSBH4	No
Acetone	1.41E+04	4/71	0.18	SB-97-7, SB-97-14, PTSSB2	No
Bromomethane	2.50E+00	1/68	0.076	SB-97-14	No
Carbon Disulfide	2.30E+02	1/71	0.032	SB-97-6	No
Chloromethane	2.80E+01	4/71	0.095	SB-97-1	No
cis-1,2-Dichloroethene	1.56E+02	1/42	0.54	PTSBH1	No
Ethylbenzene	4.00E+02	1/42	0.079	PTSBH1	No
Isopropyl Benzene (Cumene)	1.58E+03	2/50	0.97	SB-03-22	No
Methyl Acetate	1.58E+04	18/42	40	PTSB2	No
Methylcyclohexane	4.80E+02	2/42	0.044	PTSB2	No
sec-Butylbenzene	8.28E+02	1/5	0.44	SB-99-8	No
Tetrachloroethene	1.23E+00	10/71	0.84	PTSSB2	No
Toluene	4.30E+02	14/73	1.4	SB-97-7	No
trans-1,2-Dichloroethene	3.13E+02	1/42	0.14	PTSBH1	No
Trichloroethene	9.40E+03	3/71	0.42	PTSB2	Yes
Xylene, o	3.13E+04	3/71	0.46	PTSBH1	No
Xylenes, m + p	1.70E+02	3/71	0.98	SB-03-22	No
Xylenes, total	1.90E+02				No
SEMI-VOLATILE ORGANIC COMPOUNDS (Concentrations in mg/kg)					
Acenaphthene	9.39E+02	48/100	8	SS-21	No
Acenaphthylene	NA	44/100	0.73	PTSB2	No
Anthracene	4.68E+03	52/100	8.2	SS-21	No
Benzo(a)anthracene	8.70E+02	58/100	20	SS-21	Yes
Benzo(b)fluoranthene	8.70E+02	62/100	15	SS-21	Yes
Benzo(k)fluoranthene	8.75E+01	60/100	15	SS-21	Yes
Benzo(g,h,i)perylene	NA	56/100	8.5	SS-21	No
Benzo(a)pyrene	9.00E+03	58/100	17	SS-21	Yes
Bis(2-ethylhexyl)phthalate	4.58E+00	1/24	0.039	S-1	No
Carbazole	3.19E+00	2/22	0.34	SB-97-4	No
Chrysene	8.75E+00	58/100	21	SS-21	Yes
Dibenz(a,h)anthracene	9.00E+03	50/100	2.8	SS-21	Yes
Dibenzofuran	6.26E+01	1/22	0.284	SB-97-4	No
D-n-butyl phthalate	1.58E+03	2/24	0.73	S-1	No
2,4-Dimethylphenol	3.13E+02	2/22	2.34	SB-97-11	No
Fluoranthene	8.28E+02	84/100	49	SS-21	No
Fluorene	6.26E+02	2/22	0.328	SB-97-4	No
Indeno(1,2,3-cd)pyrene	8.70E+02	55/100	8.8	SS-21	Yes
2-Methylnaphthalene	6.26E+01	1/22	0.813	SB-97-4	No
2-Methylphenol	7.82E+02	1/22	0.621	SB-97-7	No
4-Methylphenol	7.82E+01	1/22	13.1	SB-97-11	No
Naphthalene	4.60E+01	45/100	3.5	SS-21	No
Phenanthrene	NA	82/100	43	SS-21	No
Phenol	4.69E+03	1/22	1.94	SB-97-14	No
Pyrene	4.69E+02	63/100	41	SS-21	No
PESTICIDES (Concentrations in mg/kg)					
beta-BHC	3.55E+02	3/24	0.0119	SB-97-13	No
delta-BHC	NA	1/24	0.00084	SB-97-1	No
Heptachlor	1.42E+02	3/24	0.00552	SB-97-13	No
Aldrin	3.76E+03	2/24	0.00193	SB-97-13	No
Heptachlor epoxide	7.02E+03	1/24	0.00228	SB-97-1	No
Endosulfan I	9.39E+01	1/24	0.00106	SB-97-1	No
Dieldrin	3.99E+03	1/24	0.00384	SB-97-5	No
4,4'-DDE	1.88E+01	1/24	0.00707	SB-97-14	No
Endrin	4.69E+00	1/24	0.0027	SB-97-5	No
Endosulfan II	9.39E+01	1/24	0.000654	SB-97-13	No
4,4'-DDD	2.68E+01	3/24	0.00398	SB-97-14	No
Endosulfan sulfate	9.39E+01	1/24	0.00111	SB-97-5	No
4,4'-DDT	1.88E+01	3/24	0.0233	SB-97-14	No
Methoxychlor	7.82E+01	1/24	0.00308	SB-97-5	No
PCB AROCLORS (Concentrations in mg/kg)					
Total PCBs	3.20E+02	123/145	7480	SB-97-11	Yes
INORGANICS (Concentrations in mg/kg)					
Antimony	8.26E+00	5/22	78.7	SB-97-14	Yes
Arsenic	3.90E+02	78/87	307	SB-97-4	Yes
Barium	1.10E+03	60/60	220	PTSBH2	No
Beryllium	3.13E+01	10/22	0.74	SB-97-4	No
Cadmium	8.00E+00	48/80	2.8	SS-4, PTSSB2	No
Chromium	1.40E+01	81/81	210	SB-97-1	Yes
Cobalt	8.21E+01	22/22	11.2	SB-97-4	No
Copper	8.28E+02	79/79	24000	PTSSB2	Yes
Cyanide (total)	3.13E+02	1/22	1.2	SB-97-1	No
Lead	5.00E+01	102/102	5900	PTSSB2	Yes
Mercury	2.70E+00	55/60	0.83	SS-4	No
Nickel	3.13E+02	60/60	26	PTSB2	No
Selenium	7.82E+01	9/60	59.7	SB-97-4	No
Silver	7.82E+01	13/60	2.6	PTSSB2	No
Thallium	1.25E+00	18/22	14	SS-8	Yes
Vanadium	1.10E+02	22/22	62.2	SB-97-4	No
Zinc	4.89E+03	60/60	2000	PTSSB2	No
GASOLINE RANGE ORGANICS (Volatile Fraction) (mg/kg)					
Gasoline Range Organics	1.00E+02	5/20	320	SB-97-7	Yes
DIESEL RANGE ORGANICS (Semivolatile Fraction) (mg/kg)					
Diesel Range Organics	1.00E+02	13/22	6300	SB-97-7	Yes

Notes:

mg/kg - milligrams per kilogram or parts per million

RCL - Residential Contaminant Level

RCLs for arsenic, cadmium, chromium and lead are from Table 2 of NR 720

RCLs for all other constituents were derived using WDNR (2002) guidance for deriving UCLs using the USEPA on-line soil screening level calculator. RCLs are the lower of

RCLs are based on 1×10^{-6} excess cancer risk or a hazard quotient of 0.2

The RCL for GROs and DROs is 100 mg/kg as listed in NR 720 (4)(a)

(a) USEPA Region 9 Preliminary Remediation Goals (PRGs) for residential soil were used when RCLs were not available

Samples with italicized sample IDs are those samples collected from beneath the current slab and are included in the construction worker exposure scenario

Shaded Value - concentration exceeds RCL

NA - Not available

Table 4-4

Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Groundwater Data - Comparison to Wisconsin Groundwater Standards

Constituents	Units	ES	PAL	PRG	Detection Frequency	Maximum Detect	Max Detect Location	COPC
VOCs								
1,1,1-Trichloroethane	mg/L	0.200	0.040	--	21/73	0.2	MW-03-4R	Yes
1,1-Dichloroethane	mg/L	0.850	0.085	--	12/73	0.0031	MW-03-4R	No
1,1-Dichloroethene	mg/L	0.007	0.0007	--	17/73	0.012	MW-03-4R	Yes
1,2,3-Trichlorobenzene	mg/L	NA	NA	NA	1/19	0.004	MW-97-3	No
2-Butanone	mg/L	0.460	0.090	--	1/66	0.0016	MW-97-2	No
cis-1,2-Dichloroethene	mg/L	NA	NA	0.061	10/63	0.0052	MW-03-4R	No
sec-Butylbenzene	mg/L	NA	NA	0.24	1/9	0.00155	MW-99-6	No
Tetrachloroethene	mg/L	0.005	0.0005	--	41/73	0.11	MW-03-4R	Yes
Trichloroethene	mg/L	0.005	0.0005	--	14/73	0.002	MW-97-5	Yes
PESTICIDES								
4,4'-DDD	mg/L	NA	NA	0.00028	1/10	0.000033	MW-97-1	No
Endosulfan sulfate	mg/L	NA	NA	0.22	1/10	0.000188	MW-97-4	No
Endrin ketone	mg/L	NA	NA	0.011	1/10	0.000033	MW-97-1	No
Heptachlor	mg/L	0.0004	0.00004	--	1/10	0.000023	MW-97-1	No
PCBs								
Total PCBs	mg/L	0.00003	0.000003	--	7/36	0.0009	MW-04-3	Yes
INORGANICS								
Arsenic	mg/L	0.010	0.001	--	6/13	0.0039	MW-97-3	Yes
Barium	mg/L	2	0.4	--	13/13	0.15	MW-06-1	No
Chromium	mg/L	0.100	0.010	--	5/13	0.0049	MW-97-2	No
Copper	mg/L	1.300	0.130	--	4/13	0.0052	MW-06-1	No
Nickel	mg/L	0.100	0.020	--	5/13	0.0073	MW-97-1	No
Selenium	mg/L	0.050	0.010	--	4/13	0.0035	MW-97-5	No
Silver	mg/L	0.050	0.010	--	6/13	0.0036	MW-97-2	No
Zinc	mg/L	5	2.5	--	3/13	0.0934	MW-97-2	No

Notes:

mg/L - milligrams per liter or parts per million

ES - Wisconsin NR 140 Enforcement Standard

PAL - Wisconsin NR 140 Preventative Action Level

PRG = USEPA Region 9 Preliminary Remediation Goal (PRG) for tap water. PRGs were used for comparison only when ESs or PALs were unavailable

-- = PRG was not used for COPC screening for this constituent

Shaded Value - Exceeds PAL

Bolded Value - Exceeds ES

NA = Not available

APPENDIX E
Detailed Cost Analysis of Remedy

Table 4-3

**Mercury Marine Plant 2
Cedarburg, WI
Focused Feasibility Study**

Remedial Alternative 4 Cost Estimate

Item	Unit Cost	Units	Extended
CAPITAL COSTS			
CONSTRUCTION			
1. Mobilization/demobilization	\$64,870 / ls	1	\$64,900
2. Oversight	\$3,000 / day	100	\$300,000
3. Site preparation	\$25,000 / ls	1	\$25,000
4. Removal of cap materials	\$15 / cy	1885	\$28,300
5. Concrete slab demolition			
Non-TSCA	\$20 /ton	157	\$3,100
TSCA	\$28 /ton	231	\$6,500
6. Sheeting	\$50 / sf	7,880	\$394,000
7. Excavation	\$20 / cy	4,219	\$84,400
8. Backfill	\$20 / cy	4,219	\$84,400
9. Excavation for footings and VOC soil removal			
Excavation	\$30 / cy	236	\$7,100
Backfill	\$20 / cy	236	\$4,700
10. Monitoring well installation and pre-remediation confirmatory sampling	\$125,000 / ls	1	\$125,000
11. Site restoration	\$10,000 / ls	1	\$10,000
12. Miscellaneous disposal	\$10,000 / ls	1	\$10,000
13. Offsite transportation			
TSCA	\$1,500 /20 ton load	230	\$345,000
Non-TSCA	\$150 /20 ton load	218	\$32,700
14. Offsite disposal			
TSCA	\$85 / ton	4,595	\$390,596
Non-TSCA	\$18 / ton	6,116	\$110,100
15. Hydroseeding	\$0.10 /sf	12,049	\$1,200
Capital Cost Subtotal			\$2,026,996
Obtain deed/GIS restriction	\$10,000 / ls	1	\$10,000
Contingency (25%)			\$284,650
Engineering, administration, and management (15%)			\$170,790
TOTAL COST			\$2,492,436
ANNUAL O&M COSTS			
16. Monitoring Well Sampling	\$20,000 / event	10	\$200,000
17. Annual Site Monitoring and Maintenance	\$5,000 / event	30	\$150,000
O&M Present Worth (30 years, 5% discount rate)			\$203,500
TOTAL COST			\$2,695,936
			Rounded to \$2.7M

Alternative:

- Removal of surface soils and subsurface soils, with groundwater monitoring.

General Assumptions:

- Costs are based on current Site information and project understanding. Costs may change following collection of additional data and/or actual project design.
- Costs include materials, equipment, and labor unless otherwise noted.
- Costs assume that construction of a vapor barrier and collection system will be part of future construction plans. As such, costs to construct a vapor barrier and collection system are not included in estimate.
- Costs are based on sampling of entire groundwater well network annually for the first 5 years and then once every 5 years after for a total of 30 years for VOCs and PCBs.
- Unit costs are in 2007 dollars and are estimated using standard estimating guides (e.g., Means Site Work and Landscape Cost Data), vendors, professional judgment, and experience from similar projects.
- Construction activities have been assumed to be performed in modified Level D protection.
- ARCADIS BBL prepared these estimates using current and generally accepted engineering cost estimation methods. These estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to ARCADIS BBL at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. We are not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

Table 4-3

Mercury Marine Plant 2
Cedarburg, WI
Focused Feasibility Study

Remedial Alternative 4 Cost Estimate

Alternative 4 Assumptions:

1. Assumed to be 10% of construction costs, except oversight, transportation and disposal. The mobilization cost estimate includes mobilization of personnel, equipment, and materials necessary to implement construction. Includes costs for decontamination of equipment.
2. Includes costs and expenses for two field oversight staff through the duration of the project. Assumes a duration of 100 days.
3. Includes costs for miscellaneous clearing and access activities. The staging area cost estimate includes labor, equipment, and materials necessary to construct a soil staging/equipment decon pad for decontamination activities and the processing of generated waste materials, and an access/staging area adjacent to the work site.
4. Cap removal costs are \$15 per cy. The cost estimate is based on removing liner materials, gravel cap, and brick/masonry rubble located across the Site property limits and processing debris as necessary for offsite disposal purposes. Removal of the materials will be conducted using standard excavation methods. Gravel cap layer assumed 6 in. thick.
5. Concrete slab demolition costs are \$28 and \$20 per ton for TSCA and non-TSCA material, respectively. The cost estimate is based on demolishing concrete slabs-on-grade located at the building footprint limits and processing demolition debris as necessary for offsite disposal purposes. The TSCA areas will be demolished in a controlled manner using standard demolition methods with some sawcutting and manual jackhammering, as needed. Demolition of the non-TSCA areas will also be conducted using standard demolition methods however, sawcutting or manual jackhammering of the slabs is not required. Non-TSCA estimates assume no vapor or dust control (other than misting with water, as needed) will be required. Interior concrete pad assumed 8 in. thick.
6. Temporary sheetpile installation/removal costs are based on installing and removing sheeting around the interior removal areas. Sheetpiles are assumed to be supported with bracing.
7. Includes costs to excavate the building perimeter (building footprint to sidewalk/fence line) 2 ft. bgs and PCBs greater than 50ppm at depth, includes a 15% volume increase from sidewall sloughing.
8. Includes costs to procure and place general fill.
9. Includes costs to excavate Sump 3 and Sump 5 to 4 ft., Location B2 in the Tool Repair Room, and fifty-two 5 ft. square future footing grids 4 ft. deep, accounting for 8 in. thick concrete pad and backfilled with general fill
10. Includes costs to install 2 shallow wells nested with 2 deep wells, and to perform pre-remediation confirmatory soil sampling that will include collection of composite samples for PCB analysis.
11. Includes costs to perform grading to achieve pre-construction topographic contours in areas used for access, staging, and decontamination.
12. Includes costs to transport and dispose of miscellaneous site waste including PPE.
13. Transportation costs are \$1500 and \$150 per 20 ton load for TSCA and non-TSCA material, respectively. Estimates have been rounded up to the nearest whole ton load.
14. Includes costs to dispose of Site cap materials (including additional 10 tons for liner/geotextile/miscellaneous debris), excavated soils and demolished concrete slabs.
15. Assumes that the backfill placed in the excavations will be hydroseeded.

APPENDIX F
Exposure Factors and Risk Characterization Summary
(Tables 4-5 – 4-15)

Table 4-5

**Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report**

Summary of Exposure Factors - Soil

Exposure Factors	Units	Commercial Indoor Worker	Ref.	Residential Adult	Ref.	Residential Child	Ref.	Construction Worker	Ref.
Cancer Slope Factor (CSFo)	(mg/kg-day) ⁻¹	chemical-specific	IRIS	chemical-specific	IRIS	chemical-specific	IRIS	chemical-specific	IRIS
Reference Dose (RfDo)	mg/kg-day	chemical-specific	IRIS	chemical-specific	IRIS	chemical-specific	IRIS	chemical-specific	IRIS
Cancer Slope Factor (CSFd)	(mg/kg-day) ⁻¹	chemical-specific	IRIS, (b)	chemical-specific	IRIS, (b)	chemical-specific	IRIS, (b)	chemical-specific	IRIS, (b)
Reference Dose (RfDd)	mg/kg-day	chemical-specific	IRIS, (b)	chemical-specific	IRIS, (b)	chemical-specific	IRIS, (b)	chemical-specific	IRIS, (b)
Cancer Slope Factor (CSFi)	(mg/kg-day) ⁻¹	chemical-specific	IRIS	chemical-specific	IRIS	chemical-specific	IRIS	chemical-specific	IRIS
Reference Dose (RfDi)	mg/kg-day	chemical-specific	IRIS	chemical-specific	IRIS	chemical-specific	IRIS	chemical-specific	IRIS
Body Weight (BW)	kg	70	(a)	70	(a)	15	(a)	70	(a)
Ingestion Rate (IR)	mg/day	50	(c)	100	(c)	200	(c)	100	(c, d)
Exposed Surface Area (SA)	cm ² /day	3300	(b, c)	5700	(b, c)	2800	(b, c)	3300	(b, c)
Adherence Factor (AF)	mg/cm ²	0.2	(b, c)	0.07	(b, c)	0.2	(b, c)	0.3	(b, c)
Absorption Fraction (ABS)	percent	chemical-specific	(b)	chemical-specific	(b)	chemical-specific	(b)	chemical-specific	(b)
Inhalation Rate (IRA)	m ³ /day	20	(a)	20	(a)	10	(a)	20	(a)
Particulate Emission Factor (PEF)	m ³ /kg	1.32E+09	(c)	1.32E+09	(c)	1.32E+09	(c)	1.32E+09	(c)
Volatilization Factor (VF)	m ³ /kg	chemical-specific	(c)	chemical-specific	(c)	chemical-specific	(c)	chemical-specific	(c)
Exposure Frequency (EF)	days/year	250	(a, b, c)	350	(a, b, c)	350	(a, b, c)	30	Site-specific
Exposure Duration (ED)	years	25	(a, b, c)	24	(a, b, c)	6	(a, b, c)	1	Site-specific
Averaging Time (Cancer) (ATc)	days	25550	(a)	25550	(a)	25550	(a)	25550	(a)
Averaging Time (Non-Cancer) (ATnc)	days	9125	(a)	8760	(a)	2190	(a)	365	(a)

Equations:

$$\text{Carcinogens} = \left[\frac{\text{CSFo} \cdot \text{EPC} \cdot \text{CF} \cdot \text{EF} \cdot \text{ED} \cdot \text{IR}}{\text{ATc} \cdot \text{BW}} \right] + \left[\frac{\text{CSFd} \cdot \text{EPC} \cdot \text{CF} \cdot \text{EF} \cdot \text{ED} \cdot \text{SA} \cdot \text{AF} \cdot \text{ABS}}{\text{ATc} \cdot \text{BW}} \right] + \left[\frac{\text{CSFi} \cdot \text{EPC} \cdot \text{IRA} \cdot \text{EF} \cdot \text{ED} \cdot 1/\text{VF} \text{ or } 1/\text{PEF}}{\text{ATc} \cdot \text{BW}} \right]$$

$$\text{Non-carcinogens} = \left[\frac{1/\text{RfDo} \cdot \text{EPC} \cdot \text{CF} \cdot \text{EF} \cdot \text{ED} \cdot \text{IR} \cdot \text{FI}}{\text{ATnc} \cdot \text{BW}} \right] + \left[\frac{1/\text{RfDd} \cdot \text{EPC} \cdot \text{CF} \cdot \text{EF} \cdot \text{ED} \cdot \text{SA} \cdot \text{AF} \cdot \text{ABS}}{\text{ATnc} \cdot \text{BW}} \right] + \left[\frac{1/\text{RfDi} \cdot \text{EPC} \cdot \text{IRA} \cdot \text{EF} \cdot \text{ED} \cdot 1/\text{VF} \text{ or } 1/\text{PEF}}{\text{ATnc} \cdot \text{BW}} \right]$$

Notes:

Chemical-specific toxicity data are provided in Table 4-7.

VF is used for volatile chemicals. VF for trichloroethene is 3.3E+03 m³/kg.

Default PEF is used for non-volatiles.

References:

(a) USEPA, 1989. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002.

(b) USEPA, 2004. Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual. Part E, Supplemental Guidance for Dermal Risk Assessment, Interim. EPA/540/R/99/005.

(c) USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

(d) Calabrese, 2003. Letter from Edward Calabrese Regarding Soil Ingestion Rates. Provided as an attachment to Comments of the General Electric Company on the U.S. Environmental Protection Agency's Human Health Risk Assessment for the Housatonic River Site – Rest of River. Prepared for General Electric by AMEC Earth and Environmental, Inc. and BBL Sciences. July 28, 2003.

IRIS = USEPA's Integrated Risk Information System

Table 4-6
Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Summary of Exposure Factors - Groundwater

Exposure Factors	Units	Construction Worker	Ref.
Cancer Slope Factor (CSF)	(mg/kg-day) ¹	chemical-specific	IRIS
Reference Dose (RfD)	mg/kg-day	chemical-specific	IRIS
Chemical Concentration in Water (CW)	(mg/cm ³)	chemical-specific	Calculated
Body Weight (BW)	kg	70	(a)
Exposed Surface Area (SA)	cm ² /day	3300	(b, c)
Absorption Fraction (ABS)	percent	chemical-specific	(b)
Permeability Constant (Kp)	cm/hour	chemical-specific	(b)
Fraction Absorbed (FA)	Fraction absorbed	chemical-specific	(b)
Event Duration (t _{event})	hour/event	2	Site-specific
T-event	lag time per event	chemical-specific	(b)
B	ratio of permeability	chemical-specific	(b)
Event Frequency (EV)	coefficient	chemical-specific	(b)
Exposure Frequency (EF)	events/day	1	(b)
Exposure Duration (ED)	days/year	30	Site-specific
Averaging Time (Cancer) (ATc)	years	1	Site-specific
Averaging Time (Non-Cancer) (ATnc)	days	25550	(a)
	days	365	(a)

Equations:

Construction Worker

$$\text{Carcinogens} = \left[\frac{((DA_{\text{event}} * EV * ED * EF * SA * CSF) / (BW * ATc))}{1} \right]$$

$$\text{Non-carcinogens} = \left[\frac{((DA_{\text{event}} * EV * ED * EF * SA * 1/RfD) / (BW * ATnc))}{1} \right]$$

where:

$$DA_{\text{event}} \text{ (for tetrachloroethane and PCBs)} = ((2FA * Kp * CW * \sqrt{6T_{\text{event}} * t_{\text{event}} / \pi}))$$

$$DA_{\text{event}} \text{ (for 1,1,1-trichloroethene, 1,1-dichloroethene and trichloroethene)} = FA * Kp * CW \left[\frac{(t_{\text{event}} / (1+B) + 2T_{\text{event}} (1 + 3B + 3B^2) / (1 + B)^2)}{1} \right]$$

Note:

Chemical-specific toxicity data are provided in Table 4-8.

References:

- (a) USEPA, 1989. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002.
 - (b) USEPA, 2004. Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual. Part E, Supplemental Guidance for Dermal Risk Assessment, Interim. EPA/540/R/99/005.
 - (c) USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.
- IRIS = USEPA's Integrated Risk Information System

Table 4-7
Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Summary of Chemical-Specific Data - Soil COPCs

Soil COPCs	Dermal Absorption Fraction (unitless)	Gastrointestinal Absorption Efficiency	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Oral Reference Dose (mg/kg-day)	Dermal Slope Factor (mg/kg-day)	Dermal Reference Dose (mg/kg-day)	Inhalation Slope Factor (mg/kg-day) ⁻¹	Inhalation Reference Dose (mg/kg- day)
Trichloroethene	0.4	No adjustment	4.00E-01	3.00E-04	NA	NA	4.00E-01	1.00E-02
Benzo(a)anthracene	0.13	No adjustment	0.73	NA	0.73	NA	3.08E-01	NA
Benzo(a)pyrene	0.13	No adjustment	7.3	NA	7.3	NA	3.08	NA
Benzo(b)fluoranthene	0.13	No adjustment	0.73	NA	0.73	NA	3.08E-01	NA
Benzo(k)fluoranthene	0.13	No adjustment	0.073	NA	0.073	NA	3.08E-02	NA
Chrysene	0.13	No adjustment	0.0073	NA	0.0073	NA	3.08E-03	NA
Dibenz(a,h)anthracene	0.13	No adjustment	7.3	NA	7.3	NA	3.08	NA
Indeno(1,2,3-cd)pyrene	0.13	No adjustment	0.73	NA	0.73	NA	3.08E-01	NA
Total PCBs	0.14	No adjustment	2	2.00E-05	2	2.00E-05	2.00E+00	2.00E-05
Antimony	NA	Adjust	NA	4.00E-04	NA	NA	NA	NA
Arsenic	0.03	No adjustment	1.5	3.00E-04	1.5	3.00E-04	15	NA
Chromium	NA	Adjust	NA	1.50E+00	NA	NA	42	NA
Copper	NA	NA	NA	4.00E-02	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	No adjustment	NA	6.60E-05	NA	NA	NA	NA

Notes:

Dermal and gastrointestinal absorption values are those presented in USEPA (2004).
Toxicity data are those presented in the USEPA Integrated Risk Assessment System (IRIS).
NA - Not Applicable.

Table 4-8

Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Summary of Chemical-Specific Data - Groundwater

Groundwater COPCs	FA (dimensionless)	Kp (cm/hour)	T-Event (hour)	B	Cancer Slope Factor (mg/kg-day) ⁻¹	Reference Dose (mg/kg-day)
1,1,1-trichloroethane	1	1.30E-02	0.6	0.1	NA	2.80E-01
1,1-dichloroethene	1	1.20E-02	0.37	0	NA	1.00E-01
Trichloroethene	1	1.20E-02	0.58	0.1	4.00E-01	3.00E-04
Tetrachloroethene	1	3.30E-02	0.91	--	0.54	1.00E-02
Total PCB	0.5	4.30E-01	11.29	--	0.4	2.00E-05

Notes:

Chemical-specific dermal values are those presented in USEPA (2004).

Toxicity data are those presented in the USEPA Integrated Risk Assessment System (IRIS).

NA - Not Applicable.

Table 4-9

Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Summary of Cancer Risks and Non-Cancer Hazards Future Commercial Indoor Worker - With Slab

Future Commercial Worker				
Soil COPCs	Exposure Point Concentrations (mg/kg)	Rationale	Cancer Risk (Adult)	Non-Cancer Hazard (Adult)
Trichloroethene	NA	NA	NA	NA
Benzo(a)anthracene	7.395	95% KM (Chebyshev) UCL	3.E-06	NA
Benzo(a)pyrene	6.39	95% KM (Chebyshev) UCL	2.E-05	NA
Benzo(b)fluoranthene	6.075	95% KM (Chebyshev) UCL	2.E-06	NA
Benzo(k)fluoranthene	5.633	99% KM (Chebyshev) UCL	2.E-07	NA
Chrysene	7.775	95% KM (Chebyshev) UCL	3.E-08	NA
Dibenz(a,h)anthracene	1.241	95% KM (Chebyshev) UCL	4.E-06	NA
Ideno(1,2,3-cd)pyrene	3.804	95% KM (Chebyshev) UCL	1.E-06	NA
Total PCBs	18.04	95% Adjusted Gamma UCL	2.E-05	1
Antimony	2.4	95% KM (Percentile Bootstrap) UCL	NA	0.003
Arsenic	69.1	Maximum detected concentration ^a	3.E-05	0.2
Chromium	131	95% Chebyshev (Mean, Sd) UCL	3.E-07	0.00004
Copper	94.69	95% Student's-t UCL	NA	0.001
Lead	242	95% Chebyshev (MVUE) UCL	NA	NA
Thallium	9.815	95% Student's-t UCL	NA	0.07
Total Cancer Risk =			8.E-05	
Total Non-Cancer Hazard =				1

Note:

NA - Not Applicable.

^a Recommended UCL exceeds maximum detected concentration. Therefore, maximum concentration is used as EPC.

Table 4-10
Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Summary of Cancer Risks and Non-Cancer Hazards Future Commercial Indoor Worker - Without Slab

Future Commercial Worker				
Soil COPCs	Exposure Point Concentrations (mg/kg)	Rationale	Cancer Risk (Adult)	Non-Cancer Hazard (Adult)
Trichloroethene	0.2	95% KM (Percentile Bootstrap) UCL	9.E-08	0.002
Benzo(a)anthracene	2.156	95% KM (BCA) UCL	7.E-07	NA
Benzo(a)pyrene	2.063	95% KM (BCA) UCL	7.E-06	NA
Benzo(b)fluoranthene	1.906	95% KM (BCA) UCL	7.E-07	NA
Benzo(k)fluoranthene	5.501	99% KM (Chebyshev) UCL	2.E-07	NA
Chrysene	2.397	95% KM (BCA) UCL	8.E-09	NA
Dibenz(a,h)anthracene	0.38	95% KM (BCA) UCL	1.E-06	NA
Ideno(1,2,3-cd)pyrene	1.135	95% KM (BCA) UCL	4.E-07	NA
Total PCBs	99.13	97.5% KM (Chebyshev) UCL	1.E-04	7
Antimony	2.4	95% KM (Percentile Bootstrap) UCL	NA	0.003
Arsenic	27.78	97.5% KM (Chebyshev) UCL	1.E-05	0.06
Chromium	62.57	95% Chebyshev (Mean, Sd) UCL	1.E-07	0.00002
Copper	1688	99% Chebyshev (Mean, Sd) UCL	NA	0.02
Lead	227.3	95% Chebyshev (MVUE) UCL	NA	NA
Thallium	14	Maximum detected concentration ^a	NA	0.1
Total Cancer Risk =			1.E-04	
Total Non-Cancer Hazard =				7

Note:

NA - Not Applicable.

^a Recommended UCL exceeds maximum detected concentration. Therefore, maximum concentration is used as EPC.

Table 4-11

Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Summary of Cancer Risks and Non-Cancer Hazards Future Residents - With Slab

Future Resident Child				
Soil COPCs	Exposure Point Concentrations (mg/kg)	Rationale	Cancer Risk (Child)	Non-Cancer Hazard (Child)
Trichloroethene	NA	NA	NA	NA
Benzo(a)anthracene	7.395	95% KM (Chebyshev) UCL	8.E-06	NA
Benzo(a)pyrene	6.39	95% KM (Chebyshev) UCL	7.E-05	NA
Benzo(b)fluoranthene	6.075	95% KM (Chebyshev) UCL	7.E-06	NA
Benzo(k)fluoranthene	5.633	99% KM (Chebyshev) UCL	6.E-07	NA
Chrysene	7.775	95% KM (Chebyshev) UCL	8.E-08	NA
Dibenz(a,h)anthracene	1.241	95% KM (Chebyshev) UCL	1.E-05	NA
Ideno(1,2,3-cd)pyrene	3.804	95% KM (Chebyshev) UCL	4.E-06	NA
Total PCBs	18.04	95% Adjusted Gamma UCL	6.E-05	16
Antimony	2.4	95% KM (Percentile Bootstrap) UCL	NA	0.08
Arsenic	69.1	Maximum detected concentration ^a	1.E-04	3
Chromium	131	95% Chebyshev (Mean, Sd) UCL	2.E-07	0.001
Copper	94.69	95% Student's-t UCL	NA	0.03
Lead	242	95% Chebyshev (MVUE) UCL	NA	NA
Thallium	9.815	95% Student's-t UCL	NA	2
Total Cancer Risk =			3.E-04	
Total Non-Cancer Hazard =				21

Future Resident Adult				
Soil COPCs	Exposure Point Concentrations (mg/kg)	Rationale	Cancer Risk (Adult)	Non-Cancer Hazard (Adult)
Trichloroethene	NA	NA	NA	NA
Benzo(a)anthracene	7.395	95% KM (Chebyshev) UCL	4.E-06	NA
Benzo(a)pyrene	6.39	95% KM (Chebyshev) UCL	3.E-05	NA
Benzo(b)fluoranthene	6.075	95% KM (Chebyshev) UCL	3.E-06	NA
Benzo(k)fluoranthene	5.633	99% KM (Chebyshev) UCL	3.E-07	NA
Chrysene	7.775	95% KM (Chebyshev) UCL	4.E-08	NA
Dibenz(a,h)anthracene	1.241	95% KM (Chebyshev) UCL	6.E-06	NA
Ideno(1,2,3-cd)pyrene	3.804	95% KM (Chebyshev) UCL	2.E-06	NA
Total PCBs	18.04	95% Adjusted Gamma UCL	3.E-05	2
Antimony	2.4	95% KM (Percentile Bootstrap) UCL	NA	0.008
Arsenic	69.1	Maximum detected concentration ^a	5.E-05	0.4
Chromium	131	95% Chebyshev (Mean, Sd) UCL	4.E-07	0.0001
Copper	94.69	95% Student's-t UCL	NA	0.003
Lead	242	95% Chebyshev (MVUE) UCL	NA	NA
Thallium	9.815	95% Student's-t UCL	NA	0.2
Total Cancer Risk =			1.E-04	
Total Non-Cancer Hazard =				2

Total Residential Cancer Risk (combined child and adult risk)	4.E-04
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Note:

NA - Not Applicable.

^a Recommended UCL exceeds maximum detected concentration. Therefore, maximum concentration is used as EPC.

Table 4-12

Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Summary of Cancer Risks and Non-Cancer Hazards Future Residents - Without Slab

Future Resident Child				
Soil COPCs	Exposure Point Concentrations (mg/kg)	Rationale	Cancer Risk (Child)	Non-Cancer Hazard (Child)
Trichloroethene	0.2	95% KM (Percentile Bootstrap) UCL	2.E-07	0.02
Benzo(a)anthracene	2.156	95% KM (BCA) UCL	2.E-06	NA
Benzo(a)pyrene	2.063	95% KM (BCA) UCL	2.E-05	NA
Benzo(b)fluoranthene	1.906	95% KM (BCA) UCL	2.E-06	NA
Benzo(k)fluoranthene	5.501	99% KM (Chebyshev) UCL	6.E-07	NA
Chrysene	2.397	95% KM (BCA) UCL	3.E-08	NA
Dibenz(a,h)anthracene	0.38	95% KM (BCA) UCL	4.E-06	NA
Ideno(1,2,3-cd)pyrene	1.135	95% KM (BCA) UCL	1.E-06	NA
Total PCBs	99.13	97.5% KM (Chebyshev) UCL	3.E-04	88
Antimony	2.4	95% KM (Percentile Bootstrap) UCL	NA	0.08
Arsenic	27.78	97.5% KM (Chebyshev) UCL	5.E-05	1
Chromium	62.57	95% Chebyshev (Mean, Sd) UCL	1.E-07	0.001
Copper	1688	99% Chebyshev (Mean, Sd) UCL	NA	0.5
Lead	227.3	95% Chebyshev (MVUE) UCL	NA	NA
Thallium	14	Maximum detected concentration ^a	NA	3
Total Cancer Risk =			4.E-04	
Total Non-Cancer Hazard =				93

Future Resident Adult				
Soil COPCs	Exposure Point Concentrations (mg/kg)	Rationale	Cancer Risk (Adult)	Non-Cancer Hazard (Adult)
Trichloroethene	0.2	95% KM (Percentile Bootstrap) UCL	1.E-07	0.002
Benzo(a)anthracene	2.156	95% KM (BCA) UCL	1.E-06	NA
Benzo(a)pyrene	2.063	95% KM (BCA) UCL	1.E-05	NA
Benzo(b)fluoranthene	1.906	95% KM (BCA) UCL	1.E-06	NA
Benzo(k)fluoranthene	5.501	99% KM (Chebyshev) UCL	3.E-07	NA
Chrysene	2.397	95% KM (BCA) UCL	1.E-08	NA
Dibenz(a,h)anthracene	0.38	95% KM (BCA) UCL	2.E-06	NA
Ideno(1,2,3-cd)pyrene	1.135	95% KM (BCA) UCL	6.E-07	NA
Total PCBs	99.13	97.5% KM (Chebyshev) UCL	1.E-04	11
Antimony	2.4	95% KM (Percentile Bootstrap) UCL	NA	0.008
Arsenic	27.78	97.5% KM (Chebyshev) UCL	2.E-05	0.1
Chromium	62.57	95% Chebyshev (Mean, Sd) UCL	2.E-07	0.0001
Copper	1688	99% Chebyshev (Mean, Sd) UCL	NA	0.06
Lead	227.3	95% Chebyshev (MVUE) UCL	NA	NA
Thallium	14	Maximum detected concentration ^a	NA	0.3
Total Cancer Risk =			2.E-04	
Total Non-Cancer Hazard =				11

Total Residential Cancer Risk (combined child and adult risk)	6.E-04
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Note:

NA - Not Applicable.

^a Recommended UCL exceeds maximum detected concentration. Therefore, maximum concentration is used as EPC.

Table 4-13

Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Summary of Cancer Risks and Non-Cancer Hazards
Future Construction Workers - With Slab

Future Construction Workers				
Soil COPCs	Exposure Point Concentrations (mg/kg)	Rationale	Cancer Risk	Non-Cancer Hazard
Trichloroethene	NA	NA	NA	NA
Benzo(a)anthracene	3.325	95% KM (BCA) UCL	9.E-09	NA
Benzo(a)pyrene	2.737	95% KM (BCA) UCL	8.E-08	NA
Benzo(b)fluoranthene	2.682	95% KM (BCA) UCL	8.E-09	NA
Benzo(k)fluoranthene	8.053	99% KM (Chebyshev) UCL	2.E-09	NA
Chrysene	3.277	95% KM (BCA) UCL	9.E-11	NA
Dibenz(a,h)anthracene	0.575	95% KM (BCA) UCL	2.E-08	NA
Ideno(1,2,3-cd)pyrene	1.673	95% KM (BCA) UCL	5.E-09	NA
Total PCBs	29.59	97.5% KM (Chebyshev) UCL	2.E-07	0.4
Antimony	2.24	95% KM (Percentile Bootstrap) UCL	NA	0.0007
Arsenic	293	99% KM (Chebyshev) UCL	1.E-06	0.1
Chromium	89.18	95% Chebyshev (Mean, Sd) UCL	9.E-10	0.000007
Copper	73.28	95% Approximate Gamma UCL	NA	0.0002
Lead	298	99% Chebyshev (Mean, Sd) UCL	NA	NA
Thallium	14	Maximum detected concentration ^a	NA	0.02
Total Cancer Risk =			1.E-06	
Total Non-Cancer Hazard =				0.6

Note:

NA - Not Applicable.

^a Recommended UCL exceeds maximum detected concentration. Therefore, maximum concentration is used as EPC.

Table 4-14

Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Summary of Cancer Risks and Non-Cancer Hazards
Future Construction Workers - Without Slab

Future Construction Workers				
Soil COPCs	Exposure Point Concentrations (mg/kg)	Rationale	Cancer Risk	Non-Cancer Hazard
Trichloroethene	0.094	95% KM (t) UCL	3.E-10	0.0002
Benzo(a)anthracene	2.08	97.5% KM (Chebyshev) UCL	6.E-09	NA
Benzo(a)pyrene	1.012	95% KM (BCA) UCL	3.E-08	NA
Benzo(b)fluoranthene	1.061	95% KM (BCA) UCL	3.E-09	NA
Benzo(k)fluoranthene	0.925	95% KM (BCA) UCL	3.E-10	NA
Chrysene	2.178	97.5% KM (Chebyshev) UCL	6.E-11	NA
Dibenz(a,h)anthracene	0.283	95% KM (Chebyshev) UCL	8.E-09	NA
Ideno(1,2,3-cd)pyrene	0.965	97.5% KM (Chebyshev) UCL	3.E-09	NA
Total PCBs	569.5	97.5% KM (Chebyshev) UCL	5.E-06	8
Antimony	28.2	97.5% KM (Chebyshev) UCL	NA	0.008
Arsenic	26.08	95% KM (Chebyshev) UCL	9.E-08	0.01
Chromium	17.56	Use 95% H-UCL	2.E-10	0.000001
Copper	2350	97.5% Chebyshev (Mean, Sd) UCL	NA	0.007
Lead	556.8	97.5% Chebyshev (Mean, Sd) UCL	NA	NA
Thallium	9.153	99% KM (Chebyshev) UCL	NA	0.02
Total Cancer Risk =			5.E-06	
Total Non-Cancer Hazard =				8

Notes:

EPC - exposure point concentration

Scenario assumes that the current slab has been removed and intrusive workers are exposed to constituents in surface and subsurface soils (including soils data previously considered sub-slab).

NA - Not Applicable.

Table 4-15

Mercury Marine Plant 2
Cedarburg, WI
Remedial Investigation Report

Summary of Cancer Risks and Non-Cancer Hazards - Groundwater

Future Construction Worker - Dermal Contact				
Groundwater COPCs	EPC (mg/cm ³)	Rationale	Cancer Risk	Non-Cancer Hazard
1,1,1-trichloroethane	0.0000192	95% KM (t) UCL	NA	0.00001
1,1-dichloroethene	0.00000191	95% KM (t) UCL	NA	0.000002
Trichloroethene	0.00000075	95% KM (t) UCL	6.E-10	0.0004
Tetrachloroethene	0.0000182	95% KM (BCA) UCL	7.E-08	0.0009
Total PCB	0.00000061	95% KM (Percentile Bootstrap) UCL	4.E-08	0.3
Total Cancer Risk =			1.E-07	
Total Non-Cancer Hazard =				0.3

Notes:

EPC - exposure point concentration.

According to USEPA (2004) RAGS Part E, dermal risks are not quantified for arsenic.

NA - Not Applicable.

APPENDIX G
Administrative Record Index

**U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION**

**ADMINISTRATIVE RECORD
FOR
CEDAR CREEK SITE
CEDARBURG, OZAUKEE COUNTY, WISCONSIN**

**ORIGINAL
NOVEMBER 2, 2005**

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	07/00/02	Foth & Van Dyke	U.S. EPA	Health and Safety Plan for the Remedial Investigation for the Amcast Industrial Corporation Site	51
2	06/00/03	Foth & Van Dyke	U.S. EPA	Remedial Investigation Work Plan for the Amcast Industrial Corporation	548
3	09/00/03	Foth & Van Dyke	U.S. EPA	Final Field Sampling Plan for the Amcast Industrial Corporation	96
4	09/00/03	Foth & Van Dyke	U.S. EPA	QAPP for the Remedial In- vestigation for the Amcast Industrial Corporation	585
5	10/00/03	Foth & Van Dyke	U.S. EPA	Quality Management Plan for the Remedial Investiga- tion for the Amcast Industri- al Corporation Site	72

**UPDATE #1
MARCH 25, 2008**

1	01/29/98	Haase, A., Mercury Marine	Graefe, M., WDNR	Letter re: Status Report of Cleanup Activities at Plant 2	3
2	06/13/00	Baumgartner, T., Mercury Marine	Martig, T., U.S. EPA	Subsurface Investigations Documentation Report for Mercury Marine Plant 2	93
3	09/00/01	Blasland, Bouck & Lee, Inc.	U.S. EPA	Building Investigations Documentation Report for Mercury Marine Plant 2	53
4	09/27/02	U.S. EPA	Respondent	Administrative Order on Consent for Remedial Inves- tigation/Feasibility Study	71
5	12/02/02	Brunette, M., WDNR	Hansen, S., U.S. EPA	Memorandum re: Documents for Administrative Record w/ Attachments	82
6	07/00/03	Blasland, Bouck & Lee, Inc.	U.S. EPA	Remedial Investigation/ Feasibility Study Work Plan for the Cedar Creek Site	72

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
7	11/00/03	Blasland, Bouck & Lee, Inc.	U.S. EPA	Remedial Investigation/ Feasibility Study Field Sampling Plan for the Cedar Creek Site (REVISION TO SEPTEMBER 2003 REPORT)	328
8	01/00/05	Blasland, Bouck & Lee, Inc.	U.S. EPA	Preliminary Site Charac- terization Summary for the Cedar Creek Site (REVISION TO THE DECEMBER 2004 REPORT)	173
9	10/00/07	U.S. EPA	Public	Fact Sheet: EPA Proposes Cleanup Plan for Former Cedar Creek Plant 2 Site	8
10	10/00/07	Arcadis BBL	Mercury Marine	Alternatives Document/ Focused Feasibility Study Study Report for Mercury Marine Plant 2	64
11	10/00/07	Arcadis BBL	U.S. EPA	Remedial Investigation Report for Mercury Marine Plant 2	563
12	10/10/07	Brown & Jones, Reporting, Inc.	U.S. EPA	Transcript: U.S. EPA Public Hearing for the Proposed Cleanup Plan for the Cedar Creek Plant 2 Site	46
13	03/04/08	U.S. EPA	Mercury Marine	Administrative Settlement Agreement and Order on Consent for Remedial Investigations and Feas- ibility Studies for the Cedar Creek Site	67