Technical Attachment F

Protocols for the Evaluation of Non-PCB Constituents in Soil

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PROTOCOLS FOR THE EVALUATION OF NON-PCB CONSTITUENTS IN SOIL

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1.0 Introduction and Purpose

For each RAA associated with the Removal Actions Outside the River, GE shall conduct an evaluation of non-PCB constituents in soils and/or sediments to propose for EPA approval whether further response actions (in addition to those conducted for PCBs) are necessary to address potentially unacceptable risks due to the presence of non-PCB constituents in soils or sediments. The need for further response actions will be determined based on comparison of site-specific data to pertinent EPA soil screening values, background levels, MCP default soil standards, and/or appropriate risk benchmarks. The non-PCB constituents subject to evaluation will include those constituents listed in Appendix IX of 40 CFR Part 264, plus benzidine, 2-chloroethylvinyl ether, and 1,2-diphenylhydrazine (i.e., Appendix IX+3), unless otherwise specified in the technical RD/RA deliverables for the Removal Action in question.

GE's evaluation of non-PCB constituents will be performed subsequent to the PCB evaluations and will consider, where applicable, all response actions proposed for PCBs, which may include removal of PCB-containing soils and replacement with clean soils, installation of engineered barriers or other surface covers, and/or implementation of Grants of Environmental Restrictions and Easements (EREs). The non-PCB constituent evaluations will be presented in technical RD/RA deliverables specific to each Removal Action.

To evaluate non-PCB constituents in soils, a phased approach will be utilized for all such constituents, except for dioxins and furans, after taking into account the proposed response actions to address PCBs. This approach will involve an initial screening comparison of the maximum soil concentration to the EPA Region 9 Preliminary Remediation Goals (PRGs) (or, for constituents for which there are no such PRGs, other screening concentrations approved by EPA, as described below). For the remaining constituents, further comparisons will be made, as appropriate, to background levels, applicable Massachusetts Contingency Plan (MCP) Method 1 standards, and/or cumulative risk benchmarks based on a site-specific risk evaluation. For dioxins and furans, after taking into account the PCB-related response actions, concentrations will be compared to EPA-established PRGs based on the EPA-published PRGs for dioxin in OSWER Directive 9200.4-26 (April 13, 1998).

A similar evaluation approach will be used to evaluate non-PCB constituents in the sediments of Unkamet Brook.

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Section 2 of this attachment described in detail the steps in this evaluation approach. Section 3 provides further details on the comparison to background levels. Section 4 provides a summary of the conditions requiring further action to address non-PCB constituents.

2.0 Evaluation Approach

To address the presence of Appendix IX+3 constituents other than PCBs in soils at the areas subject to Removal Actions Outside the River, GE shall conduct an evaluation of such constituents for each averaging area described in Attachment E to this SOW (Protocols for PCB Spatial Averaging), as provided in the pertinent Performance Standards in the SOW relating to non-PCB constituents in soil. However, for floodplain properties located downstream of the GE Plant Area, where there are intervening potential sources of non-PCB constituents, GE may exclude from this evaluation particular properties (or portions of properties) where response actions are not necessary to address PCBs.

In conducting this evaluation, GE shall undertake the following steps for each averaging area:

- **Step 1:** A review of the data qualifiers will be conducted to determine if the analytical results are representative of site conditions. Specifically, analytical laboratory results that indicate constituent occurrence as a result of laboratory interferences or contamination (as indicated by the laboratory blank data) will not be included in the site-specific evaluations.

- **Step 2:** The data will be screened to identify those sample results that are representative of potential exposure points following the proposed response actions to address PCBs. Specifically, if soils containing PCBs are proposed to be removed, then it will be assumed that all Appendix IX+3 constituents present within such soils will likewise be removed. Further, it will be assumed that these soils will be replaced with an equal volume of clean soils containing non-detectable levels of organic Appendix IX+3 constituents and backfill levels of inorganic Appendix IX+3 constituents (based on data from representative samples of the backfill material). Thus, if averaging is to be conducted, the concentration of the organic Appendix IX+3 constituents will be averaged using one-half the detection limit in the

remediated soils to derive the post-PCB remediation concentrations. The concentrations of the inorganic Appendix IX+3 constituents will be averaged using the representative backfill sample concentrations for the remediated soils (or, if non-detect in backfill, using one-half the detection limit) to derive the post-PCB-remediation concentration.

For areas where a soil cover will be installed to address PCBs, that cover and thus the resulting (new) surface soil in the area will be assumed to consist of clean material -- i.e., to contain concentrations of organic constituents at one-half the detection limit and concentrations of inorganic constituents based on representative sampling of the cover material. For areas where an engineered barrier or pavement enhancement will be installed to address PCBs in the underlying soil, the sample results from soil underlying such barrier or pavement enhancement will be eliminated from consideration, and averages will be recalculated for the portion(s) of the area not subject to such barrier or pavement enhancement (subject to potential modification, if necessary, based on the nature and concentration of volatile constituents for which such barriers/pavement may not provide effective containment). Finally, for the former landfills, on-plant consolidation areas, and former parking lot areas that will be capped, there will be no need for an evaluation of non-PCB constituents, as these areas will have already been remediated.

- **Step 3:** GE shall further screen the remaining data by making the following comparisons for the sample results that were not eliminated in Step 2:

  a. For constituents other than dioxins and furans, the maximum concentration of each detected constituent will be compared to the EPA Region 9 PRGs for that constituent in soil (listed in Exhibit F-1 to this attachment). These PRGs were specifically developed for screening purposes; each PRG corresponds to an excess lifetime cancer risk of 1×10^{-6} or a non-cancer hazard quotient of 1. Soil PRGs have been developed for residential soils and industrial soils. The comparison of maximum detected concentrations to these PRGs will use the residential soil PRGs for residential and recreational areas and the industrial soil PRGs for commercial/ industrial areas. For polycyclic aromatic hydrocarbons (PAHs) for which Region 9 PRGs do not exist, GE shall use the Region 9 PRGs for benzo(a)pyrene for carcinogenic PAHs (e.g., 7,12-

dimethylbenz(a)anthracene) and the Region 9 PRGs for naphthalene for noncarcinogenic PAHs (e.g., acenaphthylene, benzo(g,h,i)perylene, methapyrilene, 2-methylnaphthalene, and phenanthrene). For other constituents for which Region 9 PRGs do not exist, GE may propose screening concentrations based either on the Region 9 PRGs for chemicals with similar characteristics or on other appropriate risk-based calculations, and upon EPA approval, may use such screening concentrations in this step. (The Region 9 PRGs, together with the PRGs specified above for carcinogenic and noncarcinogenic PAHs for which there are no Region 9 PRGs and any additional screening concentrations proposed by GE and approved by EPA, are hereinafter referred to jointly as "Screening PRGs.") Any constituent whose maximum concentration is at or below the applicable Screening PRG will be eliminated from further consideration. The remaining constituents will be subject to further evaluation as described below.

b. For dioxins and furans, GE shall calculate for each sample a total Toxicity Equivalent (TEQ) concentration, using the consensus Toxicity Equivalency Factors (TEFs) published by the World Health Organization (Van den Berg et al., *Environ, Health Perspectives*, vol. 106, no. 12, December 1998). For each averaging area and depth increment subject to the Performance Standards for PCBs, GE shall then compare either the maximum TEQ concentration or the 95% Upper Confidence Limit (95% UCL) on the mean of TEQ concentrations, whichever is lower, to the applicable PRG established by EPA. Based on the dioxin PRGs published by EPA in OSWER Directive 9200.4-26 (April 13, 1998). Those PRGs are: for residential areas, a TEQ concentration of 1 ppb; for recreational areas, TEQ concentrations of 1 ppb in the top foot and 1.5 ppb in the 1- to 3-foot depth interval; and for commercial/ industrial areas, TEQ concentrations of 5 ppb in the top foot and 20 ppb in deeper soil. If the maximum or 95% UCL dioxin/furan TEQ concentration does not exceed the applicable PRG, no further response actions will be necessary for dioxins/furans. If the maximum or 95% UCL concentration exceeds the applicable PRG, no further evaluation will be conducted, and GE will develop response actions to achieve the applicable PRGs.

- **Step 4:** For each constituent (other than dioxins/furans) with a maximum concentration that exceeds the applicable EPA Screening PRG, the dataset for that constituent for the particular averaging area (after taking into account the PCB-related response actions) will be compared with the background dataset for that constituent, using the background datasets and procedures described in Section 3. Any constituent for which the averaging area dataset is consistent with the background dataset will be eliminated from further consideration. Any constituent for which the averaging area dataset is not consistent with the background dataset will be subject to further evaluation, as described below. (Note: This step may be omitted if all constituents remaining after Step 3.a are at or below the applicable MCP Method 1 standards and thus can be eliminated through Step 5 below.)

- **Step 5:** For each constituent (other than dioxins/furans) that is not eliminated in the prior steps, an average concentration will be calculated for the averaging area (taking into account the PCB-related response actions, as described above). The averaging approach will be determined based on the specific area and will consist of either arithmetic, spatial, or volume-weighted averaging, depending on area-specific considerations (e.g., area size, sample distribution, available dataset). The specific averaging approach and rationale for it will be presented in the RD/RA documents for the Removal Action involved. The resulting average concentration will then be compared to the applicable Method 1 soil standard (S-1, S-2, or S-3) set out in the MCP (310 CMR 40.0975). If there is no existing Method 1 soil standard for such a constituent, GE may derive a Method 2 standard for use in the comparison, using procedures consistent with the MCP procedures for deriving such Method 2 standards (310 CMR 40.0984).

  In making these comparisons, separate average concentrations shall be calculated for surface soils and subsurface soils (using depth increments consistent with those evaluated for PCBs) and will be separately compared to applicable Method 1 (or 2) standards. In determining the applicable set of Method 1 (or 2) soil standards (i.e., S-1, S-2, or S-3), the appropriate categorization of the soil under the criteria set out in the MCP (310 CMR 40.0933) will be used. In making this determination, any ERE or Alternative Solution proposed for the area in question may be taken into account.

If all constituents evaluated in this step have average concentrations at or below the applicable Method 1 (or 2) standards, it will be concluded that risks from residual non-PCB constituents are within acceptable limits and no further response actions will be necessary to address such constituents. If any constituent(s) evaluated in this step has an average concentration exceeding the applicable Method 1 (or 2) standard, then all constituents evaluated in this step will be subject to a further area-specific risk evaluation as described in Step 6, unless GE opts to adopt Performance Standards based on the applicable Method 1 standards, the Region 9 PRGs, or background levels, as described in the SOW and in Section 4 below.

- **Step 6:** If an area-specific risk evaluation will be conducted, that evaluation will include all constituents that were evaluated in Step 5 (regardless of whether individual constituent concentrations are below Method 1 standards). In such an evaluation, GE will calculate the cumulative Excess Lifetime Cancer Risk (ELCR) and non-cancer Hazard Index (HI) for all such constituents, based on the average concentrations of such constituents at the averaging area (after taking into account any PCB-related response actions). Potential risks from PCBs and dioxins/furans will not be included in these cumulative risk calculations. This evaluation will be based on the same uses for the area and depth increment in question (e.g., residential use, recreational use, commercial/industrial worker use, utility worker use) that were assumed in developing the applicable PCB Performance Standards for such area and depth increment. Risks will be evaluated using the same exposure assumptions and parameter values used in Attachment A to EPA's Action Memorandum for Removal Actions Outside the River (Appendix D to the CD) to support the PCB Performance Standards for such area and depth increment, unless GE proposes and provides an adequate justification for the use of alternate exposure assumptions or values for the following parameters for the specific area in question and EPA approves such alternate assumptions:(i) exposure frequency (if based on site-specific land conditions for the area in question); (ii) exposed skin surface area (if based on site-specific land conditions for the area in question); (iii) dermal adherence factor; (iv) soil ingestion rate; (v) oral absorption factor; and (vi) dermal absorption factor.. The toxicity values to be used for cancer and non-cancer risks in such an evaluation will be derived from standard EPA sources, such as EPA's Integrated Risk Information System (IRIS) or its Health Effects Assessment Summary Table (HEAST). Other dose-response information, such as

toxicity weighting factors and absorption factors for non-PCB constituents, will be obtained from EPA and MDEP policies and guidance, except that, as noted above, GE may propose alternative dermal and oral absorption factors and use them if approved by EPA.

If the resulting cumulative ELCR for the area does not exceed 1 x 10^{-5} (after rounding) and the cumulative HI does not exceed 1 (after rounding), it will be concluded that risks from residential Appendix IX+3 constituents are within acceptable limits and no further response actions will be necessary to address such constituents.

3.0 Comparison to Background Levels

This section further describes Step 4 in the above evaluation approach -- comparison to background levels. For purposes of making such comparisons, background datasets representative of local background soil conditions will be developed. These background datasets will be developed for the various Appendix IX+3 constituents except for dioxins and furans (which will be evaluated through Step 3.b described above). Samples selected for inclusion in the background datasets will be from locations which are relatively undisturbed and have not been used for handling or storing oil or hazardous waste. The background datasets will include data from the following sources:

- Between 1992 and 1996, GE collected soil samples from the Housatonic River floodplain upstream of releases from the GE Plant Area. These samples were collected generally from areas located between the 10- and 100 year floodplains. Individual samples were analyzed for some or all Appendix IX+3 constituents. The analytical results were reported in *Evaluation of Housatonic River Sediment and Floodplain Soil Data on Hazardous Constituent to Assess the Need for Further Sampling* (Blasland, Bouck & Lee, Inc., 1996). These Appendix IX+3 results for upstream floodplain soils will be included in the background database .
- Since 1997, GE has collected and is continuing to collect soil samples from numerous off-site residential properties in Pittsfield and nearby communities that are not covered by the CD. Many of those samples have been analyzed for Appendix IX+3 constituents. The Appendix IX+3 database from these sampling

activities will be screened to exclude any samples with detectable PCB concentrations, any samples containing fill, and any other samples from individual sample points that have been or will be subject to removal as part of response actions at such properties. Following such screening, the data from the remaining sampling points will be included in the background database.

- The entire database for Appendix IX+3 constituents in soil from areas subject to the CD, including areas sampled by EPA and areas to be sampled in the future, will be reviewed to identify data that can be used as background. This review will involve exclusion of any samples with detectable PCB concentrations, samples from fill areas and any other samples from locations likely to have been affected by releases from the GE Plant Area or other RAAs subject to this SOW (e.g., based on their location downgradient of such areas). From the remaining soil sampling results, GE will propose sampling data that appear to be representative of background conditions for inclusion in the background database .

- To supplement the datasets listed above, GE will develop a background sampling plan for EPA review and approval. That plan will consider the overall data available from the above sources of information, and will identify specific data needs and a proposal for sampling to address such needs, based on the scope of potential background evaluations that may be needed for the various RAAs identified in this SOW. Upon EPA approval, GE will conduct such sampling, and the resulting data will be added to the background datasets as appropriate.

As noted above, these sources of background data will be used to develop background datasets for the constituents of interest. These background datasets will be presented to EPA for review and approval. If there are differences in background levels between surface soils and subsurface soils, GE shall propose separate background datasets for surface soils and subsurface soils, and comparisons will be made separately for surface and subsurface soils. In addition, if sufficient data exist, GE may propose separate background datasets for residential/recreational areas and for commercial/industrial areas.

Comparisons will be made of the appropriate averaging area dataset at the RAA in question with the background dataset on a constituent-by-constituent basis. An appropriate statistical method will be used to make this

comparison. If there is an insufficient number of samples to achieve a desirable level of power for a statistical method, then summary statistics will be used to compare the averaging area dataset with the background dataset. The summary statistics method to be used to make such comparisons will be the method described in the MDEP's *Guidance for Disposal Site Risk Characterization* (1995). In brief, this method consists of comparing a measure of central tendency (generally the median) and a measure of spread (generally the maximum). If the pair of measures for the site are greater than background, then it is concluded that the site data are not consistent with background. Conversely, if both values for the site are equal to or less than background, it can be concluded that the site data are consistent with background. If comparison of the median value yields the opposite result from the comparison of the maximum value, a tolerance limit of 50% is used.

4.0 Conclusion

No further response actions will be conducted to address non-PCB Appendix IX+3 constituents at an averaging area if the following Performance Standards are met after taking into account the response actions to address PCBs:

- For dioxins and furans, TEQ concentrations do not exceed the applicable EPA PRGs for dioxin, as described in Step 3.b in Section 2;

- For other constituents, any combination of the following:

  -- Maximum concentrations of individual constituents do not exceed the applicable Screening PRGs;

  -- Concentrations of individual constituents are consistent with background levels (as determined using the procedures in Section 3); or

  -- For the remaining constituents (if any), either (i) the average concentrations of all such constituents do not exceed the applicable Method 1 (or 2) soil standards, or (ii) the calculated

cumulative risks from such constituents (based on average concentrations) do not exceed (after rounding) an ELCR of 1×10^{-5} and a non-cancer HI of 1.

If such conditions are not met, GE shall propose for EPA approval the implementation of further response actions as necessary to achieve those Performance Standards. The specific response actions to be taken to achieve those Performance Standards will be proposed by GE to EPA for approval and will be similar to the response actions established by the Performance Standards for PCBs at the area in question, subject to potential modification if necessary based on the nature and concentration of any volatile constituents detected (e.g., depending on the nature and concentration of volatile constituents, an engineered barrier or other surface cover suitable for addressing subsurface PCBs may not provide effective containment for such volatile constituents).

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References

Blasland, Bouck & Lee, Inc., *Evaluation of Housatonic River Sediment and Floodplain Soil Data on Hazardous Constituents to Assess Need for Further Sampling* (Syracuse, NY: September 1996). Prepared on behalf of General Electric Company.

MDEP, *Guidance for Disposal Site Risk Characterization - In Support of the Massachusetts Contingency Plan*, Interim Final Policy, WSC/ORS-95-141 (Boston, Massachusetts: Bureau of Waste Site Cleanup and Office of Research and Standards, July 1995).

Exhibit F-1 to Technical Attachment F

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION						CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
8.7E-03 i	4.0E-03 i	8.7E-03 r	4.0E-03 r	0	0.10	30560-19-1	Acephate	5.1E+01 ca**	3.4E+02 ca*	7.7E-01 ca*	7.7E+00 ca*		6.0E+01
7.7E-03 r	2.6E-03 r	7.7E-03 i	2.6E-03 i	1	0.10	75-07-0	Acetaldehyde	9.2E+00 ca**	2.2E+01 ca**	8.7E-01 ca*	1.5E+00 ca*		
	2.0E-02 i		2.0E-02 r	0	0.10	34256-82-1	Acetochlor	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	1.0E-01 i		1.0E-01 r	1	0.10	67-64-1	Acetone	1.4E+03 nc	6.1E+03 nc	3.7E+02 nc	6.1E+02 nc	1.6E+01	8.0E-01
	8.0E-04 h		2.9E-03 x	0	0.10	75-86-5	Acetone cyanohydrin	4.4E+01 nc	8.6E+02 nc	1.0E+01 nc	2.9E+01 nc		
	6.0E-03 i		1.4E-02 h	1	0.10	75-05-8	Acetonitrile	2.0E+02 nc	1.3E+03 nc	5.2E+01 nc	7.1E+01 nc		
	1.0E-01 i		5.7E-06 x	1	0.10	98-86-2	Acetophenone	4.9E-01 nc	1.6E+00 nc	2.1E-02 nc	4.2E-02 nc		
1.1E-01 o	1.3E-02 i	**1.1E-01 r**	1.3E-02 r	0	0.10	50594-66-6	**Acifluorfen**	4.0E+00 ca	2.7E+01 ca	6.1E-02 ca	6.1E-01 ca		
	2.0E-02 h		5.7E-06 i	1	0.10	107-02-8	Acrolein	1.0E-01 nc	3.4E-01 nc	2.1E-02 nc	4.2E-02 nc		
4.6E+00 i	2.0E-04 i	4.6E+00 i	2.0E-04 r	0	0.10	79-06-1	Acrylamide	9.8E-02 ca	6.6E-01 ca	1.5E-03 ca	1.5E-02 ca		
	5.0E-01 i		2.9E-04 i	0	0.10	79-10-7	Acrylic acid	2.6E+04 nc	4.2E+05 nc	1.0E+00 nc	1.8E+04 nc		
5.4E-01 i	1.0E-03 h	2.4E-01 i	5.7E-04 i	1	0.10	107-13-1	Acrylonitrile	1.9E-01 ca*	4.9E-01 ca*	2.8E-02 ca*	3.7E+00 ca*		
8.1E-02 h	1.0E-02 i	8.0E-02 r	1.0E-02 r	0	0.10	15972-60-8	Alachlor	5.5E+00 ca*	3.7E+01 ca	8.4E-02 ca	8.4E-01 ca		
	1.5E-01 i		1.5E-01 r	0	0.10	1596-84-5	Alar	8.2E+03 nc	1.6E+05 nc	5.5E+02 nc	5.5E+03 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	116-06-3	Aldicarb	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	1646-88-4	Aldicarb sulfone	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		
1.7E+01 i	3.0E-05 i	1.7E+01 i	3.0E-05 r	0	0.10	309-00-2	Aldrin	2.6E-02 ca*	1.8E-01 ca	3.9E-04 ca	4.0E-03 ca	1.2E+04	5.9E+02
	2.5E-01 i		2.5E-01 r	0	0.10	5585-64-8	Ally	1.4E+04 nc	1.0E+05 max	9.1E+02 nc	9.1E+03 nc		
	5.0E-03 x		5.0E-03 r	0	0.10	107-18-6	Allyl alcohol	2.7E+02 nc	5.3E+03 nc	1.8E+01 nc	1.8E+02 nc		
	5.0E-02 h		2.9E-04 i	0	0.10	107-05-1	Allyl chloride	2.7E+03 nc	5.2E+04 nc	1.0E+00 nc	1.8E+03 nc		
	1.0E+00 n			0	0.01	7429-90-5	Aluminum	7.5E+04 nc	1.0E+05 max		3.7E+04 nc		
	4.0E-04 i			0	0.01	20859-73-8	Aluminum phosphide	3.0E+01 nc	7.5E+02 nc		1.5E+01 nc		
	3.0E-04 i		3.0E-04 r	0	0.10	67485-29-4	Amdro	1.6E+01 nc	3.2E+02 nc	1.1E+00 nc	1.1E+01 nc		
	9.0E-03 i		9.0E-03 r	0	0.10	834-12-8	Ametryn	4.9E+02 nc	9.6E+03 nc	3.3E+01 nc	3.3E+02 nc		
	7.0E-02 h		7.0E-02 r	0	0.10	591-27-5	m-Aminophenol	3.8E+03 nc	7.5E+04 nc	2.6E+02 nc	2.6E+03 nc		
	2.0E-05 h		2.0E-05 r	0	0.10	504-24-5	4-Aminopyridine	1.1E+00 nc	2.1E+01 nc	7.3E-02 nc	7.3E-01 nc		
	2.5E-03 i		2.5E-03 r	0	0.10	33089-61-1	Amitraz	1.4E+02 nc	2.7E+03 nc	9.1E+00 nc	9.1E+01 nc		
			2.9E-02 i	n/a	n/a	7664-41-7	Ammonia			1.0E+02 nc			
	2.0E-01 i			0	0.10	7773-06-0	Ammonium sulfamate	1.1E+04 nc	1.0E+05 max		7.3E+03 nc		
5.7E-03 i	**7.0E-03 n**	5.7E-03 r	2.9E-04 i	0	0.10	62-53-3	**Aniline**	7.8E+01 ca**	5.3E+02 ca*	1.0E+00 nc	1.2E+01 ca*		
	4.0E-04 i			0	0.01	7440-36-0	Antimony and compounds	3.0E+01 nc	7.5E+02 nc		1.5E+01 nc	5.0E+00	3.0E-01
	5.0E-04 h			0	0.01	1314-60-9	Antimony pentoxide	3.7E+01 nc	9.4E+02 nc		1.8E+01 nc		
	9.0E-04 h			0	0.01	28300-74-5	Antimony potassium tartrate	6.7E+01 nc	1.7E+03 nc		3.3E+01 nc		
	4.0E-04 h			0	0.01	1332-81-6	Antimony tetroxide	3.0E+01 nc	7.5E+02 nc		1.5E+01 nc		
	4.0E-04 h			0	0.01	1309-64-4	Antimony trioxide	3.0E+01 nc	7.5E+02 nc		1.5E+01 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	74115-24-5	Apollo	7.1E+02 nc	1.4E+04 nc	4.7E+01 nc	4.7E+02 nc		
2.5E-02 i	5.0E-02 h	2.5E-02 i	5.0E-02 r	0	0.10	140-57-8	Aramite	1.8E+01 ca	1.2E+02 ca	2.7E-01 ca	2.7E+00 ca		
	3.0E-04 i			0	0.03	7440-38-2	Arsenic (noncancer endpoint)	2.1E+01 nc	4.8E+02 nc				
1.5E+00 i	3.0E-04 i	1.5E+01 i		0	0.03	7440-38-2	Arsenic (cancer endpoint)	3.8E-01 ca*	3.0E+00 ca	4.5E-04 ca	4.5E-02 ca	2.9E+01	1.0E+00
			1.4E-05 i	n/a	n/a	7784-42-1	Arsine (see arsenic for cancer endpoint)			5.2E-02 nc			
	9.0E-03 i		9.0E-03 r	0	0.10	76578-12-6	Assure	4.9E+02 nc	9.6E+03 nc	3.3E+01 nc	3.3E+02 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	3337-71-1	Asulam	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
2.2E-01 h	3.5E-02 h	2.2E-01 r	3.5E-02 h	0	0.10	1912-24-9	Atrazine	2.0E+00 ca	1.3E+01 ca	3.1E-02 ca	3.0E-01 ca		
	4.0E-04 i		4.0E-04 r	0	0.10	71751-41-2	Avermectin B1	2.2E+01 nc	4.3E+02 nc	1.5E+00 nc	1.5E+01 nc		
1.1E-01 i		1.1E-01 i		0	0.10	103-33-3	Azobenzene	4.0E+00 ca	2.7E+01 ca	6.2E-02 ca	6.1E-01 ca		
	7.0E-02 i		1.4E-04 h	0	0.01	7440-39-3	**Barium and compounds**	5.2E+03 nc	1.0E+05 max	5.2E-01 nc	2.6E+03 nc	1.6E+03	8.2E+01
	4.0E-03 i		4.0E-03 r	0	0.10	114-26-1	Baygon	2.2E+02 nc	4.3E+03 nc	1.5E+01 nc	1.5E+02 nc		
	3.0E-02 i		3.0E-02 r	0	0.10	43121-43-3	Bayleton	1.6E+03 nc	3.2E+04 nc	1.1E+02 nc	1.1E+03 nc		

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
	2.5E-02 i		2.5E-02 r	0	0.10	68359-37-5	Baythroid	1.4E+03 nc	2.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	3.0E-01 i		3.0E-01 r	0	0.10	1861-40-1	Benefin	1.6E+04 nc	1.0E+05 max	1.1E+03 nc	1.1E+04 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	17804-35-2	Benomyl	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
	3.0E-02 i		**3.0E-02 r**	0	0.10	25057-89-0	**Bentazon**	1.6E+03 nc	3.2E+04 nc	1.1E+02 nc	1.1E+03 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	100-52-7	Benzaldehyde	5.5E+03 nc	1.1E+05 nc	3.7E+02 nc	3.7E+03 nc		
2.9E-02 i	**3.0E-03 n**	2.9E-02 i	1.7E-03 n	1	0.10	71-43-2	**Benzene**	6.2E-01 ca*	1.4E+00 ca*	2.3E-01 ca*	3.9E-01 ca*	3.0E-02	2.0E-03
2.3E+02 i	3.0E-03 i	2.3E+02 i	3.0E-03 r	0	0.10	92-87-5	Benzidine	1.9E-03 ca	1.3E-02 ca	2.9E-05 ca	2.9E-04 ca		
	4.0E+00 i		4.0E+00 i	0	0.10	65-85-0	Benzoic acid	1.0E+05 max	1.0E+05 max	1.5E+04 nc	1.5E+05 nc	4.0E+02	2.0E+01
1.3E+01 i		1.3E+01 r		0	0.10	98-07-7	Benzotrichloride	3.4E-02 ca	2.3E-01 ca	5.2E-04 ca	5.2E-03 ca		
	3.0E-01 h		3.0E-01 r	0	0.10	100-51-6	Benzyl alcohol	1.6E+04 nc	1.0E+05 max	1.1E+03 nc	1.1E+04 nc		
1.7E-01 i		1.7E-01 r		1	0.10	100-44-7	Benzyl chloride	8.1E-01 ca	2.2E+00 ca	4.0E-02 ca	6.6E-02 ca		
	2.0E-03 i	8.4E+00 i	**5.7E-06 i**	0	0.01	7440-41-7	**Beryllium and compounds**	1.5E+02 nc	3.4E+03 nc	8.0E-04 ca*	7.3E+01 nc	6.3E+01	3.0E+00
	1.0E-04 i		1.0E-04 r	0	0.10	141-66-2	Bidrin	5.5E+00 nc	1.0E+00 nc	3.7E-01 nc	3.7E+00 nc		
	1.5E-02 i		1.5E-02 r	0	0.10	82657-04-3	Biphenthrin (Talstar)	8.2E+02 nc	1.6E+04 nc	5.5E+01 nc	5.5E+02 nc		
	5.0E-02 i		**5.0E-02 r**	1	0.10	92-52-4	**1,1-Biphenyl**	2.3E+03 nc	2.4E+04 nc	1.8E+02 nc	3.0E+02 nc		
1.1E+00 i		1.2E+00 i		1	0.10	111-44-4	Bis(2-chloroethyl)ether	1.8E-01 ca	5.6E-01 ca	5.8E-03 ca	9.8E-03 ca	4.0E-04	2.0E-05
7.0E-02 h	4.0E-02 i	3.5E-02 h	4.0E-02 r	1	0.10	39638-32-9	Bis(2-chloroisopropyl)ether	2.5E+00 ca	7.4E+00 ca	1.9E-01 ca	2.7E-01 ca		
2.2E+02 i		2.2E+02 i		1	0.10	542-88-1	Bis(chloromethyl)ether	1.9E-04 ca	4.3E-04 ca	3.1E-05 ca	5.2E-05 ca		
7.0E-02 h		3.5E-02 h		0	0.10	108-60-1	Bis(2-chloro-1-methylethyl)ether	6.3E+00 ca	4.3E+01 ca	1.9E-01 ca	9.6E-01 ca		
1.4E-02 i	2.0E-02 i	1.4E-02 r	2.2E-02 r	0	0.10	117-81-7	Bis(2-ethylhexyl)phthalate (DEHP)	3.2E+01 ca*	2.1E+02 ca	4.8E-01 ca	4.8E+00 ca		
	5.0E-02 i		5.0E-02 r	0	0.10	80-05-7	Bisphenol A	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
	9.0E-02 i		5.7E-03 h	0	0.10	7440-42-8	Boron	4.9E+03 nc	9.6E+04 nc	2.1E+01 nc	3.3E+03 nc		
			2.0E-04 h	0	0.10	7637-07-2	Boron trifluoride			7.3E-01 nc			
	2.0E-02 n		**2.9E-03 n**	1	0.10	SU 108-86-1	**Bromobenzene**	2.8E+01 nc	9.2E+01 nc	1.0E+01 nc	2.0E+01 nc		
6.2E-02 i	2.0E-02 i	6.2E-02 r	2.0E-02 r	1	0.10	75-27-4	Bromodichloromethane	9.8E-01 ca	2.3E+00 ca	1.1E-01 ca	1.8E-01 ca	6.0E-01	3.0E-02
7.9E-03 i	2.0E-02 i	3.9E-03 i	2.0E-02 r	0	0.10	75-25-2	Bromoform (tribromomethane)	5.6E+01 ca*	3.8E+02 ca*	1.7E+00 ca*	8.5E+00 ca*	8.0E-01	4.0E-02
	1.4E-03 i		1.4E-03 i	1	0.10	74-83-9	Bromomethane (Methyl bromide)	3.8E+00 nc	1.3E+01 nc	5.2E+00 nc	8.7E+00 nc	2.0E-01	1.0E-02
				0	0.10	101-55-3	4-Bromophenyl phenyl ether						
	5.0E-03 h		5.0E-03 r	0	0.10	2104-96-3	Bromophos	2.7E+02 nc	5.3E+03 nc	1.8E+01 nc	1.8E+02 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	1689-84-5	Bromoxynil	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	1.8E+02 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	1689-99-2	Bromoxynil octanoate	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
9.8E-01 r		9.8E-01 i		1	0.10	106-99-0	1,3-Butadiene	6.5E-03 ca	1.4E-02 ca	6.9E-03 ca	1.1E-02 ca		
	1.0E-01 i		1.0E-01 r	0	0.10	71-36-3	1-Butanol	5.5E+03 nc	1.1E+05 nc	3.7E+02 nc	3.7E+03 nc	1.7E+01	9.0E-01
	5.0E-02 i		5.0E-02 r	0	0.10	2008-41-5	Butylate	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
	1.0E-02 n		**1.0E-02 r**	1	0.10	104-51-8	**n-Butylbenzene**	1.3E+02 nc	5.5E+02 nc	3.7E+01 nc	6.1E+01 nc		
	1.0E-02 n		**1.0E-02 r**	1	0.10	135-9-88	**sec-Butylbenzene**	1.0E+02 nc	4.1E+02 nc	3.7E+01 nc	6.1E+01 nc		
	1.0E-02 n		**1.0E-02 r**	1	0.10	104-5-18	**tert-Butylbenzene**	1.2E+02 nc	4.9E+02 nc	3.7E+01 nc	6.1E+01 nc		
	2.0E-01 i		2.0E-01 r	0	0.10	85-68-7	Butyl benzyl phthalate	9.3E+02 sat	9.3E+02 sat	7.3E+02 nc	7.3E+03 nc	9.3E+02	8.1E+02
	1.0E+00 i		1.0E+00 r	0	0.10	85-70-1	Butylphthalyl butylglycolate	5.5E+04 nc	1.0E+05 max	3.7E+03 nc	3.7E+04 nc		
	3.0E-03 h		3.0E-03 r	0	0.10	75-60-5	Cacodylic acid	1.6E+02 nc	3.2E+03 nc	1.1E+01 nc	1.1E+02 nc		
	5.0E-04 i	6.3E+00 i	5.7E-05 x	0	0.01	7440-43-9	Cadmium and compounds	3.7E+01 nc	9.3E+02 nc	1.1E-03 ca	1.8E+01 nc	8.0E+00	4.0E-01
							"CAL-Modified PRG" (PEA, 1994)	**9.0E+00**					
	5.0E-01 i		5.0E-01 r	0	0.10	105-60-2	Caprolactam	2.7E+04 nc	1.0E+05 max	1.8E+03 nc	1.8E+04 nc		
8.6E-03 h	2.0E-03 i	8.6E-03 r	2.0E-03 r	0	0.10	2425-06-1	Captafol	5.2E+01 ca**	3.5E+02 ca**	7.8E-01 ca*	7.8E+00 ca*		
3.5E-03 h	1.3E-01 i	3.5E-03 r	1.3E-01 r	0	0.10	133-06-2	Captan	1.3E+02 ca*	8.6E+02 ca	1.9E+00 ca	1.9E+01 ca		
	1.0E-01 i		1.1E-01 r	0	0.10	63-25-2	Carbaryl	5.5E+03 nc	1.1E+05 nc	4.0E+02 nc	3.7E+03 nc		
2.0E-02 h		2.0E-02 r		0	0.10	86-74-8	Carbazole	2.2E+01 ca	1.5E+02 ca	3.4E-01 ca	3.4E+00 ca	6.0E-01	3.0E-02
	5.0E-03 i		5.0E-03 r	0	0.10	1563-66-2	Carbofuran	2.7E+02 nc	5.3E+03 nc	1.8E+01 nc	1.8E+02 nc		
	1.0E-01 i		**2.0E-01 i**	1	0.10	75-15-0	**Carbon disulfide**	3.5E+02 nc	1.2E+03 nc	7.3E+02 nc	1.0E+03 nc	3.2E+01	2.0E+00

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FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	VOC	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
1.3E-01 i	7.0E-04 i	5.3E-02 i	5.7E-04 x	1	0.10	56-23-5	Carbon tetrachloride	2.3E-01 ca**	5.2E-01 ca*	1.3E-01 ca*	1.7E-01 ca*	7.0E-02	3.0E-03
	1.0E-02 i		1.0E-02 r	0	0.10	55285-14-8	Carbosulfan	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	5234-68-4	Carboxin	5.5E+03 nc	1.1E+05 nc	3.7E+02 nc	3.7E+03 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	302-17-0	Chloral	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
	1.5E-02 i		1.5E-02 r	0	0.10	133-90-4	Chloramben	8.2E+02 nc	1.6E+04 nc	5.5E+01 nc	5.5E+02 nc		
4.0E-01 h		4.0E-01 r		0	0.10	118-75-2	Chloranil	1.1E+00 ca	7.4E+00 ca	1.7E-02 ca	1.7E-01 ca		
3.5E-01 i	**5.0E-04 i**	**3.5E-01 i**	**2.3E-05 i**	0	0.04	57-74-9	**Chlordane**	1.6E+00 ca*	1.2E+01 ca*	1.9E-02 ca**	1.9E-01 ca*	1.0E+01	5.0E-01
	2.0E-02 i		2.0E-02 r	0	0.10	90982-32-4	Chlorimuron-ethyl	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	1.0E-01 i			0	0.01	7782-50-5	Chlorine				3.7E+03 nc		
			5.7E-05 i	n/a	n/a	10049-04-4	Chlorine dioxide			2.1E-01 nc			
				1	0.10	107-20-0	Chloroacetaldehyde						
	2.0E-03 h		2.0E-03 r	0	0.10	79-11-8	Chloroacetic acid	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
	8.6E-06 r		8.6E-06 i	1	0.10	SU 532-27-4	2-Chloroacetophenone	3.2E-02 nc	1.1E-01 nc	3.1E-02 nc	5.2E-02 nc		
	4.0E-03 i		4.0E-03 r	0	0.10	106-47-8	4-Chloroaniline	2.2E+02 nc	4.3E+03 nc	1.5E+01 nc	1.5E+02 nc	7.0E-01	3.0E-02
	2.0E-02 i		5.7E-03 h	1	0.10	108-90-7	Chlorobenzene	5.4E+01 nc	1.8E+02 nc	2.1E+01 nc	3.9E+01 nc	1.0E+00	7.0E-02
2.7E-01 h	2.0E-02 i	2.7E-01 h	2.0E-02 r	0	0.10	510-15-6	Chlorobenzilate	1.6E+00 ca	1.1E+01 ca	2.5E-02 ca	2.5E-01 ca		
	2.0E-01 h		2.0E-01 r	0	0.10	74-11-3	p-Chlorobenzoic acid	1.1E+04 nc	1.0E+05 max	7.3E+02 nc	7.3E+03 nc		
	2.0E-02 h		2.0E-02 r	0	0.10	98-56-6	4-Chlorobenzotrifluoride	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	2.0E-02 h		2.0E-03 h	1	0.10	126-99-8	2-Chloro-1,3-butadiene	3.6E+00 nc	1.2E+01 nc	7.3E+00 nc	1.4E+01 nc		
	4.0E-01 h		4.0E-01 r	1	0.10	SU 109-69-3	1-Chlorobutane	4.8E+02 sat	4.8E+02 sat	1.5E+03 nc	2.4E+03 nc		
	1.4E+01 r		1.4E+01 i	1	0.10	SU 75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	3.4E+02 sat	3.4E+02 sat	5.2E+04 nc	8.7E+04 nc		
	1.4E+01 r		1.4E+01 i	1	0.10	SU 75-45-6	Chlorodifluoromethane	3.4E+02 sat	3.4E+02 sat	5.1E+04 nc	8.5E+04 nc		
				1	0.10	110-75-8	2-Chloroethyl vinyl ether						
6.1E-03 i	1.0E-02 i	8.1E-02 i	1.0E-02 r	1	0.10	67-66-3	Chloroform	2.4E-01 ca	5.2E-01 ca	8.4E-02 ca	1.6E-01 ca	6.0E-01	3.0E-02
1.3E-02 h		6.3E-03 h		1	0.10	74-87-3	Chloromethane	1.2E+00 ca	2.6E+00 ca	1.1E+00 ca	1.5E+00 ca		
5.8E-01 h		5.8E-01 r		0	0.10	95-69-2	4-Chloro-2-methylaniline	7.7E-01 ca	5.2E+00 ca	1.2E-02 ca	1.2E-01 ca		
4.6E-01 h		4.6E-01 r		0	0.10	3165-93-3	4-Chloro-2-methylaniline hydrochloride	9.7E-01 ca	6.5E+00 ca	1.5E-02 ca	1.5E-01 ca		
	8.0E-02 i		**8.0E-02 r**	1	0.10	91-58-7	**beta-Chloronaphthalene**	3.7E+03 nc	2.4E+04 nc	2.9E+02 nc	4.9E+02 nc		
2.5E-02 h		2.5E-02 r	r	0	0.10	88-73-3	o-Chloronitrobenzene	1.8E+01 ca	1.2E+02 ca	2.7E-01 ca	2.7E+00 ca		
1.8E-02 h		1.8E-02 r	r	0	0.10	100-00-5	p-Chloronitrobenzene	2.5E+01 ca	1.7E+02 ca	3.7E-01 ca	3.7E+00 ca		
	5.0E-03 i		5.0E-03 r	1	0.10	95-57-8	2-Chlorophenol	5.9E+01 nc	2.4E+02 nc	1.8E+01 nc	3.8E+01 nc	4.0E+00	2.0E-01
	2.9E-02 r		2.9E-02 h	1	0.10	SU 75-29-6	2-Chloropropane	1.6E+02 nc	5.9E+02 nc	1.0E+02 nc	1.7E+02 nc		
1.1E-02 h	1.5E-02 i	1.1E-02 r	1.5E-02 r	0	0.10	1897-45-6	Chlorothalonil	4.0E+01 ca*	2.7E+02 ca*	6.1E-01 ca*	6.1E+00 ca*		
	2.0E-02 i		2.0E-02 r	1	0.10	SU 95-49-8	o-Chlorotoluene	1.5E+02 nc	5.6E+02 nc	7.3E+01 nc	1.2E+02 nc		
	2.0E-01 i		2.0E-01 r	0	0.10	101-21-3	Chlorpropham	1.1E+04 nc	1.0E+05 max	7.3E+02 nc	7.3E+03 nc		
	3.0E-03 i		3.0E-03 r	0	0.10	2921-88-2	Chlorpyrifos	1.6E+02 nc	3.2E+03 nc	1.1E+01 nc	1.1E+02 nc		
	1.0E-02 h		1.0E-02 r	0	0.10	5598-13-0	Chlorpyrifos-methyl	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	64902-72-3	Chlorsulfuron	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
	8.0E-04 h		8.0E-04 r	0	0.10	60238-56-4	Chlorthiophos	4.4E+01 nc	8.6E+02 nc	2.9E+00 nc	2.9E+01 nc		
		4.2E+01 i		0	0.01	n/a	Total Chromium (1/6 ratio Cr VI/Cr III)	2.1E+02 ca	4.5E+02 ca	1.6E-04 ca		3.8E+01	2.0E+00
	5.0E-03 i	2.9E+02 i		0	0.01	7440-47-3	Chromium VI	3.0E+01 ca*	6.4E+01 ca	2.3E-05 ca	1.8E+02 nc	3.8E+01	2.0E+00
							"CAL-Modified PRG" (PEA, 1994)	**2.0E-01**			**1.6E-01**		
	6.0E-02 x		5.7E-06 x	0	0.01	7440-48-4	Cobalt	3.3E+03 nc	2.9E+04 nc	2.1E-02 nc	2.2E+03 nc		
		2.2E+00 i		0	0.01	8007-45-2	Coke Oven Emissions			3.1E-03 ca			
	3.7E-02 h			0	0.01	7440-50-8	Copper and compounds	2.8E+03 nc	7.0E+04 nc		1.4E+03 nc		
1.9E+00 h	1.0E-02 x	1.9E+00 x	1.0E-02 r	1	0.10	SU 123-73-9	Crotonaldehyde	5.3E-03 ca	1.1E-02 ca	3.5E-03 ca	5.9E-03 ca		
	1.0E-01 i		**1.1E-01 i**	1	0.10	98-82-8	**Cumene (isopropylbenzene)**	1.6E+02 nc	5.2E+02 nc	4.0E+02 nc	6.6E+02 nc		
8.4E-01 h	2.0E-03 h	8.4E-01 r	2.0E-03 r	0	0.10	21725-46-2	Cyanazine	5.3E-01 ca	3.6E+00 ca	8.0E-03 ca	8.0E-02 ca		

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION						CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
					n/a	Cyanides						
	1.0E-01 h			0	0.10	542-62-1	Barium cyanide	5.5E+03 nc	1.0E+05 max		3.7E+03 nc		
	4.0E-02 i			0	0.10	592-01-8	Calcium cyanide	2.2E+03 nc	4.3E+04 nc		1.5E+03 nc		
	5.0E-03 i			0	0.10	544-92-3	Copper cyanide	2.7E+02 nc	5.3E+03 nc		1.8E+02 nc		
	4.0E-02 i			0	0.10	460-19-5	Cyanogen	2.2E+03 nc	4.3E+04 nc		1.5E+03 nc		
	9.0E-02 i			0	0.10	506-68-3	Cyanogen bromide	4.9E+03 nc	1.0E+05 max		3.3E+03 nc		
	5.0E-02 i			0	0.10	506-77-4	Cyanogen chloride	2.7E+03 nc	5.3E+04 nc		1.8E+03 nc		
	2.0E-02 i			0	0.10	57-12-5	Free cyanide	1.1E+03 nc	2.1E+04 nc		7.3E+02 nc	4.0E+01	2.0E+00
	2.0E-02 i		8.6E-04 i	1	0.10	74-90-8	Hydrogen cyanide	1.1E+01 nc	3.5E+01 nc	3.1E+00 nc	6.2E+00 nc		
	5.0E-02 i			0	0.10	151-50-8	Potassium cyanide	2.7E+03 nc	5.3E+04 nc		1.8E+03 nc		
	2.0E-01 i			0	0.10	506-61-6	Potassium silver cyanide	1.1E+04 nc	1.0E+05 max		7.3E+03 nc		
	1.0E-01 i			0	0.10	506-64-9	Silver cyanide	5.5E+03 nc	1.1E+05 nc		3.7E+03 nc		
	4.0E-02 i			0	0.10	143-33-9	Sodium cyanide	2.2E+03 nc	4.3E+04 nc		1.5E+03 nc		
	5.0E-02 i			0	0.10	557-21-1	Zinc cyanide	2.7E+03 nc	5.3E+04 nc		1.8E+03 nc		
	5.0E+00 i		5.0E+00 r	0	0.10	108-94-1	Cyclohexanone	1.0E+05 max	1.0E+05 max	1.8E+04 nc	1.8E+05 nc		
	2.0E-01 i		2.0E-01 r	0	0.10	108-91-8	Cyclohexylamine	1.1E+04 nc	1.0E+05 max	7.3E+02 nc	7.3E+03 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	68085-85-8	Cyhalothrin/Karate	2.7E+02 nc	5.3E+03 nc	1.8E+01 nc	1.8E+02 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	52315-07-8	Cypermethrin	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	7.5E-03 i		7.5E-03 r	0	0.10	66215-27-8	Cyromazine	4.1E+02 nc	8.0E+03 nc	2.7E+01 nc	2.7E+02 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	1861-32-1	Dacthal	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	3.0E-02 i		3.0E-02 r	0	0.10	75-99-0	Dalapon	1.6E+03 nc	3.2E+04 nc	1.1E+02 nc	1.1E+03 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	39515-41-8	Danitol	1.4E+03 nc	2.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
2.4E-01 i		2.4E-01 r		0	0.03	72-54-8	DDD	2.4E+00 ca	1.9E+01 ca	2.8E-02 ca	2.8E-01 ca	1.6E+01	8.0E-01
3.4E-01 i		3.4E-01 r		0	0.03	72-55-9	DDE	1.7E+00 ca	1.3E+01 ca	2.0E-02 ca	2.0E-01 ca	5.4E+01	3.0E+00
3.4E-01 i	5.0E-04 i	3.4E-01 i	5.0E-04 r	0	0.03	50-29-3	DDT	1.7E+00 ca*	1.3E+01 ca*	2.0E-02 ca*	2.0E-01 ca*	3.2E+01	2.0E+00
	1.0E-02 i		1.0E-02 r	0	0.10	1163-19-5	Decabromodiphenyl ether	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	4.0E-05 i		4.0E-05 r	0	0.10	8065-48-3	Demeton	2.2E+00 nc	4.3E+01 nc	1.5E-01 nc	1.5E+00 nc		
6.1E-02 h		6.1E-02 r		0	0.10	2303-16-4	Diallate	7.3E+00 ca	4.9E+01 ca	1.1E-01 ca	1.1E+00 ca		
	9.0E-04 h		9.0E-04 r	0	0.10	333-41-5	Diazinon	4.9E+01 nc	9.6E+02 nc	3.3E+00 nc	3.3E+01 nc		
	4.0E-03 x		**4.0E-03 r**	1	0.10	132-64-9	**Dibenzofuran**	2.1E+02 nc	3.2E+03 nc	1.5E+01 nc	2.4E+01 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	106-37-6	1,4-Dibromobenzene	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
8.4E-02 i	2.0E-02 i	8.4E-02 r	2.0E-02 r	0	0.10	124-48-1	Dibromochloromethane	5.3E+00 ca	3.6E+01 ca	8.0E-02 ca	1.0E+00 ca	4.0E-01	2.0E-02
1.4E+00 h	5.7E-05 r	2.4E-03 h	5.7E-05 i	0	0.10	96-12-8	1,2-Dibromo-3-chloropropane	3.2E-01 ca**	2.1E+00 ca*	2.1E-01 nc	4.8E-02 ca*		
							"CAL-Modified PRG" (PEA, 1994)	**6.0E-02**		**9.6E-04**	**4.7E-03**		
8.5E+01 i	5.7E-05 r	7.7E-01 i	5.7E-05 h	1	0.10	106-93-4	1,2-Dibromoethane	4.9E-03 ca	2.9E-02 ca*	8.7E-03 ca*	7.6E-04 ca		
	1.0E-01 i		1.0E-01 r	0	0.10	84-74-2	Dibutyl phthalate	5.5E+03 nc	1.1E+05 nc	3.7E+02 nc	3.7E+03 nc	2.3E+03	2.7E+02
	3.0E-02 i		3.0E-02 r	0	0.10	1918-00-9	Dicamba	1.6E+03 nc	3.2E+04 nc	1.1E+02 nc	1.1E+03 nc		
	9.0E-02 i		5.7E-02 h	1	0.10	95-50-1	1,2-Dichlorobenzene	3.7E+02 sat	3.7E+02 sat	2.1E+02 nc	3.7E+02 nc	1.7E+01	9.0E-01
	3.0E-02 n		**2.3E-03 n**	1	0.10	541-73-1	**1,3-Dichlorobenzene**	4.1E+01 nc	1.4E+02 nc	8.4E+00 nc	1.7E+01 nc		
2.4E-02 h	2.0E-01 n	2.4E-02 r	2.3E-01 i	1	0.10	106-46-7	1,4-Dichlorobenzene	3.0E+00 ca	7.3E+00 ca	2.8E-01 ca	4.7E-01 ca	2.0E+00	1.0E-01
4.5E-01 i		4.5E-01 r		0	0.10	91-94-1	3,3-Dichlorobenzidine	9.9E-01 ca	6.7E+00 ca	1.5E-02 ca	1.5E-01 ca	7.0E-03	3.0E-04
9.3E+00 r		9.3E+00 h		1	0.10	764-41-0	1,4-Dichloro-2-butene	7.5E-03 ca	1.8E-02 ca	7.2E-04 ca	1.2E-03 ca		
	2.0E-01 i		5.7E-02 h	1	0.10	75-71-8	Dichlorodifluoromethane	9.4E+01 nc	3.1E+02 nc	2.1E+02 nc	3.9E+02 nc		
	1.0E-01 h		1.4E-01 h	1	0.10	75-34-3	1,1-Dichloroethane	5.7E+02 nc	2.0E+03 nc	5.2E+02 nc	8.1E+02 nc	2.3E+01	1.0E+00
9.1E-02 i	2.9E-03 r	**9.1E-02 i**	2.9E-03 x	1	0.10	107-06-2	**1,2-Dichloroethane (EDC)**	3.4E-01 ca*	7.6E-01 ca*	7.4E-02 ca	1.2E-01 ca	2.0E-02	1.0E-03
6.0E-01 i	9.0E-03 i	1.8E-01 i	9.0E-03 r	1	0.10	75-35-4	1,1-Dichloroethylene	5.2E-02 ca	1.2E-01 ca	3.8E-02 ca	4.6E-02 ca	6.0E-02	3.0E-03
	1.0E-02 h		1.0E-02 r	1	0.10	156-59-2	1,2-Dichloroethylene (cis)	4.2E+01 nc	1.5E+02 nc	3.7E+01 nc	6.1E+01 nc	4.0E-01	2.0E-02
	2.0E-02 i		2.0E-02 r	1	0.10	156-60-5	1,2-Dichloroethylene (trans)	6.2E+01 nc	2.1E+02 nc	7.3E+01 nc	1.2E+02 nc	7.0E-01	3.0E-02

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FOR PLANNING PURPOSES

TOXICITY INFORMATION						CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
	3.0E-03 i		3.0E-03 r	0	0.10	120-83-2	2,4-Dichlorophenol	1.6E+02 nc	3.2E+03 nc	1.1E+01 nc	1.1E+02 nc	1.0E+00	5.0E-02
	8.0E-03 i		8.0E-03 r	0	0.10	94-82-6	4-(2,4-Dichlorophenoxy)butyric Acid (2,4-DB)	4.4E+02 nc	8.6E+03 nc	2.9E+01 nc	2.9E+02 nc		
	1.0E-02 i		1.0E-02 r	0	0.05	94-75-7	2,4-Dichlorophenoxyacetic Acid (2,4-D)	6.4E+02 nc	1.4E+04 nc	3.7E+01 nc	3.7E+02 nc		
6.8E-02 h	1.1E-03 r	6.8E-02 r	1.1E-03 i	1	0.10	78-87-5	1,2-Dichloropropane	3.4E-01 ca*	7.6E-01 ca*	9.9E-02 ca*	1.6E-01 ca*	3.0E-02	1.0E-03
1.8E-01 h	3.0E-04 i	1.3E-01 h	5.7E-03 i	1	0.10	542-75-6	1,3-Dichloropropene	8.1E-02 ca*	1.8E-01 ca	5.2E-02 ca	8.1E-02 ca	4.0E-03	2.0E-04
	3.0E-03 i		3.0E-03 r	0	0.10	616-23-9	2,3-Dichloropropanol	1.6E+02 nc	3.2E+03 nc	1.1E+01 nc	1.1E+02 nc		
2.9E-01 i	5.0E-04 i	2.9E-01 r	1.4E-04 i	0	0.10	62-73-7	Dichlorvos	1.5E+00 ca*	1.0E+01 ca*	2.3E-02 ca*	2.3E-01 ca*		
4.4E-01 x		4.4E-01 r		0	0.10	115-32-2	Dicofol	1.0E+00 ca	6.8E+00 ca	1.5E-02 ca	1.5E-01 ca		
	3.0E-02 h		**5.7E-05 h**	1	0.10	77-73-6	**Dicyclopentadiene**	5.4E-01 nc	1.8E+00 nc	2.1E-01 nc	4.2E-01 nc		
1.6E+01 i	5.0E-05 i	1.6E+01 i	5.0E-05 r	0	0.10	60-57-1	Dieldrin	2.8E-02 ca*	1.9E-01 ca	4.2E-04 ca	4.2E-03 ca	4.0E-03	2.0E-04
	5.7E-03 h		5.7E-03 x	0	0.10	112-34-5	Diethylene glycol, monobutyl ether	3.1E+02 nc	6.1E+03 nc	2.1E+01 nc	2.1E+02 nc		
	2.0E+00 h		2.0E+00 r	0	0.10	111-90-0	Diethylene glycol, monoethyl ether	1.0E+05 max	1.0E+05 max	7.3E+03 nc	7.3E+04 nc		
	1.1E-02 h		1.1E-02 r	0	0.10	617-84-5	Diethylformamide	6.0E+02 nc	1.2E+04 nc	4.0E+01 nc	4.0E+02 nc		
1.2E-03 i	6.0E-01 i	1.2E-03 r	6.0E-01 r	0	0.10	103-23-1	Di(2-ethylhexyl)adipate	3.7E+02 ca	2.5E+03 ca	5.6E+00 ca	5.6E+01 ca		
	8.0E-01 i		8.0E-01 r	0	0.10	84-66-2	Diethyl phthalate	4.4E+04 nc	1.0E+05 max	2.9E+03 nc	2.9E+04 nc		
4.7E+03 h		4.7E+03 r		0	0.10	56-53-1	Diethylstilbestrol	9.4E-05 ca	6.4E-04 ca	1.4E-06 ca	1.4E-05 ca		
	8.0E-02 i		8.0E-02 r	0	0.10	43222-48-6	Difenzoquat (Avenge)	4.4E+03 nc	8.6E+04 nc	2.9E+02 nc	2.9E+03 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	35367-38-5	Diflubenzuron	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	1.1E+01 r		1.1E+01 i	1	0.10	75-37-6	1,1-Difluoroethane			4.2E+04 nc	6.9E+04 nc		
	8.0E-02 i		8.0E-02 r	0	0.10	1445-75-6	Diisopropyl methylphosphonate	4.4E+03 nc	8.6E+04 nc	2.9E+02 nc	2.9E+03 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	55290-64-7	Dimethipin	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	2.0E-04 i		2.0E-04 r	0	0.10	60-51-5	Dimethoate	1.1E+01 nc	2.1E+02 nc	7.3E-01 nc	7.3E+00 nc		
1.4E-02 h		1.4E-02 r		0	0.10	119-90-4	3,3'-Dimethoxybenzidine	3.2E+01 ca	2.1E+02 ca	4.8E-01 ca	4.8E+00 ca		
	5.7E-06 r		5.7E-06 x	1	0.10	124-40-3	Dimethylamine	6.3E-02 nc	2.5E-01 nc	2.1E-02 nc	3.5E-02 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	121-69-7	N-N-Dimethylaniline	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
7.5E-01 h		7.5E-01 r		0	0.10	95-68-1	2,4-Dimethylaniline	5.9E-01 ca	4.0E+00 ca	9.0E-03 ca	9.0E-02 ca		
5.8E-01 h		5.8E-01 r		0	0.10	21436-96-4	2,4-Dimethylaniline hydrochloride	7.7E-01 ca	5.2E+00 ca	1.2E-02 ca	1.2E-01 ca		
9.2E+00 h		9.2E+00 r		0	0.10	119-93-7	3,3'-Dimethylbenzidine	4.8E-02 ca	3.3E-01 ca	7.3E-04 ca	7.3E-03 ca		
2.6E+00 x		3.5E+00 x		0	0.10	57-14-7	1,1-Dimethylhydrazine	1.7E-01 ca	1.2E+00 ca	1.9E-03 ca	2.6E-02 ca		
3.7E+01 x		3.7E+01 x		0	0.10	540-73-8	1,2-Dimethylhydrazine	1.2E-02 ca	8.1E-02 ca	1.8E-04 ca	1.8E-03 ca		
	1.0E-01 h		8.6E-03 i	0	0.10	68-12-2	N,N-Dimethylformamide	5.4E+03 nc	1.1E+05 nc	3.1E+01 nc	3.7E+03 nc		
	1.0E-03 n		**1.0E-03 r**	0	0.10	122-09-8	**Dimethylphenethylamine**	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	105-67-9	2,4-Dimethylphenol	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc	9.0E+00	4.0E-01
	6.0E-04 i		6.0E-04 r	0	0.10	576-26-1	2,6-Dimethylphenol	3.3E+01 nc	6.4E+02 nc	2.2E+00 nc	2.2E+01 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	95-65-8	3,4-Dimethylphenol	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		
	1.0E+01 h		1.0E+01 r	0	0.10	131-11-3	Dimethyl phthalate	1.0E+05 max	1.0E+05 max	3.7E+04 nc	3.7E+05 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	120-61-6	Dimethyl terephthalate	5.5E+03 nc	1.1E+05 nc	3.7E+02 nc	3.7E+03 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	131-89-5	4,6-Dinitro-o-cyclohexyl phenol	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
	4.0E-04 h		4.0E-04 r	0	0.10	528-29-0	1,2-Dinitrobenzene	2.2E+01 nc	4.3E+02 nc	1.5E+00 nc	1.5E+01 nc		
	1.0E-04 i		1.0E-04 r	0	0.10	99-65-0	1,3-Dinitrobenzene	5.5E+00 nc	1.1E+02 nc	3.7E-01 nc	3.7E+00 nc		
	4.0E-04 h		4.0E-04 r	0	0.10	100-25-4	1,4-Dinitrobenzene	2.2E+01 nc	4.3E+02 nc	1.5E+00 nc	1.5E+01 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	51-28-5	2,4-Dinitrophenol	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc	3.0E-01	1.0E-02
6.8E-01 i		6.8E-01 r		0	0.10	25321-14-6	Dinitrotoluene mixture	6.5E-01 ca	4.4E+00 ca	9.9E-03 ca	9.9E-02 ca	8.0E-04	4.0E-05
	2.0E-03 i		2.0E-03 r	0	0.10	121-14-2	2,4-Dinitrotoluene (also see Dinitrotoluene mixture)	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc	8.0E-04	4.0E-05
	1.0E-03 h		1.0E-03 r	0	0.10	606-20-2	2,6-Dinitrotoluene (also see Dinitrotoluene mixture)	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc	7.0E-04	3.0E-05
	1.0E-03 i		1.0E-03 r	0	0.10	88-85-7	Dinoseb	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		
	2.0E-02 h		2.0E-02 r	0	0.10	117-84-0	di-n-Octyl phthalate	1.1E+03 nc	1.0E+04 sat	7.3E+01 nc	7.3E+02 nc	1.0E+04	1.0E+04
1.1E-02 i		**1.1E-02 r**		0	0.10	123-91-1	**1,4-Dioxane**	4.0E+01 ca	2.7E+02 ca	6.1E-01 ca	6.1E+00 ca		

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION						CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
1.5E+05 h		1.5E+05 h		0	0.03	1746-01-6	Dioxin (2,3,7,8-TCDD)	3.8E-06 ca	3.0E-05 ca	4.5E-08 ca	4.5E-07 ca		
	3.0E-02 i		3.0E-02 r	0	0.10	957-51-7	Diphenamid	1.6E+03 nc	3.2E+04 nc	1.1E+02 nc	1.1E+03 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	122-39-4	Diphenylamine	1.4E+03 nc	2.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
8.0E-01 i		7.7E-01 i		0	0.10	122-66-7	1,2-Diphenylhydrazine	5.6E-01 ca	3.7E+00 ca	8.7E-03 ca	8.4E-02 ca		
	9.0E-03 n		**9.0E-03 r**	0	0.10	127-63-9	**Diphenyl sulfone**	4.9E+02 nc	9.6E+03 nc	3.3E+01 nc	3.3E+02 nc		
	2.2E-03 i		2.2E-03 r	0	0.10	85-00-7	Diquat	1.2E+02 nc	2.4E+03 nc	8.0E+00 nc	8.0E+01 nc		
8.6E+00 h		8.6E+00 r		0	0.10	1937-37-7	Direct black 38	5.2E-02 ca	3.5E-01 ca	7.8E-04 ca	7.8E-03 ca		
8.1E+00 h		8.1E+00 r		0	0.10	2602-46-2	Direct blue 6	5.5E-02 ca	3.7E-01 ca	8.3E-04 ca	8.3E-03 ca		
9.3E+00 h		9.3E+00 r		0	0.10	16071-86-6	Direct brown 95	4.8E-02 ca	3.2E-01 ca	7.2E-04 ca	7.2E-03 ca		
	4.0E-05 i		4.0E-05 r	0	0.10	298-04-4	Disulfoton	2.2E+00 nc	4.3E+01 nc	1.5E-01 nc	1.5E+00 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	505-29-3	1,4-Dithiane	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	330-54-1	Diuron	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
	4.0E-03 i		4.0E-03 r	0	0.10	2439-10-3	Dodine	2.2E+02 nc	4.3E+03 nc	1.5E+01 nc	1.5E+02 nc		
	6.0E-03 i		**6.0E-03 r**	0	0.10	115-29-7	**Endosulfan**	3.3E+02 nc	6.4E+03 nc	2.2E+01 nc	2.2E+02 nc	1.8E+01	9.0E-01
	2.0E-02 i		2.0E-02 r	0	0.10	145-73-3	Endothall	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	3.0E-04 i		3.0E-04 r	0	0.10	72-20-8	Endrin	1.6E+01 nc	3.2E+02 nc	1.1E+00 nc	1.1E+01 nc	1.0E+00	5.0E-02
9.9E-03 i	2.0E-03 h	4.2E-03 i	2.9E-04 i	1	0.10	106-89-8	Epichlorohydrin	7.4E+00 nc	2.6E+01 nc	1.0E+00 nc	2.0E+00 nc		
	5.7E-03 r		5.7E-03 i	0	0.10	106-88-7	1,2-Epoxybutane	3.1E+02 nc	6.1E+03 nc	2.1E+01 nc	2.1E+02 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	759-94-4	EPTC (S-Ethyl dipropylthiocarbamate)	1.4E+03 nc	2.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	16672-87-0	Ethephon (2-chloroethyl phosphonic acid)	2.7E+02 nc	5.3E+03 nc	1.8E+01 nc	1.8E+02 nc		
	5.0E-04 i		5.0E-04 r	0	0.10	563-12-2	Ethion	2.7E+01 nc	5.3E+02 nc	1.8E+00 nc	1.8E+01 nc		
	4.0E-01 h		5.7E-02 i	0	0.10	110-80-5	2-Ethoxyethanol	2.2E+04 nc	1.0E+05 max	2.1E+02 nc	1.5E+04 nc		
	3.0E-01 h		3.0E-01 r	0	0.10	111-15-9	2-Ethoxyethanol acetate	1.6E+04 nc	1.0E+05 max	1.1E+03 nc	1.1E+04 nc		
	9.0E-01 i		**9.0E-01 r**	1	0.10	141-78-6	**Ethyl acetate**	1.7E+04 nc	7.7E+04 sat	3.3E+03 nc	5.5E+03 nc		
4.8E-02 h		4.8E-02 r		1	0.10 SU	140-88-5	Ethyl acrylate	2.1E-01 ca	4.5E-01 ca	1.4E-01 ca	2.3E-01 ca		
	1.0E-01 i		2.9E-01 i	1	0.10	100-41-4	Ethylbenzene	2.3E+02 sat	2.3E+02 sat	1.1E+03 nc	1.3E+03 nc	1.3E+01	7.0E-01
	4.0E-01 n		2.9E+00 i	1	0.10	75-00-3	**Ethyl chloride**	1.6E+03 sat	1.6E+03 sat	1.0E+04 nc	8.6E+03 nc		
	3.0E-01 h		3.0E-01 r	0	0.10	109-78-4	Ethylene cyanohydrin	1.6E+04 nc	1.0E+05 max	1.1E+03 nc	1.1E+04 nc		
	2.0E-02 h		2.0E-02 r	0	0.10	107-15-3	Ethylene diamine	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	2.0E+00 i		2.0E+00 r	0	0.10	107-21-1	Ethylene glycol	1.0E+05 max	1.0E+05 max	7.3E+03 nc	7.3E+04 nc		
	5.7E-03 r		5.7E-03 h	0	0.10	111-76-2	Ethylene glycol, monobutyl ether	3.1E+02 nc	6.1E+03 nc	2.1E+01 nc	2.1E+02 nc		
1.0E+00 h		3.5E-01 h		1	0.10	75-21-8	Ethylene oxide	1.3E-01 ca	3.4E-01 ca	1.9E-02 ca	2.4E-02 ca		
1.1E-01 h	**8.0E-05 i**	1.1E-01 r	**8.0E-05 r**	0	0.10	96-45-7	**Ethylene thiourea (ETU)**	4.0E+00 ca**	2.7E+01 ca**	6.1E-02 ca**	6.1E-01 ca**		
	2.0E-01 i		2.0E-01 r	1	0.10 SU	60-29-7	Ethyl ether	1.8E+03 sat	1.8E+03 sat	7.3E+02 nc	1.2E+03 nc		
	9.0E-02 h		9.0E-02 r	1	0.10 SU	97-63-2	Ethyl methacrylate	1.4E+02 sat	1.4E+02 sat	3.3E+02 nc	5.5E+02 nc		
	1.0E-05 i		1.0E-05 r	0	0.10	2104-64-5	Ethyl p-nitrophenyl phenylphosphorothioate	5.5E-01 nc	1.1E+01 nc	3.7E-02 nc	3.7E-01 nc		
	3.0E+00 i		3.0E+00 r	0	0.10	84-72-0	Ethylphthalyl ethyl glycolate	1.0E+05 max	1.0E+05 max	1.1E+04 nc	1.1E+05 nc		
	8.0E-03 i		8.0E-03 r	0	0.10	101200-48-0	Express	4.4E+02 nc	8.6E+03 nc	2.9E+01 nc	2.9E+02 nc		
	2.5E-04 i		2.5E-04 r	0	0.10	22224-92-6	Fenamiphos	1.4E+01 nc	2.7E+02 nc	9.1E-01 nc	9.1E+00 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	2164-17-2	Fluometuron	7.1E+02 nc	1.4E+04 nc	4.7E+01 nc	4.7E+02 nc		
	6.0E-02 i			0	0.10	16984-48-8	Flouride (soluble)	3.3E+03 nc	6.4E+04 nc		2.2E+03 nc		
	8.0E-02 i		8.0E-02 r	0	0.10	59756-60-4	Fluoridone	4.4E+03 nc	8.6E+04 nc	2.9E+02 nc	2.9E+03 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	56425-91-3	Flurprimidol	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	6.0E-02 i		6.0E-02 r	0	0.10	66332-96-5	Flutolanil	3.3E+03 nc	6.4E+04 nc	2.2E+02 nc	2.2E+03 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	69409-94-5	Fluvalinate	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
3.5E-03 i	1.0E-01 i	3.5E-03 r	1.0E-01 r	0	0.10	133-07-3	Folpet	1.3E+02 ca*	8.6E+02 ca	1.9E+00 ca	1.9E+01 ca		
1.9E-01 i		1.9E-01 r		0	0.10	72178-02-0	Fomesafen	2.3E+00 ca	1.6E+01 ca	3.5E-02 ca	3.5E-01 ca		
	2.0E-03 i		2.0E-03 r	0	0.10	944-22-9	Fonofos	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION						CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	VOC	skin abs. soils	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
	1.5E-01 i	4.6E-02 i		0	0.10	50-00-0 Formaldehyde	8.2E+03 nc	1.0E+05 nc	1.5E-01 ca	5.5E+03 nc		
	2.0E+00 h		2.0E+00 r	0	0.10	64-18-6 Formic Acid	1.0E+05 max	1.0E+05 max	7.3E+03 nc	7.3E+04 nc		
	3.0E+00 i		3.0E+00 r	0	0.10	39148-24-8 Fosetyl-al	1.0E+05 max	1.0E+05 max	1.1E+04 nc	1.1E+05 nc		
	1.0E-03 i		**1.0E-03 r**	1	0.10	110-00-9 **Furan**	2.5E+00 nc	8.5E+00 nc	3.7E+00 nc	6.1E+00 nc		
3.8E+00 h		3.8E+00 r		0	0.10	67-45-8 Furazolidone	1.2E-01 ca	7.9E-01 ca	1.8E-03 ca	1.8E-02 ca		
	3.0E-03 i		1.4E-02 h	0	0.10	98-01-1 Furfural	1.6E+02 nc	3.2E+03 nc	5.2E+01 nc	1.1E+02 nc		
5.0E+01 h		5.0E+01 r		0	0.10	531-82-8 Furium	8.9E-03 ca	6.0E-02 ca	1.3E-04 ca	1.3E-03 ca		
3.0E-02 i		3.0E-02 r		0	0.10	60568-05-0 Furmecyclox	1.5E+01 ca	1.0E+02 ca	2.2E-01 ca	2.2E+00 ca		
	4.0E-04 i		4.0E-04 r	0	0.10	77182-82-2 Glufosinate-ammonium	2.2E+01 nc	4.3E+02 nc	1.5E+00 nc	1.5E+01 nc		
	4.0E-04 i		2.9E-04 h	0	0.10	765-34-4 Glycidaldehyde	2.2E+01 nc	4.3E+02 nc	1.0E+00 nc	1.5E+01 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	1071-83-6 Glyphosate	5.5E+03 nc	1.1E+05 nc	3.7E+02 nc	3.7E+03 nc		
	5.0E-05 i		5.0E-05 r	0	0.10	69806-40-2 Haloxyfop-methyl	2.7E+00 nc	5.3E+01 nc	1.8E-01 nc	1.8E+00 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	79277-27-3 Harmony	7.1E+02 nc	1.4E+04 nc	4.7E+01 nc	4.7E+02 nc		
4.5E+00 i	5.0E-04 i	4.6E+00 i	5.0E-04 r	0	0.10	76-44-8 Heptachlor	9.9E-02 ca	6.7E-01 ca	1.5E-03 ca	1.5E-02 ca	2.3E+01	1.0E+00
9.1E+00 i	1.3E-05 i	9.1E+00 i	1.3E-05 r	0	0.10	1024-57-3 Heptachlor epoxide	4.9E-02 ca*	3.3E-01 ca*	7.4E-04 ca*	7.4E-03 ca*	7.0E-01	3.0E-02
	2.0E-03 i		2.0E-03 r	0	0.10	87-82-1 Hexabromobenzene	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
1.6E+00 i	8.0E-04 i	1.6E+00 i	8.0E-04 r	0	0.10	118-74-1 Hexachlorobenzene	2.8E-01 ca	1.9E+00 ca	4.2E-03 ca	4.2E-02 ca	2.0E+00	1.0E-01
7.8E-02 i	2.0E-04 h	7.7E-02 i	2.0E-04 r	0	0.10	87-68-3 Hexachlorobutadiene	5.7E+00 ca**	3.8E+01 ca**	8.7E-02 ca*	8.6E-01 ca*	2.0E+00	1.0E-01
6.3E+00 i		6.3E+00 i		0	0.04	319-84-6 HCH (alpha)	8.6E-02 ca	6.7E-01 ca	1.1E-03 ca	1.1E-02 ca	5.0E-04	3.0E-05
1.8E+00 i		1.8E+00 i		0	0.04	319-85-7 HCH (beta)	3.0E-01 ca	2.3E+00 ca	3.7E-03 ca	3.7E-02 ca	3.0E-03	1.0E-04
1.3E+00 h	3.0E-04 i	1.3E+00 r	3.0E-04 r	0	0.04	58-89-9 HCH (gamma) Lindane	4.2E-01 ca*	3.2E+00 ca	5.2E-03 ca	5.2E-02 ca	9.0E-03	5.0E-04
1.8E+00 i		1.8E+00 i		0	0.04	608-73-1 HCH-technical	3.0E-01 ca	2.3E+00 ca	3.8E-03 ca	3.7E-02 ca	3.0E-03	1.0E-04
	7.0E-03 i		2.0E-05 h	0	0.10	77-47-4 Hexachlorocyclopentadiene	3.8E+02 nc	7.1E+03 nc	7.3E-02 nc	2.6E+02 nc	4.0E+02	2.0E+01
6.2E+03 i		4.6E+03 i		0	0.10	19408-74-3 Hexachlorodibenzo-p-dioxin mixture (HxCDD)	7.2E-05 ca	4.8E-04 ca	1.5E-06 ca	1.1E-05 ca		
1.4E-02 i	1.0E-03 i	1.4E-02 i	1.0E-03 r	0	0.10	67-72-1 Hexachloroethane	3.2E+01 ca**	2.1E+02 ca**	4.8E-01 ca**	4.8E+00 ca**	5.0E-01	2.0E-02
	3.0E-04 i		3.0E-04 r	0	0.10	70-30-4 Hexachlorophene	1.6E+01 nc	3.2E+02 nc	1.1E+00 nc	1.1E+01 nc		
1.1E-01 i	3.0E-03 i	1.1E-01 r	3.0E-03 r	0	0.10	121-82-4 Hexahydro-1,3,5-trinitro-1,3,5-triazine	4.0E+00 ca*	2.7E+01 ca	6.1E-02 ca	6.1E-01 ca		
	2.9E-06 r		2.9E-06 i	0	0.10	822-06-0 1,6-Hexamethylene diisocyanate			1.0E-02 nc	1.0E-01 nc		
	6.0E-02 h		5.7E-02 i	1	0.10	110-54-3 n-Hexane	1.1E+02 sat	1.1E+02 sat	2.1E+02 nc	3.5E+02 nc		
	3.3E-02 i		3.3E-02 r	0	0.10	51235-04-2 Hexazinone	1.8E+03 nc	3.5E+04 nc	1.2E+02 nc	1.2E+03 nc		
3.0E+00 i		1.7E+01 i		0	0.10	302-01-2 Hydrazine, hydrazine sulfate	1.5E-01 ca	1.0E+00 ca	3.9E-04 ca	2.2E-02 ca		
			5.7E-03 i	0	0.10	7647-01-0 Hydrogen chloride			2.1E+01 nc			
	3.0E-03 i		2.9E-04 i	1	0.10	7783-06-4 Hydrogen sulfide			1.0E+00 nc	2.0E+00 nc		
	4.0E-02 h		4.0E-02 r	0	0.10	123-31-9 p-Hydroquinone	2.2E+03 nc	4.3E+04 nc	1.5E+02 nc	1.5E+03 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	35554-44-0 Imazalil	7.1E+02 nc	1.4E+04 nc	4.7E+01 nc	4.7E+02 nc		
	2.5E-01 i		2.5E-01 r	0	0.10	81335-37-7 Imazaquin	1.4E+04 nc	1.0E+05 max	9.1E+02 nc	9.1E+03 nc		
	4.0E-02 i		4.0E-02 r	0	0.10	36734-19-7 Iprodione	2.2E+03 nc	4.3E+04 nc	1.5E+02 nc	1.5E+03 nc		
	3.0E-01 n			0	0.01	7439-89-6 **Iron**	2.2E+04 nc	1.0E+05 max		1.1E+04 nc		
	3.0E-01 i		**3.0E-01 r**	1	0.10	78-83-1 **Isobutanol**	1.0E+04 nc	4.0E+04 sat	1.1E+03 nc	1.8E+03 nc		
9.5E-04 i	2.0E-01 i	9.5E-04 r	2.0E-01 r	0	0.10	78-59-1 Isophorone	4.7E+02 ca*	3.2E+03 ca*	7.1E+00 ca	7.1E+01 ca	5.0E-01	3.0E-02
	1.5E-02 i		1.5E-02 r	0	0.10	33820-53-0 Isopropalin	8.2E+02 nc	1.6E+04 nc	5.5E+01 nc	5.5E+02 nc		
	1.0E-01 i		1.1E-01 r	0	0.10	1832-54-8 Isopropyl methyl phosphonic acid	5.5E+03 nc	1.1E+05 nc	4.0E+02 nc	3.7E+03 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	82558-50-7 Isoxaben	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
1.8E+01 n		1.8E+01 r		0	0.10	143-50-0 Kepone	2.5E-02 ca	1.7E-01 ca	3.7E-04 ca	3.7E-03 ca		
	2.0E-03 i		2.0E-03 r	0	0.10	77501-63-4 Lactofen	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
PRGs Based on EPA Models, IEUBK (1994) and TRW (1996)						7439-92-1 Lead	4.0E+02 nc	1.0E+03 nc		4.0E+00 nc		
						"CAL-Modified PRG" (PEA, 1994)	**1.3E+02**					
	1.0E-07 i			0	0.10	78-00-2 Lead (tetraethyl)	5.5E-03 nc	1.1E-01 nc		3.7E-03 nc		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION						CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
	2.0E-03 i		2.0E-03 r	0	0.10	330-55-2 Linuron	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
	2.0E-02 x			0	0.01	7439-93-2 Lithium	1.5E+03 nc	3.7E+04 nc		7.3E+02 nc		
	2.0E-01 i		2.0E-01 r	0	0.10	83055-99-6 Londax	1.1E+04 nc	1.0E+05 max	7.3E+02 nc	7.3E+03 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	121-75-5 Malathion	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	108-31-6 Maleic anhydride	5.5E+03 nc	1.1E+05 nc	3.7E+02 nc	3.7E+03 nc		
	5.0E-01 i		**5.0E-01 r**	1	0.10	123-33-1 **Maleic hydrazide**	1.6E+03 nc	5.6E+03 nc	1.8E+03 nc	3.0E+03 nc		
	2.0E-05 h		2.0E-05 r	0	0.10	109-77-3 Malononitrile	1.1E+00 nc	2.1E+01 nc	7.3E-02 nc	7.3E-01 nc		
	3.0E-02 h		3.0E-02 r	0	0.10	8018-01-7 Mancozeb	1.6E+03 nc	3.2E+04 nc	1.1E+02 nc	1.1E+03 nc		
6.0E-02 o	**5.0E-03 i**	6.0E-02 r	**5.0E-03 r**	0	0.10	12427-38-2 **Maneb**	7.4E+00 ca*	5.0E+01 ca	1.1E-01 ca	1.1E+00 ca		
	4.7E-02 i		**1.4E-05 i**	0	0.01	7439-96-5 **Manganese and compounds**	3.1E+03 nc	4.5E+04 nc	5.1E-02 nc	1.7E+03 nc		
	9.0E-05 h		9.0E-05 r	0	0.10	950-10-7 Mephosfolan	4.9E+00 nc	9.6E+01 nc	3.3E-01 nc	3.3E+00 nc		
	3.0E-02 i		3.0E-02 r	0	0.10	24307-26-4 Mepiquat	1.6E+03 nc	3.2E+04 nc	1.1E+02 nc	1.1E+03 nc		
2.9E-02 n	**1.0E-01 n**	**2.9E-02 r**	**1.0E-01 r**	0	0.10	149-30-4 **2-Mercaptobenzothiazole**	1.5E+01 ca	1.0E+02 ca	2.3E-01 ca	2.3E+00 ca		
	3.0E-04 i			0	0.01	7487-94-7 Mercury and compounds	2.2E+01 nc	5.6E+02 nc		1.1E+01 nc		
			8.6E-05 i	n/a	n/a	7439-97-6 Mercury (elemental)			3.1E-01 nc			
	1.0E-04 i			0	0.10	22967-92-6 Mercury (methyl)	5.5E+00 nc	1.1E+02 nc		3.7E+00 nc		
	3.0E-05 i		3.0E-05 r	0	0.10	150-50-5 Merphos	1.6E+00 nc	3.2E+01 nc	1.1E-01 nc	1.1E+00 nc		
	3.0E-05 i		3.0E-05 r	0	0.10	78-48-8 Merphos oxide	1.6E+00 nc	3.2E+01 nc	1.1E-01 nc	1.1E+00 nc		
	6.0E-02 i		6.0E-02 r	0	0.10	57837-19-1 Metalaxyl	3.3E+03 nc	6.4E+04 nc	2.2E+02 nc	2.2E+03 nc		
	1.0E-04 i		2.0E-04 h	1	0.10 SU	126-98-7 Methacrylonitrile	1.8E+00 nc	8.4E+00 nc	7.3E-01 nc	1.0E+00 nc		
	5.0E-05 i		5.0E-05 r	0	0.10	10265-92-6 Methamidophos	2.7E+00 nc	5.3E+01 nc	1.8E-01 nc	1.8E+00 nc		
	5.0E-01 i		5.0E-01 r	0	0.10	67-56-1 Methanol	2.7E+04 nc	1.0E+05 max	1.8E+03 nc	1.8E+04 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	950-37-8 Methidathion	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		
	2.5E-02 i		2.5E-02 r	1	0.10	16752-77-5 Methomyl	4.4E+01 nc	1.5E+02 nc	9.1E+01 nc	1.5E+02 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	72-43-5 Methoxychlor	2.7E+02 nc	5.3E+03 nc	1.8E+01 nc	1.8E+02 nc	1.6E+02	8.0E+00
	1.0E-03 h		5.7E-03 i	0	0.10	109-86-4 2-Methoxyethanol	5.5E+01 nc	1.1E+03 nc	2.1E+01 nc	3.7E+01 nc		
	2.0E-03 h		2.0E-03 r	0	0.10	110-49-6 2-Methoxyethanol acetate	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
4.6E-02 h		4.6E-02 r		0	0.10	99-59-2 2-Methoxy-5-nitroaniline	9.7E+00 ca	6.5E+01 ca	1.5E-01 ca	1.5E+00 ca		
	1.0E+00 h		1.0E+00 r	1	0.10 SU	79-20-9 Methyl acetate	2.0E+04 nc	9.2E+04 nc	3.7E+03 nc	6.1E+03 nc		
	3.0E-02 h		3.0E-02 r	1	0.10 SU	96-33-3 Methyl acrylate	6.9E+01 nc	2.3E+02 nc	1.1E+02 nc	1.8E+02 nc		
2.4E-01 h		2.4E-01 r		0	0.10	95-53-4 2-Methylaniline (o-toluidine)	1.9E+00 ca	1.2E+01 ca	2.8E-02 ca	2.8E-01 ca		
1.8E-01 h		1.8E-01 r		0	0.10	636-21-5 2-Methylaniline hydrochloride	2.5E+00 ca	1.7E+01 ca	3.7E-02 ca	3.7E-01 ca		
	1.0E+00 x		1.0E+00 r	0	0.10	79-22-1 Methyl chlorocarbonate	5.5E+04 nc	1.0E+05 max	3.7E+03 nc	3.7E+04 nc		
	5.0E-04 i		5.0E-04 r	0	0.10	94-74-6 2-Methyl-4-chlorophenoxyacetic acid	2.7E+01 nc	5.3E+02 nc	1.8E+00 nc	1.8E+01 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	94-81-5 4-(2-Methyl-4-chlorophenoxy) butyric acid	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	93-65-2 2-(2-Methyl-4-chlorophenoxy) propionic acid	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		
')	1.0E-03 i		1.0E-03 r	0	0.10	16484-77-8 2-(2-Methyl-1,4-chlorophenoxy) propionic acid	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		
	8.6E-01 r		8.6E-01 h	0	0.10	108-87-2 Methylcyclohexane	4.7E+04 nc	1.0E+05 max	3.1E+03 nc	3.1E+04 nc		
2.5E-01 h		2.5E-01 r		0	0.10	101-77-9 4,4'-Methylenebisbenzeneamine	1.8E+00 ca	1.2E+01 ca	2.7E-02 ca	2.7E-01 ca		
1.3E-01 h	7.0E-04 h	1.3E-01 h	7.0E-04 r	0	0.10	101-14-4 4,4'-Methylene bis(2-chloroaniline)	3.4E+00 ca*	2.3E+01 ca*	5.2E-02 ca*	5.2E-01 ca*		
4.6E-02 i		4.6E-02 r		0	0.10	101-61-1 4,4'-Methylene bis(N,N'-dimethyl)aniline	9.7E+00 ca	6.5E+01 ca	1.5E-01 ca	1.5E+00 ca		
	1.0E-02 h		1.0E-02 r	0	0.10	74-95-3 Methylene bromide	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
7.5E-03 i	6.0E-02 i	1.6E-03 i	8.6E-01 h	1	0.10	75-09-2 Methylene chloride	8.5E+00 ca	2.0E+01 ca	4.1E+00 ca	4.3E+00 ca	2.0E-02	1.0E-03
	1.7E-04 r		**1.7E-04 i**	0	0.10	101-68-8 **4,4'-Methylene diphenyl diisocyanate**	9.3E+00 nc	1.8E+02 nc	6.2E-01 nc	6.2E+00 nc		
	6.0E-01 i		2.9E-01 i	1	0.10	78-93-3 Methyl ethyl ketone	6.9E+03 nc	2.7E+04 nc	1.0E+03 nc	1.9E+03 nc		
1.1E+00 h		1.1E+00 r		0	0.10	60-34-4 Methyl hydrazine	4.0E-01 ca	2.7E+00 ca	6.1E-03 ca	6.1E-02 ca		
	8.0E-02 h		**2.3E-02 h**	1	0.10	108-10-1 **Methyl isobutyl ketone**	7.5E+02 nc	2.8E+03 nc	8.3E+01 nc	1.6E+02 nc		
	5.7E-04 r		**5.7E-04 n**	0	0.10	74-93-1 **Methyl Mercaptan**	3.1E+01 nc	6.1E+02 nc	2.1E+00 nc	2.1E+01 nc		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	VOC	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
	1.4E+00 i		2.0E-01 i	1	0.10	80-62-6	**Methyl methacrylate**	2.2E+03 nc	7.3E+03 nc	7.3E+02 nc	1.4E+03 nc		
3.3E-02 h		3.3E-02 r		0	0.10	99-55-8	2-Methyl-5-nitroaniline	1.3E+01 ca	9.1E+01 ca	2.0E-01 ca	2.0E+00 ca		
	2.5E-04 i		2.5E-04 r	0	0.10	298-00-0	Methyl parathion	1.4E+01 nc	2.7E+02 nc	9.1E-01 nc	9.1E+00 nc		
	5.0E-02 x		5.0E-02 r	0	0.10	95-48-7	2-Methylphenol	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc	1.5E+01	8.0E-01
	5.0E-02 x		5.0E-02 r	0	0.10	108-39-4	3-Methylphenol	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
	5.0E-03 h		5.0E-03 r	0	0.10	106-44-5	4-Methylphenol	2.7E+02 nc	5.3E+03 nc	1.8E+01 nc	1.8E+02 nc		
	2.0E-02 n		**2.0E-02 r**	0	0.10	993-13-5	**Methyl phosphonic acid**	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	6.0E-03 h		1.1E-02 h	1	0.10	SU 25013-15-4	Methyl styrene (mixture)	1.2E+02 nc	5.4E+02 nc	4.2E+01 nc	6.0E+01 nc		
	7.0E-02 h		7.0E-02 r	1	0.10	SU 98-83-9	Methyl styrene (alpha)	6.8E+02 sat	6.8E+02 sat	2.6E+02 nc	4.3E+02 nc		
			8.6E-01 i	1	0.10	1634-04-4	**Methyl tertbutyl ether (MTBE)**	n/a	n/a	3.1E+03 nc	2.0E+01 nc/ca		
	1.5E-01 i		1.5E-01 r	0	0.10	51218-45-2	Metolaclor (Dual)	8.2E+03 nc	1.0E+05 max	5.5E+02 nc	5.5E+03 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	21087-64-9	Metribuzin	1.4E+03 nc	2.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
1.8E+00 h	2.0E-04 i	1.8E+00 r	2.0E-04 r	0	0.10	2385-85-5	Mirex	2.5E-01 ca*	1.7E+00 ca	3.7E-03 ca	3.7E-02 ca		
	2.0E-03 i		2.0E-03 r	0	0.10	2212-67-1	Molinate	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
	5.0E-03 h			0	0.01	7439-98-7	Molybdenum	3.7E+02 nc	9.4E+03 nc		1.8E+02 nc		
	1.0E-01 h		1.0E-01 h	0	0.10	10599-90-3	Monochloramine	5.5E+03 nc	1.1E+05 nc	3.7E+02 nc	3.7E+03 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	300-76-5	Naled	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	15299-99-7	Napropamide	5.5E+03 nc	1.1E+05 nc	3.7E+02 nc	3.7E+03 nc		
	2.0E-02 i			0	0.01	7440-02-0	Nickel (soluble salts)	1.5E+03 nc	3.7E+04 nc		7.3E+02 nc	1.3E+02	7.0E+00
							"CAL-Modified PRG" (PEA, 1994)	**1.5E+02**					
		8.4E-01 i		0	0.01	n/a	Nickel refinery dust			8.0E-03 ca			
		1.7E+00 i		0	0.01	12035-72-2	Nickel subsulfide		1.1E+04 ca	4.0E-03 ca			
	1.5E-03 x		1.5E-03 r	0	0.10	1929-82-4	Nitrapyrin	8.2E+01 nc	1.6E+03 nc	5.5E+00 nc	5.5E+01 nc		
Tap Water PRG Based on Infant NOAEL (see IRIS)						14797-55-8	Nitrate				1.0E+04 nc		
	1.0E-01 x			0	0.10	10102-43-9	Nitric Oxide	5.5E+03 nc	1.1E+05 nc		3.7E+03 nc		
Tap Water PRG Based on Infant NOAEL (see IRIS)						14797-65-0	Nitrite				1.0E+03 nc		
	6.0E-05 r		5.7E-05 h	0	0.10	88-74-4	2-Nitroaniline	3.3E+00 nc	6.4E+01 nc	2.1E-01 nc	2.2E+00 nc		
				0	0.10	99-09-2	3-Nitroaniline						
				0	0.10	100-01-6	4-Nitroaniline						
	5.0E-04 i		**5.7E-04 h**	1	0.10	98-95-3	**Nitrobenzene**	1.6E+01 nc	1.0E+02 nc	2.1E+00 nc	3.4E+00 nc	1.0E-01	7.0E-03
	7.0E-02 h		7.0E-02 r	0	0.10	67-20-9	Nitrofurantoin	3.8E+03 nc	7.5E+04 nc	2.6E+02 nc	2.6E+03 nc		
1.5E+00 h		9.4E+00 h		0	0.10	59-87-0	Nitrofurazone	3.0E-01 ca	2.0E+00 ca	7.2E-04 ca	4.5E-02 ca		
	1.0E+00 x			0	0.10	101102-44-(	Nitrogen dioxide						
	1.0E-01 i		1.0E-01 r	0	0.10	556-88-7	Nitroguanidine	5.5E+03 nc	1.1E+05 nc	3.7E+02 nc	3.7E+03 nc		
	6.2E-02 o		6.2E-02 r	0	0.10	100-02-7	4-Nitrophenol	3.4E+03 nc	6.6E+04 nc	2.3E+02 nc	2.3E+03 nc		
9.4E+00 r	5.7E-03 r	9.4E+00 h	5.7E-03 i	1	0.10	79-46-9	2-Nitropropane			7.2E-04 ca	3.5E+01 ca		
5.4E+00 i		**5.6E+00 i**		1	0.10	924-16-3	**N-Nitrosodi-n-butylamine**	2.2E-02 ca	5.8E-02 ca	1.2E-03 ca	2.0E-03 ca		
2.8E+00 i		2.8E+00 r		0	0.10	1116-54-7	N-Nitrosodiethanolamine	1.6E-01 ca	1.1E+00 ca	2.4E-03 ca	2.4E-02 ca		
1.5E+02 i		1.5E+02 i		0	0.10	55-18-5	N-Nitrosodiethylamine	3.0E-03 ca	2.0E-02 ca	4.5E-05 ca	4.5E-04 ca		
5.1E+01 i		4.9E+01 i		0	0.10	62-75-9	N-Nitrosodimethylamine	8.7E-03 ca	5.9E-02 ca	1.4E-04 ca	1.3E-03 ca		
4.9E-03 i		4.9E-03 r		0	0.10	86-30-6	N-Nitrosodiphenylamine	9.1E+01 ca	6.1E+02 ca	1.4E+00 ca	1.4E+01 ca	1.0E+00	6.0E-02
7.0E+00 i		7.0E+00 r		0	0.10	621-64-7	N-Nitroso di-n-propylamine	6.3E-02 ca	4.3E-01 ca	9.6E-04 ca	9.6E-03 ca	5.0E-05	2.0E-06
2.2E+01 i		2.2E+01 r		0	0.10	10595-95-6	N-Nitroso-N-methylethylamine	2.0E-02 ca	1.4E-01 ca	3.1E-04 ca	3.1E-03 ca		
2.1E+00 i		2.1E+00 i		0	0.10	930-55-2	N-Nitrosopyrrolidine	2.1E-01 ca	1.4E+00 ca	3.1E-03 ca	3.2E-02 ca		
	1.0E-02 h		1.0E-02 r	0	0.10	99-08-1	m-Nitrotoluene	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	1.0E-02 h		1.0E-02 r	0	0.10	99-08-1	o-Nitrotoluene	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	1.0E-02 h		1.0E-02 r	0	0.10	99-99-0	p-Nitrotoluene	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	4.0E-02 i		4.0E-02 r	0	0.10	27314-13-2	Norflurazon	2.2E+03 nc	4.3E+04 nc	1.5E+02 nc	1.5E+03 nc		

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SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	VOC	skin abs. soils	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
	7.0E-04 i		7.0E-04 r	0	0.10	85509-19-9	NuStar	3.8E+01 nc	7.5E+02 nc	2.6E+00 nc	2.6E+01 nc		
	3.0E-03 i		3.0E-03 r	0	0.10	32536-52-0	Octabromodiphenyl ether	1.6E+02 nc	3.2E+03 nc	1.1E+01 nc	1.1E+02 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	2691-41-0	Octahydro-1357-tetranitro-1357- tetrazocine (HMX)	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
	2.0E-03 h		2.0E-03 r	0	0.10	152-16-9	Octamethylpyrophosphoramide	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	19044-88-3	Oryzalin	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	19666-30-9	Oxadiazon	2.7E+02 nc	5.3E+03 nc	1.8E+01 nc	1.8E+02 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	23135-22-0	Oxamyl	1.4E+03 nc	2.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	3.0E-03 i		3.0E-03 r	0	0.10	42874-03-3	Oxyfluorfen	1.6E+02 nc	3.2E+03 nc	1.1E+01 nc	1.1E+02 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	76738-62-0	Paclobutrazol	7.1E+02 nc	1.4E+04 nc	4.7E+01 nc	4.7E+02 nc		
	4.5E-03 i		4.5E-03 r	0	0.10	4685-14-7	Paraquat	2.5E+02 nc	4.8E+03 nc	1.6E+01 nc	1.6E+02 nc		
	6.0E-03 h		6.0E-03 r	0	0.10	56-38-2	Parathion	3.3E+02 nc	6.4E+03 nc	2.2E+01 nc	2.2E+02 nc		
	5.0E-02 h		5.0E-02 r	0	0.10	1114-71-2	Pebulate	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
	4.0E-02 i		4.0E-02 r	0	0.10	40487-42-1	Pendimethalin	2.2E+03 nc	4.3E+04 nc	1.5E+02 nc	1.5E+03 nc		
2.3E-02 h		2.3E-02 r		0	0.10	87-84-3	Pentabromo-6-chloro cyclohexane	1.9E+01 ca	1.3E+02 ca	2.9E-01 ca	2.9E+00 ca		
	2.0E-03 i		2.0E-03 r	0	0.10	32534-81-9	Pentabromodiphenyl ether	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
	8.0E-04 i		8.0E-04 r	0	0.10	608-93-5	Pentachlorobenzene	4.4E+01 nc	8.6E+02 nc	2.9E+00 nc	2.9E+01 nc		
2.6E-01 h	3.0E-03 i	2.6E-01 r	3.0E-03 r	0	0.10	82-68-8	Pentachloronitrobenzene	1.7E+00 ca*	1.2E+01 ca	2.6E-02 ca	2.6E-01 ca		
1.2E-01 i	3.0E-02 i	1.2E-01 r	3.0E-02 r	0	0.25	87-86-5	Pentachlorophenol	2.5E+00 ca	1.5E+01 ca	5.6E-02 ca	5.6E-01 ca	3.0E-02	1.0E-03
	5.0E-04 n			0	0.01	7601-90-3	**Perchlorate**	3.7E+01 nc	9.4E+02 nc		1.8E+01 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	52645-53-1	Permethrin	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
	2.5E-01 i		2.5E-01 r	0	0.10	13684-63-4	Phenmedipham	1.4E+04 nc	1.0E+05 max	9.1E+02 nc	9.1E+03 nc		
	6.0E-01 i		6.0E-01 r	0	0.10	108-95-2	Phenol	3.3E+04 nc	1.0E+05 max	2.2E+03 nc	2.2E+04 nc	1.0E+02	5.0E+00
	2.0E-03 n		**2.0E-03 r**	0	0.10	92-84-2	**Phenothiazine**	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
	6.0E-03 i		6.0E-03 r	0	0.10	108-45-2	m-Phenylenediamine	3.3E+02 nc	6.4E+03 nc	2.2E+01 nc	2.2E+02 nc		
	1.9E-01 h		1.9E-01 r	0	0.10	106-50-3	p-Phenylenediamine	1.0E+04 nc	1.0E+05 max	6.9E+02 nc	6.9E+03 nc		
	8.0E-05 i		8.0E-05 r	0	0.10	62-38-4	Phenylmercuric acetate	4.4E+00 nc	8.6E+01 nc	2.9E-01 nc	2.9E+00 nc		
1.9E-03 h		1.9E-03 r		0	0.10	90-43-7	2-Phenylphenol	2.3E+02 ca	1.5E+03 ca	3.5E+00 ca	3.5E+01 ca		
	2.0E-04 h		2.0E-04 r	0	0.10	298-02-2	Phorate	1.1E+01 nc	2.1E+02 nc	7.3E-01 nc	7.3E+00 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	732-11-6	Phosmet	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	3.0E-04 h		8.6E-05 i	0	0.10	7803-51-2	Phosphine	1.6E+01 nc	3.2E+02 nc	3.1E-01 nc	1.1E+01 nc		
			2.9E-03 i	n/a	n/a	7664-38-2	Phosphoric acid			1.0E+01 nc			
	2.0E-05 i			0	0.01	7723-14-0	Phosphorus (white)	1.5E+00 nc	3.7E+01 nc		7.3E-01 nc		
	1.0E+00 h		1.0E+00 r	0	0.10	100-21-0	p-Phthalic acid	5.5E+04 nc	1.0E+05 max	3.7E+03 nc	3.7E+04 nc		
	2.0E+00 i		3.4E-02 h	0	0.10	85-44-9	Phthalic anhydride	1.0E+05 max	1.0E+05 max	1.2E+02 nc	7.3E+04 nc		
	7.0E-02 i		7.0E-02 r	0	0.10	1918-02-1	Picloram	3.8E+03 nc	7.5E+04 nc	2.6E+02 nc	2.6E+03 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	23505-41-1	Pirimiphos-methyl	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
8.9E+00 h	7.0E-06 h	8.9E+00 r	7.0E-06 r	0	0.10		Polybrominated biphenyls	5.0E-02 ca**	3.4E-01 ca*	7.6E-04 ca*	7.6E-03 ca*		
2.0E+00 i		**2.0E+00 r**		0	0.14	1336-36-3	**Polychlorinated biphenyls (PCBs)**	2.0E-01 ca**	1.3E+00 ca*	3.4E-03 ca*	3.4E-02 ca*		
	7.0E-05 i		7.0E-05 r	0	0.14	12674-11-2	Aroclor 1016 (see PCBs for cancer endpoint)	3.4E+00 nc	6.3E+01 nc	2.6E-01 nc	2.6E+00 nc		
	2.0E-05 i		2.0E-05 r	0	0.14	11097-69-1	Aroclor 1254 (see PCBs for cancer endpoint)	9.7E-01 nc	1.8E+01 nc	7.3E-02 nc	7.3E-01 nc		
					0.13		Polynuclear aromatic hydrocarbons (PAHs)						
	6.0E-02 i		6.0E-02 r	1	0.13	83-32-9	Acenaphthene	2.6E+03 nc	2.8E+04 nc	2.2E+02 nc	3.7E+02 nc	5.7E+02	2.9E+01
	3.0E-01 i		3.0E-01 r	1	0.13	120-12-7	Anthracene	1.4E+04 nc	2.2E+05 nc	1.1E+03 nc	1.8E+03 nc	1.2E+04	5.9E+02
7.3E-01 n		**3.1E-01 n**		0	0.13	56-55-3	**Benz[a]anthracene**	5.6E-01 ca	3.6E+00 ca	2.2E-02 ca	9.2E-02 ca	2.0E+00	8.0E-02
7.3E-01 n		**3.1E-01 n**		0	0.13	205-99-2	**Benzo[b]fluoranthene**	5.6E-01 ca	3.6E+00 ca	2.2E-02 ca	9.2E-02 ca	5.0E+00	2.0E-01
7.3E-02 n		**3.1E-02 n**		0	0.13	207-08-9	**Benzo[k]fluoranthene**	5.6E+00 ca	3.6E+01 ca	2.2E-01 ca	9.2E-01 ca	4.9E+01	2.0E+00
							"CAL-Modified PRG" (PEA, 1994)	**6.1E-01**					

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION						CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
7.3E+00 i		3.1E+00 n		0	0.13	50-32-8	**Benzo[a]pyrene**					
							"CAL-Modified PRG" (PEA, 1994)			**1.5E-03**		
7.3E-03 n		3.1E-03 n		0	0.13	218-01-9	**Chrysene**	5.6E+01 ca	3.6E+02 ca	2.2E+00 ca	9.2E+00 ca	1.6E+02	8.0E+00
							"CAL-Modified PRG" (PEA, 1994)	**6.1E+00**				
7.3E+00 n		3.1E+00 n		0	0.13	53-70-3	**Dibenz[ah]anthracene**	5.6E-02 ca	3.6E-01 ca	2.2E-03 ca	9.2E-03 ca	2.0E+00	8.0E-02
	4.0E-02 i		4.0E-02 r	0	0.13	206-44-0	Fluoranthene	2.0E+03 nc	3.7E+04 nc	1.5E+02 nc	1.5E+03 nc	4.3E+03	2.1E+02
	4.0E-02 i		4.0E-02 r	1	0.13	86-73-7	Fluorene	1.8E+03 nc	2.2E+04 nc	1.5E+02 nc	2.4E+02 nc	5.6E+02	2.8E+01
7.3E-01 n		3.1E-01 n		0	0.13	193-39-5	**Indeno[1,2,3-cd]pyrene**	5.6E-01 ca	3.6E+00 ca	2.2E-02 ca	9.2E-02 ca	1.4E+01	7.0E-01
	2.0E-02 i		**8.6E-04 i**	1	0.13	91-20-3	**Naphthalene**	5.5E+01 nc	1.9E+02 nc	3.1E+00 nc	6.2E+00 nc	8.4E+01	4.0E+00
	3.0E-02 i		3.0E-02 r	1	0.13	129-00-0	Pyrene	1.5E+03 nc	2.6E+04 nc	1.1E+02 nc	1.8E+02 nc	4.2E+03	2.1E+02
1.5E-01 i	9.0E-03 i	1.5E-01 r	9.0E-03 r	0	0.10	67747-09-5	Prochloraz	3.0E+00 ca	2.0E+01 ca	4.5E-02 ca	3.3E+02 ca		
	6.0E-03 h		6.0E-03 r	0	0.10	26399-36-0	Profluralin	3.3E+02 nc	6.4E+03 nc	2.2E+01 nc	2.2E+02 nc		
	1.5E-02 i		1.5E-02 r	0	0.10	1610-18-0	Prometon	8.2E+02 nc	1.6E+04 nc	5.5E+01 nc	5.5E+02 nc		
	4.0E-03 i		4.0E-03 r	0	0.10	7287-19-6	Prometryn	2.2E+02 nc	4.3E+03 nc	1.5E+01 nc	1.5E+02 nc		
	7.5E-02 i		7.5E-02 r	0	0.10	23950-58-5	Pronamide	4.1E+03 nc	8.0E+04 nc	2.7E+02 nc	2.7E+03 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	1918-16-7	Propachlor	7.1E+02 nc	1.4E+04 nc	4.7E+01 nc	4.7E+02 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	709-98-8	Propanil	2.7E+02 nc	5.3E+03 nc	1.8E+01 nc	1.8E+02 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	2312-35-8	Propargite	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	2.0E-03 i		2.0E-03 r	0	0.10	107-19-7	Propargyl alcohol	1.1E+02 nc	2.1E+03 nc	7.3E+00 nc	7.3E+01 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	139-40-2	Propazine	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	2.0E-02 i		2.0E-02 r	0	0.10	122-42-9	Propham	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	60207-90-1	Propiconazole	7.1E+02 nc	1.4E+04 nc	4.7E+01 nc	4.7E+02 nc		
	1.0E-02 n		**1.0E-02 r**	1	0.10	SU 104-5-18	**iso-Propylbenzene**	1.2E+02 nc	4.9E+02 nc	3.7E+01 nc	6.1E+01 nc		
	1.0E-02 n		**1.0E-02 r**	1	0.10	SU 104-51-8	**n-Propylbenzene**	1.3E+02 nc	5.5E+02 nc	3.7E+01 nc	6.1E+01 nc		
	2.0E+01 h		2.0E+01 r	0	0.10	57-55-6	Propylene glycol	1.0E+05 max	1.0E+05 max	7.3E+04 nc	7.3E+05 nc		
	7.0E-01 h		7.0E-01 r	0	0.10	111-35-3	Propylene glycol, monoethyl ether	3.8E+04 nc	1.0E+05 max	2.6E+03 nc	2.6E+04 nc		
	7.0E-01 h		5.7E-01 i	0	0.10	107-98-2	Propylene glycol, monomethyl ether	3.8E+04 nc	1.0E+05 max	2.1E+03 nc	2.6E+04 nc		
2.4E-01 i	8.6E-03 r	1.3E-02 i	8.6E-03 i	1	0.10	75-56-9	Propylene oxide	1.5E+00 ca	6.8E+00 ca	5.2E-01 ca*	2.2E-01 ca		
	2.5E-01 i		2.5E-01 r	0	0.10	81335-77-5	Pursuit	1.4E+04 nc	1.0E+05 max	9.1E+02 nc	9.1E+03 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	51630-58-1	Pydrin	1.4E+03 nc	2.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	110-86-1	Pyridine	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		
	5.0E-04 i		5.0E-04 r	0	0.10	13593-03-8	Quinalphos	2.7E+01 nc	5.3E+02 nc	1.8E+00 nc	1.8E+01 nc		
1.2E+01 h		1.2E+01 r		0	0.10	91-22-5	Quinoline	3.7E-02 ca	2.5E-01 ca	5.6E-04 ca	5.6E-03 ca		
1.1E-01 i	3.0E-03 i	1.1E-01 r	3.0E-03 r	0	0.10	121-82-4	RDX (Cyclonite)	4.0E+00 ca*	2.7E+01 ca	6.1E-02 ca	6.1E-01 ca		
	3.0E-02 i		3.0E-02 r	0	0.10	10453-86-8	Resmethrin	1.6E+03 nc	3.2E+04 nc	1.1E+02 nc	1.1E+03 nc		
	5.0E-02 h		5.0E-02 r	0	0.10	299-84-3	Ronnel	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		
	4.0E-03 i		4.0E-03 r	0	0.10	83-79-4	Rotenone	2.2E+02 nc	4.3E+03 nc	1.5E+01 nc	1.5E+02 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	78587-05-0	Savey	1.4E+03 nc	2.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	5.0E-03 i			0	0.10	7783-00-8	Selenious Acid	2.7E+02 nc	5.3E+03 nc		1.8E+02 nc		
	5.0E-03 i			0	0.01	7782-49-2	Selenium	3.7E+02 nc	9.4E+03 nc		1.8E+02 nc	5.0E+00	3.0E-01
	5.0E-03 h			0	0.10	630-10-4	Selenourea	2.7E+02 nc	5.3E+03 nc		1.8E+02 nc		
	9.0E-02 i		9.0E-02 r	0	0.10	74051-80-2	Sethoxydim	4.9E+03 nc	9.6E+04 nc	3.3E+02 nc	3.3E+03 nc		
	5.0E-03 i			0	0.01	7440-22-4	Silver and compounds	3.7E+02 nc	9.4E+03 nc		1.8E+02 nc	3.4E+01	2.0E+00
1.2E-01 h	5.0E-03 i	1.2E-01 r	2.0E-03 r	0	0.10	122-34-9	Simazine	3.7E+00 ca*	2.5E+01 ca	5.6E-02 ca	5.6E-01 ca		
	4.0E-03 i		4.0E-03 r	0	0.10	26628-22-8	Sodium azide	2.2E+02 nc	4.3E+03 nc	1.5E+01 nc	1.5E+02 nc		
2.7E-01 h	3.0E-02 i	2.7E-01 r	3.0E-02 r	0	0.10	148-18-5	Sodium diethyldithiocarbamate	1.6E+00 ca	1.1E+01 ca	2.5E-02 ca	2.5E-01 ca		
	2.0E-05 i		2.0E-05 r	0	0.10	62-74-8	Sodium fluoroacetate	1.1E+00 nc	2.1E+01 nc	7.3E-02 nc	7.3E-01 nc		
	1.0E-03 h		1.0E-03 r	0	0.10	13718-26-8	Sodium metavanadate	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION						CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
	6.0E-01 i			0	0.01	7440-24-6	Strontium, stable	4.5E+04 nc	1.0E+05 max		2.2E+04 nc		
	3.0E-04 i		3.0E-04 r	0	0.10	57-24-9	Strychnine	1.6E+01 nc	3.2E+02 nc	1.1E+00 nc	1.1E+01 nc		
	2.0E-01 i		2.9E-01 i	1	0.10	100-42-5	Styrene	1.7E+03 sat	1.7E+03 sat	1.1E+03 nc	1.6E+03 nc	4.0E+00	2.0E-01
	2.5E-02 i		2.5E-02 r	0	0.10	88671-89-0	Systhane	1.4E+03 nc	2.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
1.5E+05 h		1.5E+05 h		0	0.03	1746-01-6	2,3,7,8-TCDD (dioxin)	3.8E-06 ca	3.0E-05 ca	4.5E-08 ca	4.5E-07 ca		
	7.0E-02 i		7.0E-02 r	0	0.10	34014-18-1	Tebuthiuron	3.8E+03 nc	7.5E+04 nc	2.6E+02 nc	2.6E+03 nc		
	2.0E-02 h		2.0E-02 r	0	0.10	3383-96-8	Temephos	1.1E+03 nc	2.1E+04 nc	7.3E+01 nc	7.3E+02 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	5902-51-2	Terbacil	7.1E+02 nc	1.4E+04 nc	4.7E+01 nc	4.7E+02 nc		
	2.5E-05 h		2.5E-05 r	0	0.10	13071-79-9	Terbufos	1.4E+00 nc	2.7E+01 nc	9.1E-02 nc	9.1E-01 nc		
	1.0E-03 i		1.0E-03 r	0	0.10	886-50-0	Terbutryn	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		
	3.0E-04 i		3.0E-04 r	0	0.10	95-94-3	1,2,4,5-Tetrachlorobenzene	1.6E+01 nc	3.2E+02 nc	1.1E+00 nc	1.1E+01 nc		
2.6E-02 i	3.0E-02 i	2.6E-02 i	3.0E-02 r	1	0.10	630-20-6	1,1,1,2-Tetrachloroethane	2.8E+00 ca	6.8E+00 ca	2.6E-01 ca	4.3E-01 ca		
2.0E-01 i		2.0E-01 i		1	0.10	79-34-5	1,1,2,2-Tetrachloroethane	3.6E-01 ca	8.7E-01 ca	3.3E-02 ca	5.5E-02 ca	3.0E-03	2.0E-04
5.2E-02 n	1.0E-02 i	2.0E-03 n	**1.1E-01 n**	1	0.10	127-18-4	**Tetrachloroethylene (PCE)**	4.7E+00 ca*	1.6E+01 ca	3.3E+00 ca	1.1E+00 ca	6.0E-02	3.0E-03
							"CAL-Modified PRG" (PEA, 1994)			**3.2E-01**			
	3.0E-02 i		3.0E-02 r	0	0.10	58-90-2	2,3,4,6-Tetrachlorophenol	1.6E+03 nc	3.2E+04 nc	1.1E+02 nc	1.1E+03 nc		
2.0E+01 h		2.0E+01 r		0	0.10	5216-25-1	p,a,a,a-Tetrachlorotoluene	2.2E-02 ca	1.5E-01 ca	3.4E-04 ca	3.4E-03 ca		
2.4E-02 h	3.0E-02 i	2.4E-02 r	3.0E-02 r	0	0.10	961-11-5	Tetrachlorovinphos	1.9E+01 ca*	1.2E+02 ca	2.8E-01 ca	2.8E+00 ca		
	5.0E-04 i		5.0E-04 r	0	0.10	3689-24-5	Tetraethyldithiopyrophosphate	2.7E+01 nc	5.3E+02 nc	1.8E+00 nc	1.8E+01 nc		
	8.6E-02 r		**8.6E-02 n**	0	0.10	109-99-9	**Tetrahydrofuran**	4.7E+03 nc	9.2E+04 nc	3.1E+02 nc	3.1E+03 nc		
	7.0E-05 h			0	0.01	1314-32-5	Thallic oxide	5.2E+00 nc	1.3E+02 nc		2.6E+00 nc		
	9.0E-05 i			0	0.01	563-68-8	Thallium acetate	6.7E+00 nc	1.7E+02 nc		3.3E+00 nc	7.0E-01	4.0E-01
	8.0E-05 i			0	0.01	6533-73-9	Thallium carbonate	6.0E+00 nc	1.5E+02 nc		2.9E+00 nc	7.0E-01	4.0E-01
	8.0E-05 i			0	0.01	7791-12-0	Thallium chloride	6.0E+00 nc	1.5E+02 nc		2.9E+00 nc	7.0E-01	4.0E-01
	9.0E-05 i			0	0.01	10102-45-1	Thallium nitrate	6.7E+00 nc	1.7E+02 nc		3.3E+00 nc	7.0E-01	4.0E-01
	9.0E-05 x			0	0.01	12039-52-0	Thallium selenite	6.7E+00 nc	1.7E+02 nc		3.3E+00 nc	7.0E-01	4.0E-01
	8.0E-05 i			0	0.01	7446-18-6	Thallium sulfate	6.0E+00 nc	1.5E+02 nc		2.9E+00 nc	7.0E-01	4.0E-01
	1.0E-02 i		1.0E-02 r	0	0.10	28249-77-6	Thiobencarb	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	1.0E-01 n		**1.0E-01 r**	0	0.10	N/A	**Thiocyanate**	5.5E+03 nc	1.0E+05 max	3.7E+02 nc	3.7E+03 nc		
	3.0E-02 x		3.0E-02 r	0	0.10	21564-17-0	2-(Thiocyanomethylthio)- benzothiazole (TCMTB)	1.6E+03 nc	3.2E+04 nc	1.1E+02 nc	1.1E+03 nc		
	3.0E-04 h		3.0E-04 r	0	0.10	39196-18-4	Thiofanox	1.6E+01 nc	3.2E+02 nc	1.1E+00 nc	1.1E+01 nc		
	8.0E-02 i		8.0E-02 r	0	0.10	23564-05-8	Thiophanate-methyl	4.4E+03 nc	8.6E+04 nc	2.9E+02 nc	2.9E+03 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	137-26-8	Thiram	2.7E+02 nc	5.3E+03 nc	1.8E+01 nc	1.8E+02 nc		
	6.0E-01 h			0	0.01	n/a	Tin (inorganic, see tributyltin oxide for organic tin)	4.5E+04 nc	1.0E+05 max		2.2E+04 nc		
	2.0E-01 i		1.1E-01 h	1	0.10	108-88-3	Toluene	5.2E+02 sat	5.2E+02 sat	4.0E+02 nc	7.2E+02 nc	1.2E+01	6.0E-01
3.2E+00 h		3.2E+00 r		0	0.10	95-80-7	Toluene-2,4-diamine	1.4E-01 ca	9.4E-01 ca	2.1E-03 ca	2.1E-02 ca		
	6.0E-01 h		6.0E-01 r	0	0.10	95-70-5	Toluene-2,5-diamine	3.3E+04 nc	1.0E+05 max	2.2E+03 nc	2.2E+04 nc		
	2.0E-01 h		2.0E-01 r	0	0.10	823-40-5	Toluene-2,6-diamine	1.1E+04 nc	1.0E+05 max	7.3E+02 nc	7.3E+03 nc		
1.9E-01 i		1.9E-01 r		0	0.10	106-49-0	p-Toluidine	2.3E+00 ca	1.6E+01 ca	3.5E-02 ca	3.5E-01 ca		
1.1E+00 i		1.1E+00 i		0	0.10	8001-35-2	Toxaphene	4.0E-01 ca	2.7E+00 ca	6.0E-03 ca	6.1E-02 ca	3.1E+01	2.0E+00
	7.5E-03 i		7.5E-03 r	0	0.10	66841-25-6	Tralomethrin	4.1E+02 nc	8.0E+03 nc	2.7E+01 nc	2.7E+02 nc		
	1.3E-02 i		1.3E-02 r	0	0.10	2303-17-5	Triallate	7.1E+02 nc	1.4E+04 nc	4.7E+01 nc	4.7E+02 nc		
	1.0E-02 i		1.0E-02 r	0	0.10	82097-50-5	Triasulfuron	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	5.0E-03 i		5.0E-03 r	0	0.10	615-54-3	1,2,4-Tribromobenzene	2.7E+02 nc	5.3E+03 nc	1.8E+01 nc	1.8E+02 nc		
	3.0E-04 i			0	0.10	56-35-9	**Tributyltin oxide (TBTO)**	1.6E+01 nc	3.2E+02 nc		1.1E+01 nc		
3.4E-02 h		3.4E-02 r		0	0.10	634-93-5	2,4,6-Trichloroaniline	1.3E+01 ca	8.8E+01 ca	2.0E-01 ca	2.0E+00 ca		
2.9E-02 h		2.9E-02 r		0	0.10	33663-50-2	2,4,6-Trichloroaniline hydrochloride	1.5E+01 ca	1.0E+02 ca	2.3E-01 ca	2.3E+00 ca		
	1.0E-02 i		5.7E-02 h	1	0.10	120-82-1	1,2,4-Trichlorobenzene	4.8E+02 nc	1.7E+03 sat	2.1E+02 nc	1.9E+02 nc	5.0E+00	3.0E-01

Key : i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION							CONTAMINANT	PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SFi 1/(mg/kg-d)	RfDi (mg/kg-d)	VOC	skin abs. soils	CAS No.		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m^3)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	Migration to Ground Water DAF 1 (mg/kg)
	3.5E-02 n		2.9E-01 n	1	0.10	71-55-6	1,1,1-Trichloroethane	6.8E+02 nc	1.4E+03 sat	1.0E+03 nc	7.9E+02 nc	2.0E+00	1.0E-01
5.7E-02 i	4.0E-03 i	5.6E-02 i	4.0E-03 r	1	0.10	79-00-5	1,1,2-Trichloroethane	8.2E-01 ca*	1.9E+00 ca*	1.2E-01 ca	2.0E-01 ca	2.0E-02	9.0E-04
1.1E-02 n	6.0E-03 x	6.0E-03 n	6.0E-03 r	1	0.10	79-01-6	Trichloroethylene (TCE)	2.7E+00 ca**	6.1E+00 ca*	1.1E+00 ca*	1.6E+00 ca*	6.0E-02	3.0E-03
	3.0E-01 i		2.0E-01 h	1	0.10	75-69-4	Trichlorofluoromethane	3.8E+02 nc	1.3E+03 nc	7.3E+02 nc	1.3E+03 nc		
	1.0E-01 i		1.0E-01 r	0	0.10	95-95-4	2,4,5-Trichlorophenol	5.5E+03 nc	1.1E+05 nc	3.7E+02 nc	3.7E+03 nc	2.7E+02	1.4E+01
1.1E-02 i		1.1E-02 i		0	0.10	88-06-2	2,4,6-Trichlorophenol	4.0E+01 ca	2.7E+02 ca	6.2E-01 ca	6.1E+00 ca	2.0E-01	8.0E-03
	1.0E-02 i		1.0E-02 r	0	0.10	93-76-5	2,4,5-Trichlorophenoxyacetic Acid	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
	8.0E-03 i		8.0E-03 r	0	0.10	93-72-1	2-(2,4,5-Trichlorophenoxy) propionic acid	4.4E+02 nc	8.6E+03 nc	2.9E+01 nc	2.9E+02 nc		
	5.0E-03 i		5.0E-03 r	1	0.10	598-77-6	1,1,2-Trichloropropane	1.5E+01 nc	5.1E+01 nc	1.8E+01 nc	3.0E+01 nc		
7.0E+00 h	6.0E-03 i	7.0E+00 r	5.0E-03 r	1	0.10	96-18-4	1,2,3-Trichloropropane	1.4E-03 ca	3.1E-03 ca	9.6E-04 ca	1.6E-03 ca		
	5.0E-03 h		5.0E-03 r	1	0.10 SU	96-19-5	1,2,3-Trichloropropene	1.1E+01 nc	3.8E+01 nc	1.8E+01 nc	3.0E+01 nc		
	3.0E+01 i		8.6E+00 h	1	0.10	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.6E+03 sat	5.6E+03 sat	3.1E+04 nc	5.9E+04 nc		
	3.0E-03 i		3.0E-03 r	0	0.10	58138-08-2	Tridiphane	1.6E+02 nc	3.2E+03 nc	1.1E+01 nc	1.1E+02 nc		
	2.0E-03 r		2.0E-03 i	1	0.10 SU	121-44-8	Triethylamine	2.2E+01 nc	8.6E+01 nc	7.3E+00 nc	1.2E+01 nc		
7.7E-03 i	7.5E-03 i	7.7E-03 r	7.5E-03 r	0	0.10	1582-09-8	Trifluralin	5.8E+01 ca**	3.9E+02 ca*	8.7E-01 ca*	8.7E+00 ca*		
	5.0E-02 n		**1.7E-03 n**	1	0.10	95-63-6	**1,2,4-Trimethylbenzene**	5.1E+01 nc	1.7E+02 nc	6.2E+00 nc	1.2E+01 nc		
	5.0E-02 n		**1.7E-03 n**	1	0.10	108-67-8	**1,3,5-Trimethylbenzene**	2.1E+01 nc	7.0E+01 nc	6.2E+00 nc	1.2E+01 nc		
3.7E-02 h		3.7E-02 r		0	0.10	512-56-1	Trimethyl phosphate	1.2E+01 ca	8.1E+01 ca	1.8E-01 ca	1.8E+00 ca		
	3.0E-02 i		**3.0E-02 r**	0	0.10	99-35-4	**1,3,5-Trinitrobenzene**	1.6E+03 nc	3.2E+04 nc	1.1E+02 nc	1.1E+03 nc		
	1.0E-02 h		1.0E-02 r	0	0.10	479-45-8	Trinitrophenylmethylnitramine	5.5E+02 nc	1.1E+04 nc	3.7E+01 nc	3.7E+02 nc		
3.0E-02 i	5.0E-04 i	3.0E-02 r	5.0E-04 r	0	0.10	118-96-7	2,4,6-Trinitrotoluene	1.5E+01 ca**	1.0E+02 ca**	2.2E-01 ca**	2.2E+00 ca**		
	7.0E-03 h			0	0.01	7440-62-2	Vanadium	5.2E+02 nc	1.3E+04 nc		2.6E+02 nc	6.0E+03	3.0E+02
	9.0E-03 i			0	0.01	1314-62-1	Vanadium pentoxide	6.7E+02 nc	1.7E+04 nc		3.3E+02 nc	6.0E+03	3.0E+02
	2.0E-02 h			0	0.01	13701-70-7	Vanadium sulfate	1.5E+03 nc	3.7E+04 nc		7.3E+02 nc	6.0E+03	3.0E+02
	1.0E-03 i		1.0E-03 r	0	0.10	1929-77-7	Vernam	5.5E+01 nc	1.1E+03 nc	3.7E+00 nc	3.7E+01 nc		
	2.5E-02 i		2.5E-02 r	0	0.10	50471-44-8	Vinclozolin	1.4E+03 nc	2.7E+04 nc	9.1E+01 nc	9.1E+02 nc		
	1.0E+00 h		5.7E-02 i	1	0.10	108-05-4	Vinyl acetate	4.2E+02 nc	1.4E+03 nc	2.1E+02 nc	4.1E+02 nc	1.7E+02	8.0E+00
1.1E-01 r	8.6E-04 r	1.1E-01 h	8.6E-04 i	1	0.10 SU	593-60-2	Vinyl bromide (bromoethene)	1.9E-01 ca*	4.2E-01 ca*	6.1E-02 ca*	1.0E-01 ca*		
1.9E+00 h		3.0E-01 h		1	0.10	75-01-4	Vinyl chloride	2.1E-02 ca	4.8E-02 ca	2.2E-02 ca	2.0E-02 ca	1.0E-02	7.0E-04
	3.0E-04 i		3.0E-04 r	0	0.10	81-81-2	Warfarin	1.6E+01 nc	3.2E+02 nc	1.1E+00 nc	1.1E+01 nc		
	2.0E+00 i		2.0E-01 x	1	0.10	108-38-3	m-Xylene	2.1E+02 sat	2.1E+02 sat	7.3E+02 nc	1.4E+03 nc	2.1E+02	1.0E+01
	2.0E+00 i		2.0E-01 x	1	0.10	95-47-6	o-Xylene	2.8E+02 sat	2.8E+02 sat	7.3E+02 nc	1.4E+03 nc	1.9E+02	9.0E+00
				1	0.10	106-42-3	p-Xylene	3.7E+02 sat	3.7E+02 sat			2.0E+02	1.0E+01
	3.0E-01 i			0	0.01	7440-66-6	Zinc	2.2E+04 nc	1.0E+05 max		1.1E+04 nc	1.2E+04	6.2E+02
	3.0E-04 i			0	0.01	1314-84-7	Zinc phosphide	2.2E+01 nc	5.6E+02 nc		1.1E+01 nc		
	5.0E-02 i		5.0E-02 r	0	0.10	12122-67-7	Zineb	2.7E+03 nc	5.3E+04 nc	1.8E+02 nc	1.8E+03 nc		

Technical Attachment G

Technical Requirements for Capping, Engineered Barriers and Other Surface Covers

TECHNICAL ATTACHMENT G

TECHNICAL REQUIREMENTS FOR CAPPING, ENGINEERED BARRIERS, AND OTHER SURFACE COVERS

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Figure G-2 On-Plant Consolidation Area Cap-Conceptual Cross-Section
Figure G-3 Other Surface Covers - Conceptual Cross-Sections

TECHNICAL ATTACHMENT G

TECHNICAL REQUIREMENTS FOR CAPPING, ENGINEERED BARRIERS, AND OTHER SURFACE COVERS

1.0 Introduction and Purpose

GE shall comply with the provisions of this Attachment G for any engineered barriers, consolidation area caps, pavement enhancements, or other forms of capping constructed as part of the Removal Actions Outside the River. (For the purposes of this technical attachment, these barriers, caps, covers, etc. are referred to as "surface covers.") Table G-1 provides a summary of potential locations within each RAA where surface covers may be installed as part of future response actions. This attachment describes the general composition, configuration, and technical requirements associated with the various surface covers to be installed. It includes specifications for four types of surface covers, which have been identified as possible components of the Removal Actions Outside the River:

- Engineered Barriers;
- Consolidation Area Caps;
- Enhanced Pavement; and
- Vegetated Soil Covers.

Detailed design parameters and additional information regarding the surface covers will be provided in technical RD/RA submittals prepared for each Removal Action. Cap designs shall support NRD enhancements consistent with Attachment I (Natural Resource Restoration/Enhancement Activities) to the SOW. Capping associated with the Silver Lake sediments is described in Attachment K (Silver Lake Sediment Response Action Conceptual Design) of this SOW. In addition, various other technical attachments to the SOW are relevant to the design and operation of the surface covers, including Attachment J (Future Inspection and Maintenance Activities).

2.0 Engineered Barriers

Engineered barriers are permanent caps that are designed, constructed, and maintained to isolate and contain underlying soils and other materials. As shown in Table G -1, future response actions may include the installation of engineered barriers within portions of the GE Plant Area and Former Oxbow Areas. The proposed

TECHNICAL ATTACHMENT G

TECHNICAL REQUIREMENTS FOR CAPPING, ENGINEERED BARRIERS, AND OTHER SURFACE COVERS

containment systems shall satisfy pertinent requirements regarding the construction and performance of engineered barriers as provided in the MCP [310 CMR 40.0996(4)(c)], which include the following key elements:

- prevent direct contact with contaminated media;
- control vapors or dust emanating from contaminated media;
- minimize erosion and any infiltration of precipitation that could jeopardize the integrity of the barrier or result in potential migration of contaminants;
- be constructed of materials resistant to degradation;
- be consistent with the pertinent technical standards under RCRA (40 CFR Part 264, Subpart N) and state hazardous waste regulations (310 CMR 30.600) or equivalent standards (as described below);
- include a defining layer (e.g., geotextile) to visually identify the beginning of the impermeable layer;
- be monitored and maintained to ensure the long-term integrity and performance of the barrier; and
- not include an existing building, structure, or cover unless these features are designed and constructed as an engineered barrier.

As noted above, the proposed containment systems shall be consistent with the pertinent technical standards under RCRA and state hazardous waste regulations for final cover design and construction [40 CFR 264.310(a) and 310 CMR 30.633(1).], which consist of the following :

- provide long-term minimization of migration of liquids through the closed landfill;
- function with minimum maintenance;
- promote drainage and minimize erosion of the cover or abrasion of the cover;
- accommodate settling or subsidence so that the cover's integrity is maintained; and
- sustain vegetative growth (where applicable) to enhance habitat quality; and
- have a permeability less than or equal to the permeability of any bottom liner system (e.g., pavement) or the natural subsoils present.

TECHNICAL ATTACHMENT G

TECHNICAL REQUIREMENTS FOR CAPPING, ENGINEERED BARRIERS, AND OTHER SURFACE COVERS

Several types of engineered barriers are anticipated, and the specific configuration of the barrier at a given location will be based on current and future use of the area in question, the nature of the soils subject to the surface cover, and considerations related to regulated wetland resource areas and other environmentally sensitive areas. For the purposes of this technical attachment, two types of engineered barriers are described: 1) an impermeable asphalt cover and 2) an impermeable vegetative cover, as shown on Figure G -1. A description of the components associated with these types of engineered barriers is provided below.

The asphalt and vegetated engineered barriers will, at a minimum, measure 12 inches in total thickness and be constructed of several components, as shown on Figure G-1. These components, and the intended purpose of each, are identified below (layers are listed in the order in which they will be installed). For areas in which an engineered barrier is required, such barriers shall (unless otherwise specified) contain the following components:

- **High Density Polyethylene (HDPE) (or similar) geomembrane liner:** The geomembrane liner is the primary component of the cover system and provides three significant features of the surface cover: 1) it prevents direct contact with the underlying soils, 2) it prevents infiltration of precipitation into the underlying soils, and 3) it prevents erosion of the underlying soils. This geomembrane liner will have a minimum thickness of 60 mil unless GE proposes and EPA approves an alternate geomembrane liner with equivalent physical performance specifications. A geotextile fabric may be included as a cushioning layer beneath the liner, depending on the condition of the subgrade material. A proposal regarding whether to install a geotextile fabric under the liner, as well as the thickness of the liner to be included with each cover system (if different from 60 mil), will be included in the RD/RA plans for the applicable Removal Action .

- **Geosynthetic Drainage Composite (GDC):** The primary purpose of the GDC layer is to convey any water that may infiltrate through the overlying soils to the perimeter of the cover area. The GDC is composed of a porous triplanar plastic mesh laminated on one side (the top) by non-woven geotextile. The plastic mesh provides a porous media through which infiltrated

water flows along the top of the geomembrane liner toward the perimeter of the cover area. The geotextile laminate on the top prevents the porous media from becoming clogged by soil particles originating from the overlying soil material. The permeability of the drainage material shall be no less than 1×10^{-1} cm/sec.

- **Soil Fill Material:** The soil fill layer protects the underlying geosynthetic layers from potential damage during and following construction, and prevents direct contact with underlying soils. The thickness of these layers will be specified in the RD/RA plans for the applicable Removal Actions. This thickness will be adequate to provide a root zone for select vegetative growth and reduce the potential for exposure to the underlying soils. Soil fill material will be obtained from off-site sources and will be subject to analytical testing, if necessary, to demonstrate that it is "clean" (with respect to the presence of potentially hazardous constituents) prior to its use. The procedures covering clean fill shall be included in the POP (Attachment C). The purpose of the protective soil layer is to provide a soil that is capable of sustaining the vegetative cover through dry periods and protect the underlying drainage and low permeability layers from frost damage and excessive loads.

- **Vegetated Topsoil Layer (vegetative engineered barriers):** Where a vegetative engineered barrier will be installed, the uppermost layer of the surface cover system will include a topsoil layer, consisting of a sand-silt loam mixture, over which a grass or otherwise vegetated cover will be established. The thickness of the topsoil layer will be specified in the RD/RA plans for the applicable Removal Actions. The presence of the vegetation will minimize potential soil erosion, protect the underlying soil layers, and reduce rainfall infiltration. Similar to soil fill, topsoil will be obtained from off-site sources and may be subject to analytical testing prior to use. This topsoil layer is required to support a vegetative cover.

- **Gravel Subbase Course, Bituminous Asphalt Base Course, and Bituminous Asphalt Wearing Surface (asphalt engineered barriers):** Where a paved engineered barrier will be utilized, an asphalt layer (2-inch minimum) will be installed to accommodate the current and/or

anticipated future uses of the areas as paved areas (e.g., for parking lots). The final configuration of the asphalt and subbase layers will be specified in the RD/RA plans for the applicable Removal Actions, and will consider soil bearing capacities, anticipated vehicle traffic loads, and state and local codes. The presence of the uppermost asphalt layers minimizes the potential for root growth, burrowing animals, and/or inadvertent puncturing or digging to compromise the integrity of the underlying impermeable geomembrane liner. With appropriate grading, the asphalt cover will readily divert precipitation to minimize infiltration and soil erosion. The geomembranes should meet the same requirements as for the impermeable vegetative covers.

3.0 Consolidation Area/Landfill Caps

The on-plant consolidation areas to be constructed within the GE Plant Area will be capped using a capping system that includes several enhancements to the engineered barriers described in Section 2.0 of this attachment. The components of these consolidation area caps are shown on Figure G -2, and are similar to the components of the engineered barriers described in Section 2.0 of this attachment with certain enhancements. Specifically, in addition to the engineered barrier components, the consolidation area caps will include a geocomposite clay liner (GCL) for certain portions of the final cap, and an additional one foot (approximate) depth of cover material. These enhancements will result in a greater total thickness of the cap relative to an engineered barrier. Specific design information regarding the final cap (including the relative impermeability of cap areas with and without the GCL) will be presented in the technical RD/RA deliverables for the specific RAA.

The same type of cap will be installed at the unpaved portion of the former interior landfill at the Unkamet Brook Area. The impact of this cap on flood storage capacity will be evaluated and mitigated as described in the SOW. At the currently paved portion of this former interior landfill, GE shall install an asphalt engineered barrier in accordance with the specifications described in Section 2.0 of this Attachment.

TECHNICAL ATTACHMENT G

TECHNICAL REQUIREMENTS FOR CAPPING, ENGINEERED BARRIERS, AND OTHER SURFACE COVERS

4.0 Pavement Enhancement

In certain areas of the GE Plant Area and Former Oxbow Areas where the current surface cover consists of pavement or concrete, the Performance Standards set out in the SOW require the installation of pavement enhancement. There are several types of asphalt/concrete surfaces currently present within the GE Plant Area and/or Former Oxbow Areas. These include industrial concrete slabs (i.e., 12 inches thick with steel reinforcement) and bituminous asphalt or some combination thereof. Such surfaces will be enhanced as shown on Figure G-3 to increase the overall integrity of the pavement structure and to minimize the potential for contact with the underlying soils. Such enhancements shall include repairs of existing pavement as necessary, based on visual inspection, to address excessive cracking, fissures, spalling, or potholes caused by heaving, uneven settlement, or vehicular use, as well as evidence of depressions and/or surface water ponding, excessive rutting, or exposed subbase materials. In addition, new pavement shall be added to the existing pavement where necessary based on site-specific considerations and uses. Such additional pavement (where necessary) will be placed in accordance with the RD/RA work plans for the Removal Action in question and will be constructed to be generally consistent with the components shown on Figure G-3. In no event will the total thickness of the enhanced pavement be less than 4 inches.

5.0 Soil Covers

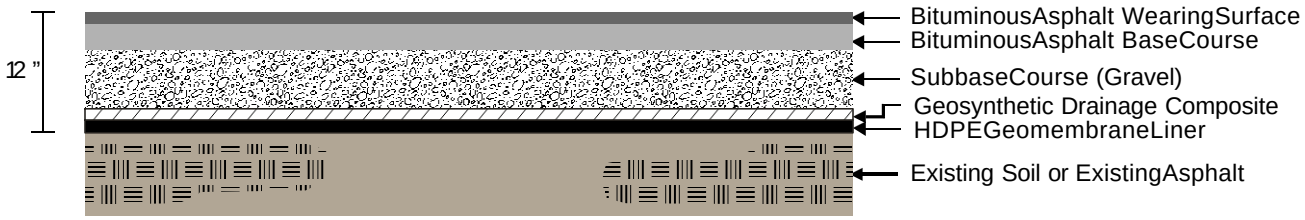
Soil covers will be installed in certain areas to minimize the potential for contact with the underlying materials, while not restricting the movement of water (from rainfall, snowmelt, etc.) from migrating into and through the soil cover. As shown on Figure G -3, the soil cover will include a geotextile layer as a means of demarcation and at a minimum measure 12 inches in thickness. A portion of the soil cover will consist of compacted common soil fill, while the uppermost layer will be a topsoil material capable of supporting a vegetative cover. The vegetated soil covers will be installed at unpaved areas at the GE Plant Area if necessary to achieve a spatial average PCB concentration at or below 25 ppm in the top foot, and also will be installed at the inundated wetland areas at the Unkamet Brook Area if necessary to achieve a spatial average PCB concentration of 1 ppm in the top foot.

TECHNICAL ATTACHMENT G

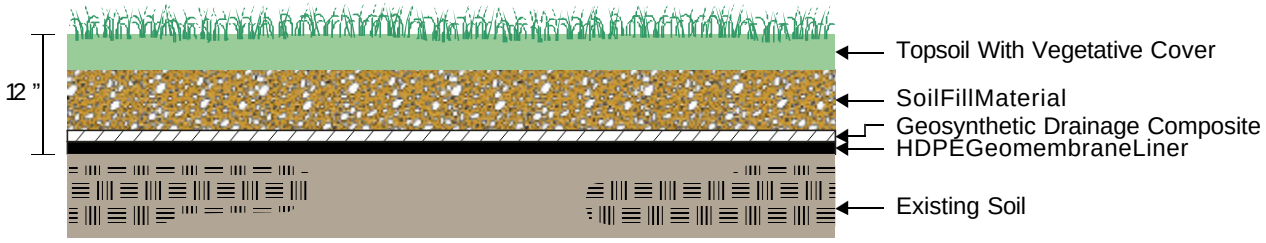
TECHNICAL REQUIREMENTS FOR CAPPING, ENGINEERED BARRIERS, AND OTHER SURFACE COVERS

6.0 Future Inspection and Maintenance Activities

Future monitoring and maintenance of the various types of surface covers discussed above will be conducted in accordance with Attachment J (Future Inspection and Maintenance Activities) of this SOW.



IMPERMEABLE ASPHALT COVER



IMPERMEABLE VEGETATIVE COVER

NOT-TO-SCALE

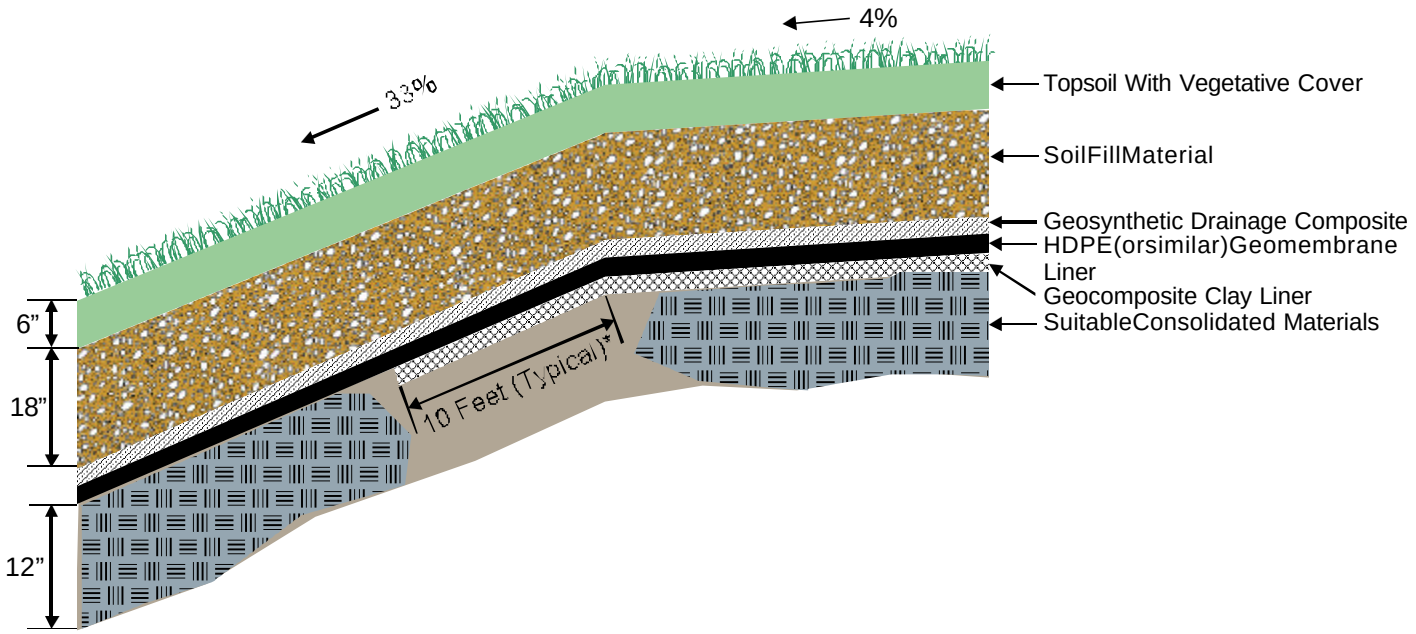
GENERAL ELECTRIC COMPANY
PITTSFIELD/HOUSATONIC RIVER SITE
STATEMENT OF WORK FOR REMOVAL ACTIONS OUTSIDE THE RIVER

ENGINEERED BARRIERS - CONCEPTUAL CROSS-SECTIONS

BBL BLASLAND, BOUCK & LEE, INC
engineers & scientists

FIGURE G-1

7/99 SYR-D54-DJH LBR ycc
20140002/20140g02.cdr



ON-PLANT CONSOLIDATION AREA CAP

NOTE:

* Extent ofgeocomposite clay linerisdependent on the results of hydrologicevaluations(e.g.,HELP model)conducteddduringResponseAction activities.

NOT-TO-SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD/HOUSATONIC RIVERSITE

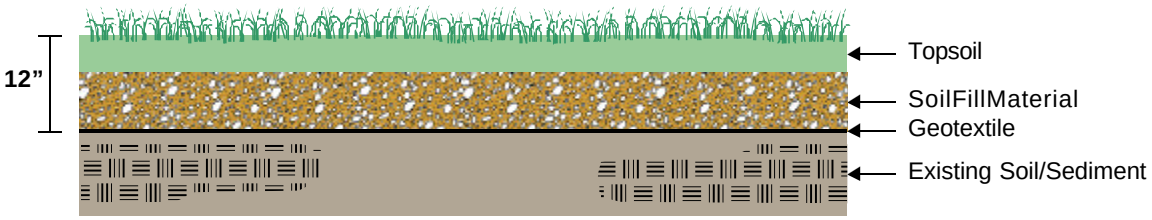
STATEMENT OF WORK FOR REMOVAL ACTIONS OUTSIDE THE RIVER

ON-PLANT CONSOLIDATION AREA CAP CONCEPTUAL CROSS-SECTION

BBL BLASLAND, BOUCK & LEE, INC engineers & scientists

FIGURE G-2

09/99 SYR-D54-DJH ycc
20140002/20140g04.cdr



SOIL COVER

ENHANCED PAVEMENT

NOT-TO-SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD/HOUSATONIC RIVER SITE

STATEMENT OF WORK FOR REMOVAL ACTIONS OUTSIDE THE RIVER

OTHER SURFACE COVERS - CONCEPTUAL CROSS-SECTIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE G-3

07/99 SYR-D54-DJH LBR ycc
20140002/20140g01.cdr

Technical Attachment H

Groundwater/NAPL Monitoring, Assessment, and Response Programs

TECHNICAL ATTACHMENT H

GROUNDWATER/ NAPL MONITORING, ASSESSMENT,

AND RESPONSE PROGRAMS

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TECHNICAL ATTACHMENT H

GROUNDWATER/ NAPL MONITORING, ASSESSMENT, AND RESPONSE PROGRAMS

1.0 Introduction

General Electric Company (GE) shall comply with the provisions of this Attachment for any response actions or monitoring programs necessary to attain or to demonstrate attainment of the Performance Standards for groundwater and non-aqueous phase liquid (NAPL) as outlined in Section 4 of this Attachment, entitled Performance Standards. This document provides the framework for the assessment, monitoring, and conduct of response actions necessary to attain and demonstrate attainment or progress toward attainment of the Performance Standards for groundwater and NAPL for the Removal Actions Outside the River.

1.1 Groundwater Program Objectives

The overall objectives of the groundwater program are to ensure that contaminated groundwater and NAPLs do not adversely impact surface waters, sediments, and biota, including those in the Housatonic River, Silver Lake, and Unkamet Brook, and also to ensure that contaminants in groundwater do not pose an unacceptable risk to human health via inhalation of vapors migrating from groundwater into occupied buildings. These two objectives are consistent with the classifications of the Site groundwater under the Massachusetts Contingency Plan (MCP) (310 CMR 40.0932).

1.1.1 Baseline Monitoring Objective

The objective of the baseline monitoring is to establish existing conditions in order to assess whether the existing response actions are protecting surface water, groundwater and sediment quality, and human health in occupied buildings. Additionally, the baseline monitoring will provide the basis for evaluating the effectiveness of future response actions, including the identification of any additional response actions that may be necessary to attain the Performance Standards. The baseline data will be used for comparison of future data collected under the long-term monitoring program.

TECHNICAL ATTACHMENT H

GROUNDWATER/ NAPL MONITORING, ASSESSMENT, AND RESPONSE PROGRAMS

1.1.2 Long-Term Monitoring Objectives

The long-term monitoring objectives are to assess groundwater conditions over time, verify the attainment of Performance Standards for groundwater and NAPL, provide the basis for identification of any additional response actions which may be necessary to attain the Performance Standards, and determine when response actions are no longer required. Analytical results collected during the Long-Term Monitoring Program will be compared to results from the Baseline Monitoring Program, as described in this Attachment.

2.0 Description of Existing Programs

GE has in the past conducted, and continues to conduct a number of monitoring, assessment and response actions, pursuant to GE's permit under the Resource Conservation and Recovery Act, EPA's May 1998 Action Memorandum, and State Administrative Consent Orders. The objectives of some of these response actions have been to contain light non-aqueous phase liquid (LNAPL) and dense non-aqueous phase liquid (DNAPL) and to prevent or minimize their migration to the Housatonic River or other areas offsite. GE shall continue these monitoring, assessment, and response actions, including the submission of periodic summary reports (currently submitted on a monthly, semi-annual, or annual basis, depending on the site), as described below until EPA determines that applicable Performance Standards are achieved. Any modifications of the actions described below shall require EPA approval.

Currently, GE conducts monitoring and recovery operations for LNAPL and/or DNAPL (along with aqueous phase recovery and treatment only as a byproduct of NAPL recovery) at the following soil/sediment Removal Action Areas (RAAs):

- Lyman Street Area;
- Newell Street Area II;
- East Street Area 1 - North;
- East Street Area 2 - South;
- Hill 78 Consolidation Area; and

- Unkamet Brook Area.

Locations of the RAAs are shown on Figure H-1. The number of wells and the monitoring frequency for each RAA varies, and includes weekly, monthly, quarterly, and semi-annual monitoring. Several automated groundwater/NAPL recovery systems are operated within the various RAAs. The primary objective of GE's groundwater extraction/treatment to date has been preventing the migration of NAPLs. Any recovery of dissolved phase contamination is a function of the NAPL recovery system. In addition to the automatic recovery systems, manual removal of LNAPL and DNAPL is also performed at select well locations. All NAPL monitoring and recovery activities are conducted in accordance with GE's Health and Safety Plan (HASP) and Sampling and Analysis Plan/Data Collection and Analysis Quality Assurance Plan (SAP/DCAQAP). NAPL monitoring and recovery activities are documented in reports submitted to EPA and MDEP.

Groundwater extracted as part of active pumping operations is conveyed via a pipeline to the 64G Groundwater Treatment Facility located within East Street Area II RAA. The Groundwater Treatment Facility system includes pH adjustment, chemically assisted clarification, continuous-backwash filtration, and carbon adsorption processes for treatment of extracted groundwater. Treated groundwater is discharged to the Housatonic River and/or an on-site recharge pond under GE's National Pollutant Discharge Elimination System (NPDES) Permit.

Existing NAPL monitoring and recovery programs for each of the five soil/sediment RAAs are described in Sections 2.1 through 2.5 that follow. The location of the existing recovery systems and wells subject to monitoring, as well as the current extent of NAPL, are presented in Figures H-2 through H-6 for each RAA described in Sections 2.1 through 2.6. A table identifying the individual wells monitored in various programs and the frequency of such monitoring is included as Supplemental Table I. The title of each area in Sections 2.1 through 2.6 is followed in parentheses by the soil/sediment RAA number.

TECHNICAL ATTACHMENT H

GROUNDWATER/ NAPL MONITORING, ASSESSMENT, AND RESPONSE PROGRAMS

2.1 Lyman Street Area (RAA 13)

LNAPL and DNAPL monitoring and recovery operations were initiated in 1990 at the GE-owned Lyman Street parking lot within the Lyman Street Area with the installation of oil absorbent booms along the Housatonic River bank, implementation of NAPL/water level monitoring and a manual bailing/recovery program.

In addition to maintaining the absorbent booms, GE currently monitors 27 wells and well points for NAPL on a weekly basis, an additional seven wells on a monthly basis, and an additional 11 wells on a quarterly basis (see Supplemental Table I). LNAPL accumulations greater than 0.25 feet in thickness are manually removed from the wells/well points (with the exception of those wells located immediately adjacent to the three recovery wells). DNAPL accumulations (thickness greater than 1.0 foot) are removed manually from any well where it is detected. In addition to the manual recovery activities, three active NAPL/groundwater recovery systems are in operation: RW-1 and RW-2 were brought on-line in 1992, and RW-3 first became operational in August 1996. Well RW-1 was replaced, because of apparent fouling, by a new recovery well [RW-1(R)], which became operational September 1998. As of March 1999, approximately 1,750 gallons of LNAPL and 600 gallons of DNAPL have been removed through these recovery systems. Results of the ongoing monitoring and NAPL remediation activities are summarized in an annual effectiveness report, which will continue to be prepared unless future modifications are made pursuant to Section 5.3 of this Attachment.

2.2 Newell Street Area II (RAA 14)

LNAPL and DNAPL monitoring and recovery activities were instituted in 1995 at Newell Street Area II. Currently, GE monitors NS-10 and NS-33 for LNAPL on a weekly basis; wells MW-1D, MW-1S, NS-31, NS-33 through NS-37, N2SC-01I, N2SC-2, N2SC-3I, N2SC-3S, N2SC-7, N2SC-8, N2SC-9S, N2SC-9I, N2SC-11, and N2SC-12 for DNAPL on a weekly/monthly basis; and wells NS-1, NS-9, NS-11, NS-16 through NS-21, and NS-23 for NAPL on a quarterly basis. LNAPL accumulations greater than 0.25 feet in thickness and DNAPL accumulations greater than 0.5 feet in thickness are manually removed from the wells (with the exception of those wells which are included in the automated DNAPL recovery system). Since March 1, 1999, GE has been operating an automated DNAPL recovery system in monitoring wells NS-15, NS-30, and NS-32. Since July 15,

1999, GE has been operating an automated DNAPL recovery system at well N2SC-1I. Starting on January 17, 2000, and every six months thereafter, unless future modifications are made pursuant to Section 5.3 of this Attachment, GE shall submit to EPA for approval, a report summarizing and evaluating all of the NAPL monitoring and recovery systems at the Newell Street II Site. The evaluation shall include proposed modifications or additions, if any, to the NAPL recovery systems necessary to optimize NAPL removal.

2.3 East Street Area 1 - North (RAA 6)

Two oil collection systems, which are composed of caissons with automated groundwater extraction pumps and oil skimmers, are operated in this area. The northside caisson was installed in 1979, replacing a groundwater collection trench system. The northside caisson is a 6.75-foot diameter perforated steel caisson with 22 six-inch diameter perforated collection laterals. The laterals start at a depth of 7.5 feet, and extend to a depth of 18.5 feet. The southside caisson was installed in 1987. The southside collection system consists of a perforated precast concrete caisson which contains an oil skimmer and a groundwater drawdown pump. The southside caisson has a diameter of 6 feet and extends to a depth of approximately 16 feet below grade. The lower 12 feet of the caisson is perforated.

Sixty-seven wells are monitored semi-annually for the presence of LNAPL. Additionally, seven wells (34, 52, 60, 72, 105, 106, 131) are monitored monthly, with LNAPL accumulations (if present) removed manually. Results of this monitoring are currently presented in semi-annual reports. These reports will continue to be prepared following initiation of this groundwater monitoring program, although future modifications to the monitoring program may occur in accordance with Section 5.3 of this Attachment. Since 1991, approximately 700 gallons of LNAPL have been collected from the two recovery systems.

2.4 East Street Area 2 - South (RAA 4)

Currently, GE monitors 145 wells for the presence of LNAPL on a semi-annual basis and presents the results of this monitoring in semi-annual reports. These reports will continue to be prepared following the initiation of this

groundwater monitoring program, although future modifications to the monitoring program may occur in accordance with Section 5.3 of this Attachment.

In addition to the semi-annual monitoring, GE currently monitors additional wells on a weekly and monthly basis. Wells 5, ES2-17, 64V, RW-1(S), EB-25, EB-28, E2SC-3I, and E2SC-17 are monitored weekly for DNAPL. Wells EB-26 and EB-29 are monitored monthly for DNAPL. Product exceedances of 0.5 feet are manually removed. Thirteen riverbank wells/well points are monitored on a weekly basis for LNAPL; this includes wells WP-1, WP-2, WP-3, WP-4, WP-5, WP-6, WP-13, PZ-1S, PZ-2S, PZ-4S, PZ-5S, PZ-6S, and RB-1. Any LNAPL accumulations with a thickness greater than 0.25 feet are manually removed from these wells. Weekly LNAPL monitoring also is performed at several wells, where isolated occurrences of LNAPL have been noted (13, 14, 15R, and 50), with manual bailing being performed if LNAPL accumulations with a thickness greater than 0.25 feet are found. Additional weekly/monthly monitoring is also performed at a number of other wells, including: 2, 5, 6, 8, 28, 29, 32, 35, 36, 37, 38, 42, 43, 44, 47, 48, 49R, 49RR, 51, 53, 54, 55, 56, 57, 58, 59, 63, 64, 66, ES2-1, ES2-2A, ES2-6, ES2-7, E2SC-23, E2SC-24, P3, P3D, P7, and TMP-1. Results of this monitoring are presented in monthly reports. These reports will continue to be prepared following initiation of this groundwater monitoring program.

Seven active oil/groundwater recovery systems are operated at this site: recovery wells RW-1(S), RW-1(X), RW-2(X), 64R, 64S, 64V, and 64X. Three of these recovery systems (64R, 64S, and 64X) are comprised of 7- to 8-foot diameter caissons which contain a series of collection laterals. The remaining systems have slotted well screens with diameters ranging from 8 inches to 2 feet. These systems actively pump groundwater and recover any accumulated oils. An automated oil skimming system is also installed in well 40R. Since the initiation of recovery efforts in the 1970s, approximately 800,000 gallons of NAPL have been collected and removed. Well 40R and the recovery systems are monitored weekly.

In addition to the recovery systems, a 380 feet long by 30 feet deep slurry wall and a groundwater recharge pond provide further physical and hydraulic containment of LNAPL.

2.5 Hill 78 Consolidation Area (RAA 7)

The presence of LNAPL was noted at one well (H78B-8R) during collection of a round of depth to groundwater measurements in May 1999. Specifically, an LNAPL thickness of approximately 0.5 feet was observed on top of the water table at a depth of approximately 28 feet, which roughly corresponds to the depth where indications of NAPL were observed in soil samples collected during well installation in 1996. Previous monitoring of the well after installation did not detect any evidence of NAPL. This location is shown on Figure H-5.

Following this recent discovery of LNAPL in well H78B-8R, GE initiated a series of activities to further assess and recover the LNAPL. Monitoring, removal, and disposal of oil from the well is performed manually on a weekly basis. GE has also collected a sample of the LNAPL for laboratory analysis and has installed several additional soil borings and monitoring wells in the area as part of the evaluation of future On-Plant Consolidation Areas. Weekly monitoring of well H78B-8R and removal of any LNAPL present will continue, and GE recently submitted a proposal for additional monitoring at wells H78B-8, OPCA-MW-2, and OPCA-MW-3.

In addition, GE has collected groundwater samples from 12 monitoring wells in this RAA and surrounding RAAs (RAAs 8 and 10) to provide baseline data for a groundwater monitoring program for the proposed on-plant consolidation activities. These samples were collected between June 14 and June 16, 1999. Analytical results are presented in an August 12, 1999 Addendum to the Detailed Work Plan for On-Plant Consolidation Areas (included in Annex 1 to this SOW), which also outlines the associated groundwater monitoring program.

2.6 Unkamet Brook Area (RAA 11)

Subsurface oil was first detected floating on the water table near Buildings 51,59, and 119 in 1986. Currently, GE monitors 27 wells monthly, and one well (51-21) on a weekly basis to track changes in the LNAPL plume and to determine when response actions are necessary to initiate LNAPL recovery. LNAPL accumulations greater than 0.5 feet in thickness in the monitoring wells are removed and disposed of. In addition, an auto-skimmer is present in well 51-21, and has been active since March 1998. GE currently conducts semi-annual monitoring at 23 wells to assess volatile organic compounds (VOCs) in groundwater near a former waste stabilization basin.

In addition to sampling for VOCs, natural attenuation parameters have been measured in these wells during three monitoring events since the Fall 1996 sampling round.

3.0 Description of Groundwater Management Areas

The overall site is sub-divided into five Groundwater Management Areas (GMAs), based on geographic locations, similarities in hydrogeologic conditions, known plumes/NAPL sources, likely potential receptors (e.g. Housatonic River, Silver Lake, Unkamet Brook), and existing or planned RAAs.

The GMAs are detailed in Table H-1 and Figure H-7 and are described as follows:

1. Plant Site 1 (includes RAAs 1, 2, 3, 4, 5, 6, 13, 14, 15, 18, and 19 and any migration areas)
2. Former Oxbows J and K (includes RAA 16 and any migration areas)
3. Plant Site 2 (includes the portion of RAA 11 east of Plastics Avenue and any migration areas)
4. Plant Site 3 (includes RAAs 7, 8, 9, 10, and the portion of RAA 11 west of Plastics Avenue and any migration areas)
5. Former Oxbows A and C (includes RAA 12 and any migration areas)

GE shall perform monitoring activities for each GMA until such time as EPA determines that the criteria set forth in Section 7.3 for discontinuance of monitoring are met. GE shall also continue to perform the groundwater response activities including recovery and treatment of groundwater, LNAPL and DNAPL recovery, oil skimming and/or booming at those soil/sediment RAAs as described and identified in Section 2.0 until such time as EPA determines that the criteria set forth in Section 7.3 for discontinuance of these response activities are met. If necessary to achieve Performance Standards, GE also shall perform additional response actions as provided herein. This document does not specifically identify any additional groundwater monitoring activities that may be necessary in conjunction with the on-plant consolidation areas. Such activities will be described in separate work plans concerning the consolidation areas.

TECHNICAL ATTACHMENT H

GROUNDWATER/ NAPL MONITORING, ASSESSMENT, AND RESPONSE PROGRAMS

4.0 Performance Standards

Two types of Performance Standards have been established for these GMAs (as applicable): groundwater quality Performance Standards and NAPL Performance Standards. The groundwater quality and the NAPL standards will be monitored and assessed through a program that will utilize a network of "sentinel," "natural attenuation" (NA), and "perimeter" wells.

4.1 Groundwater Quality Standards

The groundwater quality Performance Standards for the GMAs are based on the groundwater classification categories designated in the MCP (310 CMR 40.0932) that are relevant to the areas covered by this SOW. These categories are as follows:

- GW-2 – Groundwater that is a potential source of hazardous vapors to indoor air; groundwater shall be classified as GW-2 if it is located within 30 feet of an existing occupied building and the average annual depth to groundwater is 15 feet or less.

- GW-3 – All groundwater at these RAAs shall be classified as GW-3 because it is a potential source of discharge to surface water.

The MCP specifies certain default "Method 1" groundwater standards for both GW-2 and GW-3 groundwater. It also allows for the establishment of alternative, site-specific GW-2 and GW-3 groundwater standards, based on a site-specific risk assessment. In its groundwater monitoring program at the GMAs listed above, GE shall initially utilize the Method 1 standards set out in the MCP to evaluate groundwater quality. Specifically, GE shall initially utilize the Method 1 GW-2 standards to evaluate GW-2 groundwater and the Method 1 GW-3 standards to evaluate GW-3 groundwater. In the event that the Method 1 groundwater standards are exceeded for any constituent(s) during the course of the groundwater monitoring program, GE may develop and propose to EPA for approval risk-based alternative GW-2 and/or GW-3 standards, based on a site-specific risk evaluation using appropriate EPA or MDEP risk assessment guidance, taking into account relevant factors including but not limited

to, for GW-2 standards, an evaluation of the risks due to potential volatilization of constituents in groundwater into the indoor air of nearby buildings and, for GW-3 standards, impacts to adjacent surface waters, sediments, and biota. Upon EPA approval, such alternative risk-based GW-2 and/or GW-3 standards shall be utilized in lieu of the Method 1 GW-2 standards or Method 1 GW-3 standards.

For volatile organic compounds detected in GW-2 groundwater during the Baseline Monitoring Program for which Method 1 GW-2 standards do not exist or alternative standards have not been approved by EPA, GE shall propose, in the Baseline Monitoring Program Final Report, to develop Method 2 GW-2 groundwater standard for such compounds using the procedures set forth in 310 CMR 40.0983(2) (or alternate procedures approved by EPA), or provide a rationale (subject to EPA approval) for why Method 2 GW-2 standards should not be developed. Any such developed Method 2 GW-2 standards would be utilized at the onset of the Long-Term Monitoring Program.

For compounds detected in GW-3 groundwater during the Baseline Monitoring Program for which Method 1 GW-3 standards do not exist or alternative standards have not been approved by EPA, GE shall propose, in the Baseline Monitoring Program Final Report, to develop Method 2 GW-3 groundwater standards for such compounds using the procedures set forth in 310 CMR 40.0983(4) (or alternate procedures approved by EPA), or provide a rationale (subject to EPA approval) for why Method 2 GW-3 standards should not be developed. Any such developed Method 2 GW-3 standards would be utilized at the onset of the Long-Term Monitoring Program.

The Performance Standards for groundwater quality for the GMAs listed above shall consist of the following:

1. For groundwater located within 15 feet or less from the ground surface and within 30 feet of an existing occupied building, achievement of the Method 1 (or 2) GW-2 standards or, upon EPA approval, alternative risk-based GW-2 standards or a demonstration that constituents in the groundwater do not pose an unacceptable risk to occupants of such building via volatilization and transport to the indoor air of such building.

2. For all groundwater at and related to these GMAs, achievement of the Method 1 (or 2) GW-3 standards or, upon EPA approval, alternative risk-based GW-3 standards at the perimeter monitoring wells designated as compliance points for the GW-3 standards, as discussed below.

These GW-2 and GW-3 Performance Standards shall be applied to individual monitoring wells, based upon the type of such wells (i.e., perimeter or sentinel), their location within the GMAs, and the local groundwater classification. The specific wells to be used to determine compliance with the Performance Standards shall be proposed in the Long-Term Groundwater Monitoring Program discussed in Section 6.3.2.

Sentinel wells should be considered as an early detection system for potential source areas that may need an additional response action based on exceedances of Method 1 GW-2 or GW-3 Performance Standards, as appropriate. Sentinel wells will not be considered compliance points for GW-3 standards. Three categories of sentinel wells will be utilized:

- GW-2 Sentinel Wells – located near existing buildings where the GW-2 groundwater classification criteria apply. These locations shall be GW-2 compliance points (reference Section 6.3.2). Additional sentinel wells may be required for buildings constructed or occupied after the initial identification of GW-2 compliance wells.

- Consolidation Area Sentinel Wells – located near planned on-plant consolidation areas to monitor baseline conditions and any resulting impacts to groundwater. Sentinel wells will be located and baseline assessments initiated at consolidation areas prior to any placement of waste into a consolidation area. The Performance Standards for these sentinel wells are addressed in a separate monitoring program proposed for the on-plant consolidation areas (see *Addendum to Detailed Work Plan for On-Plant Consolidation Areas*, dated August 12, 1999, included as Annex 1 to the SOW), although their locations are depicted on Figure H-7.

- General and Source Area Sentinel Wells – located near known contaminant source areas and spatially distributed across the GMAs to monitor groundwater downgradient of known sources and to provide

additional areal coverage to monitor for previously undetected source areas. Data collected in these locations should be evaluated using GW-3 standards as a benchmark, rather than as a Performance Standard.

Unless otherwise specified, natural attenuation (NA) wells shall be considered a subset of the general and source area sentinel wells. At such locations, GW-3 standards will be used as a benchmark rather than as Performance Standards.

Trends from evaluating the data from the sentinel wells shall be considered when determining possible impacts on the perimeter wells.

All downgradient perimeter wells shall be considered as compliance points for attainment of the GW-3 Performance Standards. In some cases, perimeter wells may be located next to or immediately upgradient of occupied buildings where GW-2 classification criteria apply. Such perimeter well locations shall also be compliance points for attainment of the GW-2 Performance Standards.

4.2 Non-Aqueous Phase Liquid Standards

The Performance Standards for NAPLs shall be as follows:

1. Containment, defined as no discharge of NAPL to surface waters and/or sediments, which shall include no sheens on surface water and no bank seeps of NAPL.

2. For areas near surface waters in which there is no physical containment barrier between the wells and the surface water, elimination of measurable NAPL (i.e., detectable with an oil/water interface probe) in wells near the surface water bank that could potentially discharge NAPL into the surface water, in order to prevent such discharge and assist in achieving groundwater quality Performance Standards.

3. For areas adjacent to physical containment barriers, prevention of any measurable LNAPL migration around the ends of the physical containment barriers.

4. For NAPL areas not located adjacent to surface waters, reduction in the amount of measurable NAPL to levels which eliminate the potential for NAPL migration toward surface water discharge areas or beyond GMA boundaries, and which assist in achieving groundwater quality Performance Standards.

5. For NAPL located at depths of 15 feet or less from the ground surface and within a horizontal distance of 30 feet from an existing occupied building, a demonstration that constituents in the NAPL do not pose an unacceptable risk to occupants of such building via volatilization and transport to the indoor air of such building. Such demonstration may include assessment activities such as: NAPL sampling, soil gas sampling; desk-top modeling of potential volatilization of chemicals from the NAPL (or associated groundwater) to the indoor air of the nearby occupied buildings; or sampling of the indoor air of such buildings. If necessary, GE shall propose corrective actions, including, but not limited to, containment, recovery, or treatment of NAPL and impacted groundwater.

To achieve these Performance Standards, GE shall adequately characterize NAPL areas (see Section 6.1) and also shall reassess and optimize (if necessary) the recovery systems to maximize the volume of NAPL recovered over the life of the extraction system (see Section 6.3.2.). GE shall reassess the recovery systems for each NAPL area at the Site and propose enhancements as necessary to meet the long-term goal of maximizing NAPL recovery and eliminating mobile NAPL. The recovery systems shall be evaluated considering the following factors:

- Recovery well design – optimal screen placement, well diameter and screen/filter pack design.
- The number and placement of recovery wells; and
- Groundwater drawdown and product recovery rates – minimal product smear zone and water infiltration during pumping.

At a minimum, the recovery system assessment shall require the evaluation of installing automated pumping systems in areas where NAPL is consistently detected in excess of 0.25 feet and not currently subject to automated NAPL removal. Cyclical pumping may be required once a product thickness of less than those amounts is attained by consistent automated pumping. GE shall continue to operate the NAPL recovery systems within a given area until GE demonstrates and EPA determines that the NAPL Performance Standards have been achieved in that area. In addition, to the extent that such systems include groundwater recovery/treatment at perimeter areas, GE shall continue to operate the groundwater recovery/treatment component of such systems at those areas until the applicable groundwater quality Performance Standards have been achieved at such areas, unless GE demonstrates, and EPA concurs, that continued operation of the groundwater recovery/treatment system is no longer appropriate.

5.0 Monitoring Program Components

5.1 Groundwater Quality

The initial groundwater quality monitoring network to be implemented by GE at the GMAs identified above shall consist of the sentinel, perimeter, and NA monitoring wells located as shown on Figure H-7. During the Baseline Monitoring Program (described in Section 6) and as well as during the Long-Term Monitoring Program (described in Section 7), GE may propose additional sentinel, perimeter, and/or NA monitoring locations or other modifications to the locations shown on Figure H-7, consistent with the requirements of this Attachment and subject to EPA approval.

The locations of sentinel monitoring wells have been and shall be based upon the following considerations:

- Areas where elevated concentrations of dissolved phase constituents (relative to the surrounding groundwater) are or may be present;
- Areas of known, suspected, or potential sources of groundwater contamination;

- Areas located within or immediately downgradient of known NAPL areas;
- Other areas where spatial (e.g. vertical and horizontal) representation within a GMA is warranted (to provide general information regarding hydrogeological conditions and presence of dissolved phase hazardous constituents);
- Proximity of surface water discharge locations.
- The potential for impacts to indoor air quality in occupied buildings or structures, due to the volatilization of constituents present in shallow groundwater and the potential upward or lateral migration of vapors into the structures or buildings. To address this concern, monitoring locations shall be selected to address areas that meet the criteria for GW-2 groundwater under the Massachusetts Contingency Plan (MCP).
- Areas downgradient of buildings where demolition debris may be placed in foundations (e.g., Building 31).
- Sentinel monitoring locations may also address NA characterization.

The locations of the perimeter monitoring wells have been and shall be based upon the following considerations:

- Locations along the boundaries of each GMA and/or near surface water bodies where elevated concentrations of dissolved- phase constituents (relative to the surrounding groundwater) have been, are, or may be present;
- Ability to detect migration from such locations and from other areas of past, current, or potential sources of groundwater contamination;
- Ability to detect migration of NAPL and/or dissolved phase constituents from known NAPL areas; and
- Non-interference with ongoing source control or other response activities.
- Upgradient perimeter wells to assess background conditions.
- Perimeter monitoring locations sited as close to the downgradient boundary of each GMA as feasible.

The locations of the NA monitoring wells have been and shall be based upon the following considerations:

- Upgradient NA wells to assess background conditions
- Downgradient NA wells (within plume) to evaluate NA processes along the migration pathway.
- Source area NA wells to indicate NA processes occurring within the contaminant source.

5.2 Hydraulic Parameters

GE shall include the following hydraulic components in the baseline monitoring program (see section 6.1.2):

- A comprehensive round of quarterly depth to water measurements within wells proposed for groundwater monitoring for each GMA, including piezometers located near the Housatonic River.
- Stream elevation monitoring at a number of locations within the Housatonic River between the Unkamet Brook tributary and the Lyman Street Bridge.
- The proposed baseline hydraulic monitoring should be coordinated with the existing NAPL monitoring and recovery activities discussed in Section 2 and below in Section 5.3 .

5.3 Non-Aqueous Phase Liquids

Site-specific NAPL monitoring shall be conducted as described in Section 2.0 or as required hereunder, including monitoring for riverbank seeps and sheens along the river reach between Newell Street and Elm Street.

To the extent it is not addressed by the approved work plans for source control activities or for the Upper ½ Mile Reach Removal Action, the nature and extent of NAPLs and ongoing NAPL recovery efforts shall be characterized, including an evaluation of whether any modifications to optimize existing NAPL recovery systems are warranted, in the baseline assessments.

Any changes to the NAPL monitoring program shall be proposed for EPA approval in either the source control work plans, the Baseline Assessment Proposal (described in Sections 6.1.1 and 6.1.2), or the Long-Term

Monitoring Program Proposal (described in Section 6.3.2), and shall include any other NAPL areas identified during the installation of soil borings and any other investigative activities. Monitoring wells shall be installed in future soil borings where NAPL is detected, excluding those borings located within known NAPL plumes when the NAPL observed is consistent with prior investigations.

5.4 Natural Attenuation

Within the area where GE is evaluating natural attenuation (NA) mechanisms in groundwater, baseline assessment of these parameters shall be conducted. At this time, this area consists of the portion of RAA 10 east of Plastics Avenue (GMA 3). In this area, the NA components of the baseline monitoring program shall include sampling and analysis of NA parameters at background (upgradient) locations, within the source area, and downgradient within the groundwater plume which is being evaluated. Groundwater sampling for NA shall use the EPA Region I Low Stress (Low Flow) Standard Operating Procedures. At a minimum, field parameters shall include dissolved oxygen (DO), temperature, Eh or oxidation-reduction potential (ORP), pH, conductivity, and ferrous iron. Laboratory analytical parameters should include: VOCs, anions (sulfate, sulfide, nitrate, nitrite, chloride), ferrous iron, total organic carbon (TOC), dissolved gasses (methane, ethane, ethene, carbon dioxide (CO_2)), total suspended solids (TSS) and total dissolved solids (TDS). In addition, GE shall consider measuring dissolved hydrogen during one or two of the sampling rounds to determine reduction oxidation (REDOX) zones. Hydrogen analyses require either peristaltic pump or bladder pump be used to collect samples (Reference: "Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater" EPA/600/R-98/128, September 1998). These analyses shall be performed to develop a baseline and monitor trends for evaluation of natural attenuation processes within each GMA where natural attenuation mechanisms are being evaluated.

6.0 Baseline Monitoring Program

GE shall conduct a Baseline Monitoring Program of groundwater conditions for each GMA. The Baseline Monitoring Programs shall consist of evaluation of all existing groundwater data collected to date and a proposal to address identified data gaps in the existing groundwater set.

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6.1 Development of Baseline Monitoring Program

The process of establishing a Baseline Monitoring Program shall consist of: 1) evaluation of current data; 2) submittal of a proposal which addresses data gaps from the evaluation and provides a plan for establishing the Baseline Monitoring Program; 3) field investigations; 4) baseline assessment reports; and 5) a Long-Term Monitoring Program Proposal.

6.1.1 Data Review and Evaluation

Prior to submitting the Baseline Monitoring Program Proposal for each GMA, GE shall review and evaluate all groundwater data collected to date from or related to that GMA for the following:

- Review current well locations relative to known/suspected source areas. The placement of well screens (including their elevation) shall be evaluated to determine if they are adequately monitoring NAPL or dissolved phase zones. Special emphasis should be focused on the evaluation of the hydraulic properties of aquifer areas subject to GW-2 monitoring and GW-3 monitoring near groundwater discharge points.

- Evaluate the distribution of monitoring well pair clusters and the need for establishing these types of long-term monitoring points in assessing attainment of GW-2 and GW-3 Performance Standards.

- Review adequacy of historical groundwater data relative to analytical parameters, adequate analytical/sampling procedures, and QA/QC. An evaluation of any statistical trends shall also be provided.

- Evaluate the presence of relatively shallow groundwater (15 feet below ground surface or less) in the vicinity (within 30 feet) of occupied buildings to establish local areas where GW-2 standards will be applied.

- Evaluate the current NAPL characterization and monitoring program, including an assessment of whether additional NAPL sampling is necessary to evaluate GW-2 constituents in areas where NAPL occurs within a depth of 15 feet from the surface and a distance of 30 feet from an occupied building.

6.1.2 Proposed Baseline Monitoring Program

The Baseline Monitoring Program Proposal for each GMA shall be submitted to EPA for review and approval as specified in Table H-2. The proposal shall address data gaps identified in the data review and evaluation and shall provide the plan for establishing the Baseline Monitoring Program. The proposed Baseline Monitoring Program shall include the following:

- Summary of historical groundwater data and the rationale for inclusion in baseline assessments.

- Results of updated monitoring well inventory (i.e., performed since 1995).

- A proposal to conduct baseline monitoring at the sentinel, perimeter, and NA monitoring wells shown on Figure H-7 and listed in Supplemental Table II, with any modifications or additions proposed by GE consistent with the requirements of this Attachment, based on its review of the historical groundwater data, as well as any further information about buildings where demolition debris may be placed in the foundations (so as to ensure that there are monitoring wells downgradient of such buildings).

- For wells proposed to be monitored for GW-2 groundwater quality: GE shall initially consider all VOCs listed in Appendix IX of 40 CFR 264, plus 2-chlorethylvinyl ether, for analysis in the Baseline Monitoring Program. On a well-specific basis, GE may propose to limit the constituents to be analyzed to a subset of the foregoing list based on analytical data previously collected from that well.
- For wells proposed to be monitored for GW-3 groundwater quality: GE shall initially consider all compounds listed in Appendix IX of 40 CFR 264, plus 2-chloroethylvinyl ether, benzidene, and 1,2-diphenylhydrazine (Appendix IX+3). On a well-specific basis, GE may propose to limit the constituents

to be analyzed to a subset of the foregoing list based on analytical data previously collected from that well.

- List of existing and/or new wells to be monitored for NAPL presence and thickness.

- As assessment of existing NAPL recovery systems and/or programs, including proposals to potentially optimize NAPL recovery, if appropriate.

- Other groundwater quality parameters to evaluate the intrinsic and natural processes that may mitigate groundwater contamination, including but not limited to NA parameters, and the rationale for each parameter or set of parameters.

- Wells at which hydraulic conductivity testing is to be performed, and supporting rationale.

- Identification of other potential sources.

- Evaluation of whether potential preferential pathways near occupied buildings require additional GW-2 monitoring.

- Proposed frequency of such baseline monitoring activities, which shall include a minimum of quarterly water level monitoring and semi-annual groundwater quality monitoring for at least two years. The time periods for semi-annual water quality sampling shall be chosen to adequately assess seasonal variation which may occur during the baseline sampling period. If historical water quality at a well proposed for sampling exceeds Method 1 GW-2 or GW-3 standards, GE shall evaluate the need for quarterly groundwater quality monitoring at that well for the constituent(s) which exceeded the standard.

- Schedule to conduct the field program, assessment, and submittal of a summary report.

6.1.3 Field Program

As part of this Baseline Monitoring Program, GE shall perform a field investigation program according to, and after EPA approval of, the proposal phase of the Baseline Monitoring Program to supplement existing groundwater data. The baseline field investigation program shall include two (2) years of monitoring of the locations proposed in the approved Baseline Monitoring Program, commencing upon the schedule set forth in Table H-2. For this period, such monitoring shall be conducted quarterly for groundwater elevations and semi-annually for groundwater quality, unless GE has proposed and EPA has approved an increased monitoring frequency. GE, in its proposal, and EPA, in its approval, shall make best efforts to avoid scheduling groundwater monitoring at times and locations at which the baseline data could be impacted by the soil/sediment response actions within a GMA. If the two-year "baseline" period ends prior to the completion of soil-related response actions at all the RAAs in a GMA, GE may make a proposal to EPA for approval to modify and/or extend the Baseline Monitoring Program based on the results of the initial assessment and the estimated timing of future response actions at the RAAs in the GMA. Such proposal shall be presented in the summary report for that area, as described below in Section 6.3.2.

The baseline field investigation program shall include installation of additional wells (if any) identified in the proposed Baseline Monitoring Program. The field program shall include monitoring at the initial locations shown on Figure H-8, with any modifications or additions to the sentinel, perimeter, and NA monitoring locations consistent with the requirements of this Attachment, as identified in the Baseline Monitoring Program Proposal and approved by EPA.

6.2 Notification to EPA

During the Baseline Monitoring Program, if NAPL is observed to be discharging to any surface water, creating a sheen on the water, in a location in which such NAPL discharge was not previously observed or measures are not in place to effectively contain the sheen, GE shall notify EPA and MDEP within two hours of obtaining knowledge of such observation. This shall be followed by written notice to EPA within seven (7) days. The

written notification shall include a proposal to EPA for interim response actions to contain such discharge. Upon EPA approval, GE shall conduct the approved interim response actions to contain the NAPL discharge.

If NAPL is observed to be discharging to any surface water, creating a sheen on the water, in a location in which such NAPL discharge was previously observed and reported to EPA and measures are in place to effectively contain the sheen, GE shall notify EPA of the continued presence of such NAPL in the next monthly progress report for overall work at the Site.

For groundwater, if a NAPL thickness of greater than or equal to ½-inch is observed in any monitoring well, GE shall notify EPA and MDEP within seventy-two hours of obtaining knowledge of such a condition, unless such conditions are consistent with the types, nature, and quantities of NAPL which were previously observed and reported to the Agencies. This notification shall be followed by written notice to the EPA within 60 days. The written notification shall include a proposal to EPA for interim response actions to be conducted which may include NAPL sampling, additional assessment/monitoring, or NAPL removal activities. Upon EPA approval, GE shall conduct the approved interim response actions. If a NAPL thickness of greater than or equal to 1/8-inch, but less than 1/2-inch is observed in a monitoring well, GE shall notify EPA and MDEP in the next monthly progress report, unless the results are consistent with the types, nature, and quantities of NAPL which have previously been observed and reported to the Agencies.

Upon obtaining knowledge of sampling data from a well containing category GW-2 groundwater within 30 feet of a school or occupied residential structure and having a total VOC concentration equal to or greater than 5 parts per million, GE shall notify EPA and MDEP within seventy-two hours unless such exceedance was previously observed and reported to EPA. GE will provide the data from each such event in the next monthly progress report for overall work at the Site. Subsequent exceedances for a given well will also be indicated in the next monthly progress report for the site.

If an exceedance of a groundwater Upper Concentration Limit (UCL), as set forth in the MCP (310 CMR 40.0996(5)), is indicated in a groundwater sample from a given well, and such an exceedance was not previously observed and reported to EPA, GE shall notify EPA and MDEP within fourteen days of obtaining knowledge of

such results. GE will also provide the data and identify specifically from each such event in the next monthly progress report for overall work at the Site. Subsequent exceedances of a UCL for a given well shall be identified in the next monthly report. The monthly progress report for overall work at the site shall also identify any wells and provide the sampling results for all constituents which exceeded the applicable GW-2 or GW-3 standards.

6.3 Baseline Monitoring Program Reports

Reports shall be provided for each GMA after each round of groundwater quality monitoring (Baseline Assessment Interim Reports) and at the conclusion of the baseline monitoring period (Baseline Assessment Final Reports).

6.3.1 Baseline Assessment Interim Reports

Within 60 days of the conclusion of each round of groundwater quality monitoring at each GMA, GE shall prepare and submit a summary report describing the field activities and presenting the monitoring results from that round and the prior water level monitoring round. GE shall also provide an electronic submittal of the analytical and locational (e.g., X-Y-Z coordinates) data for the round being reported in a format compatible for entry into an ArcInfo GIS System.

Each such summary report shall compare the results from that event to the prior data from the GMA and also to the Method 1 (or 2) GW-2 or GW-3 standards at applicable well locations. If the sampling results from wells that monitor for GW-2 groundwater compliance indicate: (1) an exceedance of the Method 1 (or 2) GW-2 standards in a well in which such exceedance had not previously been found; (2) or the GW-2 Standard has previously been exceeded and groundwater concentration is greater than or equal to 5 ppm total VOCs (if such an exceedance was not previously addressed), GE shall propose appropriate interim response actions. These response actions may include: resampling of the groundwater; increasing the sampling frequency to quarterly intervals; additional well installation (including sampling and analysis); soil gas sampling; desk-top modeling of potential volatilization of chemicals from the groundwater to the indoor air of the nearby occupied buildings; sampling of the indoor air of such buildings; an evaluation of the potential risks related to volatilization to such

indoor air; the development of a risk-based alternative GW-2 standard; and/or active response actions, including, but not limited to, containment, recovery, or treatment of impacted groundwater and/or NAPL.

For sampling results that indicate an exceedance of Method 1 (or 2) GW-3 standards at downgradient perimeter monitoring wells in a well in which: (1) such exceedance had not previously been found; or (2) the GW-3 Standard (Method 1 or 2) has previously been exceeded and the groundwater concentration is greater than or equal to 100 times the GW-3 Standard (if such exceedance was not previously addressed), GE shall propose interim response actions, which may include: further assessment activities such as resampling, increasing the sampling frequency to quarterly intervals, additional well installation (including sampling and analysis), and/or continuing the baseline monitoring program; active response actions, including, but not limited to, containment, recovery, or treatment of impacted groundwater; and/or the conduct of a site-specific risk evaluation (taking into account the impacts on adjacent surface water, sediments, or biota) and the proposal of alternative risk-based GW-3 Performance Standards. Upon EPA approval, GE shall implement the approved interim response actions.

In addition, in any interim summary report for a given GMA, GE may propose, consistent with the requirements of this Attachment, based on an evaluation of the data, modifications to the frequency and wells to be monitored and/or the constituents to be analyzed for during the remaining sampling rounds in the baseline program, as well as any modifications to NAPL recovery systems. Upon EPA approval, GE shall implement such modifications for the remaining rounds.

6.3.2 Baseline Assessment Final Reports and Long-Term Monitoring Program Proposal

Within 75 days of conclusion of each complete GMA baseline field investigation program, GE shall submit the Baseline Assessment Final Report to EPA for review and approval. The report shall also include GE's proposal to EPA for approval of a Long-Term Monitoring Program for that GMA.

The final reports of each Baseline Monitoring Program shall include:

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- An update of the current understanding of hydrogeologic conditions and the extent of contamination, including a statistical assessment of the "baseline" data and other historical data, if appropriate, and a comparison to the Performance Standards;
- An evaluation of the spatial distribution of constituents within the GMA and the actual migration or potential for migration of such constituents outside the GMA, including an evaluation of groundwater travel time to any receptor (e.g. surface water body/building);
- Identification of the presence or potential presence of previously unidentified sources of groundwater contamination;
- An assessment of the adequacy of the selected monitoring locations;
- A re-assessment of the constituents, locations, and frequencies to be subject to future monitoring;
- Identification of areas where the GW-2 Performance Standards apply in addition to the GW-3 Performance Standards;
- Identification of the specific wells to be used to measure compliance with the NAPL, GW-2 and GW-3 Performance Standards;
- An evaluation of variations in groundwater quality from event to event to identify and assess sampling data variability and potential causes for the variability, including seasonal influences;
- An evaluation of the need for follow-up investigations or assessments, interim response actions, or NAPL recovery modifications/additions;
- A statement of the basis for GE's proposal to EPA for approval of a Long-Term Monitoring Program and/or additional response actions.

The proposed Long-Term Monitoring Program for each GMA shall include:

- the specific soil/sediment RAAs subject to the monitoring, along with the supporting rationale;
- the sentinel, NA and perimeter monitoring locations, along with the supporting rationale;
- the schedule for plan implementation, including reporting;
- the frequency of future monitoring events;
- the constituents to be subject to analysis;
- descriptions of statistical techniques to be employed;

- proposal for any additional investigations or assessments, interim response actions, or NAPL recovery modifications/additions, including any proposal for risk-based alternative GW-2 or GW-3 Performance Standards; and
- an outline of the Monitoring Event Evaluation Report.

7.0 Long-Term Monitoring Program

GE shall commence the Long-Term Monitoring Program for each GMA upon EPA approval of the Long-Term Monitoring Program Proposal, discussed in the preceding section, and following completion of the soil/sediment response actions for the RAAs in that GMA, in accordance with the schedule approved by EPA.

7.1 Implementation of the Monitoring Program

The Long-Term Monitoring Program shall include monitoring of the locations and at the frequency specified in the Long-Term Monitoring Program approved by EPA. Event-specific evaluations shall be conducted following each monitoring event and long-term temporal and spatial groundwater quality trend evaluations shall be performed at intervals of no more than two (2) years. Long-term trend evaluations shall assess the need for further response actions, modification or discontinuance of all or components of the groundwater monitoring program for the given GMA.

7.2 Evaluation of Monitoring Program Data

This section describes the general approach that GE shall use to periodically evaluate the monitoring results in order to evaluate the need for further response actions and to propose, for EPA approval, to modify or discontinue components of the Long-Term Monitoring Program.

7.2.1 Event-Specific Evaluations

During the Long-Term Monitoring Program, if NAPL is observed to be discharging to any surface water, creating a sheen on the water, in a location in which such NAPL discharge was not previously observed or measures are not in place to effectively contain the sheen, GE shall notify EPA and MDEP within two hours of obtaining knowledge of such observation. This shall be followed by written notice to EPA within seven (7) days. The written notification shall include a proposal to EPA for interim response actions to contain such discharge. Upon EPA approval, GE shall conduct the approved interim response actions to contain the NAPL discharge.

If NAPL is observed to be discharging to any surface water, creating a sheen on the water, in a location in which such NAPL discharge was previously observed and measures are in place to contain the sheen, GE shall notify EPA of the continued presence of such NAPL in the next monthly progress report for overall work at the Site.

For groundwater, if a NAPL thickness of greater than or equal to 1/2-inch is observed in any monitoring well, GE shall notify EPA and MDEP within seventy-two hours of obtaining knowledge of such a condition, unless such conditions are consistent with the types, nature, and quantities of NAPL which were previously observed and reported to the Agencies. This notification shall be followed by written notice to the EPA within 60 days. The written notification shall include a proposal to EPA for interim response actions to be conducted which may include NAPL sampling, additional assessment/monitoring, or NAPL removal activities. Upon EPA approval, GE shall conduct the approved interim response actions. If a NAPL thickness of greater than or equal to 1/8-inch, but less than 1/2-inch is observed in a monitoring well, GE shall notify EPA and MDEP in the next monthly progress report, unless the results are consistent with the types, nature, and quantities of NAPL which have previously been observed and reported to the Agencies.

Upon receipt of sampling data from a well containing Category GW-2 groundwater within 30 feet of a school or occupied residential structure and having total VOC concentrations of equal to or greater than 5 parts per million, GE shall notify EPA and MDEP within seventy-two hours of obtaining knowledge of such data, unless such exceedance was previously observed. GE will provide the data from each such event in the next monthly progress report for overall work at the Site. Subsequent exceedances for a given well will be indicated in the next

monthly progress report for the site. Further, in its report on the monitoring event, GE shall propose appropriate interim response actions to address the exceedance of the GW-2 Performance Standards. Such interim response actions may include: resampling of the groundwater; increase in sampling frequency; additional well installation (including sampling and analysis); soil gas sampling; desk-top modeling of potential volatilization of chemicals from the groundwater to the indoor air of nearby occupied buildings; sampling of the indoor air of such buildings; an evaluation of the potential risks related to volatilization to such indoor air; and/or the development and proposal of a risk-based alternative GW-2 standard (if not already established). Upon EPA approval, GE shall implement the approved interim response actions.

In addition, if an exceedance of a groundwater UCL is indicated in a groundwater sample from a given well, and such exceedance was not previously observed, GE shall notify EPA and MDEP within fourteen days of obtaining knowledge of such an exceedance. GE will also provide the data from each such event in the next monthly progress report for overall work at the Site. Subsequent exceedances of a UCL for a given well shall be identified in the next monthly report.

Upon receipt of sampling data from each monitoring event, GE shall also evaluate whether or not the applicable GW-2 or GW-3 Performance Standards have been achieved at the compliance monitoring well locations and, if not, the progress toward attainment. GE shall provide notification of any previously unobserved exceedance of the applicable GW-2 or GW-3 Performance Standards from each such event in the next monthly progress report for overall work at the Site. An evaluation of potential response actions relating to any exceedances of the GW-2 or GW-3 Performance Standards at compliance point locations shall be made in the context of the long-term trend evaluations, as discussed in Section 7.3.

Finally, upon receipt of data from each monitoring event, GE shall, on a location-by-location basis for sentinel, NA, and perimeter wells, compare the data from the current monitoring event with the prior monitoring data and evaluate using statistics proposed by GE and approved by EPA. Specifically, during the first two years of the long-term monitoring program, GE shall compare the results from each event with the "baseline" monitoring data. Thereafter, as the groundwater database is updated, GE shall compare the results from each monitoring event to the entire prior database, focusing on long-term temporal or spatial trends. These comparisons shall be

performed, using an appropriate statistical technique to be proposed by GE for EPA approval, to identify instances in which the current data indicate an increase in the concentrations of dissolved-phase constituents relative to prior monitoring. In making these comparisons, GE shall focus in particular on whether the data from the sentinel, NA and perimeter monitoring wells indicate an increase in the potential for such constituents to migrate outside the boundaries of the GMA and whether such migration is already occurring.

If a statistically significant increase in dissolved-phase constituents is detected at any well in the most recent sampling results and relative to prior data, GE shall conduct the following activities:

- An evaluation of overall groundwater conditions within the GMA to ascertain if the elevated sampling data were detected elsewhere and uniformly or if the elevated data are isolated to a specific monitoring location;
- A review of the recent sampling results with respect to the sampling data available from comparable sampling periods (i.e., results from sampling conducted during a similar time of year); and
- An evaluation of the potential presence of an upgradient "source" that could explain the increase in groundwater concentrations.

GE shall provide a possible explanation(s) for any such observed increase in concentrations in the sampling data. If EPA determines that the elevated sampling data are not due to inherent variations in the field or laboratory procedures or to historical variations in the monitoring results, GE shall propose to EPA for approval one of more of the following actions, and shall implement the EPA approved actions:

- Re-sampling of the location and constituent(s) of interest;
- Increasing the frequency of monitoring at the location(s) in question;
- Additional evaluation activities in the area of interest, including but not limited to, the installation and sampling of new permanent or temporary monitoring wells;
- Evaluation of whether the groundwater in which the increase has been found is affecting any adjacent surface waters, sediments and/or biota, including, if appropriate, sampling of such surface waters, sediments, sediment pore water using seepage meters, and biota, including toxicity testing;

- Evaluation of active response actions to contain and/or recover the affected groundwater or to address potential sources if identified.

7.2.2 Long-Term Trend Evaluations

At periodic intervals during the Long-Term Monitoring Program until Performance Standards have been attained, but no less frequently than every two years, GE shall conduct an evaluation of long-term groundwater quality trends. This evaluation shall initially involve comparison of the groundwater monitoring results from the period since the last evaluation to the applicable groundwater Performance Standards set forth in Section 4.0. In the event that the Performance Standards then being applied are Method 1 (or 2) standards and such standards are exceeded, GE may develop and propose to EPA for approval risk-based alternative groundwater Performance Standards for use in these comparisons, based on a site-specific risk evaluation, taking into account, as appropriate, relevant factors as described in Section 4.1. In the event that the long-term trend evaluations indicate that groundwater quality continues, after performance of the soil/sediment response actions at the pertinent RAAs, to exceed the applicable Performance Standards (including risk-based alternative standards approved by EPA, if any), GE shall evaluate appropriate response actions, as provided in Section 7.3.

In the long-term trend evaluations, GE shall also evaluate whether modifications to the Long-Term Monitoring Program are appropriate, considering temporal and spatial groundwater quality trends, the levels of detected constituents, statistical evaluations, groundwater flow patterns, and the alternative standard evaluations, and propose such modifications to EPA for approval.

The long-term trend evaluation shall include a statistical analysis focusing on intra-well comparisons for selected critical parameters (i.e., contaminants of concern). As sufficient data becomes available, statistical evaluations, as approved by EPA, shall be made regarding the presence or absence of seasonality and trend. In wells exhibiting no trends, data means and variances shall be computed for parameters of concern for which there are greater than 50 percent detections for a particular constituent. Once trends occur, the mean, variance, and upper confidence limit will have no particular significance. At that point, plotting of the data and regression analysis shall be performed. A moving average presentation of regularly spaced data may be an alternative to directly

correlating data for seasonality. Historical data considered acceptable for use (e.g., having comparable analytical methods and detection limits) may, upon approval by EPA, be considered in the statistical analysis.

The long term trend evaluations shall also include an assessment of the current NAPL recovery efforts to determine if modifications/enhancements are appropriate to optimize NAPL recovery and to meet NAPL Performance Standards. GE shall propose any such modifications to EPA for approval.

7.3 Application of Performance Standards

Upon receipt of sampling data from each monitoring event, GE shall evaluate whether or not the Performance Standards have been attained at the appropriate monitoring locations and, if not, the progress toward attainment. GE shall also comply with all other requirements of Section 7.2.1.

If the long-term trend evaluations indicate that groundwater quality continues, after performance of the non-groundwater-related Removal Actions for the RAAs within the GMA, to exceed the groundwater quality Performance Standards (which may be either the Method 1 (or 2) standards or risk-based alternative standards approved by EPA) at the compliance points for such Performance Standards, GE shall evaluate appropriate response actions and propose such response actions to EPA for approval. Such response actions may include continued monitoring, other assessment activities, or active response actions to attain the Performance Standards. Upon EPA approval, GE shall implement the EPA-approved response actions. Additionally, GE shall evaluate the appropriateness of modifications to or, if warranted, discontinuance of the groundwater monitoring program consistent with the requirements of this Attachment. GE shall also comply with all other requirements of Section 7.2.2.

Each of the RAAs included in the "baseline" monitoring assessment shall remain in its respective GMA for long-term monitoring unless and until the available groundwater data for that RAA demonstrate that the concentrations of dissolved-phase constituents in groundwater are below the applicable Performance Standards, and other reasons do not exist for retaining that RAA in the program (e.g., the presence of NAPL or constituent concentrations exceeding the Performance Standards in upgradient groundwater).

TECHNICAL ATTACHMENT H

GROUNDWATER/ NAPL MONITORING, ASSESSMENT, AND RESPONSE PROGRAMS

GE may discontinue long-term monitoring at particular wells within any GMA, subject to approval by EPA, if the following criteria are met: (1) Long-term monitoring at particular sentinel wells may be discontinued if the results of four consecutive groundwater monitoring events show no exceedances of the relevant Performance Standards. (2) Long-term monitoring at particular perimeter wells may be discontinued if the results of four consecutive groundwater monitoring events show no exceedances of the applicable Performance Standards and other reasons do not exist for retaining such wells in the Long-Term Monitoring Program (e.g., the presence of NAPL or constituent concentrations exceeding the applicable Performance Standards in upgradient groundwater).

GE shall continue the Long-Term Monitoring Program for each GMA, with any modifications approved by EPA, until such time as the data indicate that the applicable Performance Standards have been consistently achieved at that GMA and other reasons do not exist for continuing long-term groundwater monitoring at that GMA (e.g., the presence of NAPL or constituent concentrations exceeding the applicable Performance Standards in upgradient groundwater).

Finally, it should be noted that the foregoing evaluations and criteria for discontinuance of the groundwater monitoring program are separate from those governing continued operation of the active groundwater extraction and treatment operations at certain RAAs, which are intended primarily to facilitate the recovery of NAPLs from the subsurface soils. As discussed in Section 4.2, GE shall continue to operate its NAPL recovery system(s) at a given RAA until GE demonstrates and EPA determines that the NAPL Performance Standards set forth in Section 4.2 have been achieved in that area. In addition, to the extent that such systems include groundwater extraction/treatment at perimeter areas, GE shall continue to operate the groundwater extraction/treatment component of such systems at those areas until the applicable groundwater quality Performance Standards have been achieved at such areas, unless GE demonstrates, and EPA concurs, that continued operation of the groundwater recovery/treatment system is no longer appropriate.

7.4 Long-Term Monitoring Program Reports

7.4.1 Monitoring Event Evaluation Reports

Within 60 days of completion of each long-term groundwater monitoring event, GE shall prepare and submit to EPA a Monitoring Event Evaluation Report that provides all the information required by Section 7.2.1. GE shall also provide an electronic submittal of the analytical and locational data for the round being reported in a format compatible for entry into an ArcInfo GIS System.

7.4.2 Long-Term Trend Evaluation Reports

Within 75 days of completion of each long-term trend evaluation period, GE shall prepare and submit to EPA a Long-Term Trend Evaluation Report that provides all the information required by Section 7.2.2.

TABLE H-1

GROUNDWATER MANAGEMENT AREA AND
REMEDIAL ACTION AREA MATRIX

Groundwater Management Area (GMA) Number	GMA Name	RAA No.	Removal Action Area (RAA)
1	Plant Site 1	1	40s Complex
		2	30s Complex
		3	20s Complex
		4	East Street Area 2 - South
		5	East Street Area 2 - North
		6	East Street Area 1 - North
		13	Lyman Street Area
		14	Newell Street Area II
		15	Newell Street Area I
		18	Silver Lake Area
		19	East Street Area 1 - South (Groundwater Only)
2	Former Oxbows J and K	15	Former Oxbow J
		15	Former Oxbow K
3	Plant Site 2	10	Unkamet Brook Area (east of Plastics Ave.)
4	Plant Site 3	7	Hill 78 Consolidation Area
		8	Building 71 Consolidation Area
		9	New York Avenue/Merrill Road Consolidation Area
		10	Hill 78 Area - Remainder
		11	Unkamet Brook Area (west of Plastics Ave.)
5	Former Oxbows A and C	12	Former Oxbow A
		12	Former Oxbow C

Note:

RAAs include soil/sediment and any migration area.

TABLE H-2

BASELINE MONITORING SCHEDULE

Submittal of Baseline Monitoring Program Proposal	Baseline Monitoring Program Proposal for GMA No.1 (Plant Site 1) shall be submitted within 180 days of lodging of Consent Decree. Baseline Monitoring Program Proposal for GMA No. 5 (Former Oxbows A and C) shall be submitted within 60 days of entry of Consent Decree. Baseline Monitoring Program Proposals for GMA Nos. 2, 3, and 4 shall be submitted at subsequent sequential 60-day intervals.
Initiation of Field Portion of Baseline Monitoring Program	For GMA No. 1, within 60 days of entry of Consent Decree or 60 days of EPA approval of Baseline Monitoring Program Proposal, whichever is later. For each other GMA, within 60 days of EPA approval of Baseline Monitoring Program Proposal for that GMA.
Duration of Baseline Monitoring Program	2 years for each GMA.
Number of Groundwater Elevation Monitoring Rounds for Baseline Monitoring Program	Minimum of 8 monitoring rounds, collected quarterly, for each GMA, or as otherwise proposed by GE and approved by EPA.
Number of Groundwater Sampling Rounds for Baseline Monitoring Program	Minimum of 4 sampling rounds, collected to assess seasonal variations, for each GMA, or as otherwise proposed by GE and approved by EPA
Submittal of Baseline Assessment Interim Reports	Within 60 days of the conclusion of each semi-annual groundwater sampling round, for each GMA.

SUPPLEMENTAL TABLE I

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF EXISTING GROUNDWATER MONITORING PROGRAMS

WELL ID	REMOVAL ACTION AREA	CURRENT MONITORING PROGRAMS			
		SEMI-ANNUAL SAMPLING	SEMI-ANNUAL MONITORING	QUARTERLY MONITORING	WEEKLY-MONTHLY MONITORING
002A	Unkamet Brook Area	X			
016A	Unkamet Brook Area	X			
016B	Unkamet Brook Area	X			
016C	Unkamet Brook Area	X			
016E	Unkamet Brook Area	X			
039B	Unkamet Brook Area	X			
039D	Unkamet Brook Area	X			
039E	Unkamet Brook Area	X			
089A	Unkamet Brook Area	X			
089B	Unkamet Brook Area	X			
089D	Unkamet Brook Area	X			
090A	Unkamet Brook Area	X			
090B	Unkamet Brook Area	X			
095A	Unkamet Brook Area	X			
095B	Unkamet Brook Area	X			
095C	Unkamet Brook Area	X			
111A	Unkamet Brook Area	X			
111B	Unkamet Brook Area	X			
114A	Unkamet Brook Area	X			
114B	Unkamet Brook Area	X			
114C	Unkamet Brook Area	X			
115A	Unkamet Brook Area	X			
115B	Unkamet Brook Area	X			
34B	Unkamet Brook Area				X
35B	Unkamet Brook Area				X
51-05	Unkamet Brook Area				X
51-06	Unkamet Brook Area				X
51-07	Unkamet Brook Area				X
51-08	Unkamet Brook Area				X
51-09	Unkamet Brook Area				X
51-11	Unkamet Brook Area				X
51-12	Unkamet Brook Area				X
51-13	Unkamet Brook Area				X
51-14	Unkamet Brook Area				X
51-15	Unkamet Brook Area				X
51-16	Unkamet Brook Area				X
51-17	Unkamet Brook Area				X
51-18	Unkamet Brook Area				X
51-19	Unkamet Brook Area				X
51-21	Unkamet Brook Area				X
59-01	Unkamet Brook Area				X
59-03	Unkamet Brook Area				X
59-07	Unkamet Brook Area				X
UB-MW-10	Unkamet Brook Area				X
UB-MW-9	Unkamet Brook Area				X
UB-PZ-1	Unkamet Brook Area				X
UB-PZ-2	Unkamet Brook Area				X

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GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF EXISTING GROUNDWATER MONITORING PROGRAMS

WELL ID	REMOVAL ACTION AREA	CURRENT MONITORING PROGRAMS			
		SEMI-ANNUAL SAMPLING	SEMI-ANNUAL MONITORING	QUARTERLY MONITORING	WEEKLY-MONTHLY MONITORING
UB-PZ-3	Unkamet Brook Area				X
6	MCP East Street Area 1		X		
8	MCP East Street Area 1		X		
25	MCP East Street Area 1		X		
30	MCP East Street Area 1		X		
31	MCP East Street Area 1		X		
32	MCP East Street Area 1		X		
33	MCP East Street Area 1		X		
34	MCP East Street Area 1		X		X
35	MCP East Street Area 1		X		
45	MCP East Street Area 1		X		
46	MCP East Street Area 1		X		
47	MCP East Street Area 1		X		
49	MCP East Street Area 1		X		
52	MCP East Street Area 1		X		X
53	MCP East Street Area 1		X		
56	MCP East Street Area 1		X		
57	MCP East Street Area 1		X		
60	MCP East Street Area 1		X		
72	MCP East Street Area 1		X		X
74	MCP East Street Area 1		X		
75	MCP East Street Area 1		X		
76	MCP East Street Area 1		X		
77	MCP East Street Area 1		X		
78	MCP East Street Area 1		X		
79	MCP East Street Area 1		X		
80	MCP East Street Area 1		X		
89	MCP East Street Area 1		X		
97	MCP East Street Area 1		X		
103	MCP East Street Area 1		X		
105	MCP East Street Area 1		X		X
106	MCP East Street Area 1		X		X
107	MCP East Street Area 1		X		
108A	MCP East Street Area 1		X		
109A	MCP East Street Area 1		X		
118	MCP East Street Area 1		X		
119	MCP East Street Area 1		X		
120	MCP East Street Area 1		X		
125	MCP East Street Area 1		X		
127	MCP East Street Area 1		X		
128	MCP East Street Area 1		X		
130	MCP East Street Area 1		X		
131	MCP East Street Area 1		X		X
138	MCP East Street Area 1		X		
140	MCP East Street Area 1		X		
141	MCP East Street Area 1		X		
Caisson-North	MCP East Street Area 1		X		X

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		SEMI-ANNUAL SAMPLING	SEMI-ANNUAL MONITORING	QUARTERLY MONITORING	WEEKLY-MONTHLY MONITORING
Caisson-South	MCP East Street Area 1		X		X
ES1-01	MCP East Street Area 1		X		
ES1-04	MCP East Street Area 1		X		
ES1-05	MCP East Street Area 1		X		
ES1-06	MCP East Street Area 1		X		
ES1-07	MCP East Street Area 1		X		
ES1-08	MCP East Street Area 1		X		
ES1-09	MCP East Street Area 1		X		
ES1-10	MCP East Street Area 1		X		
ES1-11	MCP East Street Area 1		X		
ES1-12	MCP East Street Area 1		X		
ES1-13	MCP East Street Area 1		X		
ES1-14	MCP East Street Area 1		X		
ES1-18	MCP East Street Area 1		X		
ES1-19	MCP East Street Area 1		X		
ES1-20	MCP East Street Area 1		X		
ES1-21	MCP East Street Area 1		X		
ES1-22	MCP East Street Area 1		X		
ES1-23	MCP East Street Area 1		X		
ES1-24	MCP East Street Area 1		X		
ES1-25	MCP East Street Area 1		X		
ES1-27	MCP East Street Area 1		X		
ES1-29	MCP East Street Area 1		X		
RF-13	MCP East Street Area 1		X		
2	MCP East Street Area 2		X		X
6	MCP East Street Area 2		X		X
8	MCP East Street Area 2		X		X
10	MCP East Street Area 2		X		
13	MCP East Street Area 2		X		X
14	MCP East Street Area 2		X		X
18	MCP East Street Area 2		X		
19	MCP East Street Area 2		X		
21	MCP East Street Area 2		X		
22	MCP East Street Area 2	X	X		
25	MCP East Street Area 2		X		
26	MCP East Street Area 2		X		
27	MCP East Street Area 2		X		
28	MCP East Street Area 2		X		X
29	MCP East Street Area 2		X		X
31	MCP East Street Area 2		X		
32	MCP East Street Area 2		X		X
34	MCP East Street Area 2		X		
35	MCP East Street Area 2		X		X
36	MCP East Street Area 2		X		X
37	MCP East Street Area 2		X		X
38	MCP East Street Area 2		X		X
39	MCP East Street Area 2		X		

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SUMMARY OF EXISTING GROUNDWATER MONITORING PROGRAMS

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		SEMI-ANNUAL SAMPLING	SEMI-ANNUAL MONITORING	QUARTERLY MONITORING	WEEKLY-MONTHLY MONITORING
42	MCP East Street Area 2		X		X
43	MCP East Street Area 2	X	X		X
44	MCP East Street Area 2	X	X		X
47	MCP East Street Area 2				X
48	MCP East Street Area 2		X		X
50	MCP East Street Area 2		X		X
51	MCP East Street Area 2		X		X
52	MCP East Street Area 2		X		
53	MCP East Street Area 2		X		X
54	MCP East Street Area 2		X		X
55	MCP East Street Area 2		X		X
56	MCP East Street Area 2		X		X
57	MCP East Street Area 2		X		X
58	MCP East Street Area 2		X		X
59	MCP East Street Area 2		X		X
60	MCP East Street Area 2		X		
61	MCP East Street Area 2		X		
62	MCP East Street Area 2		X		
63	MCP East Street Area 2		X		X
64	MCP East Street Area 2		X		X
65	MCP East Street Area 2		X		
66	MCP East Street Area 2		X		X
01R	MCP East Street Area 2		X		
05A	MCP East Street Area 2		X		
09R	MCP East Street Area 2		X		
11R	MCP East Street Area 2		X		
15R	MCP East Street Area 2		X		X
16R	MCP East Street Area 2		X		
17A	MCP East Street Area 2		X		
17C	MCP East Street Area 2		X		
17R	MCP East Street Area 2		X		
02-N	MCP East Street Area 2		X		
05-N	MCP East Street Area 2		X		X
06-N	MCP East Street Area 2		X		
09-N	MCP East Street Area 2		X		
11-N	MCP East Street Area 2		X		
13-N	MCP East Street Area 2		X		
14-N	MCP East Street Area 2		X		
16-N	MCP East Street Area 2		X		
17-N	MCP East Street Area 2		X		
19-N	MCP East Street Area 2		X		
20-N	MCP East Street Area 2		X		
21-N	MCP East Street Area 2		X		
22-N	MCP East Street Area 2		X		
23-N	MCP East Street Area 2		X		
24-N	MCP East Street Area 2		X		
27-N	MCP East Street Area 2		X		

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		SEMI-ANNUAL SAMPLING	SEMI-ANNUAL MONITORING	QUARTERLY MONITORING	WEEKLY-MONTHLY MONITORING
31-N	MCP East Street Area 2		X		
3-6C-EB-25	MCP East Street Area 2				X
3-6C-EB-26	MCP East Street Area 2				X
3-6C-EB-28	MCP East Street Area 2				X
3-6C-EB-29	MCP East Street Area 2				X
40R	MCP East Street Area 2		X		X
49R	MCP East Street Area 2		X		X
49RR	MCP East Street Area 2		X		X
64R	MCP East Street Area 2		X		X
64S	MCP East Street Area 2		X		X
64S2	MCP East Street Area 2		X		X
64V	MCP East Street Area 2		X		X
64X (N)	MCP East Street Area 2		X		X
64X (S)	MCP East Street Area 2		X		X
64X (W)	MCP East Street Area 2		X		X
95-01	MCP East Street Area 2		X		
95-02	MCP East Street Area 2		X		
95-04	MCP East Street Area 2		X		
95-05	MCP East Street Area 2		X		
95-06	MCP East Street Area 2		X		
95-07	MCP East Street Area 2		X		
95-09	MCP East Street Area 2		X		
95-12	MCP East Street Area 2		X		
95-15	MCP East Street Area 2		X		
95-16	MCP East Street Area 2		X		
95-17	MCP East Street Area 2		X		
95-19	MCP East Street Area 2		X		
95-20	MCP East Street Area 2		X		
95-23	MCP East Street Area 2		X		
95-25	MCP East Street Area 2		X		
A7	MCP East Street Area 2		X		
C1	MCP East Street Area 2		X		
C60	MCP East Street Area 2		X		
CC	MCP East Street Area 2		X		
Eastern Caisson	MCP East Street Area 2		X		
EE	MCP East Street Area 2		X		
ES2-01	MCP East Street Area 2				X
ES2-02A	MCP East Street Area 2		X		X
ES2-04	MCP East Street Area 2		X		
ES2-05	MCP East Street Area 2		X		
ES2-06	MCP East Street Area 2		X		X
ES2-07	MCP East Street Area 2				X
ES2-08	MCP East Street Area 2		X		
ES2-09	MCP East Street Area 2		X		
ES2-10	MCP East Street Area 2		X		
ES2-11	MCP East Street Area 2		X		
ES2-12	MCP East Street Area 2		X		

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WELL ID	REMOVAL ACTION AREA	CURRENT MONITORING PROGRAMS			
		SEMI-ANNUAL SAMPLING	SEMI-ANNUAL MONITORING	QUARTERLY MONITORING	WEEKLY-MONTHLY MONITORING
ES2-14	MCP East Street Area 2		X		
ES2-15	MCP East Street Area 2		X		
ES2-16	MCP East Street Area 2		X		
ES2-17	MCP East Street Area 2		X		X
ES2-18	MCP East Street Area 2		X		
ES2-19	MCP East Street Area 2		X		
E2SC-03I	MCP East Street Area 2				X
E2SC-17	MCP East Street Area 2				X
E2SC-21	MCP East Street Area 2		X		
E2SC-22	MCP East Street Area 2		X		
E2SC-23	MCP East Street Area 2				X
E2SC-24	MCP East Street Area 2				X
FF	MCP East Street Area 2		X		
GG	MCP East Street Area 2		X		
HH	MCP East Street Area 2		X		
J	MCP East Street Area 2		X		
JJ	MCP East Street Area 2		X		
K	MCP East Street Area 2		X		
KK	MCP East Street Area 2		X		
LL	MCP East Street Area 2		X		
MM	MCP East Street Area 2		X		
N-R	MCP East Street Area 2		X		
NN	MCP East Street Area 2		X		
O-R	MCP East Street Area 2		X		
OO	MCP East Street Area 2		X		
P1	MCP East Street Area 2		X		
P2	MCP East Street Area 2		X		
P3	MCP East Street Area 2		X		X
P3D	MCP East Street Area 2		X		X
P4	MCP East Street Area 2		X		
P5	MCP East Street Area 2		X		
P6	MCP East Street Area 2	X	X		
P7	MCP East Street Area 2		X		X
PP	MCP East Street Area 2		X		
PZ-1S	MCP East Street Area 2				X
PZ-2S	MCP East Street Area 2				X
PZ-4S	MCP East Street Area 2				X
PZ-5S	MCP East Street Area 2				X
PZ-6S	MCP East Street Area 2				X
QQ	MCP East Street Area 2		X		
R	MCP East Street Area 2		X		
RB-01	MCP East Street Area 2				X
RF-01	MCP East Street Area 2		X		
RF-02	MCP East Street Area 2		X		
RF-03	MCP East Street Area 2		X		
RF-04	MCP East Street Area 2		X		
RF-16	MCP East Street Area 2		X		
RW-1(S)	MCP East Street Area 2		X		X
RW-1(x)	MCP East Street Area 2		X		X

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WELL ID	REMOVAL ACTION AREA	CURRENT MONITORING PROGRAMS			
		SEMI-ANNUAL SAMPLING	SEMI-ANNUAL MONITORING	QUARTERLY MONITORING	WEEKLY-MONTHLY MONITORING
RW-2(x)	MCP East Street Area 2		X		X
TMP-1	MCP East Street Area 2				X
U	MCP East Street Area 2		X		
UU-R	MCP East Street Area 2		X		
WP-01	MCP East Street Area 2				X
WP-02	MCP East Street Area 2				X
WP-03	MCP East Street Area 2				X
WP-04	MCP East Street Area 2				X
WP-05	MCP East Street Area 2				X
WP-06	MCP East Street Area 2				X
WP-13	MCP East Street Area 2				X
Y	MCP East Street Area 2		X		
E-01	Lyman Street Area			X	
E-03	Lyman Street Area			X	
E-04	Lyman Street Area			X	
E-07	Lyman Street Area			X	
LS-02	Lyman Street Area			X	X
LS-04	Lyman Street Area				X
LS-10	Lyman Street Area			X	
LS-11	Lyman Street Area				X
LS-12	Lyman Street Area				X
LS-13	Lyman Street Area			X	
LS-20	Lyman Street Area				X
LS-21	Lyman Street Area				X
LS-23	Lyman Street Area				X
LS-24	Lyman Street Area				X
LS-25	Lyman Street Area			X	
LS-28	Lyman Street Area			X	
LS-29	Lyman Street Area			X	
LS-30	Lyman Street Area				X
LS-31	Lyman Street Area				X
LS-32	Lyman Street Area				X
LS-33	Lyman Street Area				X
LS-34	Lyman Street Area				X
LS-35	Lyman Street Area				X
LS-36	Lyman Street Area			X	
LS-37	Lyman Street Area			X	
LS-38	Lyman Street Area				X
LS-41	Lyman Street Area				X
LS-43	Lyman Street Area				X
LS-44	Lyman Street Area				X
LS-45	Lyman Street Area				X
LSSC-06	Lyman Street Area				X
LSSC-07	Lyman Street Area				X
LSSC-8S	Lyman Street Area				X
LSSC-16I	Lyman Street Area				X
LSSC-18	Lyman Street Area				X

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SUPPLEMENTAL TABLE I

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF EXISTING GROUNDWATER MONITORING PROGRAMS

WELL ID	REMOVAL ACTION AREA	CURRENT MONITORING PROGRAMS			
		SEMI-ANNUAL SAMPLING	SEMI-ANNUAL MONITORING	QUARTERLY MONITORING	WEEKLY-MONTHLY MONITORING
P-1	Lyman Street Area				X
P-2	Lyman Street Area				X
P-3	Lyman Street Area				X
P-4	Lyman Street Area				X
P-5	Lyman Street Area				X
P-6	Lyman Street Area				X
P-7	Lyman Street Area				X
RW-1(R)	Lyman Street Area				X
RW-2	Lyman Street Area				X
RW-3	Lyman Street Area				X
MW-1D	Newell Street Area II				X
MW-1S	Newell Street Area II				X
NS-01	Newell Street Area II			X	
NS-10	Newell Street Area II				X
NS-11	Newell Street Area II			X	
NS-15	Newell Street Area II				X
NS-16	Newell Street Area II			X	
NS-17	Newell Street Area II			X	
NS-18	Newell Street Area II			X	
NS-19	Newell Street Area II			X	
NS-20	Newell Street Area II			X	
NS-21	Newell Street Area II			X	
NS-23	Newell Street Area II			X	
NS-30	Newell Street Area II				X
NS-31	Newell Street Area II				X
NS-32	Newell Street Area II				X
NS-33	Newell Street Area II				X
NS-34	Newell Street Area II				X
NS-35	Newell Street Area II				X
NS-36	Newell Street Area II				X
NS-37	Newell Street Area II				X
N2SC-01I	Newell Street Area II				X
N2SC-02	Newell Street Area II				X
N2SC-03I	Newell Street Area II				X
N2SC-03S	Newell Street Area II				X
N2SC-07	Newell Street Area II				X
N2SC-08	Newell Street Area II				X
N2SC-09I	Newell Street Area II				X
N2SC-09S	Newell Street Area II				X
N2SC-11	Newell Street Area II				X
N2SC-12	Newell Street Area II				X
H78B-8	Hill 78 Area				X
H78B-8R	Hill 78 Area				X
OPCA-MW-2	Hill 78 Area				X
OPCA-MW-3	Hill 78 Area				X

Notes:

1. In East Street Area 2, semi-annual groundwater sampling is conducted at wells 22, 43, 44, and P-6 as a part of monitoring activities associated with the groundwater recharge pond.

SUPPLEMENTAL TABLE II

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF PROPOSED GROUNDWATER MONITORING WELL NETWORK

WELL ID	REMOVAL ACTION AREA NUMBER	MONITORING WELL TYPE	APPLICABLE GROUNDWATER PERFORMANCE STANDARD	RATIONALE	DEPTH TO TOP OF SCREEN (Feet BGS)	SCREEN LENGTH (Feet)	SCREEN INTERVAL ELEVATION (Feet AMSL)	APPROXIMATE GROUNDWATER ELEVATION (Feet AMSL)
GMA 1 - PLANT SITE 1								
RF-4	1	Perimeter	GW-2/GW-3	Upgradient perimeter	10	15	1002.2-987.2	997
RF-2	2	Perimeter	GW-3	Downgradient perimeter near Silver Lake	3	15	980.2-965.2	977
RF-3	2	Perimeter	GW-3	Downgradient perimeter near Silver Lake	3	15	982.7967.7	976
PROP-17	2	Sentinel	GW-3	Deeper well paired with RF-3	-	-	-	-
RF-16	2	Perimeter	GW-3	Downgradient perimeter near Silver Lake	7	15	981.15-966.15	979
ES2-19	2	Sentinel	GW-2	Upgradient of 30s Complex	11.5	8	995.7-987.7	995
PROP-18	2	Sentinel	GW-3	Proposed sentinel between 30s and 40s Complexes	-	-	-	-
PROP-11	2	Sentinel	GW-2	Proposed sentinel between 30s and 60s Complexes	-	-	-	-
PROP-16	2	Sentinel	GW-2	Proposed sentinel in 30s Complex	-	-	-	-
95-23	3	Sentinel	GW-3	Sentinel downgradient of 20s Complex	10	10	989.03-979.03	988
U	3	Sentinel	GW-3	Sentinel downgradient of LNAPL area	4	25	994.9-969.9	980
64	4	Perimeter	GW-3	Downgradient perimeter	7	15	978.0-963.0	973
3-6C-EB-14	4	Perimeter	GW-3	Downgradient perimeter	12	9.5	972.68-963.18	973
3-6C-EB-29	4	Perimeter	GW-3	Downgradient perimeter	4.8	14.5	978.1-963.6	973

See Notes on Page 10.

SUPPLEMENTAL TABLE II

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF PROPOSED GROUNDWATER MONITORING WELL NETWORK

WELL ID	REMOVAL ACTION AREA NUMBER	MONITORING WELL TYPE	APPLICABLE GROUNDWATER PERFORMANCE STANDARD	RATIONALE	DEPTH TO TOP OF SCREEN (Feet BGS)	SCREEN LENGTH (Feet)	SCREEN INTERVAL ELEVATION (Feet AMSL)	APPROXIMATE GROUNDWATER ELEVATION (Feet AMSL)
GMA 1 - PLANT SITE 1 (continued)								
ES2-2	4	Perimeter	GW-3	Downgradient perimeter	20	10	960.9-950.9	973
ES2-3	4	Perimeter	GW-3	Downgradient perimeter	18	10	966.7-956.7	973
ES2-8	4	Perimeter	GW-3	Downgradient perimeter	10	15	985.3-970.3	975
E2SC-23	4	Perimeter	GW-3	Downgradient perimeter near edge of sheetpile (formerly PROP-12)	9	10	981.1-971.1	974
E2SC-24	4	Perimeter	GW-3	Downgradient perimeter near edge of sheetpile (formerly PROP-12)	9	10	977.0-967.0	972
95-9	4	Sentinel	GW-3	Downgradient of plant	15	10	980.27-970.27	978
95-25	4	Sentinel	GW-2	Sentinel in 60s Complex	8	10	977.12-967.12	975
ES2-5	4	Sentinel	GW-3	Sentinel in 60s Complex, downgradient of NAPL area	9	15	981.8-966.8	974
ES2-17	4	Sentinel	GW-3	Sentinel downgradient of NAPL Area	11	10	975-965	974
17A	5	Perimeter	GW-2	Upgradient perimeter near Bldg. 17	5	15	1019-1004	1016
ES1-6	5	Perimeter	GW-3	Downgradient perimeter	18	10	974.6-964.6	981
ES1-18	5	Perimeter	GW-2	Upgradient perimeter near Bldg. 14	4	10	1045.8-1035.8	1042
ES1-20	5	Perimeter	GW-3	Upgradient perimeter	6	10	991.8-981.8	988
11	5	Sentinel	GW-3	Sentinel downgradient of plant area	5	20	1018-998	1008

See Notes on Page 10.

SUPPLEMENTAL TABLE II

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF PROPOSED GROUNDWATER MONITORING WELL NETWORK

WELL ID	REMOVAL ACTION AREA NUMBER	MONITORING WELL TYPE	APPLICABLE GROUNDWATER PERFORMANCE STANDARD	RATIONALE	DEPTH TO TOP OF SCREEN (Feet BGS)	SCREEN LENGTH (Feet)	SCREEN INTERVAL ELEVATION (Feet AMSL)	APPROXIMATE GROUNDWATER ELEVATION (Feet AMSL)
GMA 1 - PLANT SITE 1 (continued)								
95-20	5	Sentinel	GW-2	Near several buildings	10	10	1000.83-990.83	996
ES1-10	5	Sentinel	GW-2	Near Buildings 9 and 9-G	7	10.5	1017.09-1006.59	1016
ES1-27	5	Sentinel	GW-2/GW-3	Downgradient of plant area and upgradient of commercial area	7	10	1016.4-1006.4	1009
PROP-14	5	Sentinel	GW-2	Proposed sentinel near several buildings	-	-	-	-
52	6	Sentinel	GW-2/GW-3	Along East Street near buildings	2	20	997.3-977.3	994
ES1-14	6	Sentinel	GW-2/GW-3	Along East Street near commercial/residential area	10	10	988.8-978.8	992
ES1-8	6	Sentinel	GW-2/GW-3	Near north recovery system, upgradient of residential area	5	10	996.2-986.2	996
B-1	13	Perimeter	GW-3	Downgradient perimeter	5	15	976.88-961.88	971
E-4	13	Perimeter	GW-3	Downgradient perimeter	11.6	10	974.4-964.4	973
E-7	13	Perimeter	GW-3	Downgradient of Silver Lake, upgradient of former Oxbow E	4.6	15	978.73-963.73	976
LS-28	13	Perimeter	GW-3	Downgradient of Silver Lake, upgradient of former Oxbow D	8.6	15	975-960	975
LSSC-8S	13	Perimeter	GW-3	Downgradient perimeter, near sheetpile	5	10	978.64-968.64	971
LSSC-16S	13	Sentinel	GW-2	Near building	5	10	976.71-966.71	973
MW-2	13	Sentinel	GW-2	Upgradient of former Oxbow B, near building	N/A	N/A	N/A	N/A

See Notes on Page 10.

SUPPLEMENTAL TABLE II

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF PROPOSED GROUNDWATER MONITORING WELL NETWORK

WELL ID	REMOVAL ACTION AREA NUMBER	MONITORING WELL TYPE	APPLICABLE GROUNDWATER PERFORMANCE STANDARD	RATIONALE	DEPTH TO TOP OF SCREEN (Feet BGS)	SCREEN LENGTH (Feet)	SCREEN INTERVAL ELEVATION (Feet AMSL)	APPROXIMATE GROUNDWATER ELEVATION (Feet AMSL)
GMA 1 - PLANT SITE 1 (continued)								
MW-4	13	Perimeter	GW-3	Downgradient perimeter	N/A	N/A	N/A	N/A
MW-6	13	Perimeter	GW-3	Upgradient of Lyman Street Area	N/A	N/A	N/A	N/A
PROP-9	13	Perimeter	GW-3	Proposed downgradient perimeter	-	-	-	-
LSSC-18	13	Perimeter	GW-3	Downgradient perimeter, near sheetpile	9	10	978.66-968.66	972
LS-29	13	Sentinel	GW-3	Downgradient of Silver Lake, upgradient of river	24.6	10	963.72-953.72	N/A
N2SC-7S	14	Perimeter	GW-3	Downgradient perimeter, near NAPL (proposed well)	-	-	-	-
NS-9	14	Perimeter	GW-3	Downgradient perimeter	5	15	978.2-963.2	973
NS-17	14	Perimeter	GW-3	Downgradient perimeter	6	10	976-966	973
NS-20	14	Perimeter	GW-3	Upgradient perimeter	6	10	979.6-969.6	978
NS-24	14	Perimeter	GW-3	Downgradient perimeter	8	10	976.5-966.5	973
FW-16R	15	Perimeter	GW-3	Downgradient perimeter	8	9.5	976.11-966.61	975
IA-9R	15	Perimeter	GW-3	Downgradient perimeter	7.4	9.5	977.31-967.81	974
MM-1	15	Sentinel	GW-2	Upgradient, near building	5	10	983.11-973.11	977
SZ-1	15	Perimeter	GW-2/GW-3	Upgradient perimeter, near building	6	10	979.33-969.33	977

See Notes on Page 10.

SUPPLEMENTAL TABLE II

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF PROPOSED GROUNDWATER MONITORING WELL NETWORK

WELL ID	REMOVAL ACTION AREA NUMBER	MONITORING WELL TYPE	APPLICABLE GROUNDWATER PERFORMANCE STANDARD	RATIONALE	DEPTH TO TOP OF SCREEN (Feet BGS)	SCREEN LENGTH (Feet)	SCREEN INTERVAL ELEVATION (Feet AMSL)	APPROXIMATE GROUNDWATER ELEVATION (Feet AMSL)
GMA 1 - PLANT SITE 1 (continued)								
ES1-23	19	Perimeter	GW-3	Downgradient perimeter	4	10	984.11-974.11	976
92	19	Perimeter	GW-3	Downgradient perimeter	3	18	982.6-964.6	972
139	19	Perimeter	GW-2/GW-3	Downgradient perimeter	5	10	982.13-972.13	976
GMA 2 - FORMER OXBOWS J AND K								
J-1	16	Perimeter	GW-3	Downgradient perimeter	N/A	N/A	N/A	N/A
PROP-1	16	Perimeter	GW-2/GW-3	Proposed upgradient perimeter near building	-	-	-	-
PROP-2	16	Perimeter	GW-2/GW-3	Prop. downgradient perimeter near building	-	-	-	-
PROP-3	16	Perimeter	GW-3	Proposed downgradient perimeter	-	-	-	-
PROP-4	16	Perimeter	GW-3	Proposed upgradient perimeter	-	-	-	-
GMA 3 - PLANT SITE 2								
2A	11	Natural Attenuation	-	Near former waste stabilization basin	45	5	948.11-943.11	985
6B	11	Perimeter	GW-3	Near former waste stabilization basin and Unkamet Brook	5	7	N/A	N/A
16A	11	Natural Attenuation	-	Downgradient of former waste stabilization basin (deeper cluster well)	44	6	946.95-940.95	984
16B	11	Perimeter/Nat. Atten.	GW-2	Near buildings downgradient of former waste stabilization basin	13	5	978.08-973.08	984

See Notes on Page 10.

SUPPLEMENTAL TABLE II

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF PROPOSED GROUNDWATER MONITORING WELL NETWORK

WELL ID	REMOVAL ACTION AREA NUMBER	MONITORING WELL TYPE	APPLICABLE GROUNDWATER PERFORMANCE STANDARD	RATIONALE	DEPTH TO TOP OF SCREEN (Feet BGS)	SCREEN LENGTH (Feet)	SCREEN INTERVAL ELEVATION (Feet AMSL)	APPROXIMATE GROUNDWATER ELEVATION (Feet AMSL)
GMA 3 - PLANT SITE 2 (continued)								
16C	11	Natural Attenuation	-	Downgradient of former waste stabilization basin (deeper cluster well)	91	5	899.45-894.45	985
16E	11	Natural Attenuation	-	Downgradient of former waste stabilization basin (deeper cluster well)	145	5	846.62-841.62	985
27B	11	Perimeter	GW-2/GW-3	Upgradient perimeter near Buildings 105 and 106	15	5	986.17-981.17	992
33B	11	Sentinel	GW-2	Near buildings	15	5	978.55-973.55	985
39B	11	Natural Attenuation	-	Near former waste stabilization basin	10	5	981.84-976.84	985
39D	11	Natural Attenuation	-	Near former waste stabilization basin (deeper cluster well)	56	10	936.3-926.3	985
39E	11	Natural Attenuation	-	Near former waste stabilization basin (deeper cluster well)	225	10	767.3-757.3	985
43A	11	Natural Attenuation	-	Upgradient perimeter (deeper cluster well)	45	5	947.28-942.28	988
43B	11	Perimeter/Nat. Atten.	GW-3	Upgradient perimeter	15	5	977.19-972.19	987
50B	11	Perimeter	GW-3	Upgradient perimeter	8.5	5	981.72-976.72	989
51-14	11	Sentinel	GW-2	Near Buildings 52 and 119	N/A	N/A	N/A	986
54B	11	Perimeter	GW-3	Upgradient perimeter	8.5	5	N/A	N/A
74B	11	Sentinel	GW-2	Near buildings and former interior landfill	13	5	982.75-977.75	989
78B-R	11	Perimeter	GW-3	Proposed replacement well near former landfill and Unkamet Brook	-	-	-	-

See Notes on Page 10.

SUPPLEMENTAL TABLE II

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF PROPOSED GROUNDWATER MONITORING WELL NETWORK

WELL ID	REMOVAL ACTION AREA NUMBER	MONITORING WELL TYPE	APPLICABLE GROUNDWATER PERFORMANCE STANDARD	RATIONALE	DEPTH TO TOP OF SCREEN (Feet BGS)	SCREEN LENGTH (Feet)	SCREEN INTERVAL ELEVATION (Feet AMSL)	APPROXIMATE GROUNDWATER ELEVATION (Feet AMSL)
GMA 3 - PLANT SITE 2 (continued)								
89A	11	Natural Attenuation	-	Perimeter near Unkamet Brook (deeper cluster well)	43	5	938.41-933.41	980
89B	11	Perimeter/Nat. Atten.	GW-3	Perimeter near Unkamet Brook	4	3	976.1-973.1	979
89D	11	Natural Attenuation	-	Perimeter near Unkamet Brook (deeper cluster well)	70	5	912.96-907.96	983
90A	11	Natural Attenuation	-	Downgradient perimeter (deeper cluster well)	45	5	940.71-935.71	983
90B	11	Perimeter/Nat. Atten.	GW-3	Downgradient perimeter	8	3	979.03-976.03	983
95A	11	Natural Attenuation	-	Downgradient perimeter near Unkamet Brook (deeper cluster well)	45	5	939.75-934.75	980
95B	11	Perimeter/Nat. Atten.	GW-3	Downgradient perimeter near Unkamet Brook	8	3	977.51-974.51	980
95C	11	Natural Attenuation	-	Downgradient perimeter near Unkamet Brook (deeper cluster well)	95	5	890.44-885.44	978
101B	11	Sentinel	GW-2	Shallow water near buildings	N/A	N/A	N/A	986
111A	11	Natural Attenuation	-	Downgradient perimeter (deeper cluster well)	45	5	949.55-944.55	982
111B	11	Perimeter/Nat. Atten.	GW-3	Downgradient perimeter	10	5	984.74-979.74	983
114A	11	Natural Attenuation	-	Downgradient perimeter (deeper cluster well)	45	5	938.23-933.23	980
114B	11	Perimeter/Nat. Atten.	GW-3	Downgradient perimeter	5	5	978.59-973.59	980
114C	11	Natural Attenuation	-	Downgradient perimeter (deeper cluster well)	88	5	895.74-890.74	981

See Notes on Page 10.

SUPPLEMENTAL TABLE II

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF PROPOSED GROUNDWATER MONITORING WELL NETWORK

WELL ID	REMOVAL ACTION AREA NUMBER	MONITORING WELL TYPE	APPLICABLE GROUNDWATER PERFORMANCE STANDARD	RATIONALE	DEPTH TO TOP OF SCREEN (Feet BGS)	SCREEN LENGTH (Feet)	SCREEN INTERVAL ELEVATION (Feet AMSL)	APPROXIMATE GROUNDWATER ELEVATION (Feet AMSL)
GMA 3 - PLANT SITE 2 (continued)								
OBG-2	11	Sentinel	GW-2	Near Building OP-3	3	11.4	N/A	987
UB-MW-10	11	Sentinel	GW-2	Shallow well near Buildings 51 and 59	N/A	N/A	N/A	N/A
PROP-15	11	Perimeter	GW-3	Proposed near former landfill and Unkamet Brook	-	-	-	-
GMA 4 - PLANT SITE 3								
78-1	10	Perimeter	GW-3	Upgradient perimeter	8	15	1019.4-1004.4	1020
78-2	10	Perimeter	GW-3	Upgradient perimeter	6	15	1028.9-1013.9	1028
78-3	10	Perimeter	GW-3	Downgradient perimeter	10	15	998.1-983.1	991
78-5	10	Perimeter	GW-3	Downgradient perimeter	2	15	995.8-980.8	993
78-6	10	Perimeter	GW-3	Upgradient perimeter	3	15	1010.1-995.1	1004
H78B-17	10	Perimeter	GW-3	Downgradient perimeter	14.3	10	993.3-983.3	986
NY-2	10	Perimeter	GW-3	Downgradient perimeter	9.5	15	984.01-969.01	980
NY-4	10	Perimeter	GW-3	Upgradient perimeter	17	15	1007.65-992.65	1017
H78B-15	10	Sentinel	GW-2	Near cogeneration facility	6	10	1003.8-993.8	1002
RF-14	11	Perimeter	GW-2/GW-3	Upgradient perimeter near Bldg. OP-1	7	15	984.67-969.67	N/A

See Notes on Page 10.

SUPPLEMENTAL TABLE II

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF PROPOSED GROUNDWATER MONITORING WELL NETWORK

WELL ID	REMOVAL ACTION AREA NUMBER	MONITORING WELL TYPE	APPLICABLE GROUNDWATER PERFORMANCE STANDARD	RATIONALE	DEPTH TO TOP OF SCREEN (Feet BGS)	SCREEN LENGTH (Feet)	SCREEN INTERVAL ELEVATION (Feet AMSL)	APPROXIMATE GROUNDWATER ELEVATION (Feet AMSL)
GMA 4 - PLANT SITE 3 (continued)								
RF-15	11	Perimeter	GW-2/GW-3	Downgradient perimeter near Bldg. OP-1	9	15	1002.29-987.29	N/A
60B	11	Perimeter	GW-2/GW-3	Downgradient perimeter near Bldg. OP-1	N/A	N/A	N/A	N/A
OPCA-MW-1	10	Consolidation	GW-2/GW-3	On-Plant Consolidation Area Monitoring Program near Bldg. 78	20.1	10	-	-
OPCA-MW-2	10	Consolidation	GW-3	On-Plant Consolidation Area Monitoring Program	13	10	-	-
OPCA-MW-3	10	Consolidation	GW-2/GW-3	On-Plant Consolidation Area Monitoring Program, near U.S. Generating Co.	18	10	997.3-987.3	994
OPCA-MW-4	10	Consolidation	GW-2/GW-3	On-Plant Consolidation Area Monitoring Program, near U.S. Generating Co.	12	10	1007.2-997.2	1007
OPCA-MW-5	10	Consolidation	GW-2/GW-3	On-Plant Consolidation Area Monitoring Program, near U.S. Generating Co.	9.8	10	1007.8-997.8	1004
OPCA-MW-6	10	Consolidation	GW-3	On-Plant Consolidation Area Monitoring Program	15	10	1007.7-997.7	1005
OPCA-MW-7	10	Consolidation	GW-3	On-Plant Consolidation Area Monitoring Program	14	10	1012.9-1002.9	1012
OPCA-MW-8	11	Consolidation	GW-3	On-Plant Consolidation Area Monitoring Program	13.5	10	1014.4-1004.4	1015
ASW-5	10	Water Supply	GW-3	U.S. Generating Co. water supply well monitoring program	430	16	N/A	N/A
GMA 5 - FORMER OXBOWS A AND C								
A-1	12	Perimeter	GW-3	Downgradient perimeter	9	15	975.24-960.24	N/A
PROP-5	12	Perimeter	GW-3	Proposed downgradient perimeter	-	-	-	-

See Notes on Page 10.

SUPPLEMENTAL TABLE II

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

SUMMARY OF PROPOSED GROUNDWATER MONITORING WELL NETWORK

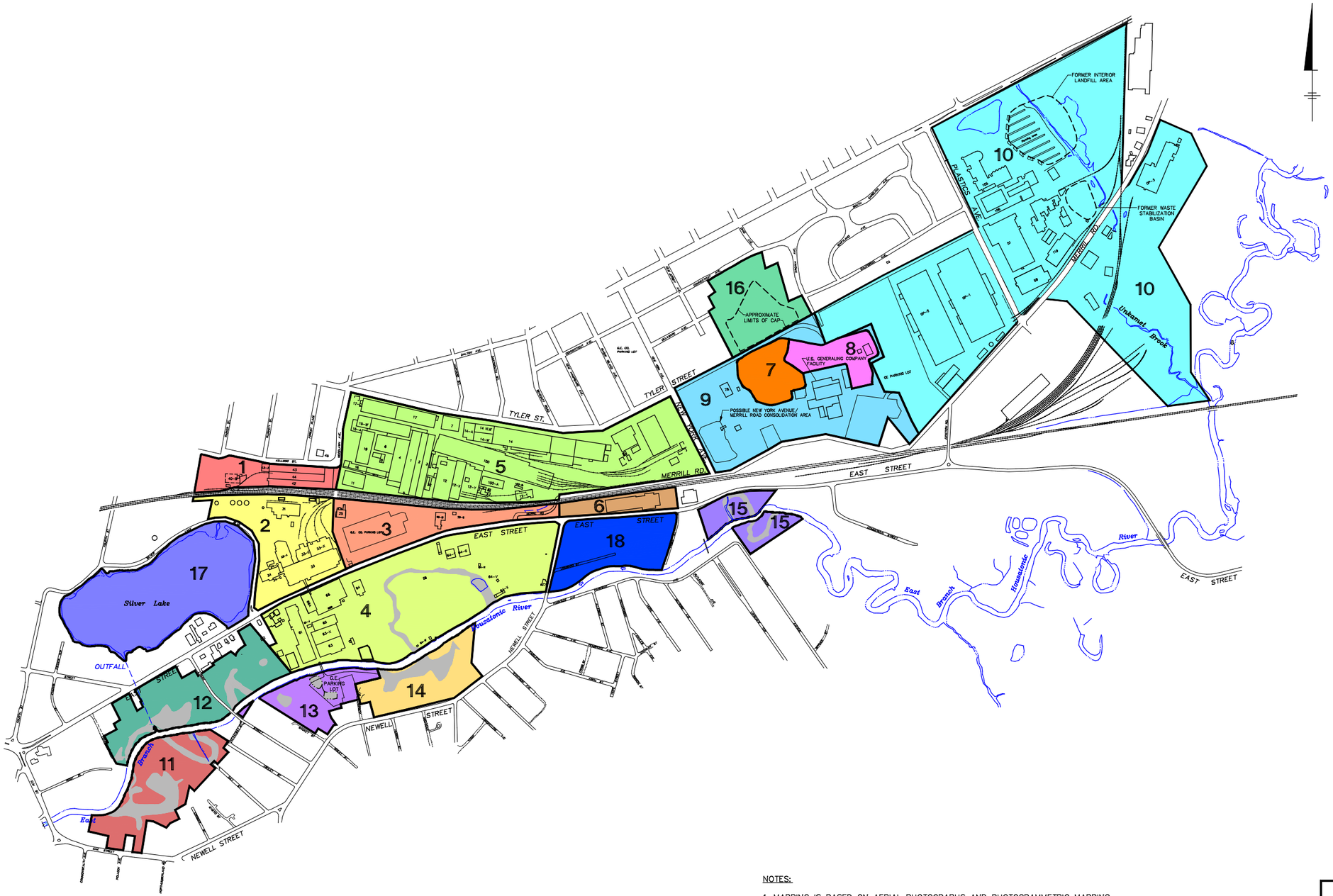
WELL ID	REMOVAL ACTION AREA NUMBER	MONITORING WELL TYPE	APPLICABLE GROUNDWATER PERFORMANCE STANDARD	RATIONALE	DEPTH TO TOP OF SCREEN (Feet BGS)	SCREEN LENGTH (Feet)	SCREEN INTERVAL ELEVATION (Feet AMSL)	APPROXIMATE GROUNDWATER ELEVATION (Feet AMSL)
GMA 5 - FORMER OXBOWS A AND C (Continued)								
PROP-6	12	Perimeter	GW-3	Proposed upgradient perimeter	-	-	-	-
PROP-7	12	Perimeter	GW-3	Proposed downgradient perimeter	-	-	-	-
PROP-8	12	Perimeter	GW-3	Proposed upgradient perimeter	-	-	-	-
A-3	12	Sentinel	GW-3	Sentinel upgradient of river	7	15	978.3-963.3	N/A
C-1	12	Sentinel	GW-3	Sentinel upgradient of river	9	15	979.1-964.1	N/A

Notes:

1. Although several natural attenuation monitoring wells (90A, 95A, 95C, 111A, 114A, and 114C) are located along the Unkamet Brook site perimeter, they are not included as perimeter compliance wells as the screen intervals in these wells are placed in the lower portion of the aquifer.
2. Approximate groundwater elevations are derived from a review of available data for the purpose of assessing well screen interval elevations. Actual groundwater elevations will vary seasonally.
3. -: Construction data not available for proposed well.
4. N/A: Information not available.
5. Semi-annual VOC monitoring program is ongoing at 21 of the 23 proposed natural attenuation monitoring wells included on this table (exception is wells 43A and 43B).
6. Removal Action Areas:

RAA 1: 40s Complex	RAA 6: East Street Area 1-North	RAA 13: Lyman Street Area
RAA 2: 30s Complex	RAA 7: Hill 78 Consolidation Area	RAA 14: Newell Street Area II
RAA 3: 20s Complex	RAA 10: Hill 78 Area - Remaining Areas	RAA 15: Newell Street Area I
RAA 4: East Street Area 2 - South	RAA 11: Unkamet Brook Area	RAA 16: Former Oxbow Areas J and K
RAA 5: East Street Area 2 - North	RAA 12: Former Oxbow Areas A and C	RAA 19: East Street Area 1-South (NAPL/Groundwater only)

7. On-Plant Consolidation Area monitoring wells and U.S. Generating Company water supply wells are subject to monitoring under separate programs. The U.S. Generating Company Wells will be monitored in accordance with their existing permit.



GENERAL ELECTRIC PLANT AREA

1 40s COMPLEX
2 30s COMPLEX
3 20s COMPLEX
4 EAST STREET AREA 2–SOUTH
5 EAST STREET AREA 2–NORTH
6 EAST STREET AREA 1–NORTH
7 HILL 78 CONSOLIDATION AREA
8 BUILDING 71 CONSOLIDATION AREA
9 HILL 78 AREA–REMAINDER
10 UNKAMET BROOK AREA

FORMER OXBOW AREAS

11 FORMER OXBOW AREAS A AND C
12 LYMAN STREET AREA
13 NEWELL STREET AREA II
14 NEWELL STREET AREA I
15 FORMER OXBOW AREAS J AND K

OTHER AREAS

16 ALLENDALE SCHOOL PROPERTY
17 SILVER LAKE AREA
18 EAST STREET AREA 1–SOUTH (NAPL/GROUNDWATER ONLY)

0 500' 1000'
APPROXIMATE SCALE

NOTES:

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. – FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY; AND BLASLAND AND BOUCK ENGINEERS, P.C. P.C. CONSTRUCTION PLANS.
2. NOT ALL PHYSICAL FEATURES SHOWN.
3. SITE BOUNDARIES/LIMITS ARE APPROXIMATE.
4. REFER TO FIGURE 1–2 FOR IDENTIFICATION OF REMOVAL ACTION AREAS RELATED TO THE HOUSATONIC RIVER FLOODPLAIN.

L: ON=*, OFF=REF
P: STD-PCP/DL
9/10/99 SYR-54-YCC GMS NES
20140001/SOWRPT/20140B08.DWG

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

REMOVAL ACTION AREAS

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
H-1

Silver Lake

EAST STREET

LYMAN

Housatonic River

E. Branch

HATHAWAY ST.

ASHLEY ST

STREET

SACKET ST

NEWELL STREET

SIBLEY ST

VERMONT ST

66A

66B

61-J

61

65

63-X

63

67

BLDG. 68

G.E. PARKING LOT

13

14

E-7 E-1 E-3 E-4

LS-37 LS-29 LS-10 LS-13 LS-36 LS-31 LS-24 LS-20 LS-25 LS-4 LS-23 LS-21 LS-11 LS-35 LS-32 LS-41 LS-2 LS-33 LS-38 LS-28 LS-30 LS-34 LS-12 LSSC-06 LSSC-7 LSSC-16I LS-43 LS-44 LSSC-8S LS-45

LSSC-18 RW-2 P-5 P-4 P-3 P-2 P-1 RW-1(R) RW-3 P-6 P-7

NS-9 NS-36 NS-37 N2SC-7 NS-31 NS-15 NS-30 NS-1 NS-32 NS-21 NS-17 NS-34 N2SC-2 N2SC-1I NS-35 NS-16 NS-11 N2SC-3S N2SC-3I NS-18 MW-1S MW-1D NS-10 NS-19 N2SC-11 N2SC-8 N2SC-9I N2SC-9S NS-33 NS-23 N2SC-12 NS-20

L: ON=*,OFF=REF
P:B02.PCP QR BSIZ.PCP
9/10/99 SYR-54-GMS JMS NES
20140001/SOWRPT/20140B06.DWG

LEGEND

- 13 — LYMAN STREET AREA RAA (INCLUDING FORMER OXBOWS B, D, AND E)
- 14 — NEWELL STREET AREA II RAA
- LS-43 — MONITORING WELL INCLUDED IN EXISTING MONITORING PROGRAMS
- RW-3 — NAPL RECOVERY WELL
- LS-12 — MEASURABLE DNAPL IN WELL
- EXTENT OF MEASURABLE LNAPL
- APPROXIMATE EXTENT OF FORMER OXBOW AREA

NOTES:

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. – FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY; AND BLASLAND & BOUCK ENGINEERS, P.C CONSTRUCTION PLANS.
2. NOT ALL PHYSICAL FEATURES SHOWN.
3. SITE BOUNDARIES/LIMITS AND WELL LOCATIONS ARE APPROXIMATE.
4. AN ADDITIONAL NAPL RECOVERY SYSTEM IS BEING CONSTRUCTED IN WELL N2SC-1I.

0 80' 160'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

GROUNDWATER MONITORING PROGRAMS
LYMAN STREET AREA
AND NEWELL STREET AREA II

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **H-2**

LEGEND

1	40s COMPLEX RAA
2	30s COMPLEX RAA
3	20s COMPLEX RAA
4	EAST STREET AREA 2 SOUTH RAA
5	EAST STREET AREA 2 NORTH RAA
70	MONITORING WELL INCLUDED IN EXISTING MONITORING PROGRAMS
RW-1R	NAPL RECOVERY WELL
28	MEASURABLE DNAPL IN WELL
	EXTENT OF MEASURABLE LNAPL
	APPROXIMATE EXTENT OF FORMER OXBOW AREA

NOTES:

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. – FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY; AND BLASLAND & BOUCK ENGINEERS, P.C CONSTRUCTION PLANS.
2. NOT ALL PHYSICAL FEATURES SHOWN.
3. SITE BOUNDARIES/LIMITS AND WELL LOCATIONS ARE APPROXIMATE.

0 160' 320'
GRAPHIC SCALE

L: ON=*,OFF=REF
P: B02.PCP OR BSIZ.PCP
9/10/99 SYR-54-GMS JMS NES
20140001/SOWRPT/20140B03.DWG

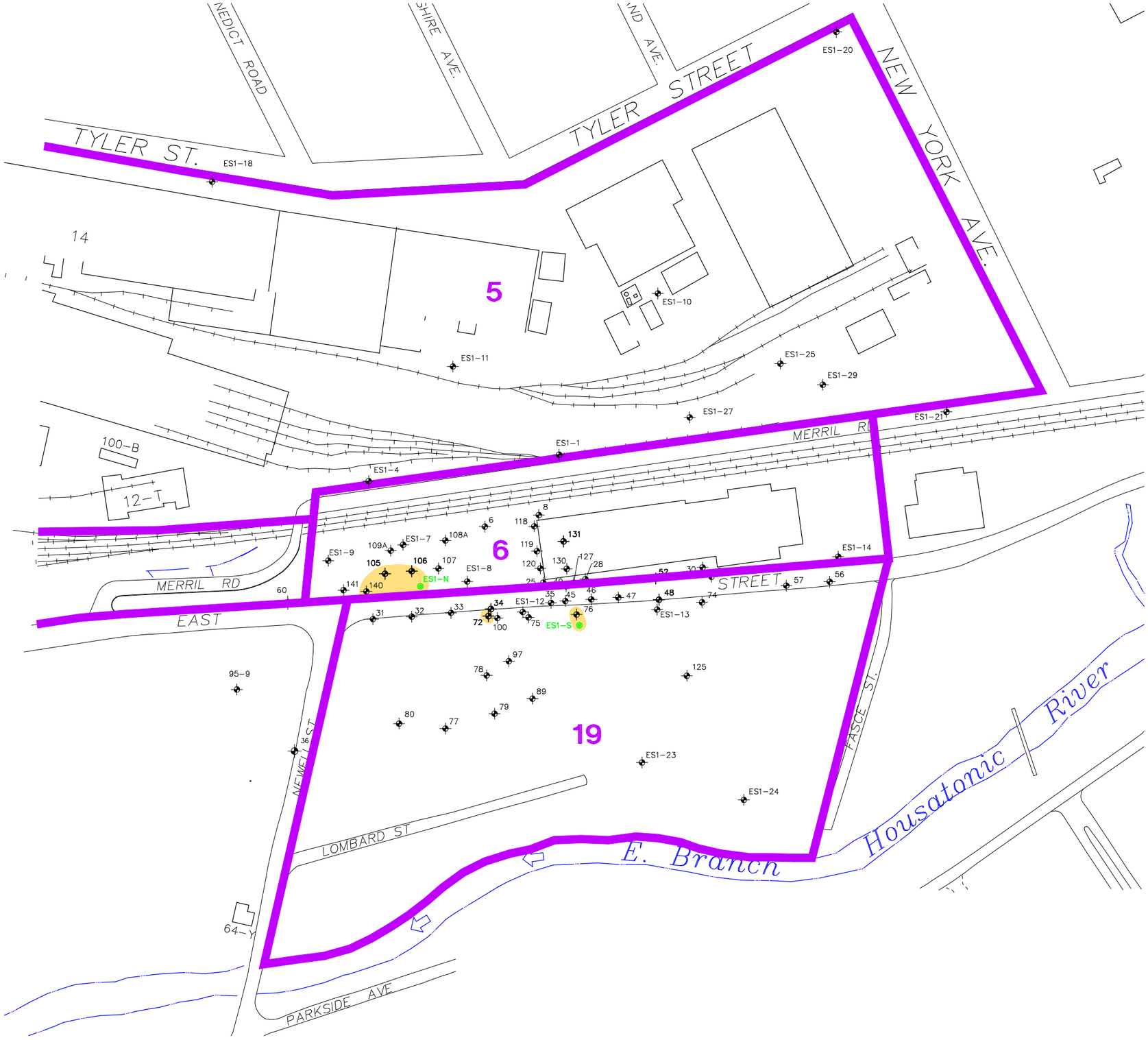
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

GROUNDWATER MONITORING PROGRAMS MCP EAST STREET AREA 2

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE
H-3



LEGEND

5	EAST STREET AREA 2 NORTH RAA
6	EAST STREET AREA 1 NORTH RAA
19	EAST STREET AREA 1 SOUTH RAA (NAPL/GROUNDWATER ONLY)
70	MONITORING WELL
RW-1R	NAPL RECOVERY WELL
	EXTENT OF MEASUREABLE LNAPL

NOTES:

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. – FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY; AND BLASLAND & BOUCK ENGINEERS, P.C CONSTRUCTION PLANS.
2. NOT ALL PHYSICAL FEATURES SHOWN.
3. SITE BOUNDARIES/LIMITS AND WELL LOCATIONS ARE APPROXIMATE.

0 100' 200'
GRAPHIC SCALE

L: ON=*,OFF=REF
P: B02.PCP OR BSIZ.PCP
9/10/99 SYR-54-GMS JMS NES
20140001/SOWRPT/20140B02.DWG

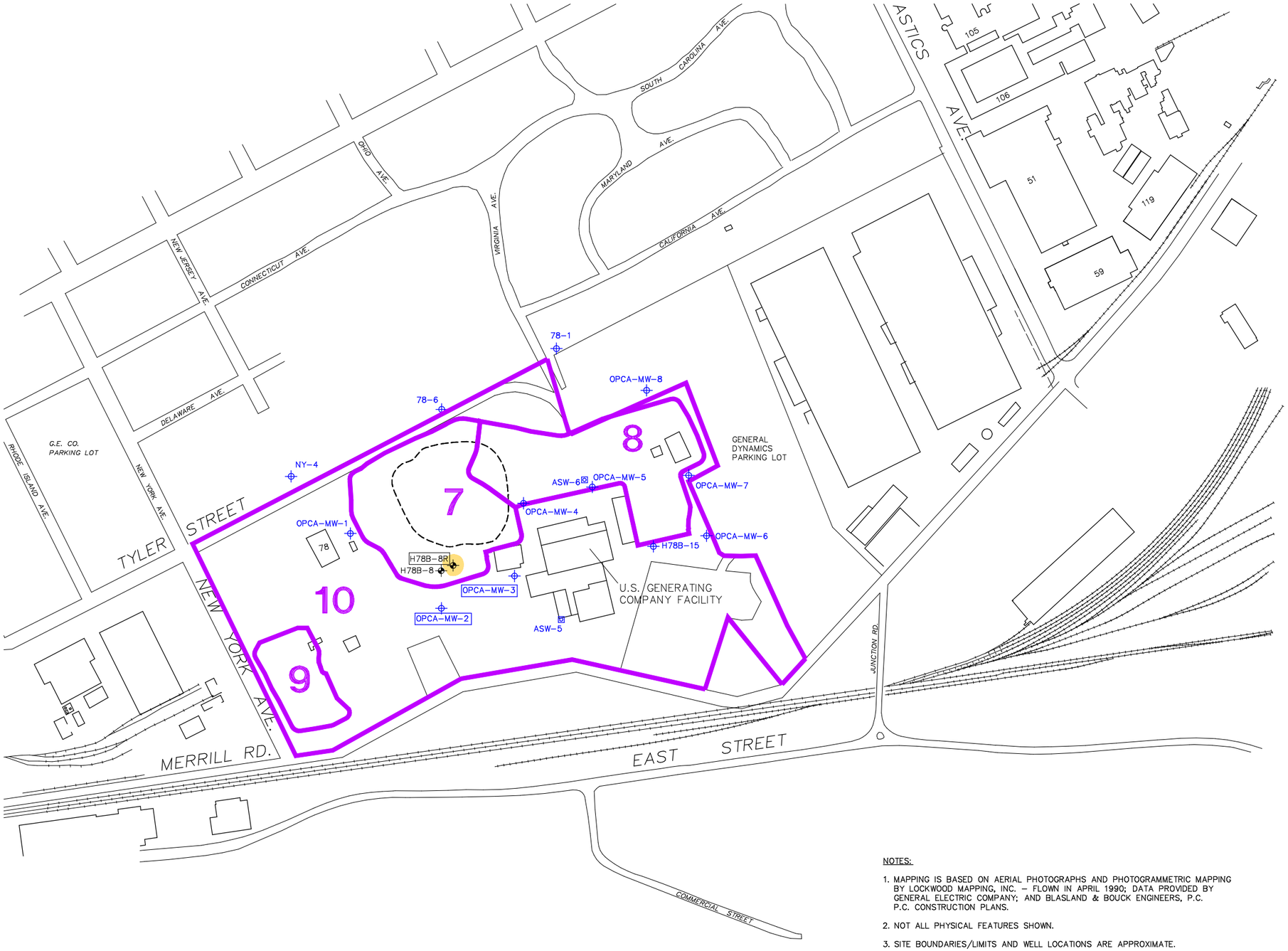
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

GROUNDWATER MONITORING PROGRAMS MCP EAST STREET AREA 1

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE H-4



NOTES:

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. – FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY; AND BLASLAND & BOUCK ENGINEERS, P.C. P.C. CONSTRUCTION PLANS.
2. NOT ALL PHYSICAL FEATURES SHOWN.
3. SITE BOUNDARIES/LIMITS AND WELL LOCATIONS ARE APPROXIMATE.

LEGEND

7	HILL 78 CONSOLIDATION AREA
8	BUILDING 71 CONSOLIDATION AREA
9	NEW YORK AVENUE/MERRILL ROAD CONSOLIDATION AREA
10	HILL 78 (REMAINDER) RAA
ASW-5	DEEP WATER SUPPLY WELL (SAMPLED BY U. S. GENERATING COMPANY)
NY-4	PROPOSED ON-PLANT CONSOLIDATION AREA MONITORING PROGRAM WELL
H78B-8R	MONITORING WELL PROPOSED FOR NAPL MONITORING PROGRAM
	EXTENT OF MEASURABLE LNAPL

NOTES:

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. – FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY; AND BLASLAND & BOUCK ENGINEERS, P.C CONSTRUCTION PLANS.
2. NOT ALL PHYSICAL FEATURES SHOWN.
3. SITE BOUNDARIES/LIMITS AND WELL LOCATIONS ARE APPROXIMATE.
4. AN ADDITIONAL NAPL RECOVERY SYSTEM IS BEING CONSTRUCTED IN WELL N2SC-11.

0 200' 400'
GRAPHIC SCALE

L: ON=*, OFF=REF
P: B01.PCP OR BSIZ.PCP
9/10/99 SYR-54-JMS GMS NES
20140001/SOWRPT/20140B01.DWG

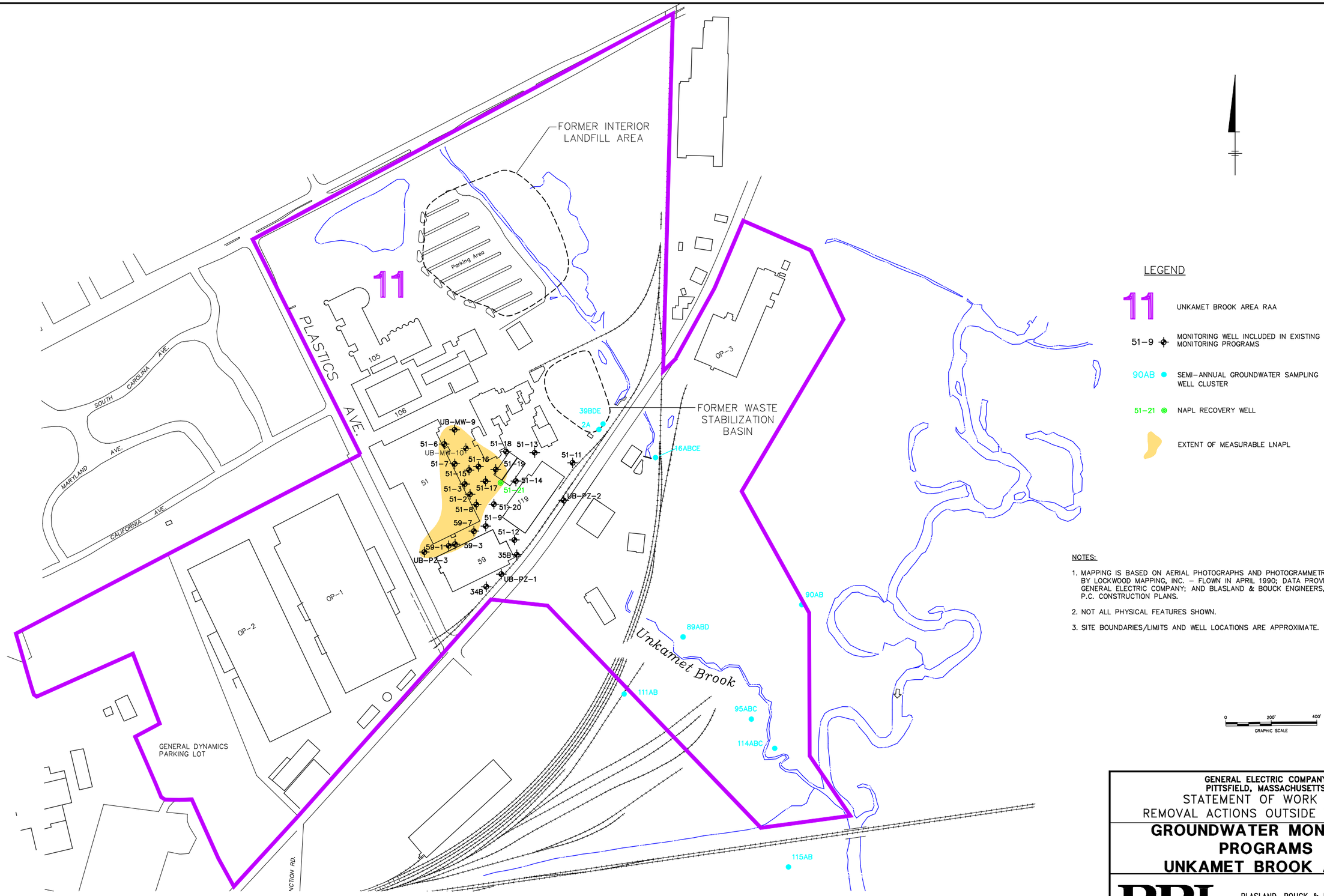
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

GROUNDWATER MONITORING PROGRAMS HILL 78 AREA

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
H-5



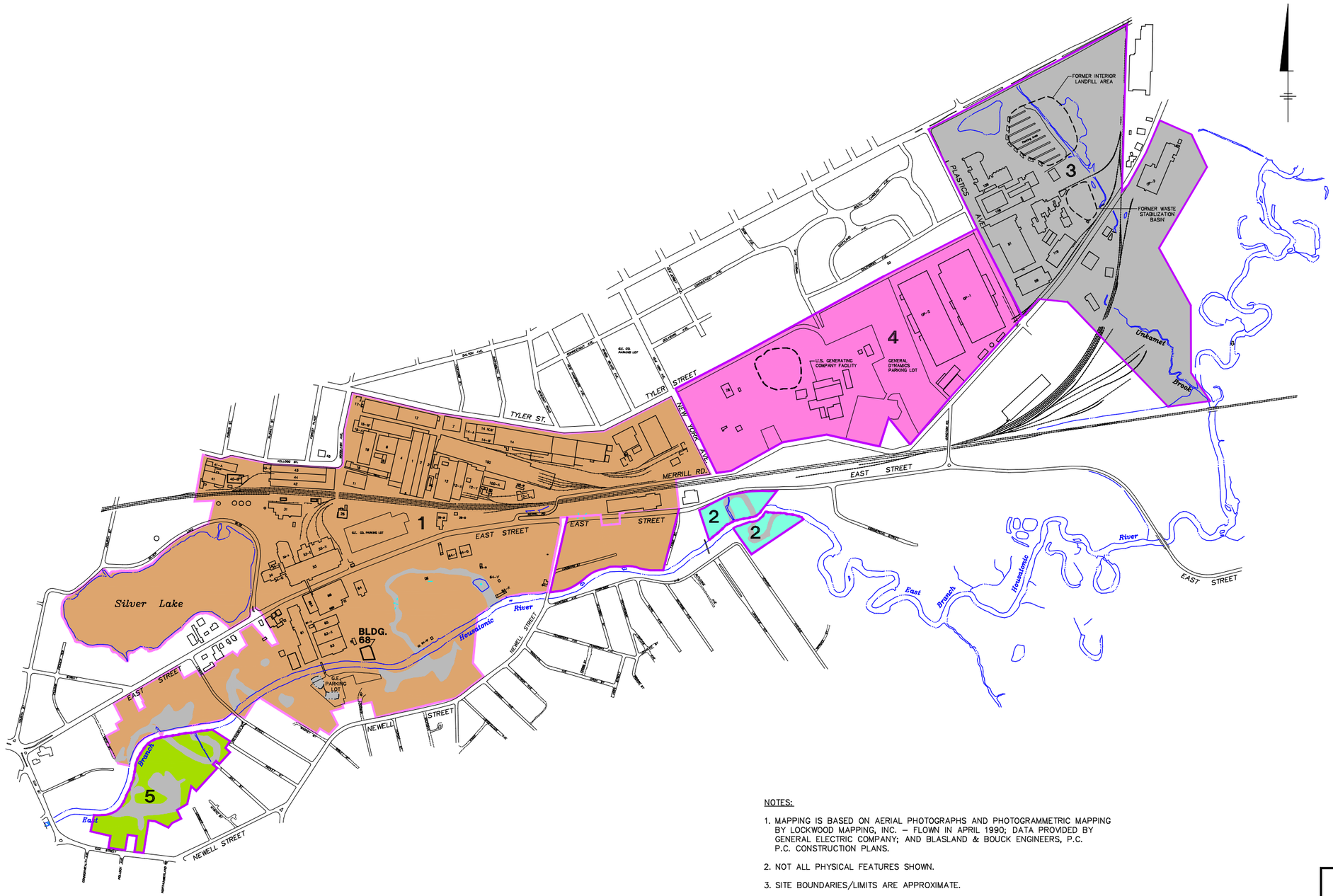
L: ON=*,OFF=REF
P: B02.PCP OR BSIZ.PCP
9/10/99 SYR-54-GMS JMS NES
20140001/SOWRPT/20140B07.DWG

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

GROUNDWATER MONITORING PROGRAMS UNKAMET BROOK AREA

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE H-6



LEGEND

GMA 1 (PLANT SITE 1)

- RAA 1–40s COMPLEX
- RAA 2–30s COMPLEX
- RAA 3–20s COMPLEX
- RAA 4–EAST STREET AREA 2 SOUTH
- RAA 5–EAST STREET AREA 2 NORTH
- RAA 6–EAST STREET AREA 1 NORTH
- RAA 13–LYMAN STREET AREA (INCLUDING FORMER OXBOWS B, D AND E)
- RAA 14–NEWELL STREET AREA II
- RAA 15–NEWELL STREET AREA I
- RAA 18–SILVER LAKE AREA
- RAA 19–EAST STREET AREA 1 SOUTH (NAPL/GROUNDWATER ONLY)

GMA 2 (FORMER OXBOWS J AND K)

- RAA 16–FORMER OXBOWS J AND K

GMA 3 (PLANT SITE 2)

- RAA 11–UNKAMET BROOK AREA (EAST OF PLASTICS AVENUE)

GMA 4 (PLANT SITE 3)

- RAA 7–HILL 78 CONSOLIDATION AREA
- RAA 8–BUILDING 71 CONSOLIDATION AREA
- RAA 9–NEW YORK AVENUE/MERRILL ROAD CONSOLIDATION AREA
- RAA 10–HILL 78 (REMAINDER)
- RAA 11–UNKAMET BROOK AREA (WEST OF PLASTICS AVENUE)

GMA 5 (FORMER OXBOWS A AND C)

- RAA 12–FORMER OXBOWS A AND C

NOTES:

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. – FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY; AND BLASLAND & BOUCK ENGINEERS, P.C. P.C. CONSTRUCTION PLANS.
2. NOT ALL PHYSICAL FEATURES SHOWN.
3. SITE BOUNDARIES/LIMITS ARE APPROXIMATE.

0 500' 1000'
APPROXIMATE SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

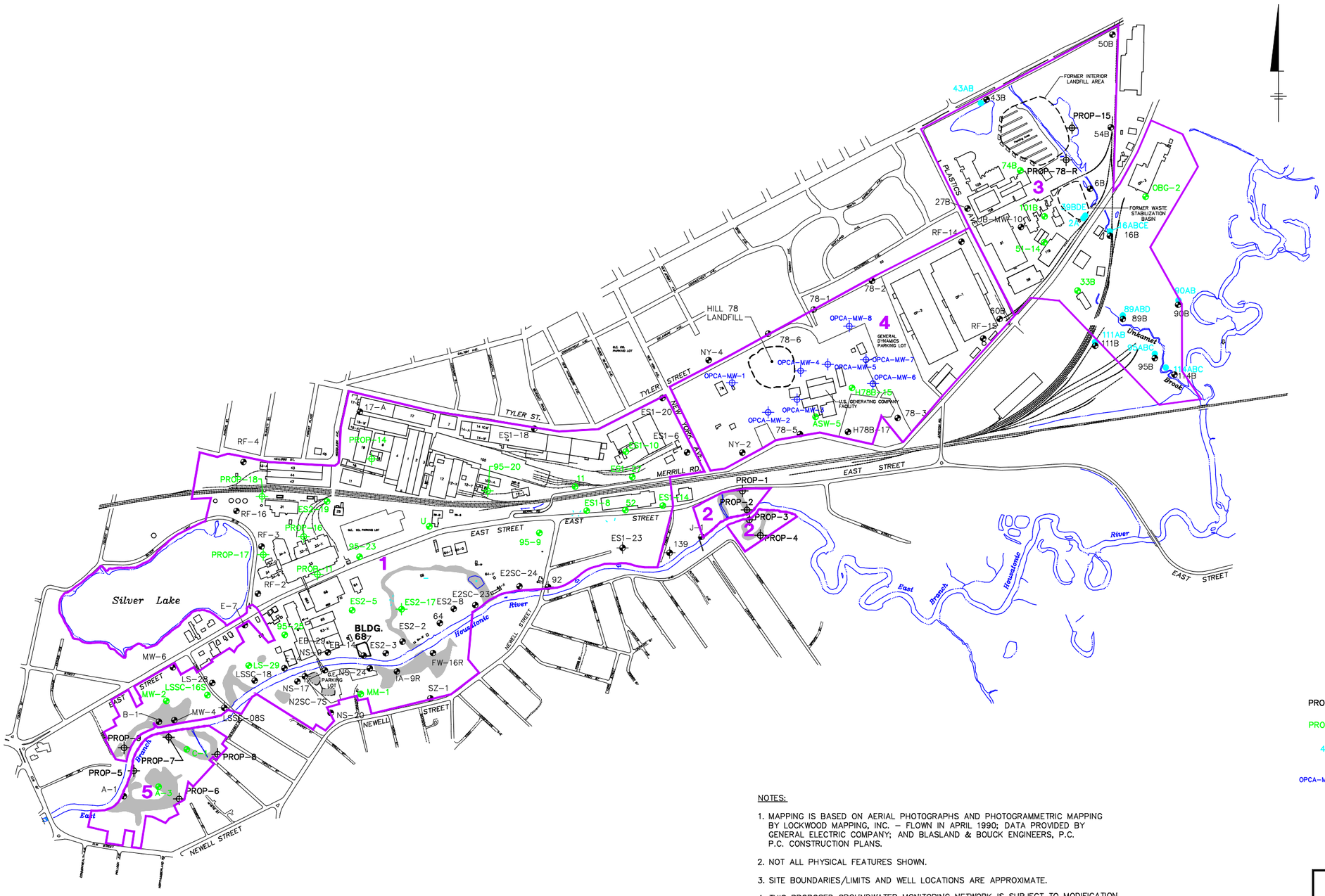
STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

GROUNDWATER MANAGEMENT AREAS

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
H-7

L: ON=*, OFF=REF
P: B01.PCP OR BSIZ.PCP
9/10/99 SYR-54-GMS GMS NES
20140001/SOWRPT/20140B04.DWG



GMA 1 (PLANT SITE 1)

- RAA 1–40s COMPLEX
- RAA 2–30s COMPLEX
- RAA 3–20s COMPLEX
- RAA 4–EAST STREET AREA 2 SOUTH
- RAA 5–EAST STREET AREA 2 NORTH
- RAA 6–EAST STREET AREA 1 NORTH
- RAA 13–LYMAN STREET AREA (INCLUDING FORMER OXBOWS B, D AND E)
- RAA 14–NEWELL STREET AREA II
- RAA 15–NEWELL STREET AREA I
- RAA 18–SILVER LAKE AREA
- RAA 19–EAST STREET AREA 1 SOUTH (NAPL/GROUNDWATER ONLY)

GMA 2 (FORMER OXBOWS J AND K)

- RAA 16–FORMER OXBOWS J AND K

GMA 3 (PLANT SITE 2)

- RAA 11–UNKAMET BROOK AREA (EAST OF PLASTICS AVENUE)

GMA 4 (PLANT SITE 3)

- RAA 7–HILL 78 CONSOLIDATION AREA
- RAA 8–BUILDING 71 CONSOLIDATION AREA
- RAA 9–NEW YORK AVENUE/MERRILL ROAD CONSOLIDATION AREA
- RAA 10–HILL 78 (REMAINDER)
- RAA 11–UNKAMET BROOK AREA (WEST OF PLASTICS AVENUE)

GMA 5 (FORMER OXBOWS A AND C)

- RAA 12–FORMER OXBOWS A AND C

103 — EXISTING WELL (PROPOSED PERIMETER NETWORK)

114 — EXISTING WELL (PROPOSED SENTINEL NETWORK)

PROP-8 — PROPOSED WELL (PROPOSED PERIMETER NETWORK)

PROP-11 — PROPOSED WELL (PROPOSED SENTINEL NETWORK)

43AB — PROPOSED NATURAL ATTENUATION MONITORING WELL CLUSTER

OPCA-MW-7 — ON–PLANT CONSOLIDATION AREA MONITORING PROGRAM WELLS

0 500' 1000'
APPROXIMATE SCALE

NOTES:

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. – FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY; AND BLASLAND & BOUCK ENGINEERS, P.C. P.C. CONSTRUCTION PLANS.
2. NOT ALL PHYSICAL FEATURES SHOWN.
3. SITE BOUNDARIES/LIMITS AND WELL LOCATIONS ARE APPROXIMATE.
4. THIS PROPOSED GROUNDWATER MONITORING NETWORK IS SUBJECT TO MODIFICATION BASED ON AN ASSESSMENT OF THE CONDITION OF THE INCLUDED WELLS. IF ANY OF THE WELLS ARE FOUND TO BE DAMAGED OR DESTROYED, NEARBY WELLS WILL BE UTILIZED IF AVAILABLE, OR REPLACEMENT WELLS MAY BE INSTALLED.
5. MONITORING AT WELL ASW–5 WILL BE CONDUCTED BY U.S. GENERATING COMPANY IN ACCORDANCE WITH AN EXISTING PERMITTED PROGRAM.

L: ON=*, OFF=*REF*
P: B01.PCP OR BSIZ.PCP
9/10/99 SYR–54–JMS GMS NES
20140001/SOWRPT/20140B05.DWG

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

PROPOSED BASELINE GROUNDWATER MONITORING PROGRAM

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **H-8**

Technical Attachment I

Natural Resource Restoration/ Enhancement Activities

TECHNICAL ATTACHMENT I

NATURAL RESOURCE RESTORATION/ENHANCEMENT ACTIVITIES

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Figure I-4 Unkamet Brook Area

TECHNICAL ATTACHMENT I

NATURAL RESOURCE
RESTORATION/ENHANCEMENT ACTIVITIES

Figure I-5 Silver Lake Restoration/Enhancement Projects

TECHNICAL ATTACHMENT I

NATURAL RESOURCE
RESTORATION/ENHANCEMENT ACTIVITIES

1.0 Introduction

As stated in the CD and the SOW, GE shall implement certain natural resource restoration/enhancement activities at a number of Removal Action Areas (RAAs) at the Site, as well as at an off-site restoration area. Specifically, GE shall implement the following natural resource restoration/enhancement activities, as described in this Attachment:

1. The creation of herbaceous native grassland communities at certain GE-owned areas at or near the GE Plant Area -- namely, a 200-foot-wide riparian strip within East Street Area 2-South, the Newell Street parking lot within Newell Street Area II, the Lyman Street parking lot within the Lyman Street Area, and the Hill 78 Consolidation Area;

2. Certain specified habitat restoration/enhancement activities at the Unkamet Brook Area;

3. The creation of floodplain forest/wetland communities on approximately 12 acres of riparian land (approximately 9.75 acres of floodplain forest and approximately 2.25 acres of freshwater wetlands) located within the Housatonic River watershed outside the GE Plant Area, using either an off-site location to be provided by the Trustees (subject to mutual agreement with GE on such location) or a combination of such an off-site location and Former Oxbows A and C; and

4. Certain habitat and recreational enhancements at the Silver Lake Area.

For those natural resource restoration/enhancement activities that are conducted at RAAs subject to this SOW, GE shall carry out such activities in conjunction with the Removal Actions for those RAAs.

This Technical Attachment describes the natural resource restoration/enhancement activities that GE shall conduct at the above-referenced areas, and provides the Performance Standards for these activities. More detailed existing condition surveys, design parameters, and specific restoration techniques will be provided in the

technical RD/RA submittals for the Removal Actions for the identified RAAs, or, for the off-site location, in a separate Restoration Design/Action Plan.

2.0 General Objectives

The overall goal of the natural resource restoration/enhancement activities is to enhance or improve existing habitat quality at the above areas or to create new habitat for indigenous species at such areas. Habitat enhancement or restoration will include the establishment of forest communities, freshwater wetland communities, and/or native grassland areas in the above-referenced areas. The aim is to develop natural systems that are sustainable in the long term and require a minimum level of maintenance to ensure success. The proposed habitat restoration/enhancement activities were developed based on the current physical condition and location of the enhancement areas, the wildlife species that are potentially supported by the habitat (i.e., small mammals, birds, amphibians and insects with relatively small territories), and the ability to integrate the habitat restoration with planned response activities (where applicable).

In general, to achieve this goal, the restoration/enhancement activities will involve modification of the existing habitat through vegetative plantings and/or engineered structures, as described in this attachment. The planting activities will involve: selection of appropriate natural vegetative communities for the areas in question, given the soil types and hydrological regimes at those areas, as well as the response actions to be implemented at those areas (where applicable); developing and re-soiling the areas with a suitable growth medium (in terms of pH and organic content) for the targeted natural communities; preparing final grades to allow development of the targeted communities; replanting with indigenous species as necessary to achieve appropriate densities for the targeted communities; and monitoring and maintaining the natural communities as necessary to ensure successful growth, while controlling exotic, nuisance and adventive plant species that may be detrimental to those communities. These activities shall be consistent with the response actions for the areas in question (where applicable) in order to ensure protection of human health and the environment, while at the same time enhancing the habitat value for wildlife.

TECHNICAL ATTACHMENT I

NATURAL RESOURCE RESTORATION/ENHANCEMENT ACTIVITIES

The specific Performance Standards and other requirements for these activities are set forth in subsequent sections of this attachment.

3.0 Natural Resource Restoration/Enhancement Activities at East Street Area 2-South Riparian Buffer, Newell Street and Lyman Street Parking Lots, and the Hill 78 Consolidation Area

This Section sets forth the Performance Standards and other requirements for natural resource restoration/enhancement activities in a 200-foot wide strip of land within East Street Area 2-South that is located along the north side of the Housatonic River between the former Thermal Oxidizer location and the downstream boundary of the GE Plant Area (as generally depicted on Figure I-1), in the Newell Street and Lyman Street parking lots (as generally depicted on Figure I-2), and in the Hill 78 Consolidation Area (as generally depicted on Figure I-3). At the present time, the 200-foot wide riparian strip at East Street Area 2-South contains land that is predominantly covered by pavement and buildings. The Newell Street and Lyman Street parking lots are largely paved. The Hill 78 Consolidation Area is unpaved and covered with an old field community dominated by grass species such as switchgrass (*Panicum virgatum*) and herbaceous species such as Queen Anns lace (*Daucus carota*).

The response actions to be undertaken by GE in these areas are described in Sections 2.2 and 2.3 of the SOW. These actions will include: (a) removal of all paved surfaces, buildings (except for oil/water separator 64W), and underlying soil to a depth of one foot from the East Street Area 2-South riparian strip between the former Thermal Oxidizer location and the downstream boundary of the GE Plant Area and replacement with a one-foot vegetative engineered barrier; (b) removal of pavement and underlying soil to a total depth of one foot from the Newell Street and Lyman Street parking lots and replacement with a one-foot vegetative engineered barrier; and (c) capping the Hill 78 Consolidation Area, after completion of use as an on-plant consolidation area, with a consolidation area/landfill cap. The engineered barriers and consolidation area/landfill cap to be used in these areas are described in Attachment G to the SOW.

In connection with these response actions, GE shall enhance the habitat in the East Street Area 2-South riparian strip, the Newell Street and Lyman street parking lots, and Hill 78 Consolidation Area through the planting of

herbaceous vegetation and completion of other natural resource restoration/enhancement measures in accordance with the following Performance Standards and other requirements.

3.1 Performance Standards

1. In East Street Area 2-South riparian strip, the Newell Street and Lyman Street parking lots, and the Hill 78 Consolidation area (after use for on-plant consolidation), GE shall plant a herbaceous native grassland community on the surface of the vegetative barriers or cap, using a seed mixture of native grass and wildflower species.

2. In addition to the vegetative enhancements, GE shall place uncontaminated stumps and rock piles, randomly throughout the vegetated areas (except at the Hill 78 Consolidation Area) to provide habitat for fossorial and ground-dwelling wildlife. Further, GE shall place bluebird boxes along the edges of the East Street Area 2-South riparian strip, Newell Street and Lyman Street parking lots adjacent to the river, and the Hill 78 Consolidation Area.

3. In a 200-foot strip along the Housatonic River upstream of the East Street Area 2 - South riparian strip, GE shall place uncontaminated stumps and rock piles to provide habitat for fossorial and ground-dwelling wildlife.

3.2 Implementation

To achieve the foregoing Performance Standards, GE shall conduct the following specific activities:

In the East Street Area 2-South riparian buffer, Newell Street and Lyman Street parking lots, and the Hill 78 Consolidation Area, GE shall plant a variety of herbaceous species that will develop into a native grassland that can provide habitat for a variety of small mammals and birds without interfering with the integrity of the engineered barriers or consolidation area cap installed at these areas. The grassland species to be used in the plantings will include a mixture of native warm-season grass and wildflower species, such as big bluestem

(*Andropogon gerardi*), little bluestem (*Andropogon scoparius*), indian grass (*Sorghastrum nutans*), wild blue lupine (*Lupinus perennis*), Canada wild-rye (*Elymus canadensis*), Canada goldenrod (*Solidago canadensis*), common milkweed (*Asclepias syriaca*), beard tongue (*Pestamon digitalis*), grass-leaved goldenrod (*Euthamia graminifolia*), blue vervain (*Verbena hastata*), butterfly milkweed (*Asclepias tuberosa*), New England aster (*Aster novae-anglia*), showy tick-trefoil (*Desmodium canadense*), roundhead bush clover (*Lespidesa capitata*), and wild bergamont (*Monarda fistulosa*). To ensure soil stability and prevent erosion, a nurse crop of annual rye-grass (*Lolium temulentum*) will be added to the seed mixture. The seed mixture will be seeded at a rate of 25 pounds per acre.

In addition to the vegetative enhancement activities, GE shall place uncontaminated stumps and rock piles randomly throughout the East Street Area 2 - South riparian buffer, the Newell Street and Lyman Street parking lots, and in the 200-foot wide strip along the north bank of the Housatonic River upstream of the East Street Area 2 South riparian buffer with a minimum spacing of 100 feet to further assist in providing habitat to a variety of wildlife. The stumps and rock piles will provide habitat primarily for fossorial and ground-dwelling wildlife. The rock piles will be approximately six feet in diameter and no more than three feet in height. The stumps will be taken from uncontaminated areas and will be trimmed of roots and branches before placement.

GE shall also place bluebird boxes along the edges of the East Street Area 2-South riparian strip and Newell Street and Lyman Street parking lots adjacent to the river and along the edges of the Hill 78 Consolidation Area, with a minimum distance of 300 yards between boxes.

4.0 Natural Resource Restoration/Enhancement Activities at Unkamet Brook Area

Unkamet Brook is an upper-order stream that flows into the Housatonic River. The present channel through which the brook flows separates the unpaved portion of the former interior landfill in this area from the paved portion of that former landfill. The current channel of the brook is heavily vegetated with a diverse riparian community dominated by black willow (*Salix nigra*), boxelder (*Acer negundo*), eastern cottonwood (*Populus deltoides*), American elm (*Ulmus american*), quaking aspen (*Populus tremuloides*), Morrow's honeysuckle (*Lonicera morrowii*), speckled alder (*Alnus incana*), red-osier dogwood (*Cornus sericea*), northern arrowwood

(*Viburnum dentatum*), and meadow-sweet (*Spirea alba*). The eastern side of the unpaved portion of the former interior landfill area borders a large (approximately 10-acre) wetland (see Figure I-4). The wetland supports a diverse robust emergent marsh community and is characterized by standing water ranging from one inch to over 12 inches in depth. The emergent area is dominated by cattails and purple loosestrife (*Lythrum salicaria*). In addition, common reed or phragmites (*Phragmites australis*), an invasive species, has covered a large portion of the wetland. The marsh is interspersed with isolated pockets of buttonbush (*Cephalanthus occidentalis*) and red-osier dogwood.

As described in the SOW, the response actions for the Unkamet Brook Area will include rerouting the brook to its approximate original channel; capping the former interior landfill area with a landfill cap in the unpaved portion and an asphalt engineered barrier in the paved portion (as described in Attachment G); removing certain sediments within the top one foot of the brook as necessary to achieve an average PCB concentration of 1 part per million (ppm); and removing or covering the soil/sediments in specific inundated (palustrine/emergent) wetland areas near the brook, as necessary, to achieve an average PCB concentration of 1 ppm in the top one foot.

In connection with these response actions, GE shall undertake certain natural resource restoration/enhancement activities, including the removal of certain nuisance vegetative species from the wetland area east of the current brook channel, restoration of the banks of the rerouted brook channel, and planting of vegetation on the landfill cap to be installed at the unpaved portion of the former landfill area. For planting purposes, the rerouted brook will be bordered to the east by the existing wetlands area and to the west by the landfill. The Performance Standards and other requirements for these activities are set forth below.

4.1 Performance Standards

1. GE shall remove the existing stand of phragmites located in an approximate 2-acre wetland area east of Unkamet Brook, as shown on Figure I-4. GE shall excavate the surface soil in this area to approximately one foot below shallow groundwater as determined in May (total excavation depth of a minimum of two feet depending on the nature and quality of the soil) to minimize the possibility for natural reestablishment of phragmites in the area.

2. After rerouting Unkamet Brook to its approximate original channel, GE shall plant a vegetative community along the western bank of the new channel to ensure bank stability. Since this bank will abut the former landfill, GE shall plant a diverse herbaceous community so as not to interfere with the integrity of the landfill cap. Areas east of the new channel that are disturbed by activities associated with rerouting Unkamet Brook shall also be seeded with a herbaceous seed mixture.

3. After installation of the landfill cap over the unpaved portion of the former landfill area, GE shall plant on the surface of the cap a herbaceous vegetative community that will not interfere with the integrity of the cap. In addition, GE shall place bluebird boxes along the edges of the former interior landfill area.

4.2 Implementation

This section presents additional details regarding the activities to be performed to achieve the above Performance Standards.

4.2.1 Nuisance Species Removal in Wetlands Area

Phragmites dominates the vegetative community over an area approximately two acres in size east of Unkamet Brook and just south of Dalton Avenue, as shown in Figure I-4. Because phragmites are highly invasive, crowd out other ecologically important plant species, and are of low food value to wildlife, a wetland dominated by phragmites is considered to be of low quality.

GE shall remove the existing stand of phragmites. The removal of the entire stand of phragmites is necessary for the following reasons: (1) the likelihood of phragmites re-establishing itself as the dominant wetland plant species will be minimized, and (2) the underlying rhizome system will be physiologically stressed from such an action, thus further minimizing the re-establishment of the stand.

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GE shall remove the phragmites through shallow surface soil excavation and grading to lower the surface topography of the phragmites infested area to a depth of approximately one foot below the level of shallow groundwater (i.e., excavation to a total depth of at least two feet, pending evaluation of the nature and quality of the soil). The objective is to lower the surface of the soil to a point approximately one foot below the shallow water table (point of soil saturation) as determined in May. The reason for this is based on the growth characteristics of phragmites. Phragmites grow well under a variety of hydrologic conditions, but complete inundation of the soil is not preferred. This is evidenced by the observation that the phragmites in the stand south of Dalton Avenue was only found in areas of saturation, not inundation. The shallow surface soil excavation conducted to accomplish the surface topography modification will also provide flood storage compensation for any loss of flood storage capacity resulting from the capping of the former interior landfill area.

Following the surface topography adjustment, GE shall allow for the redevelopment of the wetlands community through natural succession. GE shall ensure that invasive species do not revegetate the area through actions described in Section 8.0.

4.2.2 Riparian Area Along the Rerouted Unkamet Brook

After rerouting Unkamet Brook to its approximate original channel, GE will stabilize the western banks of the restored channel through the placement of straw matting/fabric on the lower portions of the slope, and shall plant a vegetative community on those banks to ensure bank stability. Specifically, along the western side of the rerouted brook channel, GE shall plant a native herbaceous community that will not interfere with the integrity of the landfill cap. The herbaceous community will be established using a mixture of warm-season grasses and wildflower species such as big bluestem, little bluestem, indian grass, wild blue lupine, Canada wild-rye, Canada goldenrod, common milkweed, beard tongue, grass-leaved goldenrod, blue vervain, butterfly milkweed, New England aster, showy tick-trefoil, roundhead bush clover, and wild bergamont. To ensure soil stability and prevent erosion, a nurse crop of annual rye-grass will be added (to a maximum percentage of 10%) to the seed mixture. Herbaceous plants will be seeded at a rate of 25 pounds per acre.

Areas east of Unkamet Brook, if disturbed during the rerouting activity, will also be seeded to establish a herbaceous community using the seed mixture and application rate described above.

As described in Section 8.0, GE shall ensure that invasive species do not colonize those work areas affected by the rerouting of the brook.

4.2.3 Plantings on Landfill Cap Area

After installation of the landfill cap over the unpaved portion of the former interior landfill area, GE shall plant vegetation on the surface of that cap. In order to maintain the integrity of the barrier, such plantings will utilize herbaceous species. The planting of herbaceous species on the former interior landfill cap will allow for the development of a structurally diverse native grassland that will provide habitat and feeding areas for a variety of small mammals, song birds, and insects. The plantings will consist of a combination of warm-season grasses and wildflower species such as big bluestem, little bluestem, indian grass, wild blue lupine, Canada wild-rye, Canada goldenrod, common milkweed, beard tongue, grass-leaved goldenrod, blue vervain, butterfly milkweed, New England aster, showy tick-trefoil, roundhead bush clover, and wild bergamont. To ensure soil stability and prevent erosion, a nurse crop of annual rye-grass will be added to the seed mixture. The seed mixture will be seeded at a rate of 25 pounds per acre.

GE shall also place bluebird boxes along the edge of the former interior landfill area, with a minimum distance of 300 yards between boxes.

5.0 Natural Resource Restoration/Enhancement Activities at Off-Site Restoration Area and/or Former Oxbows A and C

This section sets forth the Performance Standards and other requirements for the creation of approximately 12 acres of restored/enhanced habitat at riparian land located within the Housatonic River watershed outside the GE Plant Area.. As discussed in this section, GE shall create a total of approximately 9.75 acres of floodplain forest habitat and approximately 2.25 acres of freshwater palustrine wetlands in such area(s). For this purpose, GE

will have the option of creating such habitat either: (a) entirely at a suitable off-site area (Off-Site Restoration Area) to be selected and provided by the Trustees (subject to mutual agreement with GE on the location of such area); or (b) using a combination of such an Off-Site Restoration Area and Former Oxbows A and C, provided that at least six of the 12 habitat restoration/enhancement acres are created at Former Oxbows A and C.

Former Oxbows A and C (depicted on Figure I-2) are largely unpaved and consist of old field communities dominated by grass and herbaceous species. These former oxbow areas border riparian communities supported by either the Housatonic River or major drainage features. As described in the SOW, the response actions for these former oxbow areas will depend upon the concentrations of PCBs and other constituents present in the soils and upon whether a Grant of Environmental Restrictions and Easements (ERE) is executed and recorded. Such response actions could involve the removal and replacement of soil in the top three feet and/or the installation of a vegetative engineered barrier to achieve the Performance Standards in the SOW.

If GE elects to create six or more acres of floodplain forest/wetlands habitat at Former Oxbows A and C, it shall ensure that such activities are conducted only in areas which have spatial average PCB concentrations at or below 10 ppm in the top foot and 15 ppm in the top three feet and where an engineered barrier will not be installed. Further, GE will make best efforts to obtain the property owner's agreement to record a Conservation Easement and Restrictions (CER), in accordance with Paragraph 58 of the Consent Decree, on the portions of the property where such habitat is installed. If the above conditions are met (including the property owner's agreement to record such a CER), and if GE elects to undertake the habitat restoration/enhancement activities at Former Oxbows A and C, then the balance of the required forest and wetlands habitat will be created at the Off-Site Restoration Area. If the foregoing conditions are not met (including an agreement to record a CER) or if GE elects not to use Former Oxbows A and C for the creation of such habitat, then the entire 12 acres of forest/wetlands habitat will be created at the Off-Site Restoration Area.

The Off-Site Restoration Area will be selected and provided by the Trustees, subject to mutual agreement with GE on the location of such area. That area will be of sufficient size to allow for development of the required floodplain forest habitat and freshwater palustrine wetlands, will be located in a non-contaminated, riparian area within the Housatonic River watershed outside the Site, will have sufficient hydrology that it can be altered to

allow for the development of pockets of wetlands, will not contain PCBs or other hazardous constituents that would require response actions under the Performance Standards in the SOW for recreational areas, will not contain a significant amount of phragmites or other nuisance species, and will be undeveloped and/or unpaved and contain no structures that would have to be removed to allow for habitat enhancement. GE shall not incur any costs or have any responsibility for securing any kind of property interest in the Off-Site Restoration Area, including, but not limited to, ownership, easements, or restrictions. GE's sole obligations with respect to the Off-Site Restoration Area will be to install the required floodplain forest/wetland habitat in accordance with the Performance Standards and other requirements set forth below, and to monitor the habitat restoration/enhancement measures in that area, as detailed in Section 8.0, for a period of five years, after which all responsibility for that property will be turned over to the Trustees or an entity designated by the Trustees. Following selection of the Off-Site Restoration Area, technical details regarding existing conditions at that area and regarding the specific design parameters and habitat restoration/enhancement techniques will be provided in a Restoration Design/Restoration Action Plan for that area.

5.1 Performance Standards

1. GE shall create a total of approximately 9.75 acres of floodplain forest habitat and approximately 2.25 acres of freshwater palustrine wetlands at either: (a) an Off-Site Restoration Area selected as described above; or (b) a combination of such an Off-Site Restoration Area and Former Oxbow Areas A and C; provided that if GE elects to use Former Oxbow Areas A and C for this purpose, GE shall create a minimum of 5.75 acres of floodplain forest and 0.25 acres of freshwater palustrine wetlands in those former oxbow areas, shall do so in portions of those areas that have spatial average PCB concentrations at or below 10 ppm in the top foot and 15 ppm in the top three feet and where an engineered barrier will not be installed, and shall obtain the property owner's agreement to execute and record a CER on portions of the former oxbow areas where such habitat restoration/enhancement measures will be implemented.

2. In portions of the Off-Site Restoration Area and/or Former Oxbows A and C targeted for the creation of a floodplain forest community, GE shall plant trees in varying densities, clumps, or sinuous lines

across the area using a planting density of 700 trees per acre. Understory species shall be planted (to the extent possible) in oblong patches scattered such that there is a minimum distance of 40 feet between patches, with plantings within each patch on four-foot centers. The patches will be 30 feet wide by 50 feet long, or similar configuration to be approved by the Trustees, such that GE shall plant 730 shrubs per acre. Woody vines shall be planted in small, oblong patches measuring 15 feet wide by 30 feet long, scattered such that there is a minimum distance of 150 feet between patches, with plantings within each patch on four-foot centers. A total of 40 vines will be planted per acre. This will mean an approximate planting density of 40 vines per acre. Open ground throughout the planted forest community area shall be sown with a herbaceous seed mixture of native grass and wildflower species to provide immediate erosion control and create a herbaceous community. Based on discussions with the Trustees, the foregoing planting densities at the Off-Site Restoration Area may be spread out over a larger area, provided that the same number of plants are installed; but in that case (depending on the spacing of the planted areas), open areas between planted areas may be left in their native condition.

3. In portions of the Off-Site Restoration Area and/or Former Oxbows A and C targeted for the creation of freshwater palustrine wetlands, GE shall take actions (such as grading that encourages the ponding of water) designed to create such wetlands. GE shall then plant ½ of the wetlands area with species typical of a circumneutral shrub swamp community and ½ with species typical of a graminoid marsh community.

4. In addition to the vegetative enhancements, GE shall place uncontaminated stumps and rock piles, randomly throughout the vegetated areas to provide habitat for fossorial and ground-dwelling wildlife. Further, GE shall place bluebird boxes along the edges of these areas.

5.2 Implementation

In areas where a floodplain forest will be created, GE shall plant a vegetative community referred to as a floodplain forest community (Weatherbee, 1996). Common floodplain forest community species that will be utilized in the plantings include:

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Canopy	Understory/Shrub
American elm (*Ulmus americana*)	silky dogwood (*Cornus amomum*)
boxelder (*Acer negundo*)	northern arrowwood (*Viburnum dentatum*)
black willow (*Salix nigra*)	winterberry holly (*Ilex verticillata*)
eastern cottonwood (*Populus deltoides*)	serviceberry (*Amelanchier canadensis*)

Trees shall be planted in varying densities, clumps, or sinuous lines using a planting density of 700 trees per acre. This will allow for the development of structural diversity within the habitat and integration of understory habitats within the area covered by the canopy species. (As noted above, based on discussions with the Trustees, this planting density may be spread out over a larger area at the Off-Site Restoration Area so long as the same number of trees are planted.) Approximately 85% of the planted trees will be either boxelder or cottonwood. With the concern over Dutch elm disease, no more than 10% of the planted specimens will be American elms. Approximately 5% of the trees will be black willows, which will be planted in areas surrounding the wetland pockets. All canopy specimens will be container-grown, with species obtained for planting being four feet to six feet in height, unless otherwise approved by the Trustees.

To further allow for good structural distribution and juxtaposition of habitats, the understory vegetation will be planted (to the extent possible) in oblong patches. The patches will be 30 feet wide by 50 feet long, or similar configuration to be approved by the Trustees, such that 730 shrubs are planted per acre. The patches will be scattered such that a minimum distance of 40 feet is maintained between patches. Understory plantings within each patch will be on four-foot centers. Each planted shrub will be two to three feet in size (depending on commercial availability) and will be container-grown. Understory specimens will be planted on a random-mixed basis so as to ensure a heterogeneous distribution of species.

GE shall plant woody vines in small, oblong patches measuring 15 feet wide by 30 feet long, scattered such that there is a minimum distance of 150 feet between patches, with plantings within each patch on four-foot centers. A total of 40 vines will be planted per acre. GE shall plant a readily available indigenous form of grape vine (*Vitis riparia*).

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The herbaceous community will be established using a mixture of native warm-season grasses and wildflowers such as little bluestem, big bluestem, switchgrass (*Panicum virgatum*), deertongue (*Panicum clandestinum*), fox sedge (*Carex vulpinoidea*), Pennsylvania smartweed (*Polygonum pensylvanicum*), Canada wild-rye , cup-plant (*Silphium perfoliatum*), nodding bur-marigold (*Bidens cernua*), showy tick-trefoil, butterfly milkweed, Canada goldenrod, giant goldenrod (*Solidago gigantea*), and white snakeroot (*Eupatorium altissima*). To ensure soil stability and prevent erosion, a nurse crop of annual rye-grass (not to exceed 10% of the seed mixture) will be added to the seed mixture. The herbaceous plant mixture will be seeded at a rate of 25 pounds per acre.

In areas targeted for the creation of wetlands, GE shall take actions (such as grading that encourages the ponding of water) to create small pockets of freshwater palustrine wetlands. GE will plant ½ of the wetlands with species typical of a circumneutral shrub swamp community and ½ with species typical of a graminoid marsh community.

Plantings in the circumneutral shrub swamp community will include silky dogwood, red-osier dogwood (*Cornus sericea*), and spicebush (*Lindera benzoin*), as per Weatherbee (1996). Shrubs within the shrub swamp community will be planted on four-foot centers. Each planted shrub will be two to three feet in size (depending on commercial availability) and will be container-grown. Species in the graminoid marsh community will include blue joint grass (*Calamagrostis canadensis*), fox sedge (*Carex vulpinoidea*), soft rush (*Juncus effusus*), hop sedge (*Carex lupilina*), New England aster (*Aster nova-angliae*), and blue vervain (*Verbena hastata*). Specimens will planted on four-foot centers. Herbaceous plants will be two-inch peat pots, depending upon commercial availability. A herbaceous wetland seed mixture including such species as Canada manna grass (*Glyceria canadensis*), fringed sedge (*Carex crinita*), bearded sedge (*Carex comosa*), lurid sedge (*Carex lurida*), joe-pye-weed (*Eupatoriadelphus maculatus*), green bulrush (*Scirpus atrovirens*), hop sedge, boneset (*Eupatorium perfoliatum*), chufa (*Cyperus esculentus*) red-top panic grass, (*Panicum rigidulum*) woolgrass (*Scirpus cyperinus*), and blue vervain will be seeded through the circumneutral shrub swamp and the graminoid marsh community. The mixture will be seeded at a rate of one pound per 2500 square feet.

Finally, GE shall place bluebird boxes along the edges of the Off-Site Restoration Area and (if used for habitat enhancement) Former Oxbows A and C, with a minimum distance of 300 yards between boxes.

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6.0 Natural Resource Restoration/Enhancement Activities at Silver Lake

Silver Lake is located southwest of the GE plant and is bounded by East Street to the south and Silver Lake Boulevard to the east and north. The lake supports a lacustrine vegetative community along the banks that is dominated by black willow, boxelder, black locust (*Robinia pseudoacacia*), and red oak (*Quercus rubra*). The lake supports a fish community of unknown size and composition.

A sediment "island," which actually consists of two peninsulas, is located around the mouth of the discharge outfall located in the northeastern edge of the lake, as shown on Figure I-5. This horseshoe-shaped "island" is approximately 30 yards wide at its base and is divided by a channel that connects the lake with the pool area at the mouth of the discharge outfall. The "island" supports a shrub-scrub/emergent wetland community dominated by red-osier dogwood, cattail, and soft-stem bulrush (*Scirpus validus*). The "island" is 100% covered by the vegetative community.

As described in the SOW, the response actions to be implemented by GE at the Silver Lake Area include bank soil removal and replacement as necessary to achieve certain cleanup levels, removal and replacement of select sediments associated with sample location N-2 in the vicinity of the discharge outfall, and capping of the entire lake bottom and armoring of the cap along the shoreline, as described in Attachment K to the SOW.

In addition, GE shall implement a number of natural resource restoration/enhancement measures in accordance with the Performance Standards and other requirements set forth below.

6.1 Performance Standards

1. In connection with the installation of the Silver Lake capping system described in Attachment K to the SOW, GE shall construct a shallow-water shelf along the shorelines of the lake to provide an improved habitat for aquatic species. This shallow-water shelf shall consist of an armoring layer of stone to be placed around the shoreline as part of the capping system. GE shall place a three-inch layer of gravel and sand over the armoring stone to facilitate fish usage on the shelf.

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2. GE shall fund activities to be performed by the Trustees to create littoral habitat (that will not interfere with the performance of the cap) suitable for a balanced, indigenous aquatic community in the lake, in the amount of $25,000.

3. GE shall fund activities to be performed by the Trustees to remove the existing fish community and replace it with a balanced fish population, in the amount of $50,000.

4. GE shall cap the "island" (actually a peninsula) located near the discharge outfall with the cap described in Attachment K to the SOW. Following the installation of this cap, GE shall plant appropriate wetlands vegetative species on the surface of the cap.

5. Following bank soil removal and slope restoration activities, GE shall plant a line of trees along the recreational portions of the eastern and northern banks (non-privately owned areas), spaced approximately 8 feet apart. GE shall plant an understory community in oblong patches approximately 10 feet wide and 20 feet long along these banks, spaced approximately 50 feet apart, with shrubs within each patch on approximate four-foot centers.

6. In addition, as part of response actions on the remaining banks of the lake, GE shall plant herbaceous species on those banks where response actions are conducted.

7. In addition to the vegetative enhancement activities, GE shall place engineered structures along the eastern and northern sides (non-privately owned areas) of the lake to enhance recreational use and wildlife observation. These structures shall consist of a walking path around these sides of the lake and two picnic areas on these sides of the lake.

6.2 Implementation

To achieve these Performance Standards, GE shall conduct a variety of activities both within the lake and along its banks, as described below.

6.2.1 Natural Resource Restoration/Enhancement Measures Within Silver Lake

As described in Attachment K, the capping/armoring system for Silver Lake will include an armoring layer of rough, angular quarry stone, approximately 0.9 feet thick, around the shoreline to provide erosion protection. This armoring layer will extend into the lake to a mean water depth of approximately 5.3 feet along the east and west shores and approximately 2.5 feet along the north and south shores, as shown on Figure I-5. GE shall cover this stone armoring layer with a three-inch layer of gravel to create a shallow-water shelf adjacent to the shoreline. This will create a band of shallow water in these areas, averaging approximately two to three feet deep, increasing the size of the littoral zone within the lake. The littoral zone is the shallow-water zone of the lake where light penetrates to the bottom. Aquatic life is generally richest and most diverse in the littoral zone. The creation of the shelf will increase food production for fish and other organisms within the lake. Additionally, placement of rock material along the shoreline will not only provide protection from erosion, but will also provide spawning sites for fish (Summerfelt, 1993).

In addition, following excavation and replacement of the sediments associated with sample location N-2, GE shall install the cap described in Attachment K over that area and also over the existing shrub-scrub "island" near the discharge point. It is anticipated that this capping of the entire "island" area will make the two existing peninsulas into one contiguous "island" or peninsula. To facilitate this action, GE shall evaluate extending the existing discharge pipe so that the discharge occurs outside the "island" area. Following the installation of the cap, GE will extend the armor stone erosion protection layer around the outer bounds of the "island" area. GE shall then place eight inches of topsoil over the top of this capped "island" or peninsula. The topsoil will be graded such that the top of the island remains approximately one foot above the surface of the lake. GE shall plant the center of this "island" with a mixture of red-osier dogwood and buttonbush. The shrubs will be randomly mixed and planted on four-foot centers to allow the development of cover for shore birds and waterfowl. The buttonbush

will be oriented towards the edges (more wet areas) of the "island", and the red-osier dogwood will be oriented more towards the center (drier area) of the "island". Each planted shrub will be two to three feet in size (subject to commercial availability) and will be container-grown.

To form an understory for the planted shrubs, GE shall also plant a wetlands mixture of herbaceous species in the section of the "island" that the shrubs are planted on. That mixture will include species such as Canada manna grass, fringed sedge, bearded sedge, lurid sedge, joe-pye-weed, green bulrush, hop sedge, boneset, woolgrass, chufa, and red-top panic grass and blue vervain. The mixture will be seeded at a rate of one pound per 2500 square feet.

GE shall plant the periphery of the island above the armoring layer with an emergent mixture of soft-stem bulrush, cattail, soft rush, and blue-flag iris. Planted specimens will be two-inch peat pot plants, installed on two-foot centers. In areas where exposed armoring is present, the voids in the stone will be filled with topsoil and seeded with a wetlands mixture of herbaceous species. That mixture will include species such as Canada manna grass, fringed sedge, bearded sedge, lurid sedge, joe-pye-weed, green bulrush, hop sedge, boneset, woolgrass, chufa, and red-top panic grass and blue vervain. The mixture will be seeded at a rate of one pound per 2,500 square feet.

These activities will increase the diversity of the plant community on the island, thereby increasing wildlife usage. A mostly monotypic community of cattails dominates the present plant community, which limits the food and shelter possibilities afforded by the habitat. The more diverse community to be planted will provide greater cover and the presence of more herbaceous species.

GE shall also provide funds to the Trustees for certain activities to be conducted by the Trustees or their contractor within Silver Lake. These activities include in-water plantings to create littoral habitat suitable for a balanced, indigenous aquatic community representative of a great pond of equal size, and the removal of the existing fish community and replacement of that community with a balanced fish population representative of a great pond of equal size. GE shall pay the Trustees $25,000 to create the aquatic habitat. GE shall pay the Trustees $50,000 to remove and replace the fish population.

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6.2.2 Natural Resource Restoration/Enhancement Measures on Banks and Near Lake

Following the bank soil removal activities and the restoration of the natural slope of the banks, GE shall plant the non-privately owned portions of the banks with black willow and eastern cottonwood in the canopy stratum. A single line of trees will be planted along the eastern and northern banks of Silver Lake. Trees will be planted approximately 4 feet back from the water's edge, with a spacing of approximately 8 feet between each tree.

To further increase structural diversity and enhance the available habitat, GE shall also plant an understory community along the eastern and northern shores of Silver Lake. Red-osier dogwood, northern arrowwood, and winterberry holly will be planted in oblong patches approximately ten-feet wide by 20-feet long, oriented so the long axis parallels the lake bank. The patches will be planted adjacent to the bank and will be spaced approximately 50 feet between patches. The understory species will be uniformly planted so that there is four-feet spacing between plants within the patch.

All canopy specimens will be container-grown, with obtained species being four to six feet in height unless otherwise approved by the Trustees. Each planted shrub will be two to three feet in size unless otherwise approved by the Trustees and will be container-grown. Both canopy and understory specimens will be planted on a random mixed basis to ensure a heterogeneous distribution of species.

In addition to the canopy and understory specimens described above, other areas affected by future response actions will be vegetated using a herbaceous seed mixture. To ensure soil stability and minimize the potential for erosion, annual rye grass (less than 10% of seed mixture) will also be installed in disturbed areas.

In addition to the vegetative habitat enhancement activities, GE shall place engineered structures around the lake to facilitate recreational use and wildlife observation. These structures will be located along the eastern and northern sides of the lake (non-privately owned areas) where there is adequate room for the placement of these structures. Specifically, GE shall install a walking path covered with crushed stone around the northern and eastern sides of the lake within close proximity of the lake. GE shall also construct two picnic areas, each with 3 to 4 wooden picnic tables, on the northern and eastern sides of the lake in connection with the pathway.

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7.0 Planting Requirements

The following general specifications will be followed for all plantings to be conducted as part of habitat restoration/enhancement activities at the above-described areas.

Topsoil will be utilized to provide a base for planting the woody and herbaceous species, except at the Off-Site Restoration Area. Soils will be a sandy loam and contain approximately three to five percent organic matter. The target pH for the soil is 6 (± 1 standard unit).

All plants will be delivered and staged onsite prior to planting. Planting pits will be dug one foot larger in circumference than the plant container. Pit depth shall be to the depth of the plant container plus 6 inches. In excavated areas, 6 inches of topsoil will be placed in the pit prior to planting. In cleared, unexcavated areas, 6 inches of native soil will be placed in the pit. Plants will not be removed from containers until immediately before planting. Roots will be examined to determine if they are pot bound. Roots that are pot bound will be separated prior to planting. Plants will be placed in the dug pit in such a manner as to allow further growth without future constriction of the root ball. Sufficient topsoil will then be used to bring the surface, when settled, to the required grade.

When trees and shrubs have been properly set, the pit will be thoroughly watered during and after backfilling. Watering will be conducted in such a manner that the newly installed plants are not injured and surrounding soil is not eroded away. After planting and watering, each plant will be mulched with wood chips from on-site cleared vegetation or with loose straw, and will be fertilized with a 10-10-10 slow release fertilizer. The fertilizer will be applied at the product-recommended application rate.

Trees and shrubs will be planted during the months of April or May, or in October or November. Herbaceous species will be planted immediately after soil replacement or the cessation of construction activities within an area. Herbaceous species will be planted by broadcast seeding or other appropriate measures. If necessary, seeding of herbaceous species can be delayed until the spring season following planting of the trees and shrubs.

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RESTORATION/ENHANCEMENT ACTIVITIES

During each planting, a certified arborist, to be selected jointly by GE and the Trustees, will be on-site to observe the plant installations.

The need for subsequent watering of the installed plants will be made during the periodic monitoring visits, described in Section 8.0. Supplemental watering may be required during drought conditions, as indicated by substantial leaf wilting or loss (greater than 20% all of the installed plants) or apparent loss of vigor (as determined during the monitoring visits).

8.0 Monitoring, Inspections, and Maintenance

After planting the above-described vegetative communities and installing the above-described engineered structures, GE shall monitor, inspect, and maintain the plantings and structures in accordance with the Performance Standards and other requirements set forth below. Further details regarding the future monitoring, inspection, and maintenance activities to be performed for the natural resource restoration/enhancement measures at each of the foregoing areas will be provided in Restoration Project Monitoring and Maintenance Plans, to be submitted by GE as a component of the RD/RA deliverables for the Removal Actions that involve such areas (or separately for the Off-Site Remediation Area).

8.1 Performance Standards

1. GE shall monitor and inspect each of the areas where natural resource restoration/enhancement plantings have been installed for a minimum of seven years after the year in which they are installed, except at the Off-Site Restoration Area, where GE shall conduct such monitoring and inspections for five years after planting (after which responsibility for that area will be transferred to the Trustees or an entity designated by the Trustees). Such monitoring and inspections shall be conducted two times per year for the first three years after planting, once during the fifth year after planting, and (except at the Off-Site Restoration Area) once during the seventh year after planting.

TECHNICAL ATTACHMENT I

NATURAL RESOURCE
RESTORATION/ENHANCEMENT ACTIVITIES

2. In each of the first three years after plantings GE shall inspect each of the planting areas in the late spring after the first leaf flush (May/June) and in the summer (July/August) to assess plant survival. During the fifth year after plantings and (except at the Off-Site Restoration Area) during the seventh year after planting, GE shall inspect each of the planting areas in the summer (July/August). During these events, based on stem counts, any dead trees or shrubs in excess of 20% of the original planting shall be replaced to ensure an 80% survival rate. A 100% coverage of bare ground (outside of the foliar coverage of the trees) will be maintained. In addition, GE shall ensure that, during each monitoring event, the certified arborist who observed the plant installation will inspect the planted vegetation for apparent vigor and growth, using best professional judgment based on accepted restoration standards and familiarity with local planting conditions, and will make recommendations to GE and the Trustees in the event he or she concludes that the vegetation on average is not growing at an acceptable rate. In the event of a loss of plantings or growth failure over an area of ¼ acre or more, GE shall replant that area, and shall restart the timing for monitoring and inspections of that area once actions to replant the lost vegetation have been completed. Notwithstanding the above requirements, GE shall not be required to replant an area if the loss of vegetation or growth failure is caused solely by the actions of a third party (excluding GE contractors).

3. GE shall ensure that no greater than 5% of any area subject to restoration is covered with invasive species.

4. GE shall prevent shrub and tree growth in those grassland areas that have been created over engineered barriers or consolidation area/landfill caps through periodic mowing. Mowing shall be conducted once every one to three years, and shall occur no earlier in the year than August 1.

5. GE shall inspect the integrity of the bluebird boxes, rock piles, and tree stumps on an annual basis for a three-year period after they are installed. If such structures have been damaged to the extent that they can no longer be used as intended, GE shall replace or repair these structures as necessary to ensure their ability to function.

6. GE shall inspect and maintain the shallow-water shelf and the cap on the scrub-shrub "island" in Silver Lake in accordance with the post-implementation inspection and maintenance requirements set forth in Attachment K to this SOW. The plantings on the scrub-shrub "island" shall be inspected and replaced (as necessary) in accordance with Performance Standards #1 and #2 above.

8.2 Implementation

To achieve these Performance Standards, GE shall implement a monitoring program for all restoration/enhancement areas. For the areas that involve plantings, the monitoring program will consist of two visits during each of the first three years after planting, one visit during the fifth year after planting, and (except at the Off-Site Restoration Area) one visit during the seventh year after planting. In each of the first three years after planting, visits will be conducted in the late spring after the first leaf flush (May/June) and in the summer (July/August) to assess plant survival. The single visit in the fifth year and seventh year after planting will be conducted in the summer (July/August). In the event of a significant loss of plantings (greater than 1/4 acre), the timing for monitoring of that area will be restarted following actions to replant the lost trees or shrubs (except where a third party is responsible for the loss).

Each monitoring visit will consist of a field inspection and survey of the areas where plantings were installed. The selected certified arborist will participate in these monitoring visits. During each field visit, personnel conducting the inspection, supported by the certified arborist, will perform a stem count of planted trees and shrubs to determine survival rates. Estimates of groundcover by herbaceous species will be made to verify aerial coverage. Any indications of damage from trespassing or herbivory will be noted. In addition, the certified arborist will assess the apparent vigor of the planted specimens using best professional judgment based on accepted restoration standards and familiarity with local conditions. Any dead trees or shrubs in excess of 20% of the original planting will be replaced to ensure an 80% survival rate, and any herbaceous planting area with less than 100% cover (outside the foliar coverage of the trees) will be supplemented with additional planting and seeding. Recommendations will also be made for supplemental activities such as additional fertilizing or watering, and implementation of measures to reduce herbivory.

TECHNICAL ATTACHMENT I

NATURAL RESOURCE
RESTORATION/ENHANCEMENT ACTIVITIES

During each of the monitoring visits, GE shall also inspect for the presence of invasive species. Invasive species of concern include Amur honeysuckle, Autumn olive, Black locust, Black swallow-wort, Common barberry, Common buckthorn, Garlic mustard, Glossy buckthorn, Goutweed or Bishop's weed, Japanese barberry, Japanese honeysuckle, Japanese knotweed, Morrow's honeysuckle, Morrow's X Tatarian honeysuckle (hybrid), Multiflora rose, Norway maple, Oriental bittersweet, Phragmites - Reed grass, Porcelain berry, Purple loosestrife, Russian olive, Tatarian honeysuckle, and Yellow iris. GE shall ensure that no greater than 5% of any area subject to restoration is covered with invasive species. Invasive species will be removed in an appropriate manner.

GE shall prevent shrub and tree growth in those grassland areas that have been created over engineered barriers or consolidation area/landfill caps through periodic mowing. Mowing will be conducted once every one to three years, and will occur no earlier in the year than August 1.

GE shall inspect the other engineering structures utilized as part of the restoration activities on a yearly basis for three years to ensure their integrity and ability to function. GE will inspect bluebird boxes to ensure that they have not become damaged by storms, tree blowdowns, or vandalism. If the damage is sufficient to render the boxes uninhabitable by bluebirds, then they will be replaced. Rock piles and stumps will be inspected to ensure that major damage from acts such as vandalism have not leveled or relocated the structures. Due to the use of these structures by small mammals for the creation of dens, GE will only conduct maintenance upon the rock piles and stumps (e.g., restacking the rock piles and/or reorienting the stumps) in the case of catastrophic damage to the structures.

For the shallow-water shelf and engineered cap over the scrub-shrub "island" in Silver Lake, GE shall follow the post-implementation monitoring/inspection program specified in Attachment K to the SOW.

GE shall prepare and submit to the Trustees an event-specific report on these inspection, monitoring, and maintenance activities, including the results of the inspections and any maintenance activities performed. The report will be prepared using field notes and other information collected during each of the monitoring visits. The report will include photographic documentation of the conditions of the restoration/enhancement areas. Such

a report shall be submitted to the Trustees, with copies to U.S. Environmental Protection Agency (EPA) and Massachusetts Department of Environmental Protection (MDEP), within 90 days of the inspection.

TECHNICAL ATTACHMENT I

NATURAL RESOURCE
RESTORATION/ENHANCEMENT ACTIVITIES

References

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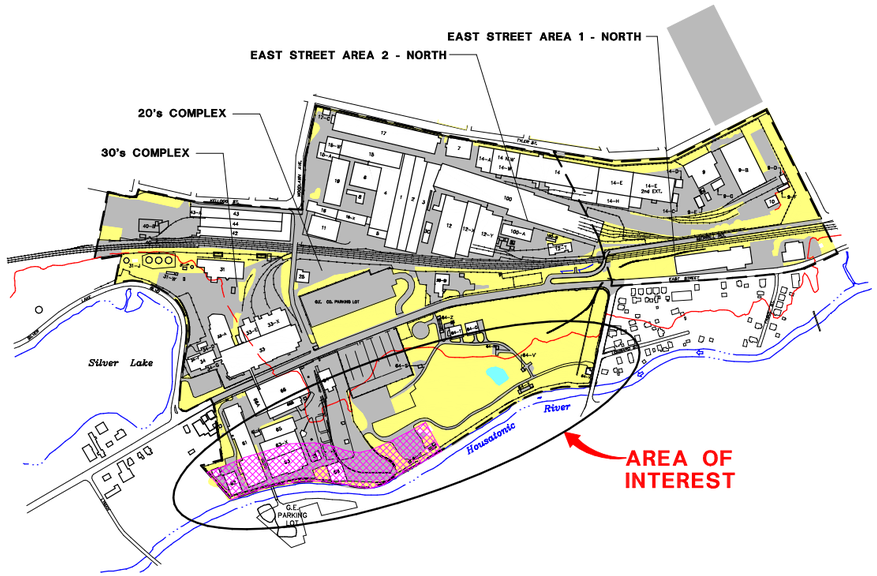


LEGEND:

- FENCE
- 100-YEAR FLOODPLAIN BOUNDARY (DASHED WHERE TOPOGRAPHY IS INFERRED)
- UNPAVED AREA
- PAVED AREA
- WATER
- AREA SUBJECT TO PLANTINGS AS NATURAL RESOURCE RESTORATION/ENHANCEMENT

NOTES:

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. -FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY; AND BLASLAND, BOUCK & LEE, INC. (BBL) CONSTRUCTION PLANS, AND ON OBSERVATIONS DURING A SITE VISIT BY BBL PERSONNNEL ON DECEMBER 3, 1997.
2. SITE BOUNDARIES ARE APPROXIMATE.
3. NOT ALL PHYSICAL FEATURES SHOWN.
4. EXTENT OF PAVED/UNPAVED AREAS IS APPROXIMATE.
5. 100-YEAR FLOODPLAIN BOUNDARY IS BASED ON FLOOD ELEVATIONS PUBLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY: "FLOOD INSURANCE STUDY" - CITY OF PITTSFIELD, MASSACHUSETTS" JANUARY 16, 1987; AND "FLOOD INSURANCE RATE MAP - CITY OF PITTSFIELD, MASSACHUSETTS" (PANELS 250037 0010C AND 25037 0020C), FEBUARY 19, 1982, AND TWO-FOOT CONTOUR TOPOGRAPHIC MAPPING GENERATED PHOTOGRAMETRICALLY IN 1990 AT A BASE SCALE OF 1:2,400.

0 200' 400'

GRAPHIC SCALE

X: 201SRF01.DWG
L: ON=*, OFF=*REF*
P: STD-PCP/D2BL
9/10/99 SYR-54-GMS GMS NES
20140002/20140B01.DWG

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

EAST STREET AREA 2 200-FOOT RIPARIAN REMOVAL ZONE

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
I-1

LYMAN STREET PARKING LOT SUBJECT TO PLANTINGS AS NATURAL RESOURCE RESTORATION/ENHANCEMENT

NEWELL STREET PARKING LOT SUBJECT TO PLANTINGS AS NATURAL RESOURCE RESTORATION/ENHANCEMENT

FORMER OXBOW AREAS A AND C

Silver Lake

East Branch Housatonic River

Hibbard Playground J9-23-26

Deming Park

LEGEND

- EDGE OF WATER
- PAVED ROADWAY
- UNPAVED ROADWAY OR TRAIL
- RAILROAD
- VEGETATION
- PROPERTY BOUNDARY
- J9-23-11 PROPERTY ID
- FORMER OXBOW/DEPRESSION AREA
- PARKING LOT AREAS SUBJECT TO PLANTINGS AS NATURAL RESOURCE RESTORATION/ENHANCEMENT
- PAVED AREA
- GE PARKING LOT
- RECREATIONAL PROPERTY (GE OWNED)
- RECREATIONAL PROPERTY (NON-GE OWNED)
- COMMERCIAL/INDUSTRIAL PROPERTY (NON-GE OWNED)

NOTES:

1. THE BASE MAP FEATURES PRESENTED ON THIS FIGURE WERE PHOTOGRAMMETRICALLY MAPPED FROM APRIL 1990 AERIAL PHOTOGRAPHS.
2. TAX ASSESSORS' PARCEL IDENTIFICATION NUMBERS AND BOUNDARY INFORMATION OBTAINED FROM CITY OF PITTSFIELD'S TAX ASSESSOR'S OFFICE AND IS CURRENT THROUGH SEPTEMBER 5, 1997.
3. PROPERTY USE DESIGNATIONS REFLECT CURRENT AND FORESEEABLE FUTURE USE.

0 200' 400'
GRAPHIC SCALE

X: 101X1X02, 101CHX02.DWG
L: ON=*,OFF=*REF,*FLOOD,*255
P: 101CE-B
9/27/99 SYR-54-GMS KMD NES
20140002/20140B02.DWG

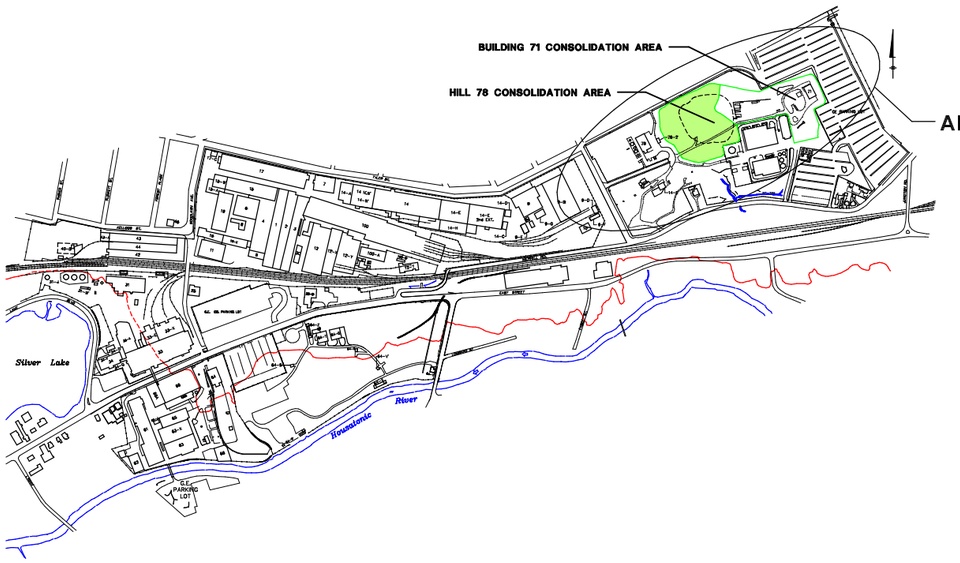
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

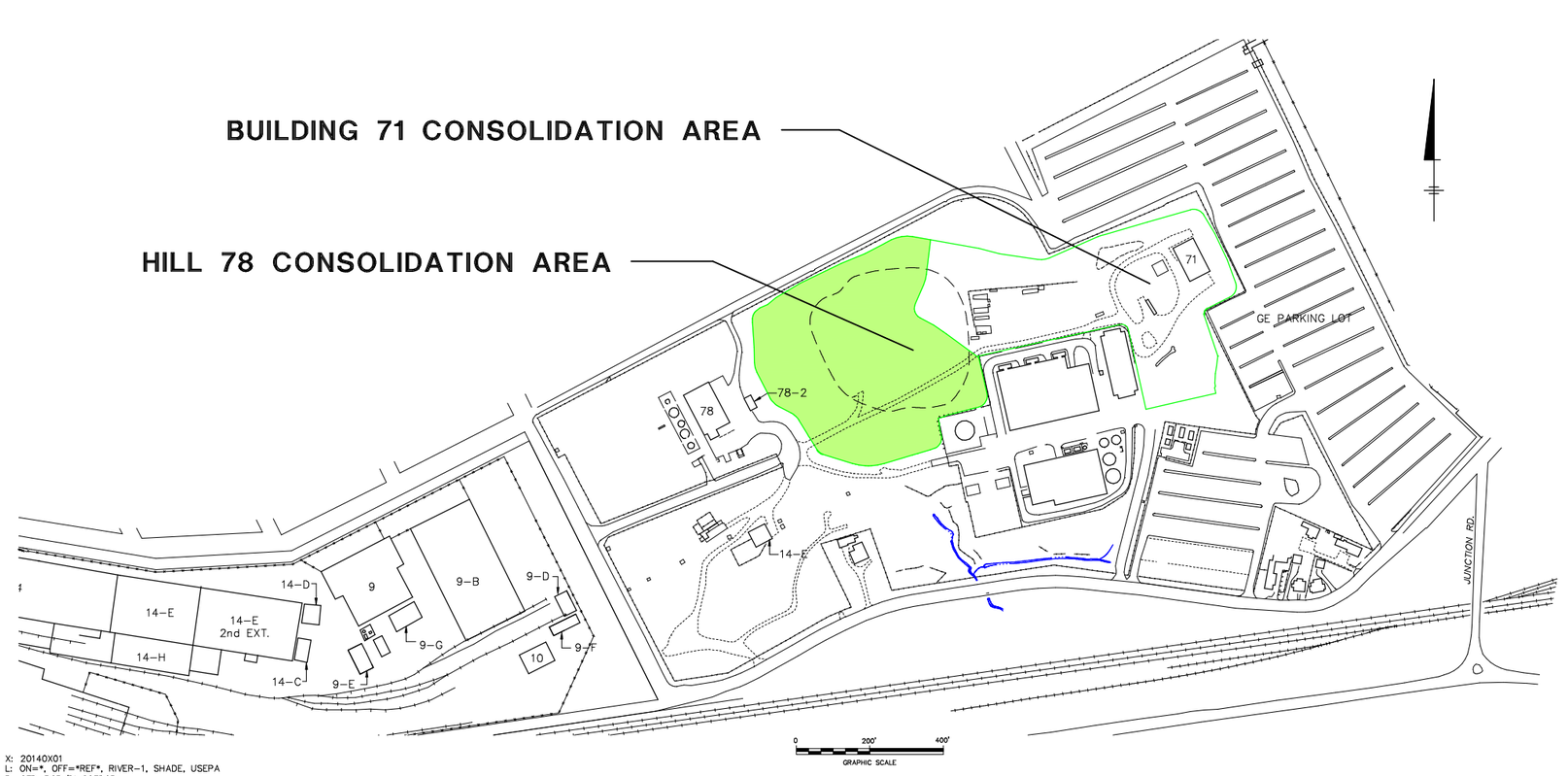
STATEMENT OF WORK FOR REMOVAL ACTIONS OUTSIDE THE RIVER

NEWELL STREET PARKING LOT, LYMAN STREET PARKING LOT, AND FORMER OXBOW AREAS A & C

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE I-2





LEGEND:

- APPROXIMATE AREA OF CANDIDATE CONSOLIDATION LOCATION
- FENCE
- 100-YEAR FLOODPLAIN BOUNDARY (DASHED WHERE INFERRED)
- EDGE OF WATER

NOTES:

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. -FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY; AND BLASLAND, BOUCK & LEE, INC. (BBL) CONSTRUCTION PLANS, AND ON OBSERVATIONS DURING A SITE VISIT BY BBL PERSONNEL ON DECEMBER 3, 1997.
2. SITE BOUNDARIES ARE APPROXIMATE.
3. NOT ALL PHYSICAL FEATURES SHOWN.
4. 100-YEAR FLOODPLAIN BOUNDARY IS BASED ON FLOOD ELEVATIONS PUBLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY: "FLOOD INSURANCE STUDY" - CITY OF PITTSFIELD, MASSACHUSETTS" JANUARY 16, 1987; AND "FLOOD INSURANCE RATE MAP - CITY OF PITTSFIELD, MASSACHUSETTS" (PANELS 250037 0010C AND 25037 0020C), FEBUARY 19, 1982, AND TWO-FOOT CONTOUR TOPOGRAPHIC MAPPING GENERATED PHOTOGRAMETRICALLY IN 1990 AT A BASE SCALE OF 1:2,400.

X: 20140X01
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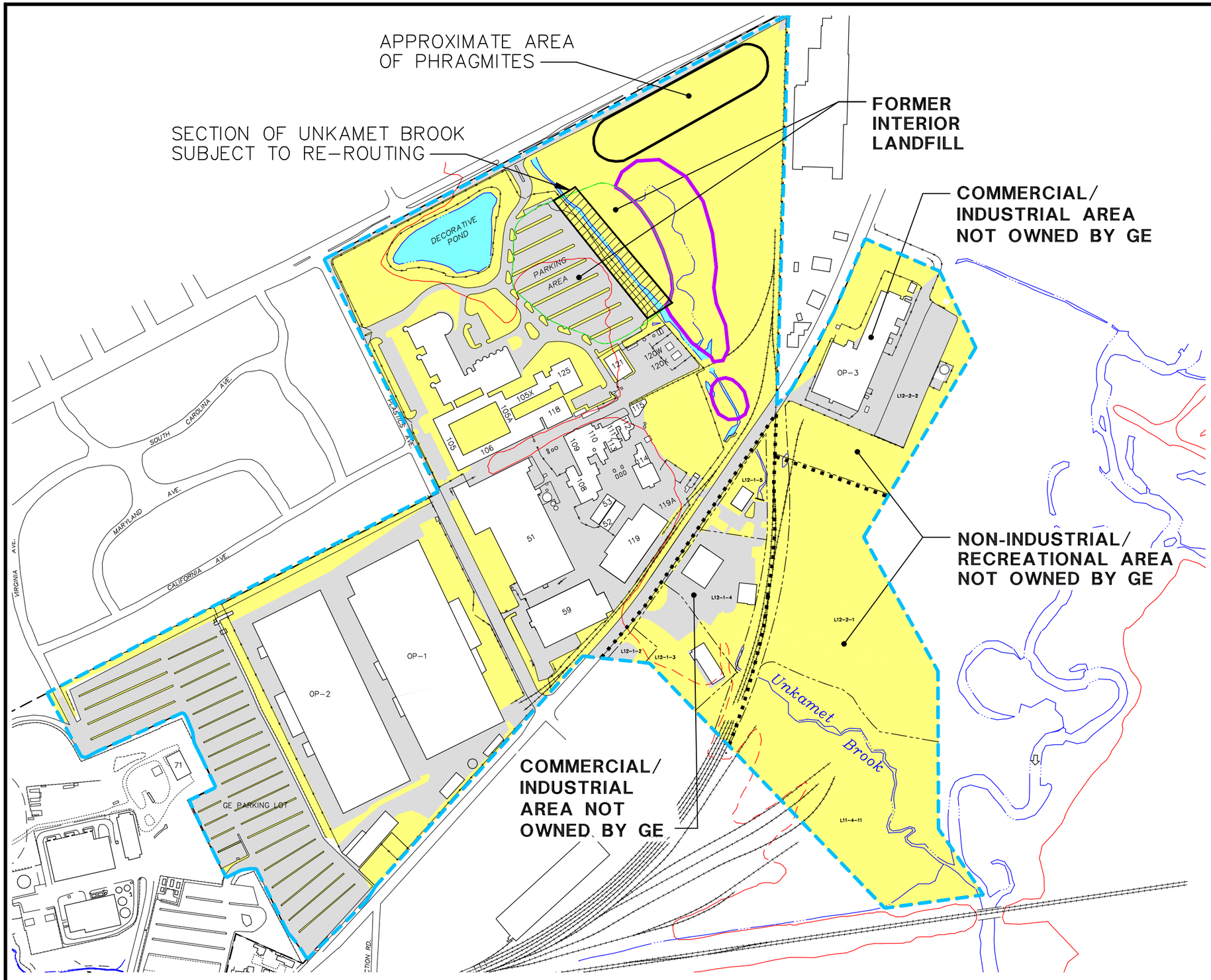
P: STD-PCP/DL,G03D2B
9/10/99 SYR-54-RLP GMS NES
20140003/20140B99.DWG

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
STATEMENT OF WORK FOR REMOVAL ACTIONS OUTSIDE THE RIVER

HILL 78 CONSOLIDATION AREA

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
I-3



LEGEND:

- APPROXIMATE REMOVAL ACTION AREA BOUNDARY
- SUBAREAS OF REMOVAL ACTION AREAS (APPROXIMATE)
- FENCE
- PROPERTY LINE
- L12-2-1 PROPERTY IDENTIFICATION
- 100-YEAR FLOODPLAIN BOUNDARY (DASHED WHERE INFERRED)
- APPROXIMATE PALUSTRINE/EMERGENT WETLANDS BOUNDARY
- UNPAVED AREA
- PAVED AREA
- WATER

NOTES:

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. -FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY; AND BLASLAND, BOUCK & LEE, INC. (BBL) CONSTRUCTION PLANS, AND ON OBSERVATIONS DURING A SITE VISIT BY BBL PERSONAL ON DECEMBER 3, 1997.
2. SITE BOUNDARIES ARE APPROXIMATE.
3. NOT ALL PHYSICAL FEATURES SHOWN.
4. EXTENT OF PAVED/UNPAVED AREAS IS APPROXIMATE.
5. 100-YEAR FLOODPLAIN BOUNDARY IS BASED ON FLOOD ELEVATION PUBLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY: "FLOOD INSURANCE STUDY - CITY OF PITTSFIELD, MASSACHUSETTS" JANUARY 19, 1987; AND "FLOOD INSURANCE RATE MAP - CITY OF PITTSFIELD, MASSACHUSETTS" (PANELS 250037 0010C AND 25037 0020C), FEBRUARY 19, 1982, AND TWO-FOOT CONTOUR TOPOGRAPHIC MAPPING GENERATED PHOTOGRAMETRICALLY IN 1990 AT A BASE SCALE OF 1:2,400.
6. TAX ASSESSORS' PARCEL IDENTIFICATION NUMBERS AND BOUNDARY INFORMATION OBTAINED FROM CITY OF PITTSFIELD'S TAX ASSESSOR'S OFFICE AND IS CURRENT THROUGH SEPTEMBER 5, 1997.

0 400' 800'

GRAPHIC SCALE

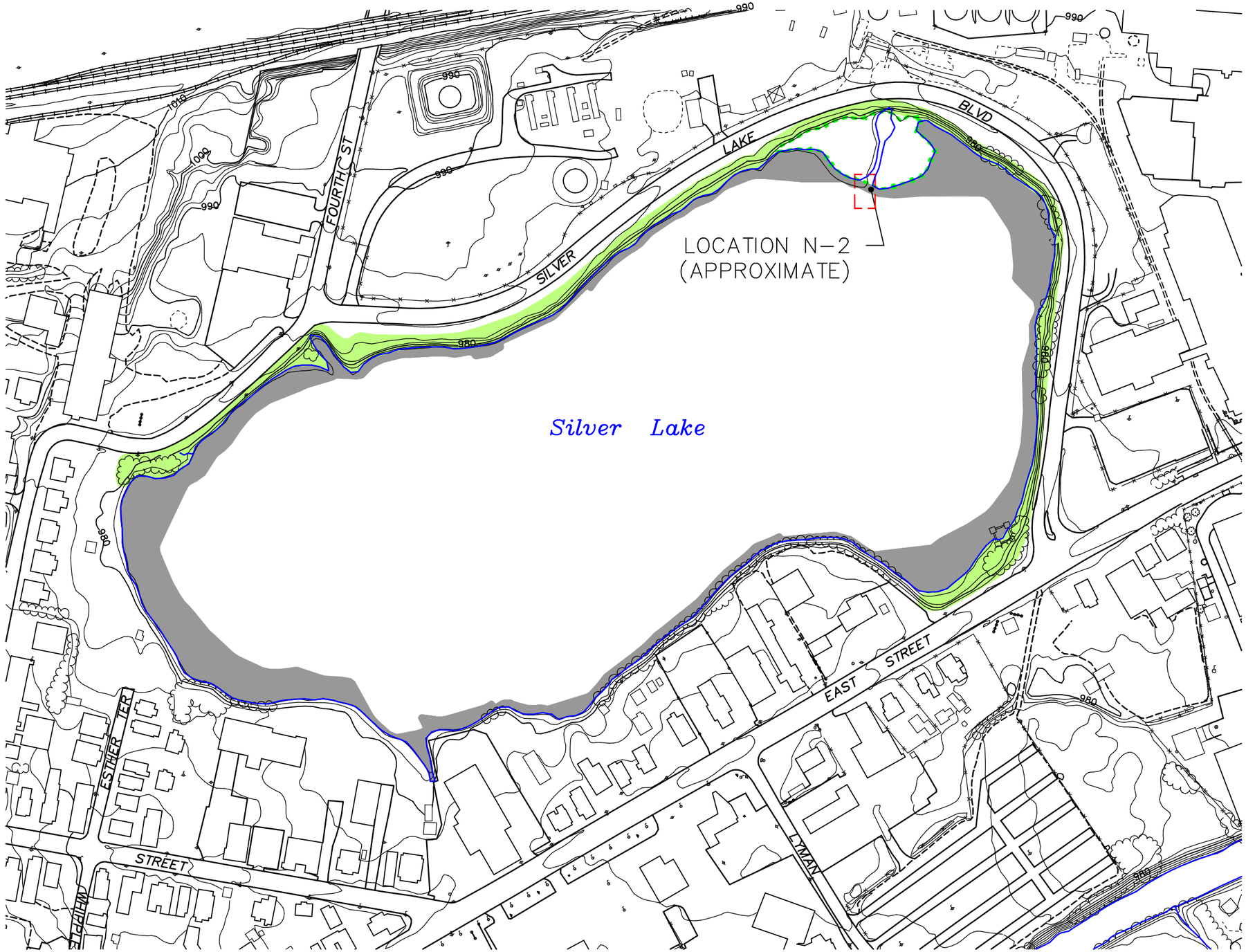
X: 20140X01,201SRF01
L: ON=*, OFF=*REF*
P: STD-PCP/D2BL
9/10/99 SYR-54-GMS GMS NES
20140002/20140B03.DWG

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

UNKAMET BROOK AREA

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE I-4



LEGEND

- EDGE OF WATER
- PAVED ROADWAY
- UNPAVED ROADWAY OR TRAIL
- RAILROAD
- VEGETATION
- APPROXIMATE LOCATION OF DISCRETE SEDIMENT REMOVAL
- APPROXIMATE AREA OF SCRUB-SHRUB ISLAND
- APPROXIMATE AREA SUBJECT TO SHORE-LINE ARMORING
- APPROXIMATE AREA SUBJECT TO TREE PLANTING

NOTES:

1. THE BASE MAP FEATURES PRESENTED ON THIS FIGURE WERE PHOTOGRAMMETRICALLY MAPPED FROM APRIL 1990 AERIAL PHOTOGRAPHS.
2. A WALKING PATH WILL BE INSTALLED ALONG THE NORTHERN AND EASTERN BANKS OF THE LAKE. PICNIC AREAS WILL BE INSTALLED IN TWO SELECTED LOCATIONS ALONG THE NORTHERN AND/OR EASTERN BANKS OF THE LAKE.

0 200' 400'

GRAPHIC SCALE

X: 20140X01, 20142X02.DWG
L: ON=*, OFF=REF
P: RAOR.PCP
9/10/99 SYR-54-GMS KMD NES
20140001/RAOR/20140G01.DWG

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

SILVER LAKE RESTORATION/ ENHANCEMENT PROJECTS

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE I-5

Technical Attachment J

Inspection and Maintenance Activities

TECHNICAL ATTACHMENT J

INSPECTIONS AND MAINTENANCE ACTIVITIES

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TECHNICAL ATTACHMENT J

INSPECTION AND MAINTENANCE ACTIVITIES

1.0 Introduction and Purpose

Following the completion of the construction activities to implement the response actions, GE shall continue to inspect, maintain, and monitor the completed actions and perform repairs and replacement as needed, to ensure that the completed response actions are performing as designed (I/M activities). These activities, to be performed as part of Post-Removal Site Control activities, shall include the periodic inspection and maintenance of the various surface covers and soil replacement measures implemented as part of response actions, inspection and maintenance of certain ancillary components of the response actions, and repair or replacement of response actions at areas exhibiting deficiencies or potential problems. The I/M activities outlined in this attachment shall continue until GE proposes, and EPA approves, modifying or terminating any such activity.

2.0 Description of Inspection/Maintenance Activities

The I/M activities to be performed to maintain the effective performance and integrity of the response actions completed as part of the Removal Actions Outside the River are described below. Further I/M methodology and scope details (including details regarding the manner of conducting the I/M activities so as to protect human health and the environment) shall be presented in the specific Post-Removal Site Control Plans for the Removal Actions in question. These plans will also contain contact information (e.g., names, telephone numbers) for those persons conducting future I/M activities. Further information concerning I/M activities related to groundwater and Natural Resource Restoration/Enhancement activities is presented in Attachments H and I of this SOW respectively.

2.1 Engineered Barriers and Consolidation Area Caps

GE shall conduct I/M activities specific to engineered barriers and consolidation area caps according to generally accepted methods. At a minimum, inspections and monitoring of the barriers and caps shall be performed at least every six months (subject to subsequent EPA approval of a different frequency). A discussion of engineered barrier and consolidation area cap components is provided in Attachment G of this SOW.

TECHNICAL ATTACHMENT J

INSPECTIONS AND MAINTENANCE ACTIVITIES

2.1.1 Engineered Barriers (Vegetated)

The overall integrity of the vegetated engineered barriers shall be assessed during periodic inspections, which shall occur at least every six months (subject to subsequent EPA approval of a different frequency). Vegetated barriers shall be visually inspected for evidence of topsoil erosion, damage to synthetic cover components, uneven settlement relative to the surrounding areas, and overall integrity. The vegetated barriers shall be inspected to verify that vegetation has become established, and bare or sparsely vegetated areas shall be repaired. In addition, the surfaces shall be inspected for deficiencies in the soil layer overlying the synthetic cover components. Deficiencies may be evident as excessive erosion, surface water ponding, depressions, exposed or damaged synthetic cover components, vehicle ruts, or other abnormalities. GE shall perform repairs and replacement at any areas exhibiting deficiencies or potential problems within a time period proposed to and approved by EPA. Ancillary components (e.g., fencing, surface water diversions, etc.)shall also be inspected to verify that these items are intact and functioning properly. GE shall repair or correct any identified damages or deficiencies of such ancillary components.

2.1.2 Engineered Barriers (Asphalt/Concrete) and Enhanced Pavement

The overall condition of asphalt or concrete engineered barriers and enhanced pavement surface covers shall be assessed during periodic inspections, which shall occur at least every six months (subject to subsequent EPA approval of a different frequency). Surfaces shall be visually inspected for excessive cracking, fissures, spalling, or potholes caused by heaving, uneven settlement, and vehicular use. Additionally, the surfaces shall be inspected for evidence of depressions and/or surface water ponding, excessive rutting, or exposed subbase materials, and the condition of perimeter drainage system discharge locations shall be inspected for evidence of blockage. Areas exhibiting deficiencies or potential problems shall be repaired or replaced. Repairs may range from filling cracks or patching asphalt areas to replacement of surface cover components.

TECHNICAL ATTACHMENT J

INSPECTIONS AND MAINTENANCE ACTIVITIES

2.1.3 Consolidation Area Caps

For the on-plant consolidation area caps, GE shall comply with the same inspection, maintenance, and repair requirements set forth in Section 2.1.1 for vegetative engineered barriers. Further details regarding such activities will be provided in Post-Removal Site Control Plans for the on-plant consolidation areas.

2.2 Soil Covers

Where soil covers consisting of compacted soil fill and a vegetated topsoil layer are installed, as described in Attachment J of this SOW, soil cover I/M activities shall be performed at least every six months for the first year following response actions and annually thereafter (subject to subsequent EPA approval of a different frequency). Additional inspections of the soil covers shall be conducted following severe storms (those with 10- to 20- year return periods) to verify that the cover systems have not sustained significant damage.

In particular, soil covers installed at the inundated wetlands at the Unkamet Brook Area shall be periodically monitored to determine whether the soil covers are remaining intact or whether erosion is occurring. If such wetlands remain inundated after installation of the soil cover, soil/sediment surfaces shall be periodically inspected for evidence of erosion due to flow currents, storm-related surges, ice movement, and wave action using visual observations, sequential bathymetric surveys, or other applicable techniques. In areas where monitoring results indicate a decrease in the soil or sediment cover, steps shall be taken to increase the thickness of the soil cover to the original design depth. Large obstructions that may restrict the movement of water (from rainfall, snowmelt, etc.) from migrating into and through the soil cover shall be removed.

Within other areas at which soil covers are installed (including formerly inundated wetland areas that are no longer inundated), soil covers shall be inspected approximately one month after completion of the final restoration activities to visually identify potential problems associated with the response actions, such as settlement or the presence of stressed vegetation. Additionally, during the two-year period following the planting and installation of vegetative material, these areas shall be inspected in April and October of each year to ensure that the vegetation is growing as anticipated and is providing the necessary erosion control. (These inspections

shall be performed in addition to those proposed specifically as part of the Natural Resource Restoration/Enhancement activities covered in Attachment I to this SOW.) If needed, additional planting will be done to replace dead or dying vegetation. Further details regarding replacement vegetation will be presented in the Post-Removal Site Control Plans for the Removal Actions in question. For all soil covers, GE shall perform repairs or replacement at areas exhibiting deficiencies or potential problems. A schedule for such repairs shall be included with the Post-Removal Site Control Plans.

2.3 Other Backfilled/Restored Areas

Response actions at certain RAA locations (e.g., floodplain residential properties) will be completed through soil removal and subsequent property restoration. Restoration activities at such locations will restore the property to its prior condition, to the extent practical and will include backfilling the excavations with soil fill materials and subsequent placement of topsoil and sod to establish vegetative covers. Additional details regarding post-excavation property restoration will be provided in the technical RD/RA deliverables for each Removal Action. I/M activities to be conducted for these vegetated covers shall be identical to those discussed above for soil covers within non-inundated areas. Additionally, if any drainage or growth problems arise due to possible over-compaction of the backfill materials, areas that receive sod shall be aerated after the sod roots are established.

3.0 Other Inspection / Maintenance Activities

Additional I/M activities will include inspection and maintenance of ancillary response action components such as fencing and warning signs. Such inspection shall be conducted periodically, at least every six months (subject to subsequent EPA approval of a different frequency). Other I/M activities may be identified in the specific Post-Removal Site Control Plans .

I/M activities shall be conducted at locations where fencing, other barriers, and warning signs are placed as components of response actions. In addition, for Unkamet Brook, I/M activities shall be conducted to ensure that the active watercourse is not restricted by debris or beaver activity. Inspection of such features shall be conducted as long as the barriers or warning signs are necessary to maintain the completed response actions or

until RAA conditions change rendering such response actions unnecessary as approved by EPA. Fencing and other barriers shall be periodically inspected to ensure that they are intact and effectively limiting access as intended. Any deficiencies noted during I/M activities shall be addressed by repairing or replacing damaged components as necessary. Warning sign locations shall be monitored to verify that warning signs are present, intact, and legible. Missing or damaged signs shall be replaced promptly following I/M activities.

Inspection, monitoring, and maintenance activities associated with response actions at Silver Lake will be conducted in accordance with protocols presented in Attachment K to this SOW (Silver Lake Sediment Response Action Conceptual Design).

4.0 Documentation

Inspection reports shall be prepared every six months at a minimum (subject to subsequent EPA approval of a different frequency), and shall include the following information:

- a description of the type and frequency of inspection and/or monitoring activities conducted;
- a description of any significant modifications to inspection and/or monitoring programs made since the submission of the preceding monitoring report;
- a description of any conditions or problems noted during the inspection and/or monitoring period which are or may be affecting the performance of the response action;
- a description of any measures taken to correct conditions which are affecting the performance of the response action;
- the results of sampling analyses and screening conducted as part of the monitoring and/or inspection program; and
- a description of any measures that may need to be performed to correct any conditions affecting performance of the response actions.

Technical Attachment K

Silver Lake Sediment Response Action Conceptual Design

TECHNICAL ATTACHMENT K

SILVER LAKE SEDIMENT RESPONSE ACTION CONCEPTUAL DESIGN

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1.0 Introduction and Purpose

Pursuant to the Consent Decree and the SOW, GE is required to perform a Removal Action for the Silver Lake Area. That Removal Action will include certain response actions to address the sediments in Silver Lake. This Attachment provides Performance Standards and conceptual design plans for the response actions to address the Silver Lake sediments. It includes: (a) a delineation of the sediments to be removed from the lake near existing sample location N-2; (b) a general description of the capping system to be installed over the bottom of Silver Lake, including identification of Preliminary Response Action Goals (PRAGs), minimum design standards to achieve those PRAGs, a modeling-based demonstration that a cap meeting those design standards should achieve the PRAGs over time, and a description of the additional pre-design investigations needed for the design of the cap; and (c) a conceptual description of the periodic monitoring to be conducted by GE to address the effectiveness of the cap in meeting the design standards. Following the performance of additional pre-design investigations (to be described in the Pre-Design Work Plan for this RAA), more specific and detailed design plans and parameters for the sediment-related response activities at Silver Lake will be presented in RD/RA submittals for the Silver Lake Area Removal Action, as outlined in the SOW.

In accordance with the Consent Decree and the SOW, the Performance Standards for Silver Lake sediments consist of the following:

a. GE shall remove a maximum of 400 in situ cubic yards of sediments from the area associated with existing sample location N-2 in the vicinity of the existing outfall from the GE Plant Area to the lake, as generally depicted on Figure K-1 of this attachment. Following removal, GE shall replace the removed sediments and restore and vegetate that portion of the affected area that is not underwater, in coordination with the installation of a sediment cap for the entire lake bottom and the implementation of certain natural resource restoration/enhancement activities in the lake, as described below.

b. GE shall install a cap over the entire bottom of Silver Lake. This cap shall achieve the following minimum design standards, which have been developed to achieve, over time, specific risk-based PRAGs, as described in this attachment:

(i) The cap shall include an isolation layer positioned directly above the sediments over the entire lake bottom. This layer shall consist of silty sand, with a presumptive thickness of 10 inches, if geotextile is placed between the sediments and the cap (or 12 inches, installed in two six-inch lifts, if a geotextile is not placed between the sediments and the cap), an organic carbon content of 0.5 percent (as total organic carbon), and concentrations of PCBs at non-detectable levels and other constituents at background levels, as approved by EPA. (The presumptive thickness of the cap is based on use of a 6-inch isolation layer to control PCB migration from the underlying sediments into the surface water of the lake, plus an additional 4 inches of silty sand if geotextile is placed between the sediments and the cap (or an additional 6 inches if such a geotextile is not used), to account for uncertainties associated with bioturbation. GE shall perform pre-design investigations to confirm the design parameters which support the above presumptive thickness and organic carbon content of the isolation layer. If those pre-design investigations confirm the design assumptions presented in this Attachment, then the isolation layer will consist of a silty sand layer with a thickness of 10 inches, if geotextile is placed between the sediments and the cap (or 12 inches, installed in two six-inch lifts, if a geotextile is not placed between the sediments and the cap), and an organic content of 0.5 percent (as total organic carbon). If the pre-design investigations indicate that a thicker cap and/or a higher organic content is necessary, then the cap thickness and/or organic content will be modified using revised input parameters based on the results of the pre-design investigations and the procedures/equations presented in Exhibit K-1. GE shall ensure that the design cap thickness is achieved over the entire bottom of the lake.

(ii) The capping system shall also include an overlying armoring layer of stone, incorporated along the shoreline as necessary to prevent erosion of the isolation layer due to wind-induced wave action.

c. Following sediment removal and capping, GE shall conduct natural resource restoration and habitat enhancement activities at Silver Lake, as described in Attachment I to the SOW.

d. As part of Post-Removal Site Control activities, GE shall conduct periodic inspections and monitoring to assess the effectiveness of the cap in meeting the specified design standards. These activities shall include monitoring of the cap to ensure maintenance of the design cap thickness, sampling of the isolation layer to monitor its long-term effectiveness in controlling PCB migration from the underlying sediments, and monitoring of the shoreline armor layer to ensure that it is effectively preventing erosion.

(i) If the periodic inspections and monitoring of the cap thickness and the shoreline armoring layer indicate that the design standards for those components of the capping system are not achieved or maintained, GE shall evaluate and propose to EPA appropriate corrective actions to achieve those design standards, and shall implement such corrective actions upon approval by EPA.

(ii) If the sampling of the isolation layer indicates that that layer is not performing in general accordance with the predictions on which the isolation layer design was based in terms of controlling PCB migration from the underlying sediments into the surface water of the lake, GE shall evaluate corrective actions and submit the results of such evaluation to EPA for approval, and shall implement such corrective actions, if any, upon approval by EPA.

(iii) If these periodic inspection/monitoring activities indicate that the capping system is continuing to achieve the design standards and is performing as generally predicted in

terms of controlling PCB migration from the underlying sediments into the surface water of the lake, then no further response actions shall be necessary for the isolation layer or shoreline armoring layer, except for any required activities to address erosion as described in Section 5.0 of this Attachment and except as otherwise required pursuant to Section XIX (Emergency Response) or Paragraphs 162, 163, 167, and/or 168 (re-openers) of the Consent Decree.

e. In addition, if the periodic sampling of the cap indicates the deposition of PCBs on the surface of the cap (as opposed to migration of PCBs through the cap from the underlying sediments), GE shall evaluate, to the extent practical, whether such PCBs are attributable to sources other than erosion or surface runoff from the banks or currently known discharges of PCBs into the lake from NPDES-permitted or other outfalls. If the surface PCBs can be attributed to such other sources and such sources are located within property owned by GE, GE shall evaluate potential source control measures and shall submit a report on such evaluation, along with a recommendation for any appropriate source control measures, to EPA for review and approval. Otherwise, no further response actions shall be required to address such deposition of PCBs on the surface of the cap, except for any required activities to address erosion as described in Section 5 of this Attachment and except as otherwise required pursuant to Section XIX (Emergency Response) or Paragraphs 162, 163, 167, and/or 168 (re-openers) of the Consent Decree.

2.0 Overview of Sediment and Surface Water Characteristics

Silver Lake is described in Section 2.1 of the SOW. Numerous investigations have previously been performed at this RAA. The results of these investigations are summarized in GE's *Supplemental Phase II/RCRA Facility Investigation Report for Housatonic River and Silver Lake* (Blasland, Bouck & Lee, Inc., January 1996).

In general, the sediments of Silver Lake are characterized as consisting of predominantly silts (approximately 72% silts, 22% medium to fine sands, and 6% clays) with relatively high organic content (averaging approximately

9.6% based on total organic carbon content). Bulk density of these materials averages approximately 71 pounds per cubic foot, while specific gravity averages approximately 2.4. Based on the results of geochronological dating performed on 63 sediment samples obtained from several locations in the lake, sedimentation rates within the lake are shown to range from 0.2 to 0.5 inches per year. More than 200 sediment samples have been collected from Silver Lake and analyzed for PCBs. The results of these analyses indicate PCB concentrations in lake sediments at concentrations up to 20,700 ppm and averaging approximately 330 ppm (based on spatial average of all samples obtained from the upper 1 foot of sediment, excluding those proposed for removal, e.g., 20,700 ppm). Aroclor 1254 is found to be the principal Aroclor detected (averaging approximately 57% of the total), with Aroclors 1242 and 1260 also being detected (each averaging about 21% of the total).

A total of 12 sediment samples obtained from Silver Lake have also been analyzed for other Appendix IX+3 constituents. The results of these analyses indicate the presence, at varying concentrations, of various semivolatile organic constituents (SVOCs) (particularly polycyclic aromatic hydrocarbons), polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), inorganics, pesticides, and herbicides.

In addition to the sediment sampling, a total of eight surface water samples were collected in 1995 from locations within the lake as well at the lake's outfall to the Housatonic River under both high- and low-flow conditions (four samples under high flow; four samples under low-flow) and analyzed for volatile organic constituents (VOCs), SVOCs, PCBs, and inorganics. In summary, the majority of these constituents were either reported as non-detect or near or below detection or quantitation limits. PCBs were detected in all the lake water samples at concentrations ranging from 0.00014 ppm to 0.00034 ppm. Diethylphthalate was detected in one sample, but at a concentration just above the quantitation limit (detected at 0.068 ppm). Lead, zinc, and sulfide were detected in the lake water at concentrations up to 0.0084 ppm, 0.0312 ppm, and 5.7 ppm, respectively.

In addition to prior surface water analytical data, an analysis of the lake's mixing characteristics was performed in December 1994. This analysis consisted of the collection of water-column velocity profiles at 20 locations, based on a standard grid system layout. At each grid location, water-column velocities and information on flow direction were collected at 1-foot depth increments until the surface of bottom sediments was encountered. The results of this analysis indicated only very limited flow currents in the lake.

3.0 Sediment Removal Activities

As part of the response actions for the Silver Lake sediments, GE shall remove sediments from a specific area associated with existing sample location N-2, where a PCB concentration of 20,700 ppm was detected. This location is situated in the vicinity of the existing outfall from the GE facility in the northeast corner of the lake. The horizontal limits of sediments to be removed from this area are generally depicted on Figure K-1. GE shall perform additional sediment sampling in this area (in accordance with the Pre-Design Work Plan) to allow specific identification of the sediment area and depth to be removed. The sampling results and GE's proposed removal area and depth will be submitted to EPA for approval prior to implementation. The maximum in situ sediment volume to be removed in this area will be 400 cubic yards.

In general, GE's removal of these sediments will involve use of conventional construction equipment, with subsequent placement of the removed sediment in a temporary stockpile area to allow for gravity drainage. The water collected at the temporary stockpile area is anticipated to be transported to GE's Building 64G groundwater treatment facility for treatment. Once the excavated sediments have sufficiently drained, they will be placed in a permanent on-plant consolidation area at the GE Plant Area.

Following removal, GE shall backfill the excavation area and cover that area with a cap consistent with the cap to be used for the remainder of the lake bottom (described in Section 4 below).

More details regarding the sediment removal and backfilling activities will be presented in the RD/RA submittals for the Silver Lake Area Removal Action.

4.0 Sediment Capping

GE shall install a cap over the entire lake bottom (26 acres) to isolate the PCBs and other Appendix IX+3 constituents present in the Silver Lake sediments and thus to prevent direct contact of humans and ecological receptors with such sediments and to minimize the migration of such constituents to the water column. A

properly designed, constructed, and maintained capping system is highly effective in isolating the affected sediments and minimizing the potential for: (a) resuspension of PCB-containing sediments into the water column; (b) desorption of PCBs from the sediments into the water column; and (c) direct contact of human and ecological receptors with the affected sediments.

Conceptual design standards have been developed for the cap, which are predicted to achieve, over time, specified risk-based PRAGs for the surface water of the lake and the cap material. These PRAGs and design standards are described in the following sections.

4.1 Identification of Preliminary Response Action Goals

Solely for purposes of developing design standards for the Silver Lake cap (and not to be considered a precedent for any other area of the Pittsfield/Housatonic River Site), the PRAGs for PCBs are to:

(a) Establish and maintain a physical exposure barrier (i.e., a cap) consisting of "clean" material over the PCBs in the sediments;

(b) Prevent the migration of PCBs from the sediments through the cap to the water column of the lake for the foreseeable future; and

(c) Prevent the erosion or physical displacement of sediments or capping materials in those areas potentially subject to wind-induced wave action and man-made discharges along the shoreline of the lake.

For a capping system that is properly designed, implemented and maintained, these PRAGs are protective of human health and the environment because they will ensure that human and ecological receptors will not be exposed to PCBs in the underlying sediments and that the cap will prevent the migration of PCBs from the underlying sediments to the lake water for the foreseeable future.

For other Appendix IX+3 constituents, the existing surface water data for Silver Lake and the Housatonic River, presented in the *Supplemental Phase II/RCRA Facility Investigation Report for Housatonic River and Silver Lake* (Jan. 1996), have been reviewed. This review indicates that the concentrations of the four constituents that have been detected in the lake water at concentrations above quantitation limits (i.e., diethylphthalate, lead, zinc, and sulfide, as discussed in Section 2 above) are within the same general range or order of magnitude as the site-specific "background" concentrations of these constituents -- i.e., the concentrations in Housatonic River water upstream of the GE Plant site. Also, the cap to be placed over the underlying sediments of the lake will likely further reduce the potential contribution of these constituents to the surface water of the lake from the underlying sediments, thus further decreasing the surface water concentrations of these constituents. As such, specific PRAGs have not been established for these constituents in surface water. Similarly, for sediments, the cap to be installed will provide an exposure barrier to the other Appendix IX+3 constituents (as well as PCBs) in the existing sediments, and that cap will consist of material that is shown to contain acceptable (e.g., non-detectable or background) concentrations of such constituents, as approved by EPA. Hence, specific PRAGs have not been established for such constituents on the capped surface of the lake bottom.

For these reasons, the cap has been designed to achieve the above-referenced PRAGs for PCBs.

4.2 Cap Design Standards

The sediment capping system to be installed at Silver Lake shall consist of two components:

(a) An isolation layer positioned directly above the sediments over the entire lake bottom, consisting of silty sand, with a presumptive thickness of 10 inches, if geotextile is placed between the sediments and the cap (or 12 inches, installed in two six-inch lifts, if a geotextile is not placed between the sediments and the cap), a minimum organic carbon content of 0.5 percent (as total organic carbon), and concentrations of PCBs at non-detectable levels and other chemicals at background levels, as approved by EPA. The presumptive thickness of the cap is based on use of a 6-inch isolation layer to control PCB migration from the underlying sediments into the surface water of the lake, plus an additional 4 inches of silty sand if geotextile is placed between

the sediments and the cap (or an additional 6 inches if such a geotextile is not used), to account for uncertainties associated with bioturbation. (As discussed further below, the presumptive thickness and minimum organic carbon content of the isolation layer are subject to modification to the extent that the pre-design investigations indicate the need for modification of the design assumptions presented in this Attachment, using the same procedures and equations presented in Exhibit K-1).

(b) An overlying armoring layer of stone, incorporated along the shoreline as necessary to prevent erosion of the isolation layer, otherwise caused by wind-induced wave action.

A general discussion of these cap components, is presented below and shall be further evaluated in the Pre-Design Work Plan for this RAA. In addition, during further design activities for the cap, GE shall consider the feasibility and usefulness of installing a geotextile layer over all or a portion of the sediments prior to installation of the sand isolation layer and the feasibility and usefulness of installing a geotextile layer over the isolation layer prior to placement of the armor layer. As noted above, if a geotextile is placed beneath the isolation layer, the additional silty sand to be placed over the basic 6-inch isolation layer will have a presumptive thickness of four inches; whereas if a geotextile is not placed beneath the isolation layer, that additional cap thickness will be six inches.

4.3 Discussion and Evaluation of Capping System

4.3.1 Isolation Layer Evaluation

The presence of an isolation layer (as part of an overall capping system) provides a long-term reduction of PCB flux (i.e., migration) from the sediment into the water column and addresses the following physicochemical processes that contribute to the migration/transfer of PCBs:

(a) Molecular diffusion (in the absence of groundwater flow); and

(b) Advection/dispersion (in response to groundwater flow through the sediment).

The isolation layer addresses these processes by increasing the transport length necessary for PCBs to reach the cap-water interface, and by increasing the availability of materials for sorptive processes to occur, retarding this transport process. The ability to isolate the PCBs increases with both thickness and organic carbon content of the cap.

With respect to the use of a capping system for Silver Lake, the principles discussed above have been evaluated through predictive mathematical modeling. Modeling has the ability to evaluate the comparative effectiveness of various capping layer configurations. While modeling of a capping system is typically performed as part of detailed evaluation or design activities, a preliminary evaluation of the isolation layer configuration has been performed as part of this conceptual design.

The assessment of the isolation layer configuration described above involves a comparative evaluation between existing and predicted post-capping conditions. To conduct this preliminary evaluation, several parameters were initially established, including the existing sediment conditions for Silver Lake and the potential isolation layer configuration. Sediment-related parameters selected for this evaluation were based on existing data, while the initial isolation layer parameters were based on the cap design standards described in Section 4.2 (excluding the placement of additional silty sand to account for uncertainties associated with bioturbation). A summary of the evaluation is presented below. Additional details regarding the mathematical model and its use are presented in Exhibit K-1 to this attachment.

Existing Conditions

PCB Concentration -	330 ppm as Aroclor 1254 (based on the spatial average measured PCB concentration in the top foot of sediments excluding the sediments to be removed from the area near location N-2).
Total Organic Carbon -	9 percent (based on the arithmetic average TOC concentrations)

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Isolation Layer Configuration

Thickness and particle size - 6 inches of silty sand, determined to be "clean" material and approved by EPA

Organic content - 0.5 percent (as TOC)

Through various techniques, as further detailed in Exhibit K-1, the transport of PCBs via diffusion and advection/dispersion from the sediment into the water column was estimated. The effectiveness of the selected isolation layer configuration was then evaluated using two primary criteria. The first criterion is the time during which the isolation layer eliminates the release of PCBs to the water column. During this period of time, the isolation layer materials are capable of absorbing any PCBs that are released or disturbed from the sediment. The second evaluation criterion was the ultimate reduction in flux of PCBs released from the sediments into the water column.

Without considering the additional PCB sorptive capacity and increased transport length related to the deposition of new sediment on top of the cap, the results of the modeling efforts indicate PCB breakthrough times to be greater than 170 years for the isolation layer configuration described above. This estimated breakthrough time is not dependent on the concentration of PCBs in the underlying sediments, and hence would not be decreased even for the sediment PCB concentrations higher than the average used in this analysis. Further, although initial placement of the cap will result in some degree of compression, the effect of compression on breakthrough time will be insignificant. For example, if the cap placement results in 1 meter of compression, this would reduce the breakthrough time by approximately 1 year. Additional information regarding the assumptions, calculations, and other parameters utilized in this preliminary evaluation is presented in Exhibit K-1.

As previously noted, not accounted for in the breakthrough calculations is the effect of the deposition of new sediment on top of the cap. This new material will serve to further isolate the sediment from the water column. When the deposition of new sediments is taken into account (on the order of 0.2" to 0.5" per year, based on existing Silver Lake data), the isolation layer will prevent breakthrough indefinitely.

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The results of this evaluation demonstrate that a properly installed isolation layer of silty sand with a minimum thickness of six inches and a minimum organic carbon content of 0.5 percent will prevent the release of PCBs from the underlying sediments into the water column of the lake indefinitely.

In addition, by providing a layer of "clean" material over the existing sediments, this cap, in conjunction with the placement of the armor layer along the shoreline, will provide an effective barrier to potential contact by human and ecological receptors with the PCBs and other constituents in the underlying sediments. Along the shoreline of the lake, where wading may occur, potential contact with the underlying sediments will be prevented by the cap and the half-foot to one-foot armor layer of rough stone extending into the lake, as described in Section 4.3.2 below. As for the deeper portions of the lake, which will not likely be subject to human contact, GE believes that a 6-inch isolation layer would provide adequate protection for potential ecological contact caused by bioturbation. Bioturbation is the sediment processing by aquatic organisms during burrowing, feeding, movement, respiratory, and excremental activities. Bioturbation may affect the physical and chemical processes that occur in sediments (McCall & Fisher, 1980), and may result in the vertical and horizontal movement of sediment and pore water. Bioturbation as it relates to Silver Lake cap design is discussed in greater detail in Exhibit K-1. The coarser nature of the silty sand cap as well as the continued sediment deposition over time will provide separation between the PCB movement through the cap and the layer of bioturbation. If a geotextile is placed over the sediments prior to placement of the isolation layer, that geotextile would provide further protection preventing any direct contact by biological receptors with the underlying sediments.

Nevertheless, to account for uncertainties associated with bioturbation, an additional four inches of silty sand will be added to the basic isolation layer thickness (as determined by the pre-design investigations) if geotextile is placed between the sediments and the cap, or an additional six inches will be added if a geotextile is not placed between the sediments and the cap.

These evaluations thus demonstrate the effectiveness of the isolation layer to achieve the PRAGs related to potential direct contact and to potential migration of PCBs from the sediments to the water column.

4.3.2 Armoring Layer Evaluation

As discussed above, the capping system will include an isolation layer to prevent PCB migration from the underlying sediments and exposure to humans and biological receptors. However, the isolation layer alone may not be capable of withstanding potential erosional effects caused by wind-induced wave action or ice movement along the shoreline of the lake. To protect the isolation layer from these forces, an erosion control layer will be installed on top of the isolation layer along the shoreline. The characteristics of the erosion control layer (i.e., stone weight, layer thickness, and extent of armor placement) have been designed based on protection against the maximum anticipated wind-induced wave height. According to the U.S. Army Corps of Engineers Shore Protection Manual (USACE, 1984), shore structures are typically subject to wave forces comparable in magnitude to the maximum probable pressure that might be developed by an ice sheet. As the maximum wave forces and ice thrust cannot occur at the same time, usually no special allowance is made for ice thrust (USACE, 1984). Hence, no special allowances for ice movement were made in the design of the Silver Lake erosion control layer. Further details regarding the calculations and assumptions used in the preliminary design of the erosion control layer are presented in Exhibit K-2.

As described in Exhibit K-2, based on a number of conservative assumptions regarding maximum wind speed in Pittsfield, maximum wind stress at Silver Lake, and other pertinent parameters, the maximum wind-induced wave height at Silver Lake was calculated for two specific wind conditions. Along the predominant wind direction (west-east), the maximum wind-induced wave height is calculated to be 1.6 feet. Perpendicular to predominant wind direction, the maximum wind-induced wave height is calculated to be 0.65 feet. To prevent erosion of the isolation layer in response to such wave action, rough, angular quarry stone would need to be placed around the entire perimeter of Silver Lake. Based on the design calculations, a 10-pound stone layer 0.9 foot thick is necessary along the east and west shores to adequately prevent erosion. This stone layer should extend into the lake to a mean water depth of approximately 5.3 feet. Due to the anticipated smaller wave heights along the north and south shores of the lake, a 1-pound stone layer approximately 0.4 feet thick is required along these shores. Although the calculations presented in Exhibit K-2 indicate that the depth to which armor stone must be placed along these shores is 1.87 feet, a more conservative depth of 2.5 feet will be used. The protectiveness of this armor layer against erosion due to wind-induced wave action is demonstrated in Exhibit

K-2. Accordingly, GE shall place the stone armor layer around the perimeter of the lake in accordance with these specifications.

4.3.3 Pre-Design Activities

GE shall submit, for EPA review and approval, a Pre-Design Work Plan that will identify additional pre-design investigations necessary to produce detailed plans for completing the response activities at Silver Lake. The Pre-Design Work Plan will also identify activities to evaluate the existing conditions in Silver Lake, confirm the assumptions underlying the cap design described herein or assist in evaluating other cap configurations, and investigate various methods of cap placement that would result in the least amount of disturbance to the existing sediments.

The geotechnical portion of the pre-design investigation sampling program will have three major goals, including profiling of soft sediment thickness, characterization of surficial sediment, and characterization of deeper sediments. The characterization of the surficial sediment will assist in analysis of initial cap placement techniques, while the characterization of deeper sediments is necessary to evaluate long-term consolidation. Specific geotechnical tests will include tests of water and organic content, Atterberg limits, particle size, specific gravity, and bulk density. The pre-design investigations will also include an identification of underwater obstacles that could impact placement of the cap system.

In addition, a water budget for Silver Lake will be developed, and pore water sampling for subsequent PCB and DOC analysis will be conducted. The water budget will help define the rate and direction of groundwater flow. Analysis of pore water can be used to evaluate partitioning and transport of PCBs within the sediments and the cap.

The proposed sample locations and parameters to be tested are depicted on Figure K-1 and Table K-1, respectively.

If the pre-design investigations confirm the design assumptions presented in this Attachment for the isolation layer, then the isolation layer will consist of silty sand with a thickness of 10 inches, if geotextile is placed between the sediments and the cap (or 12 inches, installed in two six-inch lifts, if a geotextile is not placed between the sediments and the cap), with an organic content of 0.5 percent (as total organic carbon). If the pre-design investigations indicate that a thicker cap and/or a higher organic content is necessary, then the cap thickness and/or organic content will be modified using revised input parameters based on the results of the pre-design investigations and the procedures/equations presented in Exhibit K-1.

4.3.4 Incorporation of Natural Resource Restoration/Enhancement Projects

The detailed design and the implementation of the Silver Lake capping system, including both the isolation layer and the shoreline armoring layer, shall be coordinated with and incorporate the natural resource restoration/enhancement activities related to the Silver Lake sediments, as described in Attachment I to the SOW -- namely, the construction of a shallow-water shelf along the shorelines of the lake and the restoration and enhancement of the shrub-scrub “island” (which actually consists of two peninsulas) in the northeast portion of the lake.

5.0 Periodic Inspections and Monitoring To Assess Effectiveness of Cap

As part of Post-Removal Site Control Activities, GE shall prepare and submit for EPA approval a Post-Removal Site Control Plan. The Post-Removal Site Control Plan shall specify the sampling and monitoring program that GE will implement to ensure that the cap system meets the design standards. This Plan shall specify the sample locations and sampling and monitoring procedures to be followed, the analysis program that will be followed, the Data Quality Objectives and QA/QC procedures that will be followed, the criteria for corrective action (in accordance with this Attachment), and a cap maintenance program. Under this plan, GE shall conduct periodic inspection and monitoring activities to assess the effectiveness of the cap system to meet the specified design standards. These activities shall include monitoring of the cap to ensure maintenance of the design cap thickness (as approved in the Pre-Design Report), sampling of the isolation layer to monitor its long-term effectiveness in

effectively controlling PCB migration from the underlying sediments, and monitoring of the shoreline armor layer to ensure that it is effectively preventing erosion. The monitoring of the cap thickness shall include grid-based bathymetric surveys and/or the use of cap thickness and sedimentation gauges, as well as diver inspections. The monitoring of the isolation layer shall include sampling of the cap at a maximum of 10 locations with samples obtained from one or more depth increments within the isolation layer (to be specified in the Post-Removal Site Control Plan) with analysis for PCBs in sediment. The monitoring of the shoreline armoring system shall consist of inspections of that system to assess the effects (if any) of shoreline wave or ice action over time on the sediment cap along the shoreline.

For the first five years after the cap system is installed, GE shall conduct the monitoring/inspections of the cap thickness at least annually, and shall conduct the inspections of the shoreline armoring system at least semi-annually. With respect to sampling of the isolation layer, GE shall sample the cap at the specified locations immediately after cap placement and then after the first year and the fifth year after cap placement. At the end of this initial five-year period, GE shall propose to EPA an appropriate long-term monitoring frequency, as well as any other modifications to the monitoring/inspection program, and shall implement that long-term monitoring/inspection program upon approval by EPA.

In addition, to further assess the present sedimentation rate in the lake, GE will install sediment traps in five locations and measure the thickness of sediment that settles in the traps annually for two years following cap construction. The thickness of sediment in the traps will be measured with no other analytical work to be performed.

If the periodic inspections and monitoring of the cap thickness and the armoring isolation layer indicate that the design standards for those components of the capping system are not achieved or maintained, GE shall evaluate and propose to EPA appropriate corrective action to achieve those design standards and shall implement such action upon approval by EPA. If the sampling of the isolation layer indicates that that layer is not performing in general accordance with the predictions on which the cap design was based in terms of effectively controlling migration of PCBs from the underlying sediments through that layer into the surface water of the lake, GE shall evaluate appropriate corrective measures, shall submit the results of such evaluation to EPA for approval, and

shall implement such corrective actions, if any, upon approval by EPA. If the monitoring of the shoreline armoring system reveals significant erosion of the shoreline (e.g., ruts, gullies, washouts or sloughing), or if such significant erosion is otherwise identified by GE in coordination with EPA, GE shall, upon EPA approval, repair the erosion areas and remove eroded soils from the lake to the extent practicable. If these periodic inspection/monitoring activities indicate that the design standards continue to be achieved and maintained and that the isolation layer is performing as generally predicted in terms of effectively controlling PCB migration from the underlying sediments into the surface water of the lake, then no further response actions shall be required for the isolation layer, except for any required activities to address erosion as described above and and shoreline armoring layer except as otherwise required pursuant to Section XIX (Emergency Response) or Paragraphs 162, 163, 167, and/or 168 (re-openers) of the Consent Decree.

If the sampling of the isolation layer indicates the deposition of PCBs on the surface of the cap (as opposed to migration of PCBs through the cap from the underlying sediments), GE shall evaluate, to the extent practical, whether such PCBs are attributable to sources other than erosion or surface runoff from the banks or currently known discharges of PCBs into the lake from NPDES-permitted or other outfalls. If the surface PCBs can be attributed to such other sources and such sources are located within property owned by GE, GE shall evaluate potential source control measures and shall submit a report on such evaluation to EPA, along with a recommendation for any appropriate source control measures. Otherwise, no further response action shall be required to address the deposition of PCBs on the surface of the cap, except for any activities required to address erosion as described above and except as otherwise required pursuant to Section XIX or (Emergency Response) or Paragraphs 162, 163, 167, and/or 168 (re-openers) of the Consent Decree.

Further details regarding future monitoring and Post-Removal Site Control Activities will be provided in subsequent RD/RA submittals for the Silver Lake RAA.

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SILVER LAKE SEDIMENT RESPONSE ACTION CONCEPTUAL DESIGN

References

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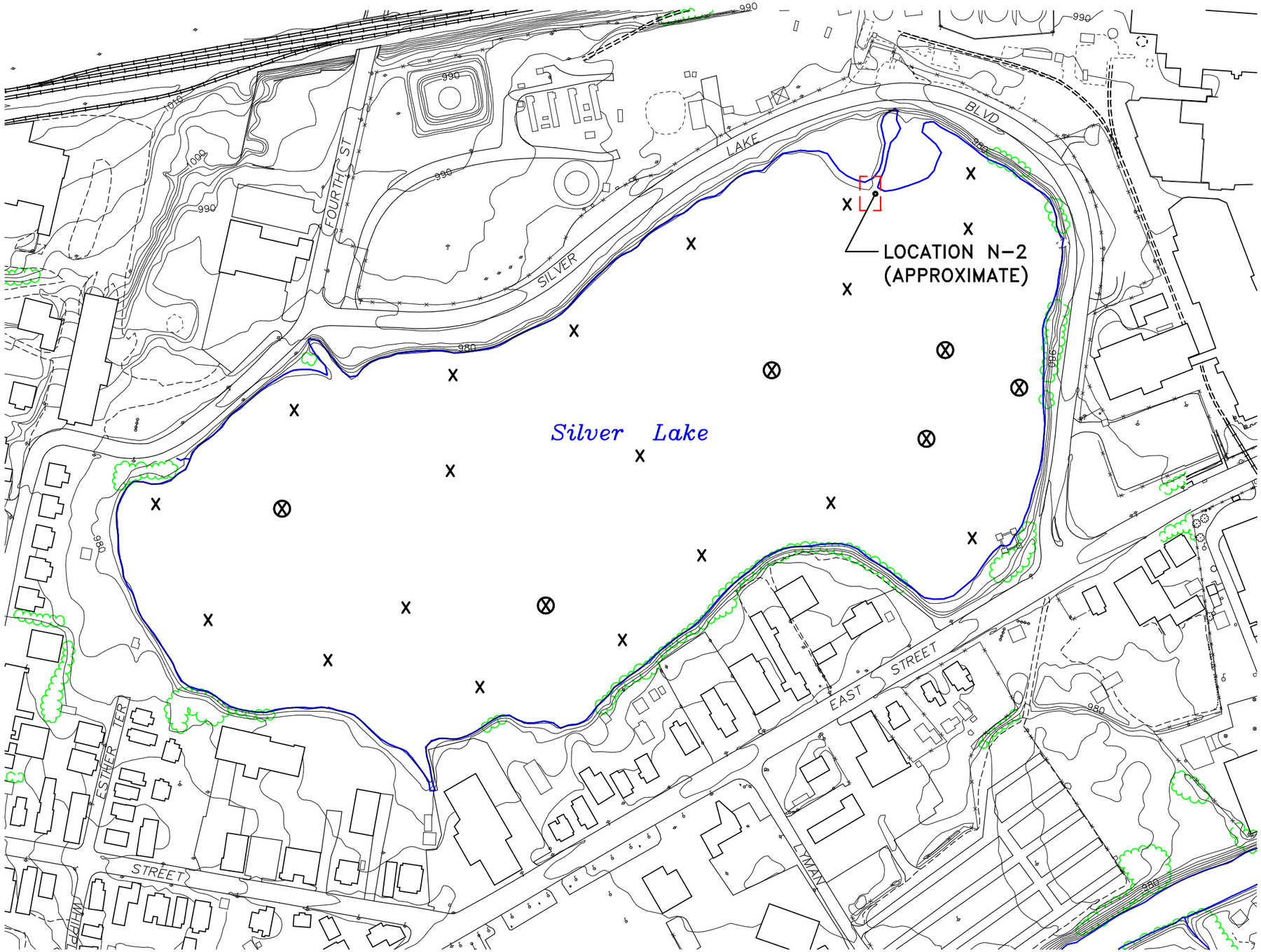
TABLE K-1

Quantity of Tests Proposed at Various Depths for Silver Lake

	Geotechnical Testing						Porewater Testing
Depth (feet)	**Water Content ASTM D 2216-90**	**Organic Content ASTM D 2974**	**Atterberg Limits ASTM D 4318**	**Particle Size Analysis ASTM D 422**	**Specific Gravity ASTM D 854**	**Bulk Density**	**PCBs and DOC**
0.0 - 0.5*	25	25	25	12 to 25	5	2	0
0.5 - 1.0	25	0	0	0	0	0	6
1.0 - 3.0	12	12	12	6 to 12	3	2	0
>3.0	6	6	6	3 to 6	2	2	0

* The quantity of material required for testing will likely require samples be taken from the 0 to 1 foot interval.



LEGEND

- PROPOSED GEOTECHNICAL SAMPLING LOCATIONS
- PREVIOUS GEOTECHNICAL SAMPLING LOCATIONS
- EDGE OF WATER
- PAVED ROADWAY
- UNPAVED ROADWAY OR TRAIL
- RAILROAD
- VEGETATION
- APPROXIMATE LOCATION OF DISCRETE SEDIMENT REMOVAL

NOTES:

1. THE BASE MAP FEATURES PRESENTED ON THIS FIGURE WERE PHOTOGRAMMETRICALLY MAPPED FROM APRIL 1990 AERIAL PHOTOGRAPHS.
2. A MAXIMUM OF 10 PORE WATER AND ISOLATION LAYER MONITORING LOCATIONS WILL BE SPECIFIED IN THE POST-REMOVAL SITE CONTROL PLAN.

0 200' 400'

GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

STATEMENT OF WORK FOR
REMOVAL ACTIONS OUTSIDE THE RIVER

SILVER LAKE SEDIMENT REMOVAL AREA AND PRE-DESIGN SAMPLING LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE K-1

X: 101X1X02,101X2X02
L: ON=*,OFF=*REF*
P: STD/BL, CFG18A
9/13/99 SYR-54-KLN GMS NES
1019741R/TOPO/101CFG18.DWG

EXHIBIT K-1 TO TECHNICAL ATTACHMENT K

(SILVER LAKE SEDIMENT RESPONSE ACTION CONCEPTUAL DESIGN)

ISOLATION LAYER BASIS OF DESIGN

1.0 General

In order to assess the effectiveness of a given isolation layer, it is necessary to first establish a "baseline" condition as a reference for comparison to subsequent evaluation results. Using a number of assumptions regarding the concentration of PCBs, their physiochemical properties, and a number of site-specific and general sediment characteristics, the theoretical transport of PCBs from the sediment into the water column was estimated. Then, an estimate of PCB transport through the isolation layer was performed.

To ensure the protectiveness of the isolation layer, the assumptions used to model "baseline" conditions were selected to be conservative and not necessarily representative of actual on-site conditions. Hence, the estimates of PCB transport rates both under "baseline" conditions and through the isolation layer are theoretical. Accordingly, use of these estimates is limited to relative comparisons within the context of this evaluation.

2.0 Defining "Baseline" Site Conditions

As part of the evaluation of sediment isolation layer configurations for Silver Lake, "baseline" conditions were considered. These conditions were developed based on available sediment data, and were utilized to identify the rate of PCB migration from sediment to the water column solely for purposes of the evaluation and comparisons in this exhibit. For Silver Lake sediment, these "baseline" conditions are a total organic carbon (TOC) concentration of 9 percent, along with a PCB concentration of 330 ppm as Aroclor 1254 (based on the spatial average measured PCB concentration in the top 1 foot of sediment, excluding the sediments to be removed near location N-2). For the purpose of this evaluation, a groundwater Darcy velocity of 0.27 cm per day was assumed for the isolation layer evaluation.

3.0 Potential Isolation Layer Configurations

The effectiveness of several isolation layers in reducing PCB migration from the sediments to the water column was evaluated to provide a means for comparisons between various configurations and existing conditions. Based on this evaluation, the parameters associated with the isolation layer presented here included a 6-inch silty

sand layer with TOC content of 0.5 percent. If the pre-design investigative activities confirm the design parameters which support use of a six-inch silty sand layer with a 0.5 percent organic content, GE will install a cap with a thickness of 10 inches, if geotextile is placed between the sediments and the cap (or 12 inches, installed in two six-inch lifts, if a geotextile is not placed between the sediments and the cap), to account for uncertainties associated with bioturbation.

4.0 Estimates of Sediment Porewater PCB Concentrations

The theoretical PCB concentration in sediment porewater consists of two phases: a freely dissolved phase and a dissolved organic carbon (DOC)-sorbed phase. The dissolved phase equilibrium PCB concentration in porewater is described by the partitioning equation:

$$C_{DIS} = C_{SED}/(f_{oc} \times K_{oc})$$

where:

C_{DIS} = PCB concentration in porewater (mg/R)

C_{SED} = PCB concentration in the sediment = 330 mg/kg

f_{oc} = fraction of organic carbon in the sediment (gm/gm) = 0.09

K_{oc} = organic carbon partitioning coefficient for Aroclor 1254 = $10^{6.43}$ (R/kg)

then

C_{DIS} = (330 mg/kg)/(0.09 x $10^{6.43}$ R/kg) = 0.0014 mg/R = 1.4 Fg/R

The equilibrium concentration of PCBs sorbed to DOC in porewater can be described by the partitioning equation:

$$C_{DOC} = (M_{DOC} \times K_{DOC}) \times [C_{SED}/(f_{oc} \times K_{oc})] = (M_{DOC} \times K_{DOC}) \times C_{DIS}$$

where:

C_{DOC} = Concentration of PCB sorbed to dissolved organic carbon (mg/R)

M_{DOC} = Concentration of DOC in porewater (mg/R)

K_{DOC} = Dissolved organic carbon partitioning coefficient (R/kg)

Using the assumptions that

K_{DOC} = 0.1 x K_{oc}

and

M_{DOC} = 50 mg/L (estimated)

the calculation of C_{DOC} simplifies to:

C_{DOC} = $(50 \times 10^{5.43}) \times (1.4 \times 10^{-3}) \times 10^{-6}$ kg/mg

= 0.018.3 mg/L = 18.3 µg/L

The total porewater PCB concentration (C_{pw}) is then described by:

$C_{pw} = C_{DIS} + C_{DOC}$

For the conditions present in Silver Lake:

C_{pw} = 1.4 µg/L + 18.3 µg/L = 19.7 µg/L

5.0 Theoretical PCB Transport Under "Baseline" Conditions

As previously discussed, to assess the effectiveness of the isolation layer, it is necessary to establish a "baseline" condition of PCB flux from the sediments to the water column. As also noted above, this estimate has been made on a theoretical basis, utilizing the conservative assumptions described above. As such, the estimate should not be considered to represent actual PCB flux, but should be used only for comparison to the flux after installation of the isolation layer. To make this theoretical estimate of "baseline" PCB flux, two methods were used. First, from previous investigations on Housatonic River, a diffusive flux sediment/water exchange coefficient (K_f) of 0.019 m/day was estimated. This estimate was based on average sediment PCB and TOC concentrations, bed surface area, and baseflow water column PCB concentrations. Second, an advective flux based groundwater seepage velocity and equilibrium pore water concentration was calculated.

The diffuse flux from existing, unarmored sediments is determined by the equation:

$$Flux = K_f A C_{pw}$$

For Silver Lake sediment with 9 percent TOC and a PCB concentration of 330 ppm:

$$Flux = (0.019 \text{ m/day})\ (4{,}040 \text{ m}^2\text{/acre})\ (19.7 \times 10^{-6} \text{ gm/L})\ (1{,}000 \text{ L/m}^3)$$
$$= 1.4 \text{ gm/acre/day}$$
$$= 512 \text{ gm/acre/yr}$$

To estimate a maximum advective flux, the equilibrium porewater PCB concentration computed earlier was assumed for groundwater passing through the sediment. The advective steady-state flux is therefore computed as:

$$Flux = V \times A \times C_{pw}$$

where:

V = groundwater Darcy velocity (0.27 cm/day)

A = 1 acre

C_{pw} = porewater PCB concentration (19.7 µg/L)

The advective flux for Silver Lake sediments is 0.21 gm/acre/day or about 78 gm/acre/yr. These results show the conservative nature of the assumptions, as it yields an estimate of approximately 2.1 kg/yr discharging from Silver Lake for the advective case or 13.4 kg/yr for the diffusive case. Based on limited flow and water column PCB concentration data, PCB discharge from Silver Lake through the outfall is estimated at 0.25 kg/yr, a factor of 8 less than the advective transport estimate, and 50 less than the diffusive estimate.

6.0 Estimated PCB Transport by Advection Through Isolation Layer

If groundwater movement through the sediment and isolation layer occurs, advective transport processes will control the steady-state rate of PCB movement through the isolation layer. The rate limiting mechanism for PCB movement is the rate at which PCBs are transferred from the sediments to the isolation layer. This rate is, therefore, also the maximum flux at the water/isolation layer interface if steady state is assumed. As noted earlier, the maximum advective flux is about 78 gm/acre/yr.

To estimate the breakthrough and steady-state times associated with advective transport of PCB through the isolation layer, a one-dimensional advective/dispersive equation, incorporating a retardation factor to account for adsorption of PCB, was used. The equation takes the form:

$$\frac{\partial C}{\partial t} = \frac{D_H}{R}\frac{\partial^2 C}{\partial x^2} - \frac{V}{R}\frac{\partial C}{\partial x}$$

The solution in this case becomes (Bedient and others, 1985; Fetter, 1993):

$$C(x,t) = \frac{C_o}{2}\left[erfc\left(\frac{Rx - Vt}{2\sqrt{RD_H t}}\right) + \exp\left(\frac{Vx}{D_H}\right) erfc\left(\frac{Rx + Vt}{2\sqrt{RD_H t}}\right)\right]$$

The second term of the equation can be neglected where advective processes are the predominant mechanism of transport without introduction of measurable error (Ogata and Bank, 1961). Analysis of the Peclet number confirmed that advection was the dominate process. The higher the Peclet number the greater in influence of advection and dispersion in comparison to diffusion. A value of 0.4 to 6 represents the transition zone where both effects are more or less equal (Fetter, 1993). The value in this circumstance is 47, which is indicative of advection. When x is set to the isolation layer thickness (L), the equation reduces to:

$$\frac{C}{C_o} = \frac{1}{2} erfc\left(\frac{RL - Vt}{2\sqrt{RD_H t}}\right)$$

In the presence of dissolved organic carbon, which may facilitate the transport of PCBs, the retardation coefficient (R) can be estimated as (Magee and others, 1991):

$$R = 1 + \frac{(K_p \rho_b / n)}{(1 + K_{DOC} M_{DOC})}$$

where:

C	=	concentration at the sediment/water interface at time t
R	=	retardation factor = $\epsilon + \rho_b K_p$
L	=	isolation layer thickness in meters (= 0.15 m)
V	=	groundwater velocity (= 0.009 m/day)
t	=	time in seconds
D_H	=	hydrodynamic dispersion coefficient = $1x10^{-10}$ m^2/s
n	=	porosity of isolation layer material (= 0.3)
ρ_b	=	bulk density (= 1.5 gm/cm^3)
K_p	=	partitioning coefficient for isolation layer material = $K_{oc} \times f_{oc}$
f_{oc}	=	fraction organic carbon in the isolation layer (= 0.005)

The value of the complementary error function was approximated using the first eight terms of the infinite series:

$$erfc\,(x) = 1 - \frac{2}{\sqrt{\pi}}\left(x - \frac{x^3}{3} + \frac{x^5}{5*2!} - \frac{x^7}{7*3!} + \ldots\right)$$

As noted by Roberts and others (1985), the hydrodynamic dispersion coefficient for a solute is equal to the fluid hydrodynamic dispersion coefficient divided by the retardation coefficient. Typical fluid hydrodynamic dispersion coefficient values for groundwater are flow dependent (D_H is proportional to $V^{0.5}$); for groundwater velocities of 10^{-3}, 10^{-4} and 10^{-5} m/sec respectively, values through fine material are $1x10^{-8}$, $3x10^{-8}$ and $1x10^{-9}$ m^2/sec respectively (Tchobanoglous and Schroeder, 1987). For Silver Lake, the estimated groundwater velocity is $9x10^{-8}$ m/sec, yielding an estimate of $1x10^{-10}$ m^2/sec. At low porewater velocities, the value of the hydrodynamic dispersion coefficient for Aroclor 1254 approaches the transient molecular diffusion coefficient (Tchobanoglous and Schroeder, 1987). Both coefficients are affected by the retardation factor. The transient molecular diffusion coefficient (D_t) was approximately $1.7x10^{-14}$ m^2/sec. A more conservative value of $1x10^{-10}$ m^2/sec has been used for the fluid hydrodynamic dispersion coefficient, D_H. Times to breakthrough (5 percent of maximum flux) and steady state (95 percent of maximum flux) for each configuration assumption are 177 and 257 years, respectively. Figure K-2 presents the advective breakthrough curve for the 6-inch silty sand layer with 0.5 percent TOC concentrations.

Also included in Figure K-2 are the breakthrough curves for the layers within the cap, both 2 inches and 4 inches above the sediment/cap interface.

7.0 Bioturbation

Bioturbation is the sediment processing by aquatic organisms during burrowing, feeding, movement, respiratory, and excremental activities. Bioturbation has been shown to affect the physical and chemical processes that occur in sediments (McCall & Fisher, 1980), and may result in the vertical and horizontal movement of sediment and pore water. The rate and extent of bioturbation depends largely on the physical and chemical properties of the sediment, and the type and abundance of organisms present. In most benthic environments, numbers of organisms and rates of sediment turnover are highest in the oxygenated zone above the redox boundary, generally the top 2-5 cm of the sediment column (Bosworth and Thibideaux, 1990).

The sediments of Silver Lake are composed mostly of silt (BBL, 1996). As such, the organisms expected to inhabit these sediments are deposit feeders such as oligochaetes and chironomids. Scavenger species such as amphipods may also be present. The available literature for organisms likely to inhabit Silver Lake suggest that the majority of bioturbation is expected to occur to a maximum depth of 6 to 10 cm, although they may occasionally occur at greater depths. Studies by Ford (1962) indicated that 98% of the benthic organisms occurred in the top 5 cm. Robbins et al. (1978) studied the effects of deposit feeding oligochaete (*Tubifex tubifex*) and amphipods (*Pontoporeia hoyi*) on mass redistribution near the sediment-water interface. Activity by oligochaetes occurred primarily to a depth of 6 cm, and did not occur below 9 cm. In the same study amphipods redistributed sediments only to a well-defined depth of 1.5 cm. Studies by both McCall and Fisher (1980) and Karickhoff and Morris (1985) indicate that tubificid oligochaetes burrowed in the upper 10 cm of sediment. Similarly, microcosm studies by Matisoff et al. (1985) concluded that tubificids fed primarily in the top 2-8 cm, and chironomid burrowed in the upper 8-10 cm. Charbonneau and Hare (1998) used x-ray images of burrows of sediment-dwelling insects to evaluate burrowing behavior. Observations on three species off chironomus indicated maximum burrowing depths of less than 5 cm.

In any event, apart from those literature studies, it is important to note that the proposed cap material for Silver Lake is predominantly sand, and hence is expected to contain relatively low levels of organic matter. Grain size and organic content have been shown to affect habitat selection and feeding behavior of benthic organisms

(USACE, 1996) and the placement of sand on the bottom of the Lake may further reduce the anticipated burrowing depths of benthic invertebrates. Because organic matter is the principal food source for benthic organisms, the sand layer will be unappealing, and the organisms would be expected to reside within the newly-deposited organic matter which will begin to accumulate over the sand cap.

The effects of a bioturbation zone with no additional sedimentation onto the cap were modeled. In this simple mass balance model, the depth of the bioturbation zone was assumed to be 2 inches (5 cm). The bioturbation zone was assumed to be completely mixed. The PCB flux leaving of the unmixed 4-inch lower layer of the cap was used as the PCB input to the 2-inch mixed layer. The flux at anytime (*t*) from the mixed layer was computed as:

$$F_t = F_{SS} \times (C_t/C_{SS})$$

where: F_t = Flux entering water column at time *t*

F_{SS} = Maximum steady state flux (78 gm/acre/yr or 19.3 mg/m^2/yr)

C_t = Mixed layer PCB concentration at time *t*

C_{SS} = Steady state cap PCB concentration

Figure K-3 shows the difference in computed PCB flux with and without a completely mixed upper 2-inch layer in the 6-inch cap.

As noted above, this modeling was conducted without consideration of additional sedimentation onto the cap. In fact, the continued deposition of sediment over time, coupled with the fact that benthic organisms will preferentially reside in such newly deposited organic material rather than in the sand of the isolation area, will provide additional protection for the isolation layer from the effects of bioturbation. Moreover, to account for uncertainties associated with bioturbation, the addition of 4 inches (if geotextile is placed between the sediments and the cap) or 6 inches (if geotextile is not placed between the sediments and the cap) of silty sand to the cap will provide still further protection against contact by benthic organisms with the underlying sediments.

8.0 Sediment Deposition

EXHIBIT K-1 TO TECHNICAL ATTACHMENT K

(SILVER LAKE SEDIMENT RESPONSE ACTION CONCEPTUAL DESIGN)

Sediment deposition on top of the 10-inch (or 12-inch) cap will provide additional isolation of the underlying sediment bed PCBs from the water column. Based on the prior modeling of advective transport due to retardation, the PCB "front" moves at an average of approximately 1-inch every 35 years. If deposition of sediments occur at more than a rate of 1-inch every 35 years, breakthrough should never occur. Based on Cs-137 data from sediment cores, it appears that an inch of sediment in deposited every 2 to 5 years. Also, the cap has an assumed TOC concentration of 0.5 percent, while current sediments have an average 9 percent TOC. If the newer deposited sediments have more than 0.5 percent TOC the retardation of the PCBs will be enhanced further.

To further assess the present sedimentation rate in the lake, GE will install sediment traps in five locations and measure the thickness of sediment that settles in the traps annually for two years following cap construction. The thickness of sediment in the traps will be measured, with no other analytical work performed.

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FIGURE K-2 BREAKTHROUGH CURVES AT VARIOUS CAP LAYERS

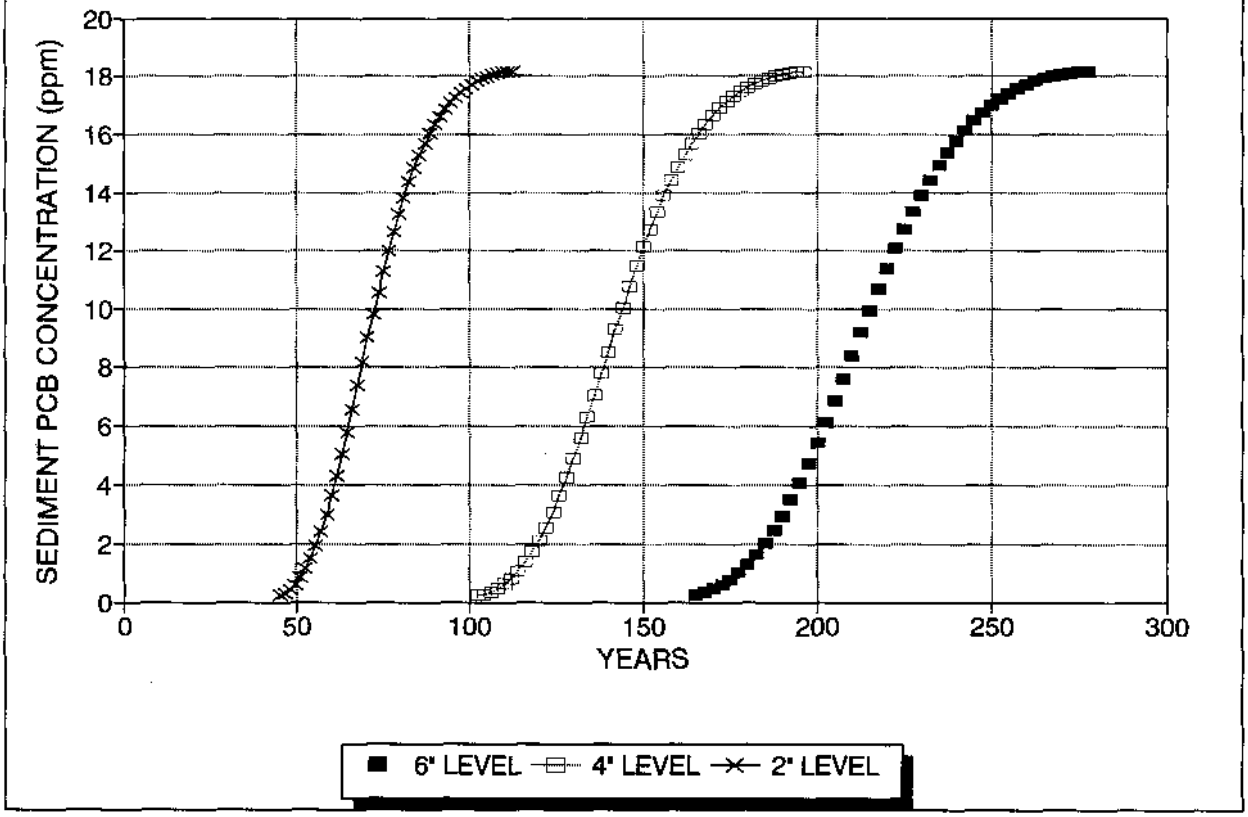


FIGURE K-3 COMPARISION OF MIXED AND UNMIXED ASSUMPTIONS

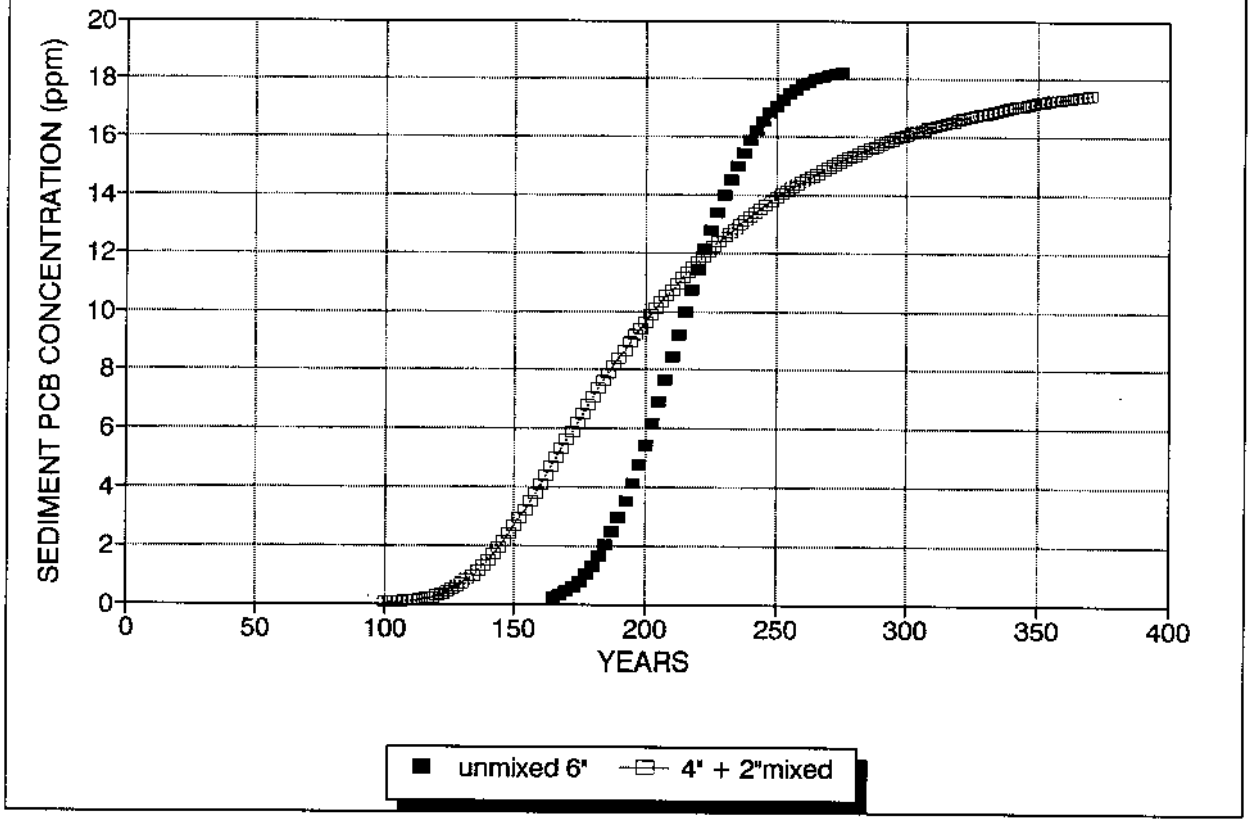


EXHIBIT K-2 TO TECHNICAL ATTACHMENT K

(SILVER LAKE SEDIMENT RESPONSE ACTION CONCEPTUAL DESIGN)

SHORELINE ARMORING LAYER BASIS OF DESIGN

1.0 General

As discussed in the text of Attachment K, to prevent erosion of the Silver Lake isolation layer, an armoring layer will be placed over the portion of the sediment cap along the shoreline. The basis of design of the armoring layer is protection against erosion from wind-induced wave action. Protection of the sediment cap against ice damage, which may be realized through movement of individual ice masses against the shoreline or by "plucking" of individual armor units from the erosion control layer and displacing them to other portions of the lake, was not specifically considered in this design. With regard to movement of individual ice masses, shore structures are typically subject to wave forces comparable in magnitude to the maximum probable pressure that might be developed by an ice sheet. As the maximum wave forces and ice thrust cannot occur at the same time, usually no special allowance is made for ice thrust (USACE, 1984). With regards to "plucking" and displacement of individual armor units, these effects are most significantly realized in systems subject to frequent fluctuations in water elevation. Such frequent changes in the water elevation are not anticipated for Silver Lake, and any ice damage which may occur would likely be minimal. This damage can easily be controlled through the periodic monitoring and replacement program described in Attachment K. Hence, no special allowances were made in the design of the Silver Lake erosion control layer for ice damage.

A description of the basis of design of the shoreline armoring protection layer is provided below.

2.0 Defining "Baseline" Site Conditions

As part of the basis of design for developing an appropriate shoreline armoring layer, it was necessary to establish certain "baseline" parameters. These parameters include wind speed, wind direction, bank/sediment bed slope, and particle size data for materials used in the isolation layer.

- To determine the "baseline" conditions for wind speed and wind direction, Pittsfield-specific wind data were obtained from the *Ambient Air Monitoring for PCB* (Zorex, 1992) study conducted between August 20, 1991 and August 14, 1992. During this study, the wind speed and wind direction were periodically recorded at an on-site weather station installed in the East Street Area 2 Site at the GE

facility. According to these data, the maximum wind speed was 27.22, and the predominant wind direction was from the west.

- Using the site-specific bathymetric data for Silver Lake presented in the *Supplemental Phase II/RCRA Facility Investigation Report for Housatonic River and Silver Lake* (BBL, January 1996), the average sediment bed slopes are approximately 1V:8H. (i.e., 12.5 percent, or 1-foot vertical to 8-feet horizontal).

- As discussed in Attachment K, the isolation layer is to be composed of silty sand. Assuming an equal distribution of silt (0.075 mm) and sand (0.500 mm) particles, the average particle size (e.g., d_{50}) of the materials used in the isolation layer is calculated as 0.2875 mm.

3.0 Calculation of Wind Stress

As stated previously, the Pittsfield-specific maximum sustained wind speed observed between August 20, 1991 and August 14, 1992 was 27.22 mph. Data from the next nearest weather station (Albany Airport, Albany, New York) show a maximum wind speed of 47 mph (Harrington, 1996). Due to the presence of significant intervening topographical features, the data collected at Albany Airport are not applicable to Silver Lake. However, in an effort to be conservative, the following wind conditions were assumed. Along the predominant wind direction at Silver Lake (west to east), a maximum wind speed of 50 mph was assumed. This wind speed is approximately twice the maximum observed wind speed in Pittsfield during the 1991-1992 study. Along the north-south axis of the lake, perpendicular to the predominant wind direction, a maximum wind speed of 30 mph was assumed. The basis for making these wind speed assumptions conservative is to ensure the protection of the isolation layer against more extreme weather conditions.

To translate the assumed wind speeds in Pittsfield to the wind speeds experienced at the Silver Lake water surface, the assumed wind speeds must be adjusted for several factors including wind gauge elevation, wind duration, wind stability (i.e., temperature), location, and coefficient of drag. These factors, and the appropriate conversion equations, are described in the United States Army Corps of Engineers (USACE) Shore Protection Manual (USACE, 1984). A brief description and discussion of the assumptions are presented below:

- Wind gauge elevation - Prior to scaling the wind speed with the appropriate adjustment factors, the assumed Pittsfield wind speed at the wind gauge must be scaled to a standard elevation. According to the United States Army Corps of Engineers, the standard elevation is 10 meters (32.8 feet). Based on available information, the Pittsfield weather station wind gauge has been assumed to be at an elevation of 20 feet above the surface elevation of Silver Lake.

- Wind duration - As wind speeds are typically measured for short durations (i.e., minutes), the wind speed must be adjusted for the time it takes to bring the waves to maximum height (i.e., steady state). For Silver Lake, it was assumed that the steady state conditions would be reached within one hour.

- Stability - The Pittsfield wind speed also must be adjusted for instability caused by temperature differences between the air and the water. The conditions where these differences would result in the greatest increase in wind speed (and hence maximum wave height) are representative of typical winter conditions where the temperature of the water is greater than the temperature of the air. For purposes of design, it has conservatively been assumed that the temperature of the water is 40E Fahrenheit (F) and the temperature of the air is 10EF.

- Location - To translate overland winds to overwater winds, an adjustment factor must be used to account for the difference in surface roughness between the land and the water. This factor also takes into account the surface of the lake which the wind acts upon (i.e., fetch length). The fetch length is typically measured across the water surface in the direction of the predominant wind. However, as wind conditions are being derived separately along the north-south and west-east directions of the lake, the fetch length used in the armor layer design will be measured specific to wind direction to which it applies.

- Coefficient of Drag - Once the windspeed has been adjusted for the aforementioned factors, it is translated into a wind stress to account for the nonlinear relationship between wind stress and wind speed (USACE, 1984).

As stated previously, the Pittsfield-specific maximum sustained wind speeds have been conservatively assumed to be 50 mph in the west-east direction, and 30 mph in the north-south direction. Adjusting these wind speeds by the aforementioned criteria and converting them to wind stresses, the adjusted wind stresses used in determining maximum wind-induced wave height are approximately 98 mph for the west-east direction and 55 mph for the north-south direction.

4.0 Calculation of Maximum Wave Height

Calculation of the maximum wave height depends on several factors. The three primary factors include wind stress, fetch length, and the average depth of Silver Lake.

Wind Stress

As stated in Section 3.0, for purposes of design, the maximum sustained wind speeds in Pittsfield were conservatively assumed to be either 50 mph (for winds along the west-east direction) or 30 mph (for winds along the north-south direction).The corresponding wind stresses used in determining the maximum wind-induced wave heights were calculated to be either 98 mph or 55 mph.

Fetch Length

The fetch length, or lake surface over which the wind stress acts upon, was determined by measuring the distance across Silver Lake along the applicable wind direction. As the armor layer design considers winds along the north-south and west-east directions separately, two fetch lengths were calculated as part of the design process. To determine an appropriate fetch length for each wind direction, a total of nine radials were developed from a single point. Per the USACE Shore Protection Manual (USACE, 1984), the radials emanated from the assumed wind direction at 3-degree intervals. For winds propagated along the west-east direction, the average radial distance, or fetch length, is approximately 1,540 feet. For winds propagated along the north-south direction, the fetch length is 814 feet.

Average Water Depth

The average depth of Silver Lake was determined from bathymetric data. According to the data, the average depth is approximately 20 feet.

Given the abovementioned information, the maximum wave height was calculated under two scenarios: (1) shallow water scenario and (2) deep water scenario.

(1) Shallow Water Scenario

The equations used to calculate the maximum wave height and wave period for shallow water conditions, as depicted in the USACE Shore Protection Manual (USACE, 1984) are:

Eqn. 3-39 (USACE, 1984)

$$\frac{gH}{Ua^2} = 0.283 \tanh\left[0.530\left(\frac{gd}{Ua^2}\right)^{3/4}\right] \tanh\left\{0.00565 \frac{\left(\frac{gF}{Ua^2}\right)^{1/2}}{\tanh\left[0.53\left(\frac{gd}{Ua^2}\right)^{3/4}\right]}\right\}$$

Eqn. 3-40 (USACE, 1984)

$$\frac{gT}{Ua} = 7.54 \tanh\left[0.833\left(\frac{gd}{Ua^2}\right)^{3/8}\right] \tanh\left\{0.0379 \frac{\left(\frac{gF}{Ua^2}\right)^{1/3}}{\tanh\left[0.833\left(\frac{gd}{Ua^2}\right)^{3/8}\right]}\right\}$$

where;

g = acceleration due to gravity, (m/s^2)

H = wave height, (m)

T = wave period, (s)

Ua = wind stress, (m/s)

d = average depth of Silver Lake, (m)

F =fetch length, (m)

Given the assumptions developed for waves propagated along the west-east direction, the maximum wave height and wave period are 1.56 feet and 1.67 seconds, respectively. Similarly, applying the assumptions developed for waves propagated along the north-south direction, the maximum wave height and wave period are 0.65 feet and 1.12 seconds, respectively. Per the USACE Shore Protection Manual (USACE, 1984), should the wave period be less than 2.8 seconds for water depths of 20 feet, the waves are considered to be

deep water waves. Since the waves on Silver Lake would be considered deep water waves, the deep water wave equations have been used for the purposes of this design.

(2) Deep Water Scenario

Due to the finite boundaries of Silver Lake, the wave heights are assumed to be constrained by the fetch length, and hence are appropriately deemed "fetch-limited". The equations for determining the wave height and wave period for fetch-limited deep water waves are as follows:

Eqn. 3-33a (USACE, 1984) $H = 0.0005112(UaF^{1/2})$

Eqn. 3-34a (USACE, 1984) $T = 0.06238(UaF)^{1/3}$

Recalculation of the maximum wave height and wave period using the deep water equations yields the following: for waves propagated along the west-east direction, the maximum wave height and wave period are 1.59 feet and 1.71 seconds, respectively. Similarly, for waves propagated along the north-south direction, the maximum wave height and wave period are 0.65 feet and 1.14 seconds.

5.0 Armor Layer Configuration

Armor Materials

The armor layer configuration is based primarily on the wave height, wave period, slope of the bank and sediment bed, and the specific characteristics of the armor stone. The appropriate weight of an individual armor unit (W_r) to be used in preventing erosion under specific wave conditions are calculated as follows:

Eqn. 7-116 (USACE, 1984)

$$W_r = \frac{\gamma_r H^3}{K_d \left(\frac{\gamma_r}{\gamma_w} - 1 \right)^3 \cot\theta}$$

where;

γ_r = unit weight of armor stone (165 lbs/ft^3)

γ_w = unit weight of water (62.4 lbs/ft^3)

K_d = stability coefficient (2, for rough angular quarry stone)

θ = angle of bank/sediment bed slope (slope 1V:8H, 7.13 degrees)

H = wave height (feet)

These calculations were performed for waves propagated along both the west-east and north-south directions. The results of these calculations indicate that a 10-pound stone should be placed along the west and east shores of the lake, and a 1-pound stone should be placed along the north and south shores of the lake. According to Table 12 of the USACE Shore Protection Manual (USACE, 1984), the corresponding diameters of 10-pound quarry stone and 1-pound quarry stone are 5.42 inches and 2.52 inches, respectively.

Eqn. 7-121 (USACE, 1984)

$$r = nK\Delta \left(\frac{W_r}{\gamma_r} \right)^{1/3}$$

where;

r = thickness of armor stone, feet

n = number of layers of armor stone

$K\Delta$ = layer coefficient, (1.0 for rough quarry stone)

To ensure complete coverage of the isolation layer, an assumed value for the minimum number of layers of each type of armor stone (n) is 2. Substituting in the appropriate values, the calculated required thicknesses of the armor stone (r) are 0.77 feet for the west and east shores and 0.32 feet for the north and south shores. Calculating the actual thicknesses of the armor stone layers yields 0.9 feet for the 10-pound stone and 0.4 feet for the 1-pound stone . Since the actual thicknesses of the armor stone exceed the required thicknesses, two layers of the assumed 10-pound stone and 1-pound stone will be adequate.

Stone Placement below Still Water Level (SWL)

In order to determine the extent that stone needs to be placed below the SWL, it is necessary to determine the maximum fluid velocity at the sediment/water interface which will not cause a disturbance of the isolation layer. This maximum fluid velocity (U_{max}) is dependent upon the specific gravity and the diameter of the average-size sand particle of the isolation layer. This relationship, as described in the Shore Protection Manual (USACE, 1984), is provided below:

Eqn. 4-23 (USACE, 1984) $U_{max} = [8(SG-1)gd_{50}]^{0.5}$

where;

SG = Specific gravity of the isolation layer

d_{50} = diameter of the sand particle of which 50% is finer, m

As discussed in Attachment K, the isolation layer is to be composed of silty sand. Averaging together the diameters of a typical sand particle (0.50 mm) and a typical silt particle (0.075 mm), the d_{50} of the isolation layer was calculated as 0.288 mm. A typical value of 2.38 was chosen for the specific gravity of the isolation layer. Factoring these values into the calculation, U_{max} = 0.2 m/s.

In addition to U_{max}, a wave length (L) also must be known to calculate the underwater extent of the stone armor layer. Using the wave periods previously calculated in Section 4.0, a value of the wave celerity (C) for each wave condition is calculated. The wave length is then calculated using both the wave celerity and the wave period.

Eqn. 2-6, (USACE, 1984)

$$C = \frac{gT}{2\pi}$$

Eqn. 2-5, (USACE, 1984)

$$C = \frac{L}{T}$$

The result of these calculations indicate that the west-east wave length is approximately 15 feet and the north-south wave length is 6.7 feet.

The vertical depth to which the armor stone must be placed (d_{max}) is given by the following expression:

Eqn. 4-24 (USACE, 1984)

$$\frac{U_{max}T}{H} = \frac{\pi}{\sinh\left(\frac{2\pi d_{max}}{L}\right)}$$

Along the west-east direction, d_{max} is approximately 5.31 feet; and along the north-south direction, d_{max} is 1.87 feet. To provide a more extensive lateral buffer zone along the north and south shores, a more conservative depth of 2.5 feet will be used.

6.0 Conclusion

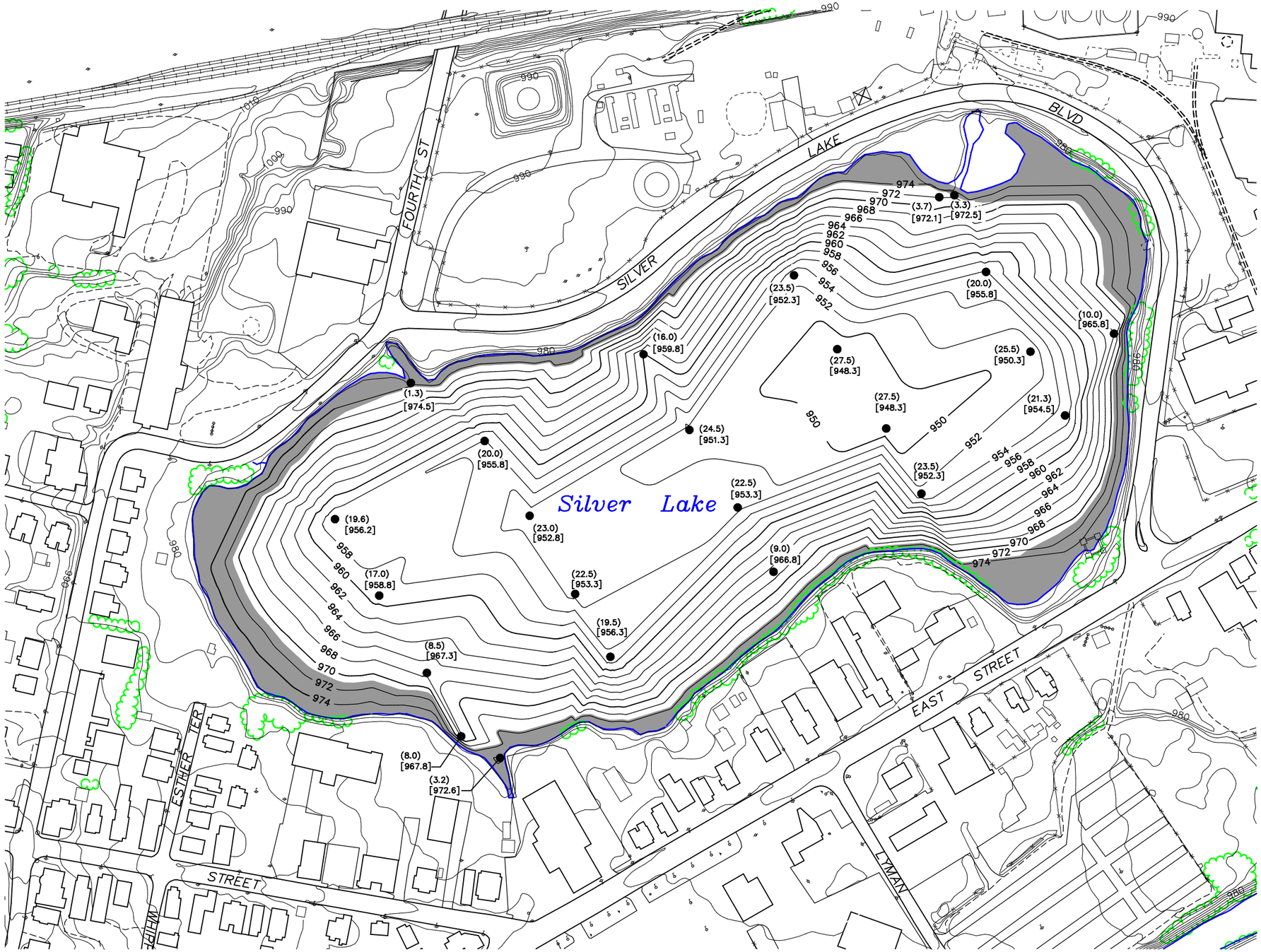
Based on the results of the armor layer design calculations, a 0.9 feet layer of a 10-pound quarry stone, shall extend into the lake to a mean water depth of approximately 5.3 feet to prevent erosion of the cap along the west and east shores. Additionally, a 0.4 feet layer of a 1-pound quarry stone shall extend into the lake to a mean water depth of approximately 2.5 feet to prevent erosion of the cap along the north and south shores.

References

US Army Corps of Engineers, Waterway Experiment Station, *Shoreline Protection* Manual, Vol. I/II, 1984.

Zorex Environmental Engineers, Inc., *Ambient Air Monitoring for PCB, August 20, 1991 - August 14, 1992,* November 1992

Harrington Engineers and Construction, Inc., *Report on Preliminary Investigation of Corrective Measures for Housatonic River and Silver Lake Sediment*, May 1996.



LEGEND

- (16.0) [959.8] — TOTAL WATER DEPTH (FEET); BOTTOM ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- EDGE OF WATER
- APPROXIMATE EXTENT OF ARMOR STONE
- PAVED ROADWAY
- UNPAVED ROADWAY OR TRAIL
- RAILROAD
- FENCELINE
- 970 — ELEVATION CONTOUR
- VEGETATION

NOTES:

1. THE BASE MAP FEATURES PRESENTED ON THIS FIGURE WERE PHOTOGRAMMETRICALLY MAPPED FROM APRIL 1990 AERIAL PHOTOGRAPHS.
2. WATER DEPTHS WERE TAKEN ON DECEMBER 13, 1994 BY BLASLAND, BOUCK & LEE, INC.
3. BOTTOM ELEVATIONS BASED ON SILVER LAKE SURFACE ELEVATION OF 975.8 FEET, TAKEN ON DECEMBER 24, 1994 BY BLASLAND, BOUCK & LEE, INC.
4. ALL SAMPLING LOCATIONS ARE APPROXIMATE.
5. ELEVATION CONTOURING WAS PRODUCED DIGITALLY, BASED ON SAMPLING INFORMATION, BY SOFTDESK CONTOURING SOFTWARE.

0 200' 400'

GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
STATEMENT OF WORK FOR REMOVAL ACTIONS OUTSIDE THE RIVER

APPROXIMATE EXTENT SILVER LAKE ARMORING

BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE **K-4**

X: 20140X01.DWG
L: ON=*, OFF=*REF*
P: STD-BL.PCP
9/10/99 SYR-54-NES GMS NES
20140002/SILVER/20140G01.DWG