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March 14, 2007

Mr. Dean Tagliaferro
U.S. Environmental Protection Agency
c/o Weston Solutions, Inc.
10 Lyman Street
Pittsfield, MA 01201

**Re: GE-Pittsfield/Housatonic River Site
Upper ½-Mile Reach of the Housatonic River (GECD800)
Report on Isolation Layer Total Organic Carbon**

Dear Mr. Tagliaferro:

Pursuant to a Consent Decree (CD) executed in 1999 by the General Electric Company (GE), the United States Environmental Protection Agency (EPA), the Massachusetts Department of Environmental Protection (MDEP), and several other government agencies and entered by the Court in October 2000, GE performed a Removal Action related to bank soils and sediments within the Upper ½-Mile Reach (½-Mile) of the Housatonic River, in Pittsfield, Massachusetts. That Removal Action was conducted in accordance with a *Removal Action Work Plan – Upper ½-Mile Reach of Housatonic River* (Removal Action Work Plan), approved by EPA and attached to the CD as Appendix F, outlining the proposed remediation activities to address polychlorinated biphenyls (PCBs) and other hazardous constituents in soils and sediment within the ½-Mile. GE performed the sediment and soil removal activities between October 1999 and September 2002 under the direct oversight of EPA, in consultation with MDEP.

In accordance with the Removal Action Work Plan, the sediment-related remediation activities generally involved the removal of certain sediments containing PCBs and placement of an engineered cap that consisted of isolation layer materials and armor stone. The Removal Action Work Plan specified that the isolation layer materials should have a minimum total organic carbon content (TOC) of 0.5% to provide a long-term reduction in potential PCB flux from the underlying sediment into the water column. The isolation layer was designed for the ½-Mile to address this flux process by increasing the transport distance necessary for PCBs to reach the cap-water interface and by increasing the availability of materials for sorptive processes to occur during this potential transport process. Based on this design, as presented in Appendix G of the Removal Action Work Plan and discussed in detail below, a breakthrough time of 125 years (i.e., the time necessary for the PCB concentration at the cap-water interface to reach 5% of the PCB concentration at the underlying sediment-cap interface) was estimated for a 12-inch thick engineered cap.

In a letter dated August 26, 2002 to GE, EPA expressed concerns regarding the levels of TOC in some of the isolation layer materials used in the ½-Mile and the subsequent impact on cap design calculations related to PCB breakthrough times. Specifically, EPA expressed concerns related to the isolation materials placed in the ½-Mile from the initiation of construction through October 2001, which consist of the materials placed in removal cells A, B, C, D, F1, F2, F3, G1, G2, G3, H1, H2, and I1. In that letter, EPA: 1) directed GE to perform additional sampling to characterize the amount of TOC in the isolation

layer material placed within the area of concern; 2) provided GE the option of submitting a plan to collect additional site-specific data (e.g., seepage rates) related to PCB transport model parameters; 3) directed GE to submit a report on the TOC levels in the isolation layer and the predicted breakthrough times using the measured TOC data; and 4) noted that GE could provide additional information related to the conservative cap design model results presented in the Removal Action Work Plan as they pertain to the area of concern.

In response to the EPA letter, GE submitted a letter to EPA dated September 9, 2002, that proposed the collection of isolation layer material samples from an additional 21 sampling locations for TOC analysis. The GE letter also proposed the installation of three seepage meters in non-removal areas located in the ½-Mile to provide site-specific data regarding groundwater seepage velocities. EPA conditionally approved the TOC investigation activities in a letter dated September 25, 2002. Following additional discussion related to the proposed protocol for seepage meter installation and data collection, EPA conditionally approved the seepage rate investigation activities in a letter dated December 31, 2002. In response to those conditions, GE submitted a revised seepage meter protocol on January 20, 2003, which was approved by EPA by letter dated February 27, 2003.

GE performed the TOC sampling in October 2002. However, the seepage rate investigation was delayed, with EPA agreement, due to extremely wet weather in the summer and fall of 2003 and EPA's installation of a temporary dam downstream of the ½-Mile in late 2003, in support of EPA's remediation activities within the 1½-Mile Reach of the Housatonic River (1½-Mile), which maintained impounded water levels within the ½-Mile at artificially high levels. Following EPA's removal of that dam after the 2005 construction season, GE conducted the seepage rate investigation in the summer of 2006.

Now that that investigation has been completed, this letter provides the following, in accordance with EPA's August 26, 2002 letter and GE's September 9, 2002 letter:

1. Results of additional TOC investigation activities in Cells A through I1 performed by GE following the completion of removal activities in the ½-Mile;
2. Results of the seepage rate investigation conducted by GE;
3. Analysis of PCB breakthrough times calculated for Cells A through I1 using measured TOC levels and isolation layer thicknesses along with both the design seepage rate and actual observed seepage rates, as well as the other parameters used in Appendix G of the Removal Action Work Plan; and
4. Discussion of the differences and implications of the predicted PCB breakthrough times using actual field parameters in comparison with the predicted breakthrough times presented in the Removal Action Work Plan.

1. TOC Investigation Results

To perform the TOC investigation, samples of the isolation layer material were collected from 21 locations between October 8 and 15, 2002. Sample locations were selected to represent the area of concern identified by EPA in its August 26, 2002 letter (i.e., Cell A through Cell I1). The locations of these 21 samples, as well as previous TOC sampling locations and removal cell outlines, are shown on Figure 1.

At each of the 21 new locations discussed above, samples were collected using methods consistent with those set forth in GE's 2000 *Field Sampling Plan/Quality Assurance Project Plan*, which was in effect at

that time. Prior to collection, armor stone was temporarily moved, as necessary, to allow access to the underlying isolation layer materials. Once exposed, isolation layer material cores were collected using hand driven Lexan tubes; and to the extent practicable, materials were collected in continuous cores extending from the isolation layer surface to the geotextile fabric installed on top of the underlying sediment. At the time of sample collection, the approximate isolation layer thicknesses and core recovery depths were measured and recorded. Recovered materials were thoroughly mixed to create one composite sample per location for TOC analysis. As requested by EPA, split samples were provided to EPA for independent analysis. Table 1 summarizes the isolation layer thicknesses, core recovery depths, and TOC results from each sampling location (including EPA split sample results). The full analytical data packages for this TOC investigation are provided in Appendix A.

In addition to the samples discussed above, EPA and GE agreed that GE could also use 5 locations from a post-construction isolation layer sampling event to supplement the characterization of the isolation layer TOC. These samples (i.e., CAP-MON-1 through CAP-MON-5) were collected in late 2001 and in 2002 as part of the post-construction monitoring program described in the Removal Action Work Plan. The locations of these 5 samples are shown on Figure 1, and the related TOC analytical results are included in Table 1.

Of the 49 samples, including duplicates, collected and analyzed by either GE or EPA, discrete TOC analytical results ranged from 0.05 to 1.03% with an average of 0.24%. TOC analytical results from five samples (GE and EPA locations in Cell I1 and EPA's sample result from one location in Cell H1) were greater than 0.5%. All remaining analytical results were less than 0.5% TOC.

To simplify the data analysis process and update the breakthrough calculations, GE and EPA results were averaged on a location-specific basis within each cell. Two cells, F3 and G2, were further split up into smaller representative subsections to reflect more substantial differences in either TOC concentration or cap thickness. This approach resulted in the creation of 14 cells for which average TOC values could be used in the reassessment of PCB breakthrough times. The cell TOC averages ranged from 0.07 to 0.8% with an overall average of 0.26%. Table 1 presents the average TOC results used for the breakthrough calculations discussed below, while Figure 2 graphically depicts the ranges of TOC concentrations for these cells.

2. Seepage Rate Investigation Results

As discussed above, due to extremely wet weather conditions in the summer and fall of 2003 and EPA's installation of a temporary dam downstream of the ½-Mile, seepage meters were not installed in 2003 as originally planned. The temporary dam, installed in support of EPA's 1½-Mile Reach Removal Action, impounded water levels within the ½-Mile at artificially high levels while the dam was in use, creating difficult field conditions for seepage meter installation. In addition, because of the artificially high water levels in the ½-Mile during this time, the groundwater/surface water equilibrium conditions may have been altered, and seepage rate measurements made at that time may not have been reflective of actual long-term conditions. In this situation, in a letter dated February 10, 2004, GE confirmed an agreement with EPA to postpone seepage meter installation until the temporary dam was removed and field conditions were appropriate for installation of the seepage meters. The EPA dam was removed after the 2005 construction season, and GE notified EPA in a July 17, 2006 email of its plan to install the seepage meters as it appeared that river flow conditions had stabilized.

The seepage meters were installed in the ½-Mile on July 19, 2006. In accordance with GE's revised seepage meter protocol, submitted on January 20, 2003 and approved by EPA on February 27, 2003, Lee meters were used. The Lee meter generally consists of a 55-gallon drum that is cut in half with the open end pushed into the sediment and the closed end fitted with a water collection bag, allowing it to capture any groundwater that may seep into the area encompassed by the meter over a given time period. An illustration depicting an installed Lee meter is provided on Figure 3. A full discussion of the Lee meter and associated installation and monitoring procedures was provided in GE's January 20, 2003 revised protocol.

The Lee meters were installed in non-removal areas (shown on Figure 1) and embedded approximately 6 inches into the channel bottom in areas of relatively loose silty or fine sands. At location Seepmeter-03, portions of a layer of armor stone that had been installed as a protective transition between removal and non-removal areas had to be removed to facilitate meter installation. Each meter was initially installed with all valves in the open position, and to the extent practicable, air trapped within the meter was evacuated. After installation, the installed meters and the areas in which they had been installed were allowed to equilibrate for a period of 5 days prior to connecting 500 milliliter (ml) polyethylene water collection bags and initiating the first data collection cycle.

Between July 27 and September 5, 2006, the water collection bags were monitored six times, and volumetric flow rates were recorded. Average flow in the ½-Mile during this period was approximately 34 cubic feet per second (cfs), as measured at U.S. Geological Survey (USGS) River Gauge Station No. 0119700 on the East Branch of the Housatonic River in Coltsville, Massachusetts. One relatively small storm event (i.e., with flow estimated to have reached 123 cfs) occurred during the time that the seepage meters were installed. Overall, however, flow and water stage were reasonably consistent and do not appear to have significantly impacted the seepage rate data.

At each monitoring visit, the water collection bag was removed and replaced with a new bag for the ensuing collection cycle, and the collected water volume was recorded. Note that prior to use, each collection bag was surcharged with 200 ml of water to mitigate any resistance to flow into the bag. Table 2 summarizes the volumetric flow rates recorded at each location for the six rounds of monitoring. In general, the volumetric flow rate, as captured by the Lee meters, ranged from -1.7 milliliters per day (ml/d) to 6.8 ml/d, with an average of approximately 0.95 ml/d of groundwater seeping into the meters over the course of the investigation.

Following the September 5, 2006 monitoring event, GE shared the results of the data collection with EPA. Both EPA and GE agreed that the data collected were sufficient to characterize seepage conditions in the ½-Mile. Consequently, the seepage meters were removed and seepage velocity was calculated from data collected during the six monitoring events. From the volumetric flow rates, an approximate seepage velocity was calculated by dividing the recorded flow by the area of the open end of the Lee meter – approximately 2,620 square centimeters. Table 3 summarizes the seepage velocities estimated for all three locations over the course of the investigation. Individual discrete estimates of seepage recorded at any location ranged from $-3.2\text{E-}5$ centimeters per day (cm/d) to $2.6\text{E-}3$ cm/d. The average estimated seepage velocities for all three locations ranged from $1.8\text{E-}5$ cm/d to $9.4\text{E-}4$ cm/d, with an overall average of $4.0\text{E-}4$ cm/d. These estimated velocities are several orders of magnitude lower than the conservative seepage rate of 3.3 cm/d used in the design calculations in the Removal Action Work Plan, as discussed further below.

3. Design Calculation of Breakthrough Times

In conditions where groundwater movement through the sediment and isolation layer occurs, even at relatively low seepage velocities, advective transport processes are generally considered to be the dominant mechanism for the steady-state rate of PCB movement through the isolation layer. In the Removal Action Work Plan, to estimate the breakthrough times associated with advective transport of PCBs through the isolation layer proposed for use in the ½-Mile, a one-dimensional advective/dispersive equation, incorporating a retardation factor to account for adsorption of PCBs, was used. A full discussion of the calculations and assumptions necessary in the preparation of the model, as well as the full basis of design for the cap and related armor system, were presented in Appendix G of the Removal Action Work Plan.

During design activities, several baseline parameters were initially established as inputs to the PCB breakthrough model, including estimates of sediment conditions for the ½-Mile and the proposed isolation layer parameters (e.g., TOC concentrations and cap thickness). Additionally, in the absence of site-specific data, conservative assumptions were made when selecting the other input variables (e.g., seepage rates).

Using the transport modeling approach, as discussed in the Removal Action Work Plan, time for breakthrough (i.e., the time necessary for approximately 5% of the maximum PCB concentration to reach the water column) was predicted for the various potential cap configurations proposed for use in the ½-Mile. Included in this modeling effort were assumptions related to the fraction of organic carbon [f_{oc} - 0.005 based on the design TOC of the isolation layer (0.5%)] and the groundwater seepage velocity (3.3 cm/d - based on groundwater modeling for the ½-Mile). Additionally, the breakthrough estimates employed in the design assumed that there would be no net deposition within the armor stone placed over the cap, thereby conservatively limiting the total distance related to breakthrough to the isolation layer thickness only.

Using these conservative assumptions, for a 12-inch isolation layer (which was proposed and subsequently implemented for the majority of the ½-Mile), breakthrough time was predicted to be 125 years. With approval from EPA, either a 6- or 18-inch thick cap was proposed for certain areas based on removal depths. For these particular areas, the “baseline” performance modeling predicted breakthrough times of 62.5 and 187.5 years, respectively. Figure 4 presents the design breakthrough curves for a silty sand layer with 0.5% TOC concentration and an assumed groundwater seepage velocity of 3.3 cm/d.

4. Effect of Variations in Model Parameters

The predictive model results discussed above, while indicative of general patterns in the ability of the isolation layer to control the migration of PCB, were specific to the assumed sediment and/or isolation layer conditions. Following cap implementation, and considering the availability of site-specific data, more accurate predictions of breakthrough can be obtained using the actual measured TOC, isolation layer thickness, and observed seepage rates obtained from the site-specific data collected throughout the ½-Mile. This section discusses the use of these additional site-specific data to develop revised predictions of PCB breakthrough times using the same model that was utilized previously. The results of this effort are summarized below.

Holding all other parameters constant, breakthrough calculations were performed using actual TOC results and isolation layer thicknesses as well as both the design and the observed seepage rates, as discussed above. Table 4 presents the results of these breakthrough calculations for each of the removal cells. Using the measured TOC data and average observed seepage rates, calculated breakthrough times range from 1,600 years to greater than 100,000 years, with an average estimated breakthrough time of approximately 26,700 years. As can be seen, modification of input parameters to reflect actual field conditions has a significant impact on the breakthrough estimates, creating increases of several orders of magnitude above the predictions in the Removal Action Work Plan.

For example, sample collection and analysis for TOC indicates that cell G2B, which surrounds sample location G2-2 (see Figure 1), has an average cap thickness of 0.6 feet and an average TOC content of 0.07%. Because of the relatively low levels of TOC in this cell, it can be used as a conservative indicator of the cap's performance in comparison to design standards. Based on the predictive model used in the design, and assuming the full 0.5 % TOC and a design isolation layer thickness of 6 inches, this portion of the cap was anticipated to provide a breakthrough time of approximately 62.5 years as described in the Removal Action Work Plan. However, using the actual TOC data, the actual isolation layer thickness, and the average observed seepage rate, the predicted breakthrough time for this cell is 1,650 years. Figure 5 illustrates the design breakthrough curve for cell G2B, as well as the revised breakthrough curve using the actual measured TOC and isolation layer thickness as well as the average observed seepage rate. That figure shows graphically that, by combining the observed seepage rates with the actual TOC, the performance of the cap in cell G2B achieves breakthrough times several orders of magnitude greater than those previously predicted in the Removal Action Work Plan.

Figure 6 illustrates the predicted breakthrough time for each cell as a percentage of the breakthrough times predicted in the Removal Action Work Plan. As illustrated on Figure 6, using actual TOC conditions and observed seepage rates, the predicted breakthrough times in all areas considered in this analysis are greater than those previously predicted in the Removal Action Work Plan.

Given these results, there is no need to conduct the additional breakthrough analyses proposed in GE's September 9, 2002 letter, which would take into account the naturally deposited sediment material present in the armor stone layer of the cap. Such analyses would only show longer breakthrough times.

5. Summary and Conclusions

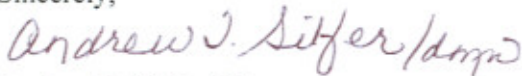
As discussed above, EPA has raised concerns related to the TOC content in the isolation layer of the cap in certain portions of the ½-Mile and the impact that TOC levels may have on the performance of the cap. In response, GE has collected additional site-specific data relating to the portions of the ½-Mile isolation layer subject to this concern, and has revised the PCB transport model used in the design of the cap to assess cap performance.

GE collected samples of the isolation layer to evaluate actual TOC content and to improve the estimate of cap thicknesses. Additionally, GE measured the seepage of groundwater into the ½-Mile to more accurately define the seepage velocities as a model parameter. In general, the revised estimates indicate that the use of actual TOC concentrations and isolation layer thicknesses, in combination with the measured seepage rates (as opposed to the estimated value from the Removal Action Work Plan), increases the estimated breakthrough times by several orders of magnitude over previously predicted values.

Although the TOC data indicate that the TOC content in the isolation layer is less than 0.5% in certain areas, the above analysis demonstrates that, when considering the isolation layer thickness and the actual groundwater seepage velocities measured in the ½-Mile, the cap should perform far better than designed. By using values in the breakthrough model that more closely resemble actual conditions, the approximate PCB breakthrough times predicted for the ½-Mile far exceed the design breakthrough times approved in the Removal Action Work Plan. As a result, GE proposes to continue to monitor the effectiveness of the cap in accordance with the requirements of the Removal Action Work Plan.

Please contact me with any comments or questions.

Sincerely,



Andrew T. Silfer, P.E.
GE Project Coordinator

ATS/dmn
Attachments

cc: Holly Inglis, EPA
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Mark Gravelding, ARCADIS BBL
Todd Cridge, ARCADIS BBL
Public Information Repositories
GE Internal Repositories

Tables

**TABLE 1
SEDIMENT CAP ISOLATION LAYER DATA**

**UPPER 1/2-MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS**

Isolation Layer Cell ID:	A		B		C		F-1		F-2		F3A	F3B	G1			
Sample ID: Date Collected:	A-1 10/10/02	B-1 10/11/02	B-2 10/11/02	C-1 10/10/02	C-2 10/10/02	F1-1 10/10/02	F1-2 10/09/02	F2-1 10/15/02	F2-2 10/15/02	CAP-MON-5 07/03/02	F3-1 10/15/02	CAP-MON-1 11/05/01	CAP-MON-2 11/05/01	G1-1 10/10/02	G1-2 10/09/02	
Isolation Layer																
Cell Area (Square Feet)	3,725	9,200		10,750		5,100		7,500		3,450	4,350	7,000				
Sample Depth (Feet)																
Measured Depth	1.3	0.6	0.6	2.2	2.5	1.1	0.6	1	1.2	1	2.7	1	2	0.7	2.4	
Recovered Depth	1.2	0.5	0.5	1.8	1.7	1	0.6	0.6	1	--	2.05	--	--	0.5	2.4	
Cell Average Measured Depth	1.3	0.6		2.35		0.85		1.1		1	2.7	1.53				
Total Organic Carbon																
GE Sample Result (%)	0.19	0.25	0.08	0.06	0.06	0.08	0.05	0.08 [0.06]	0.05	0.48	0.27	0.13	0.10	0.05	0.06	
EPA Sample Result (%)	0.16	0.26	0.08	0.07	0.10	0.09	0.10	0.10	0.11	--	0.40	--	--	0.06	0.08	
Split Sample Average (%)	0.18	0.26	0.08	0.06	0.08	0.09	0.08	0.08	0.08	0.48	0.34	0.13	0.10	0.06	0.07	
Cell Average TOC (%)	0.18	0.17		0.07		0.08		0.08		0.48	0.34	0.09				

Isolation Layer Cell ID:	G2A		G2B	G3		H1		H2		I1	
Sample ID: Date Collected:	CAP- MON-3 11/05/01	G2-1 10/15/02	G2-2 10/09/02	CAP- MON-4 02/27/02	G3-1 10/09/02	H1-1 10/08/02	H1-2 10/08/02	H2-1 10/08/02	H2-2 10/08/02	I1-1 10/08/02	I1-2 10/08/02
Isolation Layer											
Cell Area (square feet)	4,500		3,450	6,500		4,250		5,000		5,800	
Sample Depth (Feet)											
Measured Depth	3	1.2	0.6	1	0.9	1.4	0.8	0.8	1.1	0.9	0.8
Recovered Depth	--	0.9	0.6	--	0.85	0.6	0.6	0.8	0.9	0.4	0.8
Cell Average Measured Depth	2.1		0.6	0.95		1.1		0.95		0.85	
Total Organic Carbon											
GE Sample Result (%)	0.10	0.11	0.06	0.39	0.43	0.22	0.34	0.39	0.39 [0.26]	0.63	0.52
EPA Sample Result (%)	--	0.14	0.09	--	0.40	0.62	0.22	0.48	0.34	0.90	1.03
Split Sample Average (%)	0.10	0.13	0.07	0.39	0.42	0.42	0.28	0.44	0.33	0.77	0.78
Cell Average TOC (%)	0.11		0.07	0.40		0.35		0.38		0.77	

Notes:

1. GE Samples were collected by Blasland, Bouck & Lee, Inc., and were submitted to Northeast Analytical Services, Inc. for analysis of total organic carbon (TOC).
2. Duplicate sample results are presented in brackets.
3. "--" indicates that no data is available.

**TABLE 2
SEEPAGE METER MONITORING**

**UPPER 1/2-MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS**

Location	Start Time	Starting Volume in Collection Bag (mL)	Approximate Elapsed Time (days)	End Volume in Collection Bag (mL)
Seepage-1				
Seepage-1	7/24/06 4:31 PM	200	2.95	195
Seepage-1	7/27/06 3:25 PM	200	3.77	195
Seepage-1	7/31/06 9:59 AM	200	1.97	205
Seepage-1	8/2/06 9:13 AM	200	7.03	206
Seepage-1	8/9/06 10:02 AM	200	12.03	199
Seepage-1	8/21/06 10:44 AM	200	15.16	200
Seepage-2				
Seepage-2	7/24/06 5:11 PM	200	2.95	220
Seepage-2	7/27/06 3:58 PM	200	3.77	206
Seepage-2	7/31/06 10:33 AM	200	1.96	203
Seepage-2	8/2/06 9:34 AM	200	7.04	210
Seepage-2	8/9/06 10:30 AM	200	12.03	--
Seepage-2	8/21/06 11:21 AM	200	15.15	214
Seepage-3				
Seepage-3	7/24/06 5:38 PM	200	2.95	200
Seepage-3	7/27/06 4:27 PM	200	3.77	205
Seepage-3	7/31/06 11:02 AM	200	1.96	202
Seepage-3	8/2/06 10:05 AM	200	7.04	203
Seepage-3	8/9/06 11:01 AM	200	12.04	207
Seepage-3	8/21/06 12:05 PM	200	15.15	205

Notes:

1. Seepage meters were installed on 7/19/06 and allowed to equilibrate for five days prior to initiating the first monitoring cycle (7/24/06).
2. On 8/21/2006, the water collection bag at Seep-2 was observed to be leaking; a likely result of an abrasion on the bag caused by rubbing against the protective plastic cage. As such, data at this location was not recorded during Round 5.
3. Water collection bags were surcharged with 200 milliliters of water to mitigate any resistance to flow of water into the bag.

**TABLE 3
SUMMARY OF SEEPAGE VELOCITY ESTIMATES**

**UPPER 1/2-MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS**

	Date of Reading	Approximate Time Since Last Reading (days)	Approximate Seepage Velocity (cm/d)		
			Seepage-1	Seepage-2	Seepage-3
1	7/27/2006	2.95	-0.00065	0.0026	0.0
2	7/31/2006	3.77	-0.00051	0.00061	0.00051
3	8/2/2006	1.97	0.00097	0.00058	0.00039
4	8/9/2006	7.03	0.00033	0.00054	0.00016
5	8/21/2006	12.03	-0.000032	NA	0.00022
6	9/5/2006	15.16	0.0	0.00035	0.00013

Note

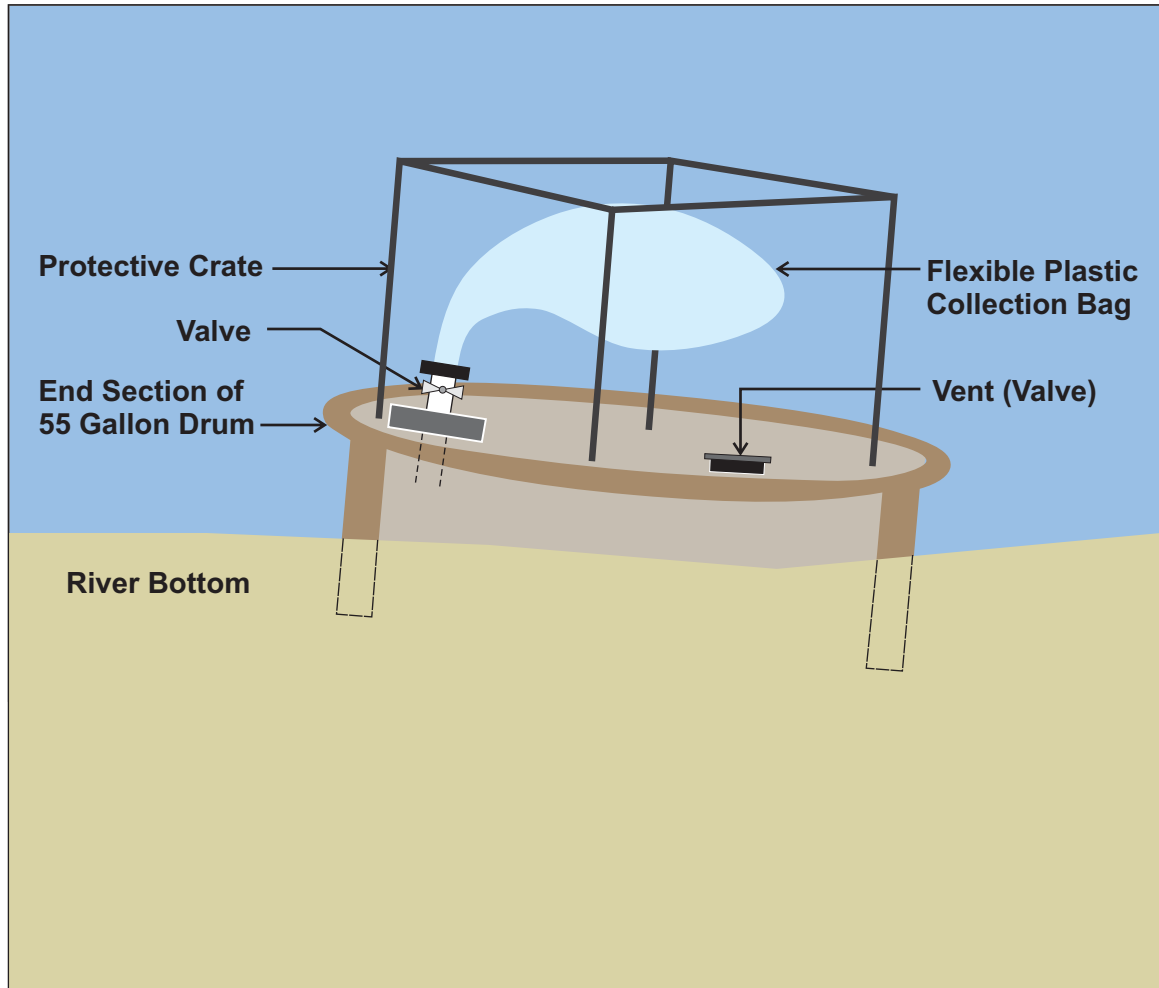
1. On 8/21/2006, the water collection bag at Seep-2 was observed to be leaking; a likely result of an abrasion on the bag caused by rubbing against the protective plastic cage. As such, data at this location was not recorded during Round 5.

**TABLE 4
ESTIMATED 5% PCB BREAKTHROUGH TIMES**

**UPPER 1/2-MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS**

Isolation Layer Cells	Isolation Layer Cell Size (square feet)	Associated Sample IDs	Average Isolation Layer TOC (percent)	Average Isolation Layer Thickness (feet)	Predicted 0.5% Breakthrough Time (Years)	
					Assumed Seepage Rate = 3.3 cm/day	Average Observed Seepage Rate = 0.0004 cm/day
A	3,750	A-1	0.18	1.30	65	18,500
B	9,200	B-1, B-2	0.16	0.60	24	3,800
C	10,750	C-1, C-2	0.07	2.35	38	23,000
F1	5,100	F1-1, F1-2	0.08	0.85	32	3,500
G1	7,000	CAP-MON-1, CAP-MON-2, G1-1, G1-2	0.09	1.53	32	12,500
F2	7,500	F2-1, F2-2	0.08	1.10	19	6,100
F3A	3,450	CAP-MON-5	0.48	1.00	107	29,500
F3B	4,350	F3-1	0.34	2.70	193	140,000
G2A	4,500	CAP-MON-3, G2-1	0.11	2.10	64	30,000
G2B	3,450	G2-2	0.07	0.60	9	1,650
G3	6,500	CAP-MON-4, G3-1	0.40	0.95	101	22,000
H1	4,250	H1-1, H1-2	0.35	1.10	81	27,000
H2	5,000	H2-1, H2-2	0.38	0.95	96	22,000
I1	5,800	I1-1, I1-2	0.77	0.85	127	35,500

Figures

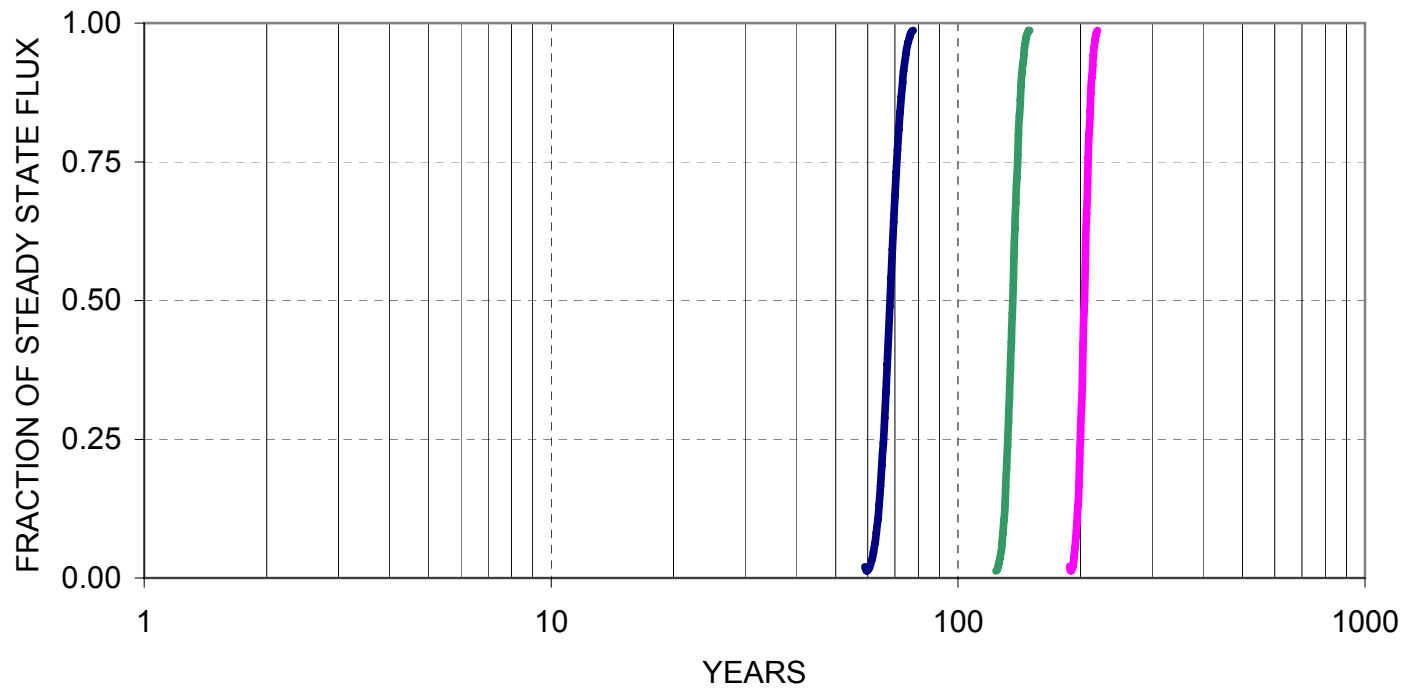


GENERAL ELECTRIC COMPANY
 PITTSFIELD, MASSACHUSETTS
**UPPER 1/2-MILE REACH
 OF THE HOUSATONIC RIVER**


LEE SEEPAGE METER

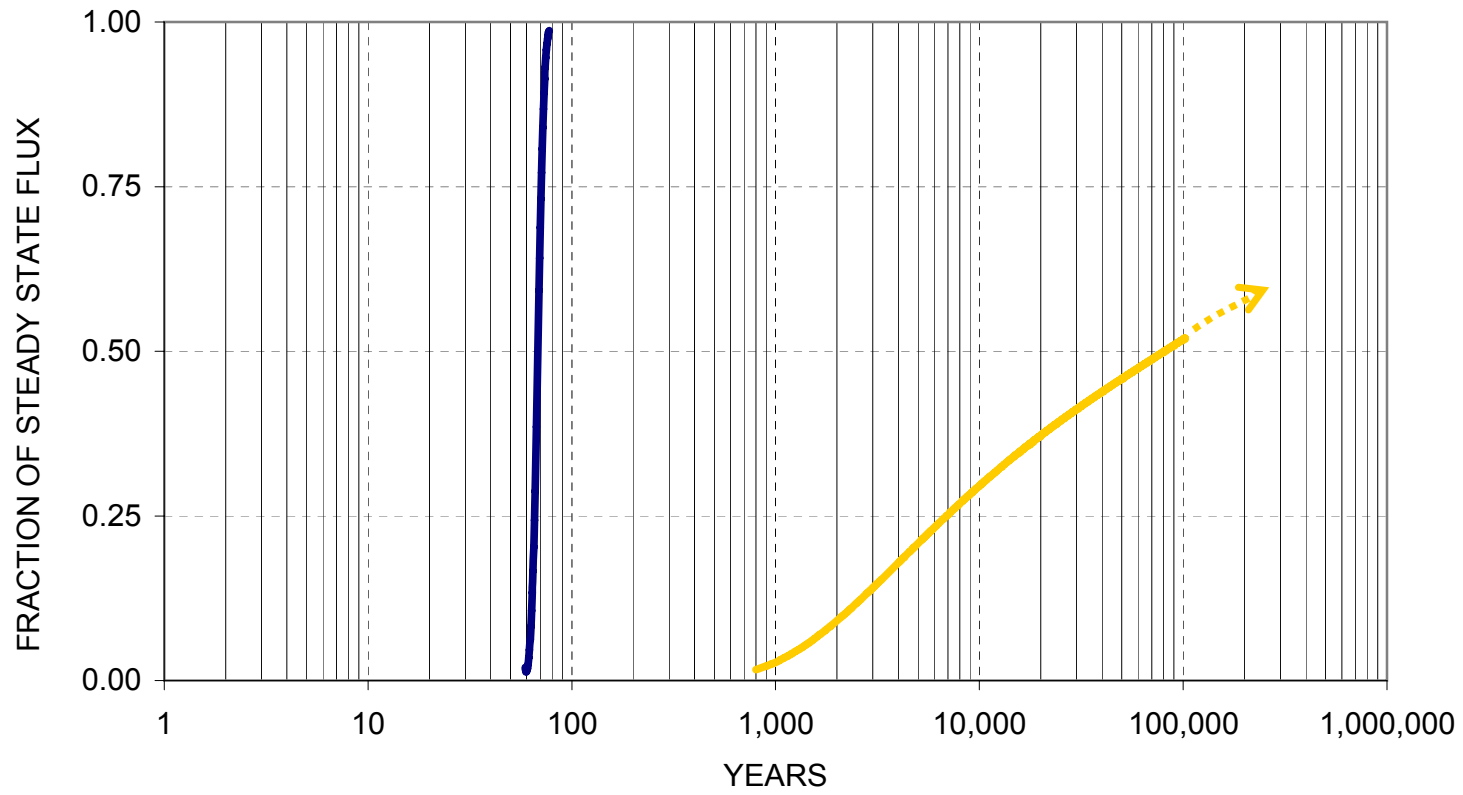


**FIGURE
 3**



- 6-INCH LAYER
- 12-INCH LAYER
- 18-INCH LAYER

GENERAL ELECTRIC COMPANY PITTSFIELD , MASSACHUSETTS UPPER 1/2-MILE REACH OF THE HOUSATONIC RIVER	
DESIGN PCB BREAKTHROUGH CURVES	
	FIGURE 4



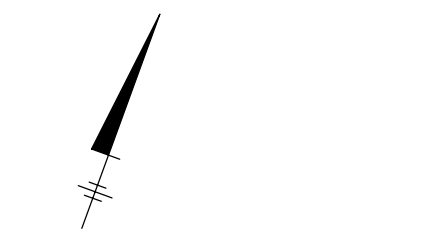
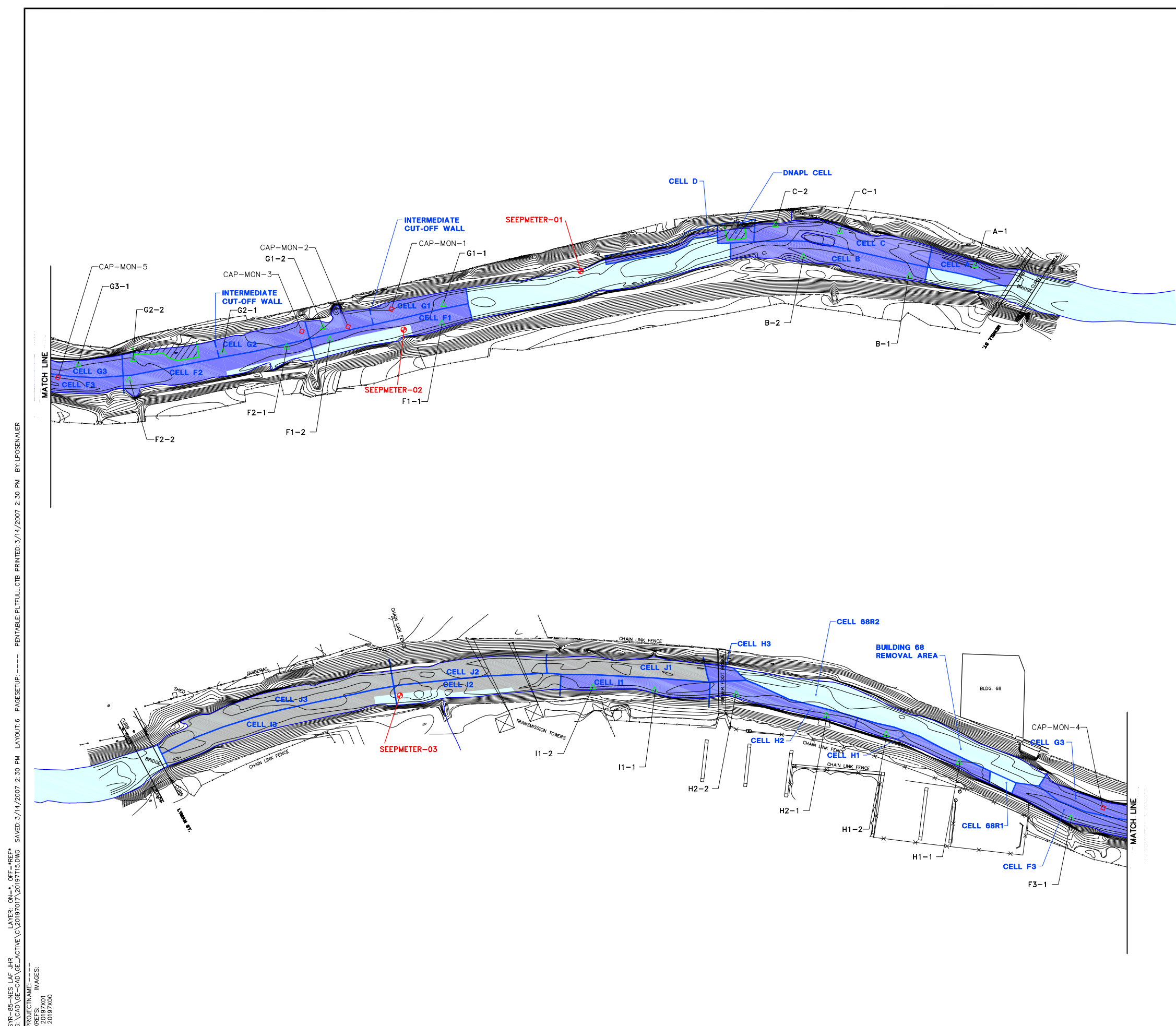
— 6-INCH LAYER DESIGN
— ACTUAL TOC WITH AVERAGE OBSERVED SEEPAGE

GENERAL ELECTRIC COMPANY
 PITTSFIELD , MASSACHUSETTS
**UPPER 1/2-MILE REACH
 OF THE HOUSATONIC RIVER**
**CELL G2B PCB BREAKTHROUGH
 CURVE WITH ACTUAL TOC AND
 AVERAGE OBSERVED SEEPAGE RATE**



FIGURE

5



- LEGEND:
- ISOLATION LAYER PRIOR SAMPLE LOCATION
 - △ OCTOBER 2002 ISOLATION LAYER SAMPLE LOCATION
 - SEEPAGE METER LOCATION
 - REMOVAL CELL BOUNDARY
 - ▨ HDPE LINER
 - EXCEEDS PREDICTED BREAKTHROUGH TIME
 - REMOVAL AREAS NOT INCLUDED IN BREAKTHROUGH ANALYSIS
 - AREAS NOT INCLUDED IN THE 1/2-MILE REACH REMOVAL ACTION

- NOTES:
- ALL LOCATIONS AND DISTANCES ARE APPROXIMATE
 - HDPE LINERS WERE DIGITIZED FROM THE FOLLOWING FIGURES PROVIDED BY S & K DESIGN GROUP, INC.: "PLAN OF DNAPL REMOVAL", FIGURE 1, DATED APRIL 12, 2000, AT A SCALE OF 1"=10'; AND "PLAN OF G2 NAPL REMOVAL", FIGURE 1, DATED JANUARY 12, 2001, AT A SCALE OF 1"=10', AND ARE APPROXIMATE.
 - BREAKTHROUGH TIMES ARE SHOWN AS A PERCENTAGE OF THE BREAKTHROUGH TIME PREDICTED IN ACCORDANCE WITH THE WORK PLAN (62.5 YEARS FOR A SIX-INCH LAYER, 125 YEARS FOR A 12-INCH LAYER, AND 187.5 YEARS FOR A 18-INCH LAYER).
 - BREAKTHROUGH TIMES ESTIMATED AS A FUNCTION OF ACTUAL ISOLATION LAYER TOC AND THICKNESS, FIELD MEASURED GROUNDWATER SEEPAGE RATE = 0.0004 cm/DAY AND ASSUMED LOG KOC = 6.43.



GENERAL ELECTRIC COMPANY
 PITTSFIELD, MASSACHUSETTS
**UPPER 1/2-MILE REACH
 OF THE HOUSATONIC RIVER**
 PCB BREAKTHROUGH TIMES WITH ACTUAL TOC AND
 THICKNESS, WORKPLAN PARAMETERS, AND
 OBSERVED SEEPAGE RATE

SYR-BE-NES-LAF-JHR LAYER: ON=*_OFF=REF*
 G:\CAD\GE-CAD\GE_ACTIVE\C\20197017\20197115.DWG SAVED: 3/14/2007 2:30 PM LAYOUT: 6 PAGESETUP: ----- PENTABLE: PLT\FULL.CTB PRINTED: 3/14/2007 2:30 PM BY: LPOSENAUER
 PROJECT NAME: IMAGES:
 20197X01
 20197X00

Appendix A

TOC Data Summary Packages

DATA SUMMARY PACKAGE FOR

GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201

ANALYTICAL METHOD:

Total Organic Carbon by EPA Lloyd Kahn Method

DATE : October 31, 2002 -D

PROVIDED BY : NORTHEAST ANALYTICAL, INC.
2190 TECHNOLOGY DRIVE
SCHENECTADY, NEW YORK 12308
518-346-4592

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
ATTESTATIONS	3
CASE NARRATIVE	4
SAMPLE CHAIN OF CUSTODY	5
 TOTAL ORGANIC CARBON BY EPA LLOYD KAHN METHOD:	
FORM 1 SAMPLE CONCENTRATION RESULTS	7
FORM 2 CONTINUING CALIBRATION VERIFICATION SUMMARY	9
FORM 3 BLANK VERIFICATION SUMMARY	10
FORM 4 SPIKE SAMPLE RECOVERY SUMMARY	11
FORM 5 DUPLICATE SAMPLE SUMMARY	12
SAMPLE PREP LOGBOOKS	13
CERTIFICATE OF ANALYSIS	18

Attestations:

The following have been directly involved in the preparation of the sample data contained herein and in the preparation of the associated data summary report.

SAMPLE CUSTODIAN: Claire Eldridge

TOC ANALYST: John Nicpon

QA/QC OFFICER: William Kotas

LAB DIRECTOR: Robert E. Wagner

S:\FORMS\CATB\WORD\ATTESTtoc.DOC

000003

November 6, 2002

Sample Delivery Group Case Narrative

This sample delivery group consists of samples received on October 11, 2002 and October 17, 2002 and includes assigned Inorganics Sample Delivery Group Number AF07542. The samples are from Project Number: 201.97.021, Project Name: Housatonic River ½ Mile TOC Sediment Cap Isolation Sand Layer Sampling Program. All samples were delivered to Northeast Analytical Inc. by FedEx delivery service on 10/11/02 and 10/17/02. All samples were received by the laboratory intact and within holding times.

This sample delivery group consists of the following sample:

<u>NEA Sample ID:</u>	<u>Client Sample ID:</u>
AF08719	F1-1 (0-1')
AF08720	G1-1 (0-0.5')
AF08721	A-1 (0-1.2')
AF08722	C-1 (0-1.8')
AF08723	C-2 (0-1.7')
AF09230	F3-1 (0-2.05')
AF09231	F2-2 (0-1')
AF09232	F2-1 (0-0.6')
AF09233	G2-1 (0-0.9')
AF09234	DUP-2

Total Organic Carbon

Analysis for Total Organic Carbon in solids was performed by the EPA Lloyd Kahn Method with the triplicate analysis option. The following technical and administrative items were noted for the analysis:

- (1.) Sample (NEA ID: AF09233) was analyzed in quadruplicate. The triplicate analysis did not meet the %RSD criteria (<25%) for this sample. The concentration result was flagged (*) on the associated Form 1. Results of all analyses of this sample are included in this data summary report for review. (Please see Certificates of Analysis for results summary)

Qualifier Summary:

I. CLP Standard Inorganic analysis qualifiers were used for all analyses.

This Case Narrative was prepared by,



William A. Kotés
Quality Assurance Officer

S:\forms\carb\cases\110602A.doc

000004



6723 Towpath Road, P.O. Box 66
Syracuse, New York 13214-0066
TEL: (315) 446-9120

CHAIN OF CUSTODY RECORD

02100064

1 of 1

PROJ. NO.		PROJECT NAME															
20197.02		HOWATONK RIVER 1/2 MILE ISOLATION		CAP LAYER TOX SAMPLING													
SAMPLERS: (Signature)																	
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	Number of Containers						REMARKS					
AFO 8719	10/10/02	1100	X		F1-1 (0-1')	1	X										
AFO 8720		1110	X		G1-1 (0-0.5')	1	X										
AFO 8721		1520	X		A-1 0-1.2	1	X										
AFO 8722		1530	X		C-1 (0-1.3')	1	X										
AFO 8723	✓	1540	X		C-2 (0-1.7')	1	X										
Relinquished by: (Signature)			DATE	TIME	Received by: (Signature)			Relinquished by: (Signature)			DATE	TIME	Relinquished by: (Signature)				
<i>[Signature]</i>			10/10/02	1630													
Relinquished by: (Signature)			DATE	TIME	Received by: (Signature)			Relinquished by: (Signature)			DATE	TIME	Relinquished by: (Signature)				
Relinquished by: (Signature)			DATE	TIME	Received for Laboratory by: (Signature)		DATE	TIME	Remarks: TO NUESSEAD ANALYTICAL LAB FEDEX#: 8274 60989447								
					<i>[Signature]</i>		10/11/02	10:30									

000005

CHAIN OF CUSTODY RECORD

02100127 1 of 1

PROJ. NO.		PROJECT NAME												
20197-021		HELYATONIC RIVER/HELVIC TOE SEDIMENT		CAP ISOLATION SAND/GRANULAR SAMPLING PROGRAM										
SAMPLERS: (Signature) <i>Stephen J. Lewis</i>														
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	Number of Containers	TOC	TOC (MS/MSD)	TEMPERATURE	REMARKS				
	10/15/02	1225	X		F3-1 (0-2.05') AFO9230	1	X			* STANDARD TURNAROUND TIME				
		1235	X		F2-2 (0-1') AFO9231	1	X							
		135	X		F2-1 (0-0.6') AFO9232	1	X							
		1545	X		G2-1 (0-0.9') AFO9233	2	X	X						
			X		DUP-2 AFO9234	1	X							
					TEMP BLANK	1								
Relinquished by: (Signature) <i>Stephen J. Lewis</i>			DATE	TIME	Received by: (Signature)			Relinquished by: (Signature)			DATE	TIME	Relinquished by: (Signature)	
			10/16/02	1700										
Relinquished by: (Signature)			DATE	TIME	Received by: (Signature)			Relinquished by: (Signature)			DATE	TIME	Relinquished by: (Signature)	
Relinquished by: (Signature)			DATE	TIME	Received for Laboratory by: (Signature)		DATE	TIME	Remarks:					
					<i>Goldridge</i>		10/17/02	10:30	TO NORTHEAST ENERGY TRUST VIA FED-EX # 6.4°C ON ICE					

900000

NORTHEAST ANALYTICAL



ENVIRONMENTAL LAB SERVICES

2190 Technology Drive, Schenectady, NY 12308

(518) 346-4592 • FAX: (518) 381-6055

1 DATA SHEET TOTAL ORGANIC CARBON

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF07542
MATRIX: SOLID
INSTRUMENT ID#: DC 80 BOAT MODULE/ HORIBA PIR 2000

Concentration Units (mg/L or mg/kg dry weight): mg/kg

NEA SAMPLE #	CLIENT SAMPLE #	DATE ANALYZED	DATE RECEIVED	AVE. CONC.	C	Q
AF08719	F1-1 (0-1')	10/24/02	10/11/02	842		
AF08720	G1-1 (0-0.5')	10/24/02	10/11/02	511		
AF08721	A-1 (0-1.2')	10/24/02	10/11/02	1880		
AF08722	C-1 (0-1.8')	10/24/02	10/11/02	585		
AF08723	C-2 (0-1.7')	10/24/02	10/11/02	566		

NORTHEAST ANALYTICAL



ENVIRONMENTAL LAB SERVICES

2190 Technology Drive, Schenectady, NY 12308

(518) 346-4592 • FAX: (518) 381-6055

1 DATA SHEET TOTAL ORGANIC CARBON

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF09230
MATRIX: SEDIMENT
INSTRUMENT ID#: DC 80 BOAT MODULE/ HORIBA PIR 2000

Concentration Units (mg/L or mg/kg dry weight): mg/kg

NEA SAMPLE #	CLIENT SAMPLE #	DATE ANALYZED	DATE RECEIVED	AVE. CONC.	C	Q
AF09230	F3-1 (0-2.5')	10/24/02	10/17/02	2670		
AF09231	F2-2 (0-1')	10/24/02	10/17/02	452		
AF08232	F2-1 (0-0.6)	10/24/02	10/17/02	816		
AF09233	G2-1 (0-0.9')	10/24/02	10/17/02	1100		*
AF09234	DUP-2	10/24/02	10/17/02	617		

NORTHEAST ANALYTICAL



ENVIRONMENTAL LAB SERVICES

2190 Technology Drive, Schenectady, NY 12308
(518) 346-4592 • FAX: (518) 381-6055

2

CONTINUING CALIBRATION VERIFICATION SUMMARY- TOC

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF09230
INSTRUMENT ID#: DC 80 BOAT MODULE/ HORIBA PIR 2000
CONTINUING CALIBRATION SOURCE (NIST traceable): VW3880-2 LOT# 2175
DATE ANALYZED 10/24/02

Concentration units: ug

Continuing Calibration						
CCV-1			CCV-2		CCV-3	
True	Found	%R	Found	%R (1)	Found	%R (2)
70	69.3	99.0	71.7	102	73.5	105

(1) Control limits: TOC 85-115%

NORTHEAST ANALYTICAL



ENVIRONMENTAL LAB SERVICES

2190 Technology Drive, Schenectady, NY 12308
(518) 346-4592 • FAX: (518) 381-6055

3

CONTINUING BLANK VERIFICATION SUMMARY- TOC

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF09230
INSTRUMENT ID#: BOAT MODULE/ HORIBA PIR 2000
Preparation blank ID: AF08719_BLANK
DATE ANALYZED: 10/24/02
Samples associated with prep. Blank: AF08719-AF08723 & AF09230-AF09234

Continuing Calibration blank (mg/L)					
1	C	2	C	3	C
71.3	U	71.3	U	71.3	U

NORTHEAST ANALYTICAL



ENVIRONMENTAL LAB SERVICES

2190 Technology Drive, Schenectady, NY 12308
(518) 346-4592 • FAX: (518) 381-6055

4

SPIKE SAMPLE RECOVERY SUMMARY- TOC

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF07542
MATRIX: SEDIMENT
INSTRUMENT ID#: DC 80 BOAT MODULE/ HORIBA PIR 2000
NEA SAMPLE #: AF09233
DATE ANALYZED: 10/24/02
Samples associated with spike: AF08719-AF08723 & AF09230-AF09234

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Control limit %R	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q
60-140	9730		1100		8950	97.0	

NORTHEAST ANALYTICAL



ENVIRONMENTAL LAB SERVICES

2190 Technology Drive, Schenectady, NY 12308
(518) 346-4592 • FAX: (518) 381-6055

5

DUPLICATE SAMPLE SUMMARY- TOC

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF09230
MATRIX: SEDIMENT
INSTRUMENT ID#: BOAT MODULE/ HORIBA PIR 2000
NEA SAMPLE #: AF09233
DATE ANALYZED: 10/24/02
Samples associated with duplicate: AF08719-AF28723& AF09230-AF09234

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Sample	C	Duplicate	C	RPD%	Q
1100		1130		2.69	

(1) Control limits for TOC: 35

S:\METALQC\TOCForms\TOC 2002\DUP9233.DOC

000012

DATE: 8-12-02

ANALYST: yw

REVIEWED BY:

s:\form\log\eva\Toctog1.xls

Run #	NEA Sample ID	Area	Boat #	Matrix	Sample wt. (g)	Sample Vol (ml)	Comments (std codes/spike amounts)
0	Blank	0.003	NA	liquid	NA	0.070	
1	↓	0.003					
2	Std #1 (4.99)	1.320					
3	↓	1.393					
4	Std #2 (10.68)	39.60					boat problem replaced quartz glass
5	↓	52.67					↓
6	↓	2.631					
7	↓	3.288					
8	↓	3.098					
9	Std #3 (106.8)	32.13					
10	↓	31.05					
11	Std #4 (267.1)	76.52					
12	↓	83.25					
13	Std #5 (504.5)	143.4					
14	↓	157.4					
15	Std #6 (831.0)	234.0					
16	↓	246.1					
17	Blank	0.002					
18	↓	0.006					
19	CCV-1	21.32					
20	↓	21.17					

yw
8/12/02

Oxygen flow (psig) 30.5 Zero set. 4.0 Range selected: 3
 Baseline value: 0.0178 Span 5.0 CCV/ICV: AF05910

Comments:

DATE: 10/24/02

ANALYST: JMS

REVIEWED BY:

s:\forms\log\svae\Toclog3.XLS

Run #	NEA Sample ID	Area	Boat #	Matrix	Sample wt. (g)	Sample Vol (ml)	Comments (std codes/spike amounts)
0	CCV-1	20.46	NA	H ₂ O	NA	0.070	Assigned Blank to AF08719
1	↓	20.01	↓	↓	↓	↓	
2	Blank	0.000	↓	↓	↓	↓	Boat stuck in chamber
3	↓	0.594	↓	↓	↓	↓	
4	↓	0.000	↓	↓	↓	↓	
5	AF08719	7.449	64	Sed	0.327	NA	
6	↓	6.270	65	↓	0.303	↓	
7	↓	5.935	66	↓	0.318	↓	
8	AF08720	3.594 ^{miss}	67	↓	0.283	↓	3.509
9	↓	3.400	68	↓	0.271	↓	
10	↓	3.430	69	↓	0.260	↓	
11	AF08721	10.44	70	↓	0.247	↓	
12	↓	13.81	71	↓	0.326	↓	
13	↓	15.01	72	↓	0.299	↓	
14	AF08722	4.078	1	↓	0.262	↓	
15	↓	4.719	2	↓	0.320	↓	
16	↓	4.257	3	↓	0.316	↓	
17	AF08723	5.796	4	↓	0.383	↓	
18	↓	5.277	5	↓	0.385	↓	
19	↓	5.847	6	↓	0.419	↓	
20	AF08723 AF09230	18.30	28	↓	0.300	↓	
21	↓	18.34	29	↓	0.297	↓	
22	↓	20.17	30	↓	0.299	↓	
23	AF09231	3.423	31	↓	0.277	↓	
24	↓	4.335	32	↓	0.341	↓	
25	CCV-2	20.75	NA	H ₂ O	NA	0.070	Assigned to AF09231 Blank
26	↓	21.10	↓	↓	↓	↓	
27	Blank	0.003	↓	↓	↓	↓	
28	↓	0.000	↓	↓	↓	↓	
29	AF09231	2.874	33	Sed	0.310	NA	
30	AF09232	7.913	34	↓	0.486	↓	
31	↓	9.720	35	↓	0.401	↓	
32	↓	7.539	36	↓	0.370	↓	
33	AF09234	5.146	37	↓	0.344	↓	
34	↓	5.667	38	↓	0.382	↓	
35	↓	4.266	39	↓	0.258	↓	
36	AF09233	10.08	40	↓	0.403	↓	
37	↓	7.769	41	↓	0.339	↓	

Oxygen flow (psig) 30 Zero set. 4.0 Range selected: 3

Baseline value: 0.012 Span 5.0 CCV/ICV: AF05910

Comments:

DATE: 10/24/02

ANALYST: JMS

REVIEWED BY:

s:\forms\log\svoa\Toclog3.XLS

Run #	NEA Sample ID	Area	Boat #	Matrix	Sample wt. (g)	Sample Vol (ml)	Comments (std codes/spike amounts)
38	AF09233	12.36	42	Sed	.0320	NA	
39	AF09233sp	10.57	43	↓	.0364	↓	
40	↓	10.13	44	↓	.0350	↓	
41	↓	9.417	45	↓	.0337	↓	
42	AF09233 vtm	7.044	49	↓	.0300	↓	
43	AF09233spha	88.09	46	↓	.0362	↓	spiked w/ .250ml of AF05910
44	↓	73.90	47	↓	.0332	↓	.0269
45	↓	79.39	48	↓	.0332	↓	
46	CCU-3	21.32	NA	H ₂ O	NA	0.070	
47	↓	21.61	↓	↓	↓	↓	
48	Blank	0.135	↓	↓	↓	↓	
49	↓	0.005	↓	↓	↓	↓	

JMS
10/24/02

Oxygen flow (psig) 30 Zero set. 4.0 Range selected: 3

Baseline value: 0.0172 Span 5.0 CCV/ICV: AF05910

Comments:

NORTHEAST ANALYTICAL INC.,

Analytical Worksheet for TOC in Solids

Date: 10/24/02

S:\Data02\toc9230

rev. 12/04/01wk

Notes: Make sure you have constructed a calibration curve. (see to the right on this worksheet)

blank= 0.003

Samples: ID#	RUN #	Area #1	RUN #	Area #2	Sample ug-1	Sample ug-2	Avg Conc ug	Quantitation Limit
TOC-CCV-1	0	20.46	1	20.01	70.1	68.5	69.3	4.99
BLANK-1	2	0.00	3	0.594	0.0	2.0	1.0	4.99
TOC-CCV-2	25	20.75	26	21.1	71.1	72.3	71.7	4.99
BLANK-2	27	0.000	28	0.000	0.0	0.0	0.0	4.99
TOC-CCV-3	46	21.32	47	21.61	73.0	74.0	73.5	4.99
BLANK-3	48	0.135	49	0.005	0.5	0.0	0.2	4.99

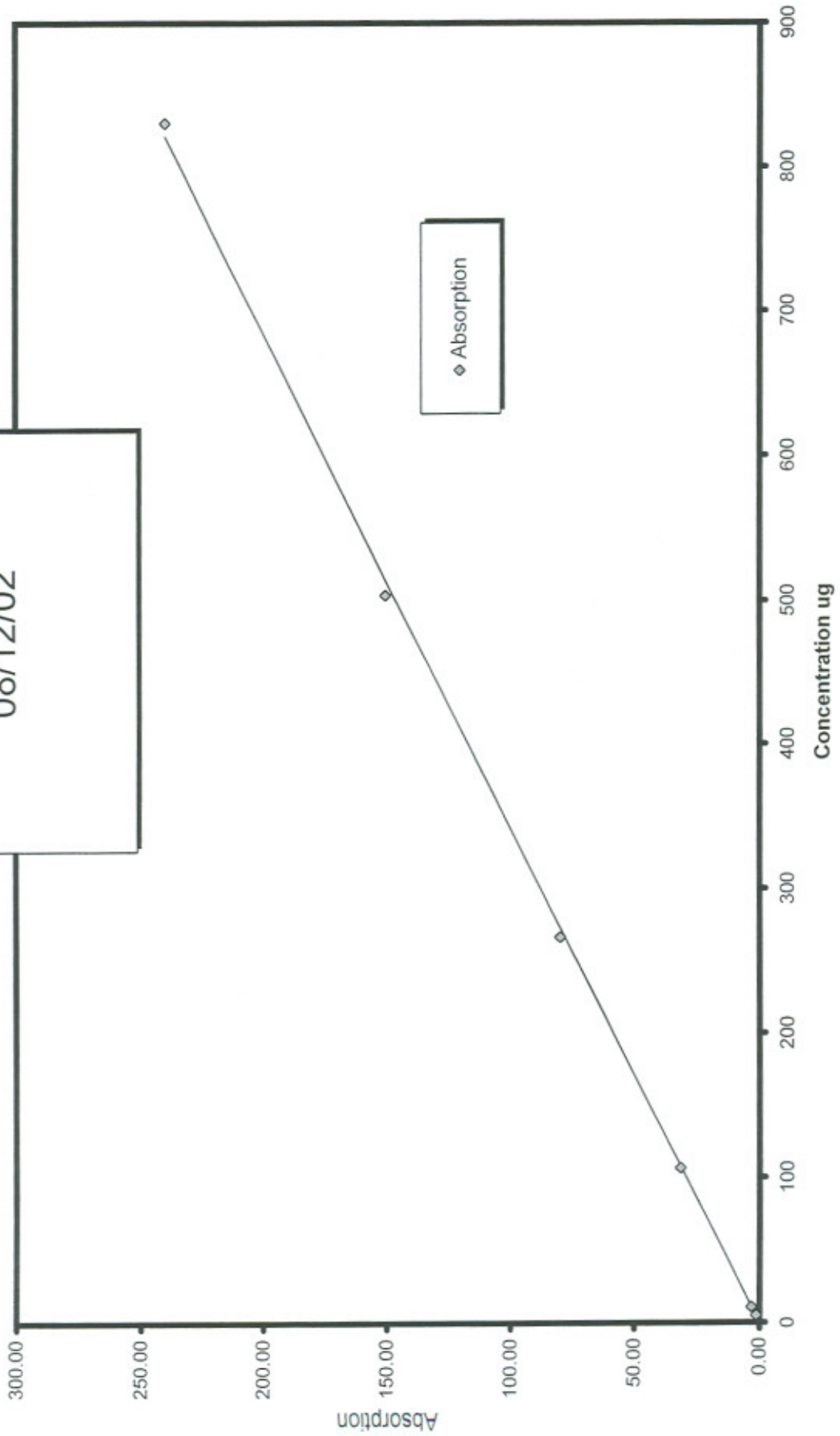
71.28571429

1

71

Quality Control		ICV & CCV		CODE:	AF05910
Manufacturer:					
NEA ID.	CONC. ug	CERTIFIED VALUE	% RECOVERY	ADVISORY RANGE	
ICV/CCV-1	69.3	70	99.0	85%-115%	
TOC CCV-2	71.7	70	102	85%-115%	
TOC CCV-3	73.5	70	105	85%-115%	

CALIBRATION CURVE
08/12/02



NORTHEAST ANALYTICAL



ENVIRONMENTAL LAB SERVICES

2190 Technology Drive, Schenectady, NY 12308
(518) 346-4592 • FAX: (518) 381-6055

CERTIFICATE OF ANALYSIS
10/25/2002
GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

CUSTOMER ID: F1-1 (0-1') NEA ID: AF08719
MATRIX : SOLID DATE SAMPLED: 10/10/2002 TIME: 11:00
DATE RECEIVED: 10/11/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	926	181	mg/kg	10/24/2002	
TOC - Replicate 2	841	196	mg/kg	10/24/2002	
TOC - Replicate 3	759	186	mg/kg	10/24/2002	
AVERAGE	842		mg/kg		
% RSD	9.94				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:

Northeast Analytical, Inc.
Robert E. Wagner, Laboratory Director

000018

NORTHEAST ANALYTICAL

ENVIRONMENTAL LAB SERVICES

2190 Technology Drive, Schenectady, NY 12308

(518) 346-4592 • FAX: (518) 381-6055

CERTIFICATE OF ANALYSIS
10/25/2002
GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

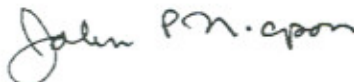
CUSTOMER ID: G1-1 (0-0.5') NEA ID: AF08720
MATRIX: SOLID DATE SAMPLED: 10/10/2002 TIME: 11:10
DATE RECEIVED: 10/11/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	499	207	mg/kg	10/24/2002	
TOC - Replicate 2	505	216	mg/kg	10/24/2002	
TOC - Replicate 3	531	226	mg/kg	10/24/2002	
AVERAGE	511		mg/kg		
% RSD	3.32				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:

Northeast Analytical, Inc.
Robert E. Wagner, Laboratory Director



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NORTHEAST ANALYTICAL



ENVIRONMENTAL LAB SERVICES

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CERTIFICATE OF ANALYSIS
10/29/2002
GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

CUSTOMER ID: A-1 (0-1.2') NEA ID: AF08721
MATRIX: SOLID DATE SAMPLED: 10/10/2002 TIME: 15:20
DATE RECEIVED: 10/11/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	1770	247	mg/kg	10/24/2002	
TOC - Replicate 2	1770	187	mg/kg	10/24/2002	
TOC - Replicate 3	2100	204	mg/kg	10/24/2002	
AVERAGE	1880		mg/kg		
% RSD	10.1				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL.
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:

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CERTIFICATE OF ANALYSIS
10/29/2002
GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

CUSTOMER ID: C-1 (0-1.8") NEA ID: AF08722
MATRIX: SOLID DATE SAMPLED: 10/10/2002 TIME: 15:30
DATE RECEIVED: 10/11/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	624	223	mg/kg	10/24/2002	
TOC - Replicate 2	591	183	mg/kg	10/24/2002	
TOC - Replicate 3	540	185	mg/kg	10/24/2002	
AVERAGE	585		mg/kg		
% RSD	7.23				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL.
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

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10/29/2002
GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

CUSTOMER ID: C-2 (0-1.7') NEA ID: AF08723
MATRIX: SOLID DATE SAMPLED: 10/10/2002 TIME: 15:00
DATE RECEIVED: 10/11/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED
TOC by EPA/LLOYD KAHN METHOD				
TOC - Replicate 1	600	151	mg/kg	10/24/2002
TOC - Replicate 2	544	150	mg/kg	10/24/2002
TOC - Replicate 3	554	138	mg/kg	10/24/2002
AVERAGE	566		mg/kg	
% RSD	5.35			

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL.
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:



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Robert E. Wagner, Laboratory Director

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CERTIFICATE OF ANALYSIS

10/25/2002

GENERAL ELECTRIC COMPANY

100 WOODLAWN AVENUE

PITTSFIELD, MA 01201

CONTACT: ANDY SILFER

CUSTOMER ID: F3-1 (0-2.05') NEA ID: AF09230
MATRIX: SEDIMENT DATE SAMPLED: 10/15/2002 TIME: 12:25
DATE RECEIVED: 10/17/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

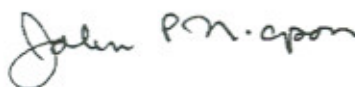
PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	2570	204	mg/kg	10/24/2002	
TOC - Replicate 2	2600	206	mg/kg	10/24/2002	
TOC - Replicate 3	2840	205	mg/kg	10/24/2002	
AVERAGE	2670		mg/kg		
% RSD	5.57				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL

PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:

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Robert E. Wagner, Laboratory Director



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10/25/2002
GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

CUSTOMER ID: F2-2 (0-1') **NEA ID:** AF09231
MATRIX : SEDIMENT **DATE SAMPLED:** 10/15/2002 **TIME:** 12:35
DATE RECEIVED: 10/17/2002 **TIME:** 10:30 **PROJECT:** 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT **LOCATION:** PITTSFIELD, MA
CUSTOMER PO: N/A **LAB ELAP #:** 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	488	208	mg/kg	10/24/2002	
TOC - Replicate 2	502	169	mg/kg	10/24/2002	
TOC - Replicate 3	366	186	mg/kg	10/24/2002	
AVERAGE	452		mg/kg		
% RSD	16.6				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

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10/25/2002

GENERAL ELECTRIC COMPANY

100 WOODLAWN AVENUE

PITTSFIELD, MA 01201

CONTACT: ANDY SILFER

CUSTOMER ID: F2-1 (0-0.6') **NEA ID:** AF09232
MATRIX : SEDIMENT **DATE SAMPLED:** 10/15/2002 **TIME:** 15:35
DATE RECEIVED: 10/17/2002 **TIME:** 10:30 **PROJECT:** 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT **LOCATION:** PITTSFIELD, MA
CUSTOMER PO: N/A **LAB ELAP #:** 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	654	121	mg/kg	10/24/2002	
TOC - Replicate 2	974	146	mg/kg	10/24/2002	
TOC - Replicate 3	819	158	mg/kg	10/24/2002	
AVERAGE	816		mg/kg		
% RSD	19.6				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL

PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:

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Robert E. Wagner, Laboratory Director

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CERTIFICATE OF ANALYSIS
10/25/2002
GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

CUSTOMER ID: G2-1 (0-0.9') NEA ID: AF09233
MATRIX: SEDIMENT DATE SAMPLED: 10/15/2002 TIME: 15:45
DATE RECEIVED: 10/17/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	985	142	mg/kg	10/24/2002	
TOC - Replicate 2	902	169	mg/kg	10/24/2002	
TOC - Replicate 3	1520	179	mg/kg	10/24/2002	
TOC - Replicate 4	1000	191	mg/kg	10/24/2002	
AVERAGE	1100		mg/kg		
% RSD	25.6				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL.
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

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Robert E. Wagner, Laboratory Director

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CERTIFICATE OF ANALYSIS 10/25/2002

GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

NEA ID: AF09233

CUSTOMER ID: G2-1 (0-0.9')

MATRIX: SEDIMENT

LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

DUPLICATE SAMPLE SUMMARY - TOC

RPD LIMIT	SAMPLE mg/kg	DUPLICATE mg/kg	RPD (%)	Q
≤ 25%	1100	1130	2.69	

MATRIX SPIKE RECOVERY SUMMARY - TOC

CONTROL LIMIT % R	SPIKED SAMPLE mg/kg	SAMPLE mg/kg	SPIKE ADDED mg/kg	% RECOVERY	Q
60-140	9780	1100	8950	97.0	

AUTHORIZED SIGNATURE: 

Northeast Analytical, Inc.

Robert E. Wagner, Laboratory Director

000028

DATA SUMMARY PACKAGE FOR

GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201

ANALYTICAL METHOD:

Total Organic Carbon by EPA Lloyd Kahn Method

DATE : November 1, 2002 - A

PROVIDED BY : NORTHEAST ANALYTICAL, INC.
2190 TECHNOLOGY DRIVE
SCHENECTADY, NEW YORK 12308
518-346-4592

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Attestations:

The following have been directly involved in the preparation of the sample data contained herein and in the preparation of the associated data summary report.

SAMPLE CUSTODIAN: Claire Eldridge

TOC ANALYST: John Nicpon

QA/QC OFFICER: William Kotas

LAB DIRECTOR: Robert E. Wagner

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000003

November 6, 2002

Sample Delivery Group Case Narrative

This sample delivery group consists of samples received on October 10, 2002 and October 15, 2002 and includes assigned Inorganics Sample Delivery Group Number AF08620. The samples are from Project Number: 201.97.021, Project Name: Housatonic River ½ Mile TOC Sediment Cap Isolation Sand Layer Sampling Program. All samples were delivered to Northeast Analytical Inc. by FedEx delivery service on 10/10/02 and 10/15/02. All samples were received by the laboratory intact and within holding times.

This sample delivery group consists of the following sample:

<u>NEA Sample ID:</u>	<u>Client Sample ID:</u>
AF08620	I1-2 (0-0.8')
AF08621	I1-1 (0-0.4')
AF08622	H2-2 (0-0.9')
AF08623	H2-1 (0-0.8')
AF08624	H1-2 (0-0.6')
AF08625	H1-1 (0-0.6')
AF08626	DUP-1
AF08627	G3-1 (0-0.85')
AF08628	G2-2 (0-0.6')
AF08629	F1-2 (0-0.6')
AF08630	G1-2 (0-2.4')
AF08887	B-1 (0-0.5')
AF08888	B-2 (0-0.5')

Total Organic Carbon

Analysis for Total Organic Carbon in solids was performed by the EPA Lloyd Kahn Method with the triplicate analysis option. The following technical and administrative items were noted for the analysis:

- (1.) Sample (NEA ID: AF08622) was analyzed in quadruplicate. The triplicate analysis did not meet the %RSD criteria (<25%) for this sample. The concentration result was flagged (*) on the associated Form 1. Results of all analyses of this sample are included in this data summary report for review. (Please see Certificates of Analysis for results summary)

Qualifier Summary:

I. CLP Standard Inorganic analysis qualifiers were used for all analyses.

This Case Narrative was prepared by,


William A. Kotas
Quality Assurance Officer

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000004



6723 Towpath Road, P.O. Box 66
 Syracuse, New York 13214-0066
 TEL: (315) 446-9120

CHAIN OF CUSTODY RECORD

02100052

PROJ. NO.		PROJECT NAME		ISOWATONIL RIVER 1/2 mile		ISOLATION LAYER SAND TOX SAMPLING		SAMPLERS: (Signature)		STEPHEN J. LEWIS		REMARKS
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	Number of Containers	TOC	TOC ML/MSTD				
AFO 8620	10/9/02	1300	X	X	I1-2 (0-0.8')	2	X	X				* STANDARD TURNAROUND TIME
AFO 8621		1315	X	X	I1-1 (0-0.4')	1	X					
AFO 8622		1345	X		H2-2 (0-0.9')	1	X					
AFO 8623		1550	X		H2-1 (0-0.8')	1	X					
AFO 8624		1600	X		H1-2 (0-0.6')	1	X					
AFO 8625		1610	X		H1-1 (0-0.6')	1	X					
AFO 8626	✓	—	X		DUP-1	1	X					
AFO 8627	10/9/02	1005	X		G3-1 (0-0.85')	1	X					
AFO 8628		1110	X		G2-2 (0-0.6')	1	X					
AFO 8629		1230	X		F1-2 (0-0.6')	1	X					
AFO 8630	✓	1500	X		G1-2 (0-2.4')	1	X					

Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)	Relinquished by: (Signature)	DATE	TIME	Relinquished by: (Signature)
<i>Stephen J. Lewis</i>	10/9/02	1630					
Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)	Relinquished by: (Signature)	DATE	TIME	Relinquished by: (Signature)
Relinquished by: (Signature)	DATE	TIME	Received for Laboratory by: (Signature)	DATE	TIME	Remarks: TO NORTHWEST ANALYSIS via FEDER # 6274669B 9458	
			<i>Christine Reddy</i>	10/10/02	10:30		

000005

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1 DATA SHEET TOTAL ORGANIC CARBON

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF08620
MATRIX: SAND
INSTRUMENT ID#: DC 190 BOAT MODULE

Concentration Units (mg/L or mg/kg dry weight): mg/kg

NEA SAMPLE #	CLIENT SAMPLE #	DATE ANALYZED	DATE RECEIVED	AVE. CONC.	C	Q
AF08620	I1-2 (0-0.8')	10/24/02	10/10/02	5180		
AF08621	I1-1 (0-0.4')	10/23/02	10/10/02	6300		
AF08622	H2-2 (0-0.9')	10/23/02	10/10/02	3870		*
AF08623	H2-1 (0-0.8')	10/23/02	10/10/02	3870		
AF08624	H1-2 (0-0.6')	10/23/02	10/10/02	3420		
AF08625	H1-1 (0-0.6')	10/23/02	10/10/02	2200		
AF08626	DUP-1	10/23/02	10/10/02	2580		
AF08627	G3-1 (0-0.85')	10/24/02	10/10/02	4280		
AF08628	G2-2 (0-0.6')	10/24/02	10/10/02	576		
AF08629	F1-2 (0-0.6')	10/24/02	10/10/02	545		
AF08630	G1-2 (0-2.4')	10/24/02	10/10/02	618		

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1 DATA SHEET TOTAL ORGANIC CARBON

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF08620
MATRIX: SEDIMENT
INSTRUMENT ID#: DC 190 BOAT MODULE

Concentration Units (mg/L or mg/kg dry weight): mg/kg

NEA SAMPLE #	CLIENT SAMPLE #	DATE ANALYZED	DATE RECEIVED	AVE. CONC.	C	Q
AF08887	B-1 (0-0.5')	10/24/02	10/15/02	2510		
AF08888	B-2 (0-0.5')	10/24/02	10/15/02	778		

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2

CONTINUING CALIBRATION VERIFICATION SUMMARY- TOC

LAB NAME: NORTHEAST ANALYTICAL, INC.

LAB CODE: NYS ELAP #11078

SDG No.: AF08620

INSTRUMENT ID#: DC 190 BOAT MODULE

CONTINUING CALIBRATION SOURCE (NIST traceable): VW3880-2 LOT# 2175

DATE ANALYZED 10/23/02

Concentration units: ug

Continuing Calibration				
True	CCV-1		CCV-2	
	Found	%R	Found	%R(1)
70.0	65.0	92.8	67.4	96.2

(1) Control limits: TOC 85-115%

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2

CONTINUING CALIBRATION VERIFICATION SUMMARY- TOC

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF08620
INSTRUMENT ID#: DC 190 BOAT MODULE
CONTINUING CALIBRATION SOURCE (NIST traceable): VW3880-2 LOT# 2175
DATE ANALYZED 10/24/02

Concentration units: ug

Continuing Calibration						
	CCV-1		CCV-2		CCV-3	
True	Found	%R	Found	%R (1)	Found	%R (2)
70	63.6	90.8	66.8	95.4	70.8	101

(1) Control limits: TOC 85-115%

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3

CONTINUING BLANK VERIFICATION SUMMARY- TOC

LAB NAME: NORTHEAST ANALYTICAL, INC.

LAB CODE: NYS ELAP #11078

SDG No.: AF08620

INSTRUMENT ID#: DC 190BOAT MODULE

Preparation blank ID: AF08621_BLK

DATE ANALYZED: 10/23/02

Samples associated with prep. Blank: AF08621-AF08626

Continuing Calibration blank (mg/L)			
1	C	2	C
72.9	U	72.9	U

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(518) 346-4592 • FAX: (518) 381-6055

3

CONTINUING BLANK VERIFICATION SUMMARY- TOC

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF08620
INSTRUMENT ID#: DC 190 BOAT MODULE
Preparation blank ID: AF08627_BLK
DATE ANALYZED: 10/24/02
Samples associated with prep. Blank: AF08620-AF08630 & AF08887-AF08888

Continuing Calibration blank (mg/L)					
1	C	2	C	3	C
72.9	U	72.9	U	72.9	U

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4

SPIKE SAMPLE RECOVERY SUMMARY- TOC

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF08620
MATRIX: SAND
INSTRUMENT ID#: DC 190 BOAT MODULE
NEA SAMPLE #: AF08620
DATE ANALYZED: 10/24/02
Samples associated with spike: AF08620-AF08630 & AF08887-AF08888

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Control limit %R	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q
60-140	11200		5180		9190	65.5	

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5

DUPLICATE SAMPLE SUMMARY- TOC

LAB NAME: NORTHEAST ANALYTICAL, INC.
LAB CODE: NYS ELAP #11078
SDG No.: AF08620
MATRIX: SAND
INSTRUMENT ID#: DC 190 BOAT MODULE
NEA SAMPLE #: AF08620
DATE ANALYZED: 10/24/02
Samples associated with duplicate: AF06638-AF06650

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Sample	C	Duplicate	C	RPD%	Q
5180		5970		14.2	

(1) Control limits for TOC: 35

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000014

S:\Form\Log\Metal\Tool\log_DC190.XLS

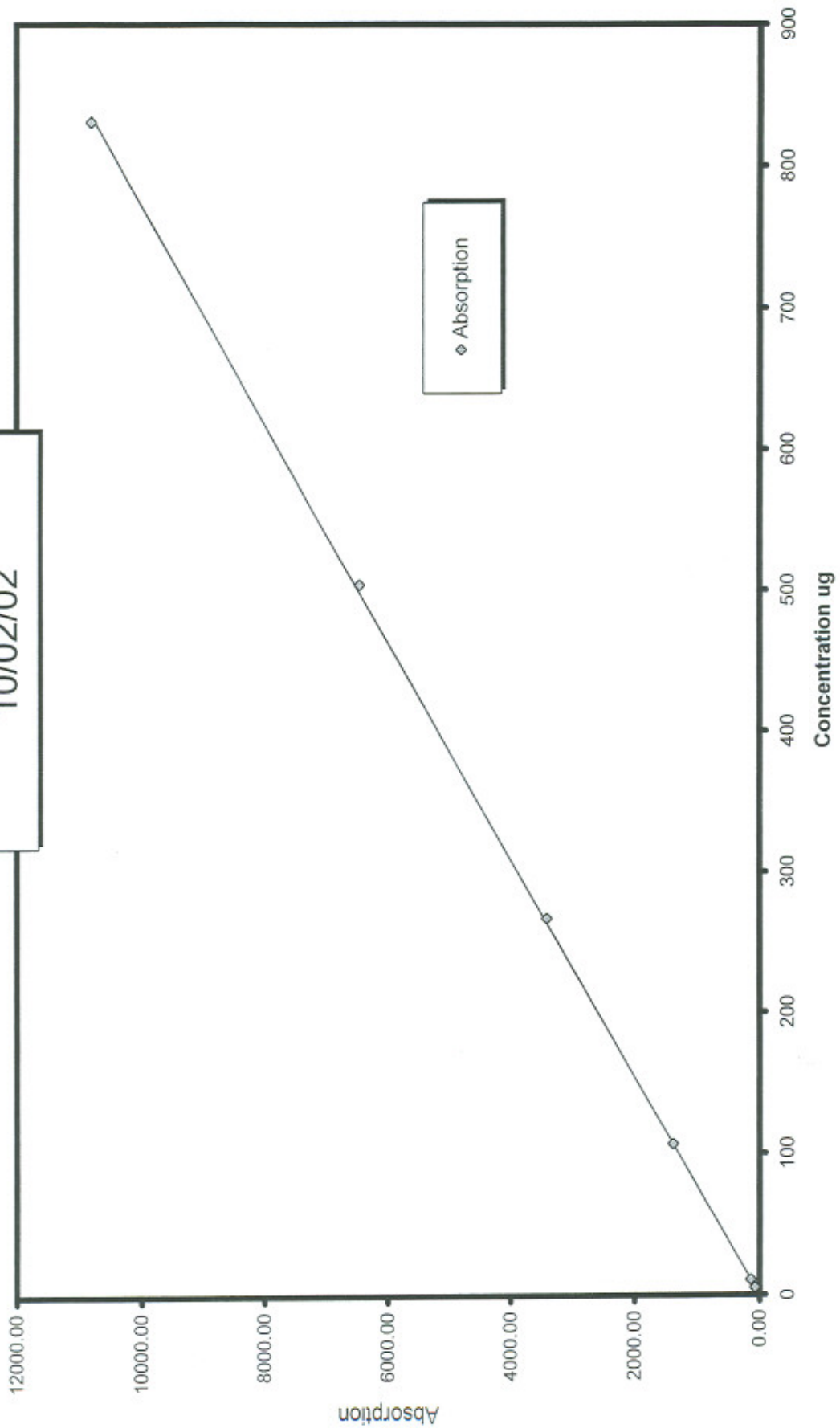
Run #	NEA Sample ID	Area	Boat #	Matrix	Sample wt. (g)	Sample Vol (ml)	Comments (std codes/spike amounts)
1	BLANK	1.604	NA	Liquid	NA	0.070	
2	↓	1.696	↓	↓	↓	↓	
3	Std #1 (5.104 ppm)	78.74	↓	↓	↓	↓	
4	↓	76.94	↓	↓	↓	↓	
5	Std #2 (10.68 ppm)	142.3	↓	↓	↓	↓	
6	↓	143.6	↓	↓	↓	↓	
7	Std #3 (106.8 ppm)	1383	↓	↓	↓	↓	
8	↓	1387	↓	↓	↓	↓	
9	Std #4 (267.1 ppm)	3356	↓	↓	↓	↓	
10	↓	3469	↓	↓	↓	↓	
11	Std #5 (504.6 ppm)	6485	↓	↓	↓	↓	
12	↓	6431	↓	↓	↓	↓	
13	Std #6 (831.9 ppm)	10620	↓	↓	↓	↓	
14	↓	11010	↓	↓	↓	↓	

JMS
 10-2-02

Oxygen flow (psig) 30 Zero set. - Range selected: High
 Baseline value: 0.00 Span - CCV/ICV: -
 Comments:

[Empty box for comments]

CALIBRATION CURVE
10/02/02



Northeast Analytical Inc.

Date: 10/02/02

Analytical Worksheet for TOC in Solids

File ID: S:\data02\tocDC190calibration1002

Calibration Date: 10/02/2002

rev. 12/04/01wk

Blank

Corrected

Cal. Standards:	Absorption	Concentration	Calculated	% Recovery
ID#	Y(x)	x-ug	concentration	
5.105	76.19	5.11	5.89	115%
10.6848	141.300	10.69	10.92	102%
106.848	1383.35	106.85	106.90	100%
267.12	3410.85	267.12	263.57	99%
504.56	6456.4	504.56	498.91	99%
831.04	10813.4	831.04	835.60	101%

Cal. Level (ug)	Replicate 1	Replicate 2	Average	%RPD
Blank	1.604	1.696	1.65	5.6
5.11	78.74	76.94	76.19	2.3
10.69	142.3	143.6	141.3	0.91
106.85	1383	1387	1383.35	0.3
267.12	3356	3469	3410.85	3.31
504.56	6485	6431	6456.35	0.84
831.04	10620	11010	10813.35	3.61

Calibration Blank Absorption= 1.65

Calculate Curve
Click Here !!!

SUMMARY OUTPUT

Regression Statistics

Multiple R	0.999938279
R Square	0.999876562
Adjusted R Square	0.799876562
Standard Error	46.99075789
Observations	6

ANOVA

	df	SS	MS	F	Significance F
Regression	1	89431888.38	89431888.38	40501.16371	3.65717E-09
Residual	5	11040.65664	2208.131327		
Total	6	89442929.04			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	12.94088255	0.046343726	279.2369896	1.11784E-11	12.8217524	13.06001269

Inverse Slope= 0.0773

Theoretical Conc. ug	Calculated Calc. Conc. ug	Absorption Response
5.105	5.89	76.19
10.685	10.92	141.30
106.848	106.90	1383.35
267.12	263.57	3410.85
504.56	498.91	6456.35
831.04	835.60	10813.35

DATE: 10/23/02

ANALYST: JMY

REVIEWED BY: JPN 10/27/02

S:\Form\Log\Metal\Toclog1_DC190.XLS

Run #	NEA Sample ID	Area	Boat #	Matrix	Sample wt. (g)	Sample Vol (ml)	Comments (std codes/spike amounts)
1	CCU-1	865.1	NA	H ₂ O	NA	0.070	Assigned Blank to AF0862
2	↓	820.2	↓	↓	↓	↓	
3	Blank	0.626	↓	↓	↓	↓	
4	↓	0.871	↓	↓	↓	↓	
5	AF08621	1266	45	Sed	.0200	NA	
6	21	1724	46	↓	.0220	↓	
7	21	1432	47	↓	.0234	↓	
8	22	546.8	48	↓	.0204	↓	
9	22	1212	49	↓	.0207	↓	
10	22	688.7	50	↓	.0190	↓	
11	23	1654	51	↓	.0249	↓	
12	23	831.1	52	↓	.0236	↓	
13	23	1037	53	↓	.0229	↓	
14	24	638.8	54	↓	.0189	↓	
15	24	681.3	55	↓	.0214	↓	
16	24	734.5	56	↓	.0208	↓	
17	22	926.9	57	↓	.0200	↓	
18	25	964.2	58	↓	.0355	↓	
19	25	650.7	59	↓	.0299	↓	
20	25	658.1	60	↓	.0304	↓	
21	26	818.3	61	↓	.0311	↓	
22	26	1009	62	↓	.0322	↓	
23	26	698.8	63	↓	.0265	↓	
24	CCU-2	1107	NA	H ₂ O	NA	0.070	Boat bad made new boat
25	↓	869.3	↓	↓	↓	↓	
26	↓	877.6	↓	↓	↓	↓	
27	Blank	1.066	NA	H ₂ O	NA	0.070	
28	↓	1.651	↓	↓	↓	↓	

JMY

10/23/02

Oxygen flow (psig) 30 Zero set. - Range selected: High
 Baseline value: 1.52 Span - CCV/ICV: AFOS 910
 Comments:

DATE: 10/24/02

ANALYST: JMS

REVIEWED BY:

JPN 1025102

S:\Form\Lab\Metals\Toxlog3_DC190.XLS

Run #	NEA Sample ID	Area	Boat #	Matrix	Sample wt. (g)	Sample Vol (ml)	Comments (std codes/spike amounts)
1	CCU-1	828.2	NA	H2O	NA	0.070	Blank assigned to AF08627
2	↓	955.8	↓	↓	↓	↓	
3	Blank	1.093	↓	↓	↓	↓	
4	↓	0.776	↓	↓	↓	↓	
5	AF08627	1419	7	Sed	.0251	NA	
6	↓	1279	8	↓	.0313	↓	
7	↓	1043	9	↓	.0257	↓	
8	AF08628	169.4	10	↓	.0344	↓	
9	↓	215.8	11	↓	.0371	↓	
10	↓	306.3	12	↓	.0422	↓	
11	AF08629	245.9	13	↓	.0362	↓	
12	↓	Redox	14	↓	.0389	↓	Boat not injected
13	↓	245.5	15	↓	.0390	↓	
14	↓	176.7	14	↓	.0338	↓	
15	AF08620	1634	19	↓	.0319	↓	
16	↓	1647	20	↓	.0350	↓	
17	↓	2243	21	↓	.0368	↓	
18	AF08620dup	1893	22	↓	.0310	↓	
19	↓	2371	23	↓	.0368	↓	
20	↓	1702	24	↓	.0294	↓	
1	AF08620spk	4770	25	↓	.0310	↓	spike w/ 250 ml of AF05910
2	↓	2910	26	↓	.0373	↓	
3	↓	4396	27	↓	.0366	↓	
4	AF08630	257.9	16	↓	.0383	↓	
5	CCU-2	873.1	NA	H2O	NA	0.070	Blank assigned to AF08630
6	↓	858.9	↓	↓	↓	↓	
7	Blank	4.906	↓	↓	↓	↓	
8	↓	8.376	↓	↓	↓	↓	
9	AF08630	228.0	17	Sed	.0340	NA	
10	↓	215.7	18	↓	.0312	↓	
11	AF08887	908.3	65	↓	.0309	↓	run 11 void port hatch not closed
12	↓	675.6	66	↓	.0259	↓	
13	↓	763.5	67	↓	.0284	↓	
15	AF08620spk	3513	49	↓	.0327	↓	spike w/ 200 ml of AF05910
16	AF08888	104.3	68	↓	.0320	↓	
17	↓	242.0	69	↓	.0318	↓	
18	↓	556.2	70	↓	.0304	↓	
19	AF08888	151.5	71	↓	.0254	↓	

Oxygen flow (psig) 30 Zero set. - Range selected: High
 Baseline value: 1.10 Span - CCV/ICV: AF05910
 Comments:

[Empty box for additional comments]

DATE: 10/24/02

ANALYST: das

REVIEWED BY:
JPN 10/25/02

S:\Form\Leg\Metal\Toclog_DC190.XLS

Run #	NEA Sample ID	Area	Boat #	Matrix	Sample wt. (g)	Sample Vol (ml)	Comments (std codes/spike amounts)
20	CCU-3	1096	NA	H ₂ O	NA	0.070	Burred boat
1	↓	943.9	↓	↓	↓	↓	
2	↓	891.9	↓	↓	↓	↓	
3	Blank	5.141	↓	↓	↓	↓	
4	↓	0.470	↓	↓	↓	↓	
<p><i>2my</i></p> <p><i>10/24/02</i></p>							

Oxygen flow (psig) 30 Zero set. - Range selected: High
 Baseline value: 1.10 Span - CCV/ICV: AFO5910

Comments:

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CERTIFICATE OF ANALYSIS
10/25/2002
GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

CUSTOMER ID: I1-2 (0-0.8') **NEA ID:** AF08620
MATRIX : SAND **DATE SAMPLED:** 10/08/2002 **TIME:** 13:00
DATE RECEIVED: 10/10/2002 **TIME:** 10:30 **PROJECT:** 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT **LOCATION:** PITTSFIELD, MA
CUSTOMER PO: N/A **LAB ELAP #:** 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	5000	198	mg/kg	10/24/2002	
TOC - Replicate 2	4590	180	mg/kg	10/24/2002	
TOC - Replicate 3	5950	171	mg/kg	10/24/2002	
AVERAGE	5180		mg/kg		
% RSD	13.4				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:

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PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

CUSTOMER ID: I1-1 (0-0.4') NEA ID: AF08621
MATRIX: SAND DATE SAMPLED: 10/08/2002 TIME: 13:15
DATE RECEIVED: 10/10/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	5890	301	mg/kg	10/23/2002	
TOC - Replicate 2	7300	274	mg/kg	10/23/2002	
TOC - Replicate 3	5700	257	mg/kg	10/23/2002	
AVERAGE	6300		mg/kg		
% RSD	13.9				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

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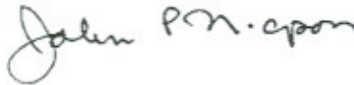
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CONTACT: ANDY SILFER

CUSTOMER ID: H2-2 (0-0.9') NEA ID: AF08622
MATRIX: SAND DATE SAMPLED: 10/08/2002 TIME: 13:45
DATE RECEIVED: 10/10/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	2470	292	mg/kg	10/23/2002	
TOC - Replicate 2	5400	288	mg/kg	10/23/2002	
TOC - Replicate 3	3340	314	mg/kg	10/23/2002	
TOC - Replicate 4	4270	298	mg/kg	10/23/2002	
AVERAGE	3870		mg/kg		
% RSD	32.5				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

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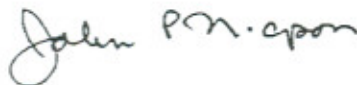
CUSTOMER ID: H2-1 (0-0.8') NEA ID: AF08623
MATRIX: SAND DATE SAMPLED: 10/08/2002 TIME: 15:50
DATE RECEIVED: 10/10/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	4000	245	mg/kg	10/23/2002	
TOC - Replicate 2	3330	259	mg/kg	10/23/2002	
TOC - Replicate 3	4280	267	mg/kg	10/23/2002	
AVERAGE	3870		mg/kg		
% RSD	12.7				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL.
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

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CONTACT: ANDY SILFER

CUSTOMER ID: H1-2 (0-0.6') NEA ID: AF08624
MATRIX: SAND DATE SAMPLED: 10/08/2002 TIME: 16:00
DATE RECEIVED: 10/10/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	3320	336	mg/kg	10/23/2002	
TOC - Replicate 2	3290	313	mg/kg	10/23/2002	
TOC - Replicate 3	3650	322	mg/kg	10/23/2002	
AVERAGE	3420		mg/kg		
% RSD	5.86				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

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CONTACT: ANDY SILFER

CUSTOMER ID: H1-1 (0-0.6') NEA ID: AF08625
MATRIX: SAND DATE SAMPLED: 10/08/2002 TIME: 16:10
DATE RECEIVED: 10/10/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	2670	179	mg/kg	10/23/2002	
TOC - Replicate 2	2140	213	mg/kg	10/23/2002	
TOC - Replicate 3	1800	209	mg/kg	10/23/2002	
AVERAGE	2200		mg/kg		
% RSD	19.9				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:

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PITTSFIELD, MA 01201

CONTACT: ANDY SILFER

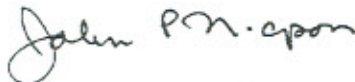
CUSTOMER ID: G3-1 (0-0.85') **NEA ID:** AF08627
MATRIX : SAND **DATE SAMPLED:** 10/09/2002 **TIME:** 10:05
DATE RECEIVED: 10/10/2002 **TIME:** 10:30 **PROJECT:** 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT **LOCATION:** PITTSFIELD, MA
CUSTOMER PO: N/A **LAB ELAP #:** 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	5260	240	mg/kg	10/24/2002	
TOC - Replicate 2	3800	192	mg/kg	10/24/2002	
TOC - Replicate 3	3770	234	mg/kg	10/24/2002	
AVERAGE	4280		mg/kg		
% RSD	19.9				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:

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CONTACT: ANDY SILFER

CUSTOMER ID: G2-2 (0-0.6') **NEA ID:** AF08628
MATRIX : SAND **DATE SAMPLED:** 10/09/2002 **TIME:** 11:10
DATE RECEIVED: 10/10/2002 **TIME:** 10:30 **PROJECT:** 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT **LOCATION:** PITTSFIELD, MA
CUSTOMER PO: N/A **LAB ELAP #:** 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	472	182	mg/kg	10/24/2002	
TOC - Replicate 2	558	168	mg/kg	10/24/2002	
TOC - Replicate 3	698	148	mg/kg	10/24/2002	
AVERAGE	576		mg/kg		
% RSD	19.8				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:

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100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

CUSTOMER ID: F1-2 (0-0.6') NEA ID: AF08629
MATRIX: SAND DATE SAMPLED: 10/09/2002 TIME: 12:30
DATE RECEIVED: 10/10/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	607	160	mg/kg	10/24/2002	
TOC - Replicate 2	466	172	mg/kg	10/24/2002	
TOC - Replicate 3	563	149	mg/kg	10/24/2002	
AVERAGE	545		mg/kg		
% RSD	13.2				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:

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10/25/2002
GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

CUSTOMER ID: G1-2 (0-2.4') NEA ID: AF08630
MATRIX: SAND DATE SAMPLED: 10/09/2002 TIME: 15:00
DATE RECEIVED: 10/10/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	614	155	mg/kg	10/24/2002	
TOC - Replicate 2	610	174	mg/kg	10/24/2002	
TOC - Replicate 3	629	190	mg/kg	10/24/2002	
AVERAGE	618		mg/kg		
% RSD	1.62				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:
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10/25/2002

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PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

NEA ID : AF08620
MATRIX : SAND

CUSTOMER ID : I1-2 (0-0.8')

LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

DUPLICATE SAMPLE SUMMARY - TOC

RPD LIMIT	SAMPLE mg/kg	DUPLICATE mg/kg	RPD (%)	Q
≤ 25%	5180	5970	14.2	

MATRIX SPIKE RECOVERY SUMMARY - TOC

CONTROL LIMIT % R	SPIKED SAMPLE mg/kg	SAMPLE mg/kg	SPIKE ADDED mg/kg	% RECOVERY	Q
60-140	11200	5180	9190	65.5	

AUTHORIZED SIGNATURE: _____

Northeast Analytical, Inc.

Robert E. Wagner, Laboratory Director

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NORTHEAST ANALYTICAL



ENVIRONMENTAL LAB SERVICES

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(518) 346-4592 • FAX: (518) 381-6055

CERTIFICATE OF ANALYSIS

10/25/2002

GENERAL ELECTRIC COMPANY

100 WOODLAWN AVENUE

PITTSFIELD, MA 01201

CONTACT: ANDY SILFER

CUSTOMER ID: B-1 (0-0.5') **NEA ID:** AF08887
MATRIX : SEDIMENT **DATE SAMPLED:** 10/11/2002 **TIME:** 11:41
DATE RECEIVED: 10/15/2002 **TIME:** 10:30 **PROJECT:** 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT **LOCATION:** PITTSFIELD, MA
CUSTOMER PO: N/A **LAB ELAP #:** 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	2680	191	mg/kg	10/24/2002	
TOC - Replicate 2	2380	228	mg/kg	10/24/2002	
TOC - Replicate 3	2450	208	mg/kg	10/24/2002	
AVERAGE	2510		mg/kg		
% RSD	6.32				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL

PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

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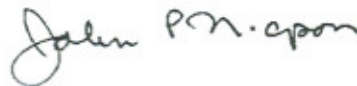
CERTIFICATE OF ANALYSIS
10/25/2002
GENERAL ELECTRIC COMPANY
100 WOODLAWN AVENUE
PITTSFIELD, MA 01201
CONTACT: ANDY SILFER

CUSTOMER ID: B-2 (0-0.5') NEA ID: AF08888
MATRIX: SEDIMENT DATE SAMPLED: 10/11/2002 TIME: 11:50
DATE RECEIVED: 10/15/2002 TIME: 10:30 PROJECT: 201.97.021HOUSATONIC ISOLATION LAY
SAMPLED BY: S. LEWITT LOCATION: PITTSFIELD, MA
CUSTOMER PO: N/A LAB ELAP #: 11078

PARAMETER PERFORMED	RESULTS	PQL	UNITS	DATE ANALYZED	FLAGS
TOC by EPA/LLOYD KAHN METHOD					
TOC - Replicate 1	286	180	mg/kg	10/24/2002	
TOC - Replicate 2	674	181	mg/kg	10/24/2002	
TOC - Replicate 3	1630	189	mg/kg	10/24/2002	
TOC - Replicate 4	526	227	mg/kg	10/24/2002	
AVERAGE	778		mg/kg		
% RSD	75.5				

Note: ND (Not Detected) Denotes analyte not detected at a concentration greater than the PQL
PQL (Practical Quantitation Limit) Denotes lowest analyte concentration reportable for the sample

AUTHORIZED SIGNATURE:



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