



01-0524

Corporate Environmental Programs  
General Electric Company  
100 Woodlawn Avenue, Pittsfield, MA 01201

October 16, 2002

Ms. Susan J. Steenstrup  
Bureau of Waste Site Cleanup  
Massachusetts Department of Environmental Protection  
436 Dwight Street  
Springfield, Massachusetts 01108

Mr. Bryan Olson  
U.S. Environmental Protection Agency  
EPA New England  
One Congress Street, Suite 1100  
Boston, Massachusetts 02114-2023

**RE: GE – Pittsfield/Housatonic River Site  
Plant Site 1 Groundwater Management Area (GECD310)  
Well Abandonment of Former Industrial Supply Well**

Dear Ms. Steenstrup and Mr. Olson:

On May 20, 2002, the General Electric Company (GE) submitted to the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MDEP) a revised proposal to abandon a former industrial water supply well located at the GE Plant near Silver Lake. This area of the plant falls within the Plant Site 1 Groundwater Management Area (also known as GMA 1), as designated under the Consent Decree for the GE-Pittsfield/Housatonic River Site. The revised proposal was developed in response to March 8, 2002 MDEP comments on an earlier GE plan, submitted in October 2001, and was conditionally approved by MDEP on June 25, 2002.

Prior to developing the revised plan, GE removed the pumping equipment and associated piping that existed within the well. Additionally, borehole geophysical logging, with a caliper tool, was performed to assess the condition of the borehole. As a result of the caliper logging, it was determined that the borehole was obstructed at a depth of approximately 1557 feet below ground surface (bgs). The original well construction logs had indicated that the well was initially 2005 feet deep. GE's revised proposal consisted of plugging the borehole with a series of materials, including pea gravel, bentonite and grout. Generally, bentonite seals were to be placed above and below three primary water-bearing zones that occurred at depths of approximately 495, 875 and 1435 feet bgs. The water-bearing zones had approximate thicknesses of 125, 365 and 70 ft., respectively. The grout was to be placed in the upper portion of the borehole and the remaining annular space was to be filled with pea gravel.

As a result of the June 25, 2002 MDEP conditional approval letter, the plan was modified slightly to include the placement of a bottom cement plug with an approximate thickness of 10 feet.

### **Well Abandonment Activities**

Well abandonment activities were completed between September 16 and September 30, 2002. The actual abandonment was completed by Layne Christensen Company, a Massachusetts certified well driller. The well abandonment project was managed by an experienced geologist from Spectra Environmental Group, Inc., and periodic inspections were made by MDEP and EPA representatives.

After mobilizing to the site, the drilling contractor confirmed the nature and depth of the well bottom, utilizing a steel-rod weight attached to a cable wireline. The well bottom was firm and had a measured depth of approximately 1558 feet bgs, as referenced to a manhole rim at the top of the well vault. This depth is consistent with the prior measurement obtained by Geophysical Applications during collection of the caliper log data. After confirmation of the well depth, the contractor installed 2-inch diameter tremie pipe to a depth of approximately 10 feet above the well bottom. A mixture of cement and bentonite chips was pumped through the tremie pipe to establish a basal plug. The cement mixture was allowed to cure overnight. The following day, the top of the cement plug was measured at 1542.75 bgs, using the weighted cable wireline. Thereafter, layers of pea gravel, bentonite, and grout were added as prescribed in the well abandonment proposal. Table 1 provides a summary of the various well abandonment layers, proposed depth intervals, actual depth intervals and estimated material volumes. A well abandonment schematic is also attached.

As specified in the proposal, material depths were confirmed at intervals of at least 50 feet, during placement. The pea gravel and bentonite were placed directly into the well at a steady but slow rate, with the tremie pipe removed. This procedure was utilized to avoid bridging of the material as it moved downward into the borehole. The tremie pipe was reinstalled in the borehole to place the upper grout layer from a depth of 66 feet to the top of the well casing.

Table 1: Well Abandonment Summary

| Proposed Depth<br>(ft. bgs) | Actual Depth<br>(ft. bgs) | Abandonment<br>Material | Est. Material<br>Volume (cu. yd.) |
|-----------------------------|---------------------------|-------------------------|-----------------------------------|
| toc - 67                    | toc - 66.2                | Cement/Bentonite Grout  | 3.5                               |
| 67 - 490                    | 66.2 - 487.7              | Pea Gravel              | 24.54                             |
| 490 - 495                   | 487.7 - 493.2             | Bentonite Seal          | .09                               |
| 495 - 620                   | 493.2 - 619.2             | Pea Gravel              | 4.31                              |
| 620 - 625                   | 619.2 - 625               | Bentonite Seal          | .09                               |
| 625 - 870                   | 625 - 868.2               | Pea Gravel              | 7.61                              |
| 870 - 875                   | 868.2 - 873.5             | Bentonite Seal          | .09                               |
| 875 - 1,240                 | 873.5 - 1239.1            | Pea Gravel              | 13.09                             |
| 1,240 - 1,245               | 1239.1 - 1245.5           | Bentonite Seal          | .08                               |
| 1,245 - 1,430               | 1245.5 - 1427.5           | Pea Gravel              | 4.53                              |
| 1,430 - 1,435               | 1427.5 - 1435.4           | Bentonite Seal          | .07                               |
| 1,435 - 1,505               | 1435.4 - 1505             | Pea Gravel              | 1.5                               |
| 1,505 - 1,510               | 1505 - 1511               | Bentonite Seal          | .07                               |
| 1,510 - 1,547               | 1511 - 1542.75            | Pea Gravel              | 0.85                              |
| 1,547 - 1,557               | 1542.75 - 1558.3          | Cement/Bentonite Grout  | .74                               |

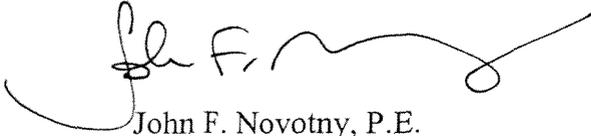
- Notes: 1.) Toc = top of casing  
 2.) Bgs = below grade surface, referenced to top of vault

Bentonite seals were constructed utilizing a compressed sodium bentonite product manufactured by Benterra Corporation. This product was specifically designed for use in deep well abandonment applications for the oil and gas industry. The Benterra product was selected because of its faster settling velocity and slower hydration rate, compared to standard bentonite chips. These two properties were considered desirable to successfully place bentonite seals at depths greater than 1000 feet. The Benterra product was oval in shape (approximately 1.5 in. by 2.0 in.) and expands 10 to 25 times its original volume.

As shown in Table 1, the approximate total volume of materials placed into the well was just over 61 cubic yards. This is consistent with the initial volume estimate of 61.9 cubic yards, derived from the caliper log. The vault surrounding the well, which is approximately 9 feet deep, was not filled. In accordance with MDEP Condition No. 4, an appropriate surface seal will be established if the vault is subsequently removed during future development of the area.

If you have any questions on this matter, please feel free to contact me at (413) 494-3177.

Sincerely,

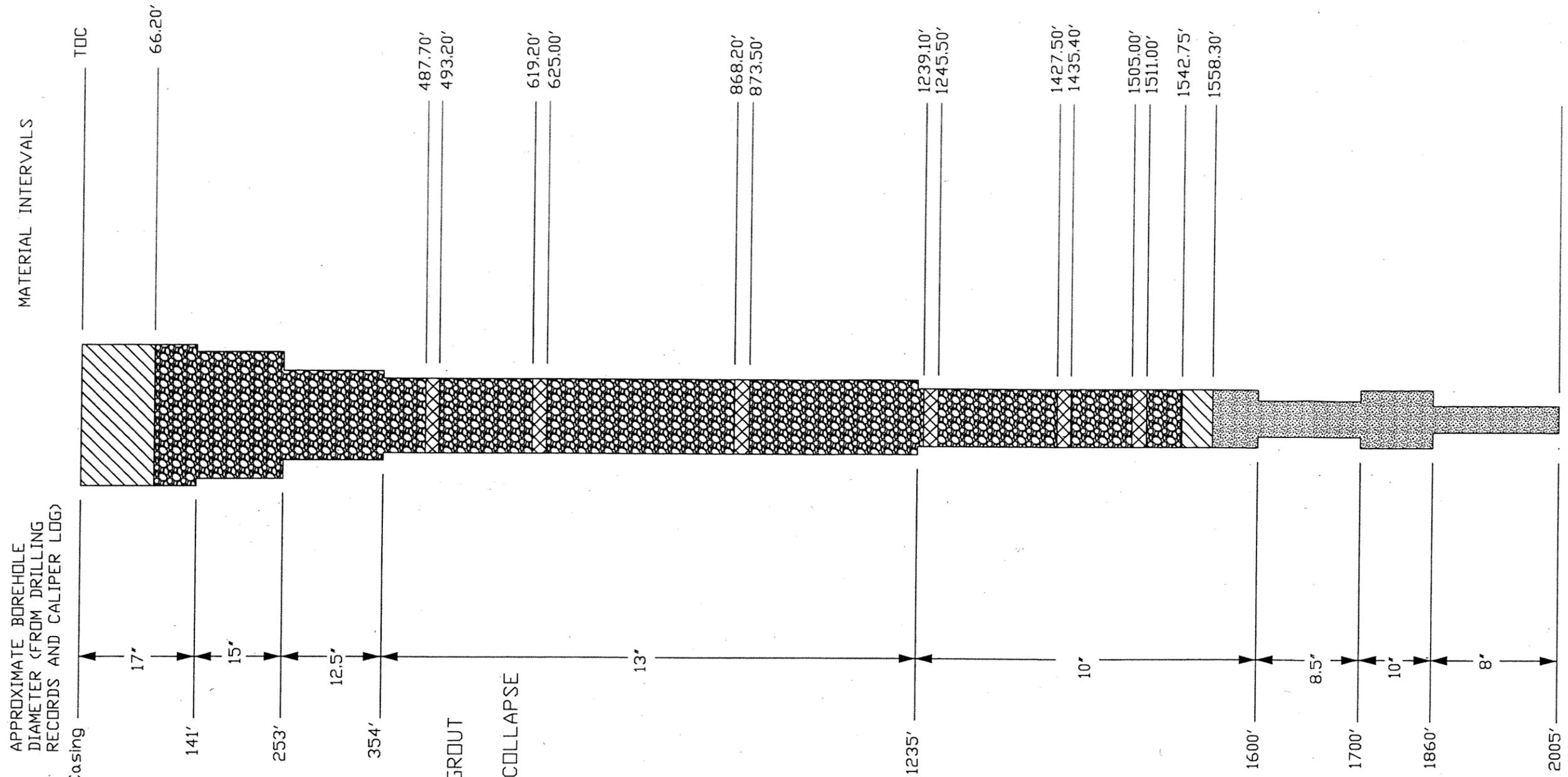


John F. Novotny, P.E.  
Manager, Facilities and Brownfields Programs

/JFN

Attachment

cc: M. Nalipinski, EPA  
T. Conway, EPA  
H. Inglis, EPA  
R. Howell, EPA  
K.C. Mitkevicius, USACE  
A. Weinberg, MDEP  
R. Bell, MDEP  
S. Steenstrup, MDEP  
T. Angus, MDEP  
S. Keydel, MDEP  
L. Poland, MDEP  
D. Jamros, Weston  
D. Young, MA EOEA  
N.E. Harper, MA AG  
Mayor S. Hathaway, City of Pittsfield  
S. D'Angelo, Pittsfield Department of Health & Inspections  
J. Bernstein, Bernstein, Cushner & Kimmel  
T. Bowers, Gradient  
M. Carroll, GE  
R. McLaren, GE  
A. Silber, GE  
J. Nuss, BBL  
J. Bieke, Shea & Gardner  
J. Ciampa, Spectra  
Public Information Repositories  
GE Internal Repository



LEGEND

-  BENTONITE SEAL
-  PEA GRAVEL
-  CEMENT/BENTONITE GROUT
-  NATURAL BOREHOLE COLLAPSE

NOTE: 1) DEPTHS ARE REFERENCED TO MANHOLE RIM EXISTING AT CURRENT GROUND SURFACE.  
 2) BOREHOLE DIAMETERS ARE APPROXIMATE, PARTIAL OBSTRUCTIONS AND WASHOUT ZONES ARE NOTED ON THE CALIPER LOG.

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|---|--|------------------|
| <br>SPECTRA ENVIRONMENTAL GROUP, INC.<br>19 British American Boulevard<br>Latham, NY 12110<br>PROJ. MANAGER: J. CIAMPA | INDUSTRIAL SUPPLY<br>WELL ABANDONMENT DIAGRAM<br><b>GENERAL ELECTRIC COMPANY</b> |                  |
|   | PITTSFIELD, MA   | BERKSHIRE COUNTY |
| PROJ. NO.: 02348  | DATE: 10/8/02  | SCALE: NTS       |
| DWG. NO.: 02348001  |  | FIGURE 1         |