FINAL
REMEDIAL ACTION REPORT
PCB REMNANT DEPOSIT SITES
2, 3, 4 AND 5
FORT EDWARD, NEW YORK

REPORT OF REMEDIATION AND CONSTRUCTION ACTIVITIES OCTOBER 1989 THROUGH SEPTEMBER 1990

Prepared for :

GENERAL ELECTRIC COMPANY
1 COMPUTER DRIVE SOUTH
ALBANY, NEW YORK 12205

Prepared by :

J&L ENGINEERING, INC.
935 SOUTH CENTRAL AVENUE
CANONSBURG, PA 15317

AUGUST 12, 1992
(REVISED SEPTEMBER 25, 1992)

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I. INTRODUCTION

Prior to 1977, two General Electric (GE) capacitor manufacturing facilities located in Fort Edward and Hudson Falls, New York, discharged, as part of the manufacturing processes, wastewater containing polychlorinated biphenyls (PCBs) into the Hudson River. Much of the PCBs discharged to the river adhered to particulate material and accumulated in the sediments in the impounded pool behind the former Fort Edward Dam. The dam was removed in 1973 and subsequent spring floods scoured and released PCB-contaminated sediments downstream. Five areas of PCB-contaminated sediments in the former dam pool were exposed due to the lower water level following removal of the dam. These areas were identified and are referred to as the Remnant Deposits or the Sites. See Figure 1.

A Record of Decision (ROD) for the site was signed on September 25, 1984. The ROD selected interim no-action for the river sediments, an evaluation of domestic water quality at Waterford, New York, and in-place containment of the remnant deposits. The ROD specified a two-foot soil covering followed by vegetation, bank stabilization and, as appropriate, fencing to prevent public access.

Remnant Deposit 1 is located in the middle of the Hudson River at river mile 196.8 and has significantly eroded away. At low water levels, portions of this deposit are above water. Due to its current condition, Remnant Deposit 1 was not included in this remedial action. Remnant Deposit 2 is located on the west bank of the river and includes about six acres. Remnant Deposit 3 is located on the east bank of the river and includes about twenty-one acres. Fourteen thousand cubic yards of material from Site 3 were excavated in 1978 and disposed of in the new Moreau facility. Remnant Deposit 4 is located on the west bank of the river and includes about twenty-three acres. Remnant Deposit 5 is located on the east bank of the river and includes about six acres. Site 5 is adjacent to the Scott Paper Plant in Fort Edward. The surficial soils at the Remnant Deposits generally consist of organic silty sand, gravel and wood up to about a thirty-four foot thickness, below which is shale bed-rock. Groundwater is shallow and generally near the surface water level in the river. In the mid 1970's the banks of several of the remnant deposits were stabilized with riprap.

The New York State Department of Environmental Conservation (NYSDEC)

prepared preliminary design documents for the construction of the caps. These were then modified by GE pursuant to an Administrative order on Consent issued on September 27, 1989. These designs were developed by J&L Engineering, Inc. of Canonsburg, Pennsylvania. These documents included design of the capping system for Remnant Deposits 2, 3, 4 and 5, as well as design drawings for the access road system and a temporary bridge for access to Site 3 from the west bank of the Hudson River. The drawings were approved by USEPA Region II, with reviews by the U.S. Army Corps of Engineers and the NYSDEC. A listing of these drawings, upon which the contract for work was based, is presented in Appendix A.

Construction activities for the access roads to the Hudson River Remnant Deposit Sites began in October 1989, pursuant to an Administrative Order issued by USEPA on September 27, 1989. Remediation, Inc., of Dover, Pennsylvania, was initially contracted by the General Electric Company for construction of the on-site roads and clearing of vegetation on the remnant deposits. This construction was completed in July, 1990. Canonie Environmental, King of Prussia, Pennsylvania, was then awarded the actual remedial portion of construction for the specific sites, bridge construction and cover material borrow area development. The activities began in June, 1990. Furthermore, Canonie was also responsible for the final site limit delineation program which occurred between July, 1990 and September, 1990. This program set up the actual site closure boundaries for each remnant deposit area. The work performance for this delineation is covered by other documents. A complete list of all contractors and vendors associated with the remediation work is presented in Appendix B. Appendix C contains a listing of the final as-built drawings referenced in this document with the drawings as an attachment to this report.

The remedial construction included in-place containment of the Remnant Deposits by the construction of a cap system which consisted of, in ascending order, a sand/fill bedding layer, a custom designed geosynthetic clay liner (GCL) composite (modified Claymax) layer, a sand drainage layer, topsoil and vegetative cover. The remedial construction also included the stabilization of the Remnant Deposits with rip-rap along the banks of the Hudson River, construction of perimeter drainage channels to divert runoff around the site(s), installation of stream transfer channels for conveyance of surface water flow across the site(s) and the erection of fences and signs to restrict public access.

CHRONOLOGY OF EVENTS

A brief chronology of significant effects is listed below:

Approval or Start Date	Completion Date	Chronology of Events
8/89	11/89	Pre-Construction Monitoring (Harza)
9/27/89		Unilateral Order 90224 (Characterization, Access Design, Project Plans)
9/89		Unilateral Order 90225 (Construct Access Roads)
10/89	7/90	Preliminary Construction of Roads, Clearing of Sites (Remediation, Inc.)
11/89	6/90	Road Construction West Side
4/90	5/90	Pre Construction Monitoring (Harza)
4/90		GE signs Consent Decree (Containment Construction)
6/90		Site Construction, Bridge Construction, Borrow Area Development Start (Canonie)
6/90	9/90	Bridge Construction
6/90	9/90	Site Clearing
6/90	5/91	Construction Monitoring (Harza)
6/90		Flood Plains Assessment
7/90	9/90	Final Site Delineation (Canonie)
7/90	9/90	Site 5 Capping
8/90	12/90	Site 3 Capping
9/90	11/90	Site 2 Capping
9/90		NYSDEC, EPA, and Army Corp approve all Design Documents
10/90	4/91	Site 4 Capping
10/90	11/90	Mining of Village of Ft. Edward Borrow Area
11/90	10/91	Mining of NIMO Borrow Area
11/90	11/91	Mining of Site 4 Borrow Area
1/91		EPA Approves RD Access Report
3/92	Present	Post Construction Monitoring (OB&G)
5/91		Canonie States Their Construction Complete
6/91	11/91	Post Construction Monitoring (Harza)
10/91		Seeding Complete
6/92	8/92	Gates and Signs Erected
7/91		RD Characterization Report Submitted to EPA
8/91		O&M Plan Approved by EPA
9/16/92		Final Inspection

II. PERFORMANCE STANDARD AND CONSTRUCTION QUALITY CONTROL

It was determined during design meetings between USEPA, NYSDEC and NYSDOH that areas of the Remnant Deposits with PCB concentrations exceeding 5 ppm of PCB should be capped. Final delineation of the 5 ppm boundary was conducted for GE by Canonie Environmental between June and September 1990.

As the data was collected and evaluated by Canonie Environmental, the boundary limits were staked and flagged by Rourke Associates and the area inspected by the J&L Engineering, Inc. field representative who field adjusted the design limits to insure the area was properly capped. These adjustments were then reviewed by the design engineer to verify proper drainage and performance. Once approved by the design engineer, the cap was constructed to completely cover the limits of contamination. In general, the areas of cover typically extended at least five (5) feet beyond these limits. In many areas, these limits extended further to insure proper drainage. Consequently, the limits of Claymax represent the limits of contamination plus at least five (5) feet beyond the limits designated by Canonie Environmental.

III. CONSTRUCTION ACTIVITIES

The following presents a description of construction activities performed on this site.

A. Road Construction

The system of roads constructed on the west side of the Hudson River occurred November, 1989 through June 1990. The roads allowed for access to remediation Sites 2, 3, and 4 utilizing on-site borrow from a Niagara Mohawk Power Company (NMPC) borrow pit. The roads allowed for successful completion of the construction with minimum impact on the surrounding communities of Hudson Falls, Fort Edward, North and South Glenns Fall.

The road construction consisted of a main road which lead from the township road (Route 32) and sloped at approximately 10% grade to the temporary bridge and to Site 4. This road is referred to as Reach 1 and Reach 4 and was approximately 3,500 feet in length. Next, an 1,850 foot section of road was

constructed from the south portion of the NMPC borrow pit and tied into Reach 1 at Station 14 + 50. This road was referred to as Reach 2 South. Another road was also constructed that commenced from the north point of the NMPC borrow area to Site 2. This road was 1,650 feet in length and is referred to as Reach 2 North. In addition to construction of the access roads, ancillary work included drainage channels and erosion control systems for all access road work. Generally, the roads were designed and constructed as a balanced cut/fill. Construction generally included one (1) foot controlled loose lifts which were spread and compacted with a ten ton smooth drum vibratory compactor. Unsuitable material was always removed and replaced with acceptable fill material.

After a stable subgrade was established, Polyfelt geotextile TS-750 was placed along the entire road surface followed by one (1) foot of subbase stone and one (1) foot of surface coarse to establish the final road surface.

1. Reach 1

Reach 1 began at Fort Edward Road (Township Road 32) and proceeded east to the Hudson River. At Station 8+00, the road began falling at a 10% grade to the river. In the initial cut, wet blue/gray clay was encountered at the subgrade surface. This material was too unstable to establish a stable surface, and was overexcavated 2 to 4 feet. A geotextile reinforcing layer [Polyfelt TS-750 (10 oz.)] fabric was placed and four (4) foot of stone was used to stabilize the subgrade. The cut material was unsuitable for fill construction from Station 8+00 to Station 10+50. This spoil material was stockpiled and appropriate erosion/sediment controls were placed around the spoil area. Sand was transported to the site to construct the major fill on Reach 1, Station 8+00 to 10+50. This material was placed in 1 foot loose lifts and compacted to at least 95% of Standard Proctor (ASTM D698) with a smooth drum roller.

The next portion of road completed was between Station 10+50 and Station 20+50. The majority of this portion of Reach 1 was a balanced cut and fill. The cut consisted of predominately weathered shale and was utilized as general fill material. This material was placed in 1 foot lifts and

compacted. A non-movement criteria was used to judge the competency of the fill material. Finally, Station 20+50 through Station 25+00 was completed to the approximate bridge abutment grades. This portion was a slight cut. Reach 4 branches from Reach 1 at Station 21+50 and created access for borrow material from the NMPC Borrow Area to Site 4. This access route was slightly adjusted because dense rock was encountered. Consequently, the grades were slightly raised to compensate for the rock.

2. Reach 2 - South

This portion of the road system was constructed to facilitate transport of borrow soils from the NMPC Borrow Area to Sites 3 and 4. The first 1,000 feet (plus) was placed in cut (sand) and a stable subgrade was established. The final 400 feet of road encountered a blue/gray clay which caused major seepage problems. There was concern if the fills were placed on these clays, a failure would occur and the remediation schedule would be hampered. Furthermore, the existing stream and culvert system along this fill was a concern due to erosion potential at the toe of the fill.

To mitigate this concern benches were cut into the subgrade to serve as drainage channels and lock in the fill. The fill selected for this area was shot limestone rock from a local quarry. The shot rock fill feathered into the toe of slope along the existing stream channel and created a stable slope. This system functions well and a stable road was completed through this area.

3. Reach 2 North

Reach 2 North facilitated transport of cover soil from the NMPC Borrow Area to Site 2. This road was designed as a balanced cut and fill with varying grades. The first 600 foot portion of the road was constructed of fill, using sand as fill material. Soils were compacted in 1 foot lifts to at least 95% of the Standard Proctor test with a smooth drum vibratory roller. The next portion of road, Station 6+00 to Station 10+00 consisted of a large cut that was anticipated to be utilized as fill from Station 10+00 to

Station 15+00. However, a grey/blue clay layer was encountered and this cut soil was discarded. Furthermore, a layer of thick bedded hard siltstone/claystone was also encountered 5 to 15 feet above the designed subgrade elevations. In lieu of blasting, the grades were adjusted and the road to the south, Station 6+00 to Station 15+00, was moved east and lengthened to maintain a maximum 10% grade. Additionally, in this large cut area, from Station 6+00 to Station 10+00, limited quantities of grey clay were encountered at the subgrade surface. The subgrade material was over-excavated from Station 6+50 to Station 7+50 and replaced with suitable shot rock before applying the final surface layers. Finally, the last portion of road, Station 14+50 to Station 16+00, was a balanced cut/fill until it terminated at Site 2.

B. Bridge Construction

Bridge construction began June, 1990 and was completed August, 1990. The bridge abutments, approach slabs and pier footings were completed before installation of the predesigned superstructure and custom designed piers.

The concrete abutments at the river bank were excavated and installed per the design drawings. The reinforcing steel used for the abutment was grade 60 steel and met ASTM A 615 Standards. The Class C concrete was vibrated during placement and met the 4000 psi $\pm$ criteria in 7 days. Concrete cylinders were taken during each pour, cured and tested to verify quality of the concrete. The steel piers were pre-fabricated by Schenectady Steel and delivered to the site. Piers 1 and 2 were placed from on shore with a 100 ton crane and leveled by leveling screws inside the pier legs. During this time frame, the bridge superstructure was constructed in sections on shore. The pre-fabricated superstructure was supplied by Acrow Bridge Company and assembled in accordance with their procedures. A manufacturer's representative was on site during this time period to assure assembly compliance. After Piers 1 and 2 were set and leveled, temporary plate bearing rollers were set and the first section of superstructure was placed from the west abutment to Pier 2. After this was complete, Piers 3 through 7 were set with the 100 ton crane. As each pier was set and leveled, sections of superstructure were completed, a roller plate was

added to the completed pier and the superstructure was pulled across to the next completed pier. This process continued until the entire span was set in place to the east side of the Hudson River.

After the entire superstructure was set in place, the super structure was jacked and permanent stationary bearing pads were installed. The superstructure was then set on the permanent bearing pads and locked. Finally, a 20 ton cherry picker was used to place the decking floor panels. As the bridge was used by truck traffic, the bearing pads and pier footings began to seat causing minor settlement. The pier footings in the river experienced settlement of 0.1 to 0.5 feet. A 0.2 foot limit of settlement across the bridge surface was used as a guideline per Acrow recommendations. As a pier elevation difference became greater than 0.2 feet, the affected superstructure was jacked up and steel shims were placed beneath the permanent bearing pad to relevel the bridge. Once the pier footing engaged bearing in the river bottom, settlement ceased and the bridge stabilized.

C. Bridge Removal

At the completion of work at Site 3, the bridge system was dismantled in accordance with the manufacturer's recommendations and removed from the site. Bridge piers were also lifted from the river and removed. The only remnant of the bridge still in place are the concrete abutments at each river bank.

D. Site Clearing

The Remnant Deposit clearing operations began in June, 1990. Rourke Associates of Glenns Falls, New York set the previously agreed upon approximate capping boundaries for each remnant site by using the 140 foot elevation contour interval. This elevation was chosen as a conservative limit based on the initial field sampling and testing program. Site clearing was completed in September, 1990. A Black Bear clearing and grubbing unit was used for this work. Using this equipment, the sites were cleared and woody debris was mulched and deposited on-site. No cleared or grubbed material was

removed from the remnant deposit areas. The material was incorporated within the closure system under the cap. Once completed, Remediation, Inc.'scontract was completed and Canonie's contract commenced.

Final site preparation and the subgrade portion of the closure system includes both the initial site grading, subgrade filling operations, construction of decontamination areas, construction of gas vent installations, and water collection and disposal. Initially, each site was surveyed by Rourke and a construction grid system was placed for control of the work. Cut areas were excavated and moved into fill areas within each remnant site to create rough grades for fill work and to control surface water flows. Surface water entering the site was re-routed upgradient from the remnant deposit areas or temporarily piped across the site to reduce erosion and improve construction conditions. Air and water sampling units were installed by Harza and monitored during construction activities.

After the required grading was complete, subgrade placement commenced. A water truck was used continuously during placement of the materials to control dust and minimize air pollution. Water was also used to aid compaction. The material was spread with D-8 and D-6 bulldozers and compacted with 10-ton smooth drum vibratory roller. The initial construction lift was placed in 2 foot lifts to "bridge" the unstable areas. After placement of this initial lift, one foot lifts of sand borrow soil were placed and compacted until the desired grade was achieved. This final subgrade surface was verified by survey before it was approved for the installation of the geosynthetic clay liner (GCL). The final lift/surface was cleared of any debris and fine graded with a grader and smooth drum rolled. The main drainage channels and perimeter surface water control channels were excavated during the initial excavation work and this contaminated soil was incorporated in the subgrade leveling operations below the cap and subbase materials. The perimeter channels and stream crossings were excavated to an elevation of 1 foot below the GCL elevation and was accomplished by bulldozers and a Cat 235 excavator. The excavated soil was incorporated into the fill areas below the clean sand subbase/leveling course.

Prior to installation of the GCL layer, gas collection and venting systems were

installed along the "high" portions of the grading plans at Sites 2, 3, 4 and 5. A 2.5 foot gravel filled trench was installed at the GCL subgrade elevation. In areas where the trench depth penetrated contaminated soil (Site 2), the trench was over-excavated before the 8" of clean sand material (subgrade) was placed to avoid cross-contamination of the liner. Subsequent to trench excavation, a Polyfelt TS-750 Geotextile layer was placed, the trench was filled to the GCL subgrade elevation with 2" to 1/2" screened gravel. Venting pipes with PVC boots were placed in the trenches at 200 foot intervals. (See Details 11, 12 and 15 of the as-built drawings.)

Water collection and disposal was an ongoing feature of the construction until completion of the cap and channels. Where significant flows occurred, this upgradient (clean) water was diverted via PVC pipe from the point of collection and discharged into the river. This controlled erosion and precluded contaminated water from entering the river. At Site 4 where there were large quantities of ponded water, dewatering was necessary before commencement of earth moving activities. Dewatering was performed by constructing a series of channels and excavating pockets into the subgrade which allowed the water to gradually disperse into the ground. This technique prevented any water from leaving the remnant deposit site through surface discharge. Once the areas were dry, the subbase sand, GCL layer, capping sand and top soil were placed in accordance with the specification requirements. Perimeter channels were lined with hay bales and silt fences to control erosion.

E. Decontamination Areas

Decontamination areas were constructed at the main entrance of each site and a water truck was used to spray and clean equipment. Personnel decontamination areas were also established at each site entrance. These facilities were designed by Canonie and used until Canonie's Health and Safety personnel, with approval from the Corps of Engineers, deemed the site clean. At that time, the area was decommissioned and the spoil material incorporated under the cap system. Spoil material consisted of contaminated soil and construction debris. Health and safety equipment, such as protective clothing, was placed in drums and removed from the site per Canonie's Health and Safety Plan.

F. Borrow Areas

Borrow materials for this closure project were obtained from three (3) areas:

1. Fort Edward Borrow Area

   The Fort Edward Borrow Area was located approximately 1.5 miles from the site offices, due west from the Fort Edward water reservoir. Approximately 32,000 c.y. of sand were removed from this borrow source. This area was reclaimed and re-seeded after borrow activities using methods and plans approved by NYDEC and Fort Edward.

2. Niagara Mohawk Power Company (NMPC) Borrow Area

   The NMPC Borrow pit was the principal source of materials for this site closure. Approximately 290,000 c.y. of sand were removed and utilized in this project. Before borrowing activities commenced, the existing vegetation, trees and stumps remaining from previous logging activities were cleared and shredded. These wood chips were used as a soil supplement in the topsoil at Sites 2, 3, and 4. The on-site topsoil was stripped and stockpiled to be used at a later date. Finally, 4 to 5 feet of sand was excavated in subcells progressing from south to north. The borrow area was graded to slope south and drain into sediment traps. Subsequent to borrow operations, the topsoil was re-spread with the scrapers and re-vegetated using seed, fertilizer and mulch approved by the Niagara Mohawk Power Company.

3. Site 4 Borrow Area

   The Site 4 borrow area was located due west of Site 4, formerly on the Rist property now owned by the General Electric Company. This borrow area was also designed to accommodate future mitigation of this area. Approximately 3 acres were excavated to a depth of 10 to 15 feet. The majority of this material was decomposed shale. Approximately 29,000 c.y. were removed and utilized as subgrade fill below the GCL layer at Site 4.

The area was dewatered during excavation work via a trench and piping system across Site 4 discharging into the river.

G. Capping Work

1. Site 2

This site was basically a balanced cut and fill. The initial cutting was accomplished by Scraper and D-8 dozers and the material was spread in the lower areas and compacted. The work began September, 1990 and was completed November, 1990. Following initial grading, eight (8) + inches of clean subgrade sand was placed by scraper and pushed/graded with bulldozers. Initially, a turn-around area was constructed of clean material to allow scrapers to travel from the borrow area into the site to unload their materials. This served as a staging area for the remainder of the subgrade placement work. The final surface was smooth graded and rolled to create a base for the GCL layer.

2. Site 3

Site earthworks began August, 1990 and was completed December, 1990. A limited amount of cutting was required at this site to achieve rough grades. This work was accomplished by scraper, 235 cat excavator and a D-6 bulldozer. The subgrade materials were trucked from the NMPC Borrow Area across the temporary bridge to the site. This initial lift (2 feet) was placed with LGP bulldozers and compacted with a smooth-drum roller. The remaining fill was discharged by dump trucks and placed with bulldozers by spreading 1 foot $\pm$ lifts of material. A water truck was used to aid compaction and control dust.

3. Site 4

Earthworks operations at Site 4 began October, 1990 and were completed April 1, 1991. The grading drawings indicated an even cut and fill operation along the central and northern portions of the site. However,

the site was extremely wet and unstable in the central and northern portions due to off-site springs and surface water runoff entering the area. Due to this water, it was concluded that cuts would create an unstable subgrade and cause construction problems which would jeopardize the integrity of the closure. Therefore, approximately 3 to 4 feet of additional subgrade fill was placed in these areas (central portion) and the grading plan was adjusted accordingly. In dry areas at the eastern portion of site (adjacent to the river) and the southern portion of the site, the existing site soil conditions were satisfactory to maintain the original design grades. Cutting was accomplished by scraper and bulldozers while filling (subgrade) was accomplished by trucks handling material from the Fort Edward Borrow Area and Site 4 borrow pit.

4. Site 5

Work at site 5 commenced in July, 1990 and was completed in September, 1990. Grades and lateral extent of the cap were adjusted on the northern portion due to the finding of additional contamination by Canonie in the summer of 1990. In addition, the planned 2:1 rip-rap fill slopes along the river were tapered to create 3:1 to 4:1 slopes to improve stability along the river front. Existing work was accomplished with bulldozers and the clean subgrade soil was transported from Fort Edward Borrow Area via dump trucks through the Scott Paper facilities. The final subbase consisting of 8"+ of clean sand was placed, the debris removed, fine graded and smooth drum rolled before placement of the GCL layer. Water trucks were used to aid compaction and control dust.

5. Geosynthetic Clay Liner (GCL)

The GCL was custom manufactured by the Clem Corporation in the spring/summer of 1990 to meet the project design requests for an impervious barrier layer. The GCL consisted of a 4 oz./s.y. polypropylene containment geotextile, Polyfelt TS-750 (10 oz) base reinforcing and gas collection fabric and a 1 lb./sq. ft. layer of bentonite. The GCL was placed with the 10 oz. fabric side facing down on the subgrade soil and the

4 oz. geotextile facing the upper sand layer. The 10 oz. side served as a reinforcing layer to support construction equipment and now serves as a gas collection system.

The GCL was overlapped 14 inches on the sides and terminal ends. Each overlap was shingled down slope or down grade to prevent surface water infiltration. On the perimeter channels and at the stream crossing areas, the GCL was placed perpendicular to the slope and shingled down slope to prevent infiltration of surface water. The GCL was deployed by use of a spreader bar and pulled with an I-28 loader on flat areas and a 963 track loader on sloped areas. Along the perimeter channels, the GCL was anchored in a trench along the tops of slopes. The GCL was placed and, in most cases, covered on the same day with the drainage layer sands. Temporary plastic sheeting protected the GCL until sand could be placed. Since some of the construction was accomplished in stages, some of the sides and terminal ends of the GCL became wet activating the bentonite before the land layer was applied. Along these boundaries the GCL was uncovered until competent GCL materials were exposed, the unsuitable GCL was removed and replaced. Approximately one (1) sample of GCL per 100,000 sf was taken and sent to J&L Testing Company, Inc. for verification of permeability characteristics. These results are tabulated in Appendix D.

6. Drainage Layer

The drainage layer consisted of free draining sand derived from the NMPC Borrow Area (Sites 2, 3, 4) and Fort Edward Borrow Area (Site 5). After the GCL was deployed and overlaps approved, drainage sand placement began. The continuous 12" layer was spread with D-4 or D-6 LGP bulldozers. Material thicknesses were checked in the field with test pits and by survey. Whenever possible the sand was pushed in the direction of the shingles to avoid GCL material separation. In the event of rain, traffic was diverted around the completed area to protect the integrity of the existing cap. Whenever traffic did run on completed areas, test pits were excavated to re-check the integrity of the inplace geo-composite. Along

the perimeter channels the sand was pushed up-slope and into the anchor trench. Finally, the surface was regraded, thicknesses verified and fine graded in preparation of topsoil placement.

a. SITE 2 - The GCL and drainage sand operation began November, 1990 and was completed December, 1990.

b. SITE 3 - The GCL and drainage sand operation began October, 1990 and was completed December, 1990.

c. SITE 4 - The GCL and drainage sand operation began December, 1990 and was completed April, 1991 .

d. SITE 5 - The GCL and drainage sand operation began September, 1990 and was completed October, 1990.

7. Top Soil

Topsoil placement on the remnant deposit areas commenced only after the drainage layer was surveyed by Rourke Associates and approved by the Engineer. The topsoil came from two (2) sources. One (1) source was classified as a silty clay topsoil and the other a sandy silt topsoil. Both sources were tested to determine fertilization requirements. Wood chips were also added to the topsoil at a ratio of 20:1, from NMPC borrow area chipping operations to supplement the organic content. The chips were either mixed while the topsoil was being stockpiled or after it was placed. Mixing was accomplished by evenly spreading the chips with a bulldozer, 1 load of chips to 20 loads of topsoil. The topsoil was worked outward to avoid compaction of the layer. Placement depths were checked with a ruler to assure that 6" or more of material was placed. A soil stabilization matting was placed in the perimeter channels while vegetation was established.

a. SITE 2 - The topsoil was stockpiled in the NMPC Borrow Area from the outside source which provided the silty clay materials.

Topsoil placement commenced in December, 1990 and was completed April, 1991. The topsoil was transported to Site 2 both by scrapper and dump truck and spread with D-4 LGP bulldozers. This topsoil was fairly wet and there was some difficulty in holding to a single 6" lift. In some areas the topsoil was applied to a thickness of one (1) foot due to its wet condition.

b. SITE 3 - Topsoil operations began October, 1990 and was completed April, 1991. The topsoil utilized on Site 3 came from both of the borrow sources. The silty clay topsoil was stockpiled in two (2) separate stockpile areas, the southern portion and the southern central portion of the site. Wood chips were mixed in the stockpiling process and during placement. It was at this time that Canonie switched from the silty clay topsoil source to the sandy silty topsoil source due to the wetness of the silty-clayey topsoil. During placement there was a large quantity of spoil due to the inability to spread the topsoil evenly in 6 inch lifts. Again, the topsoil was placed with D-4 bulldozers, and 963 trackloads. Topsoil was transported to the site with scrapers and dump trucks. In the perimeter channels, the topsoil was spread with D-4 bulldozers.

c. SITE 4 - Topsoil operations began January, 1990 and was completed April, 1991. The sandy-silty topsoil used at this site was transported directly on-site by the dump truck and spread with D-4 and D-6 bulldozers.

d. SITE 5 - The topsoil utilized on Site 5 was the silty-clay type material, spread from northern central portion to the south and western areas. A 963 track loader and D-4 dozer were used for spreading. Six (6) inch depths were checked with a ruler to insure thickness. The topsoil was trucked through the Scott Paper facility. Operation began October, 1990 and ended April, 1991.

8. River Bank Construction and Slope Stabilization

The river bank stabilization portion of the project consisted of a three (3) layer composite of filter fabric, filter stone and rip-rap.

Before construction activities commenced Canonie submitted geotextile literature and samples; geotextile placement methods; in-place silt fence literature and samples; stone samples; and, rock placement methods for approval by the Engineer. Additional construction samples were taken of the geotextile and bedding stone (NYDOT bedding stone) during construction for verification testing. The large rip-rap was visually inspected at the site to insure a gradation that was in accordance with the design criteria:

Gradation Size	Content
12" - 18"	50%
12" - 6"	30%
<6"	20%

After the desired slope was constructed and the debris removed, geotextile installation work began. Meanwhile, the geotextile materials were stored and covered with plastic until it was used. The geotextile was placed perpendicular to the slope and anchored along the top of slope in an anchor trench. (See Detail 6 of the as-built drawings.) Generally, the geotextile was placed 2 to 4 days ahead of the stone operation work. In conjunction with these construction activities, an in-river silt fence and on-shore silt fence were installed to trap sediment. This system generally worked very well except at isolated times of high water/velocity flows when operation ceased. The sides of the geotextile were overlapped 18" and anchored with staples. Where the bottom of the river could not be judged due to the river depth, the geotextile was cut an additional 5 to 10 feet to insure that it extended far enough to underlay the stone. After the geotextile was in place, a 12" layer of bedding stone was placed as a

cushion to support the rip-rap. The stone was placed, where possible, from the toe of slope working up-slope to the crest. A 235 Cat excavator was used to place the stone and grade stakes were installed to verify that a 12" layer of bedding material was placed. Placement was limited to a maximum 24 inch drop to preclude damage to the geotextile. After the 12" bedding stone was in-place, an 18" layer of rip-rap was installed with a 235 cat excavator. After the single lift of 18" rock was placed, the machine operator used the smaller particles (6 inch maximum) to fill voids and interlock the rip-rap. A dump box derived from an articulating haul truck was used to stockpile the bedding stone/rip-rap so as to keep the rip-rap and bedding stone clean. Before production of these components commenced, a test fill (50 ft.) section was constructed on-site and inspected by all parties to verify placement criteria.

a. SITE 2 - River-bank stabilization work began October, 1990 and was complete November, 1990. The 2:1 slope was cut with a 235 cat excavator and the excess material was cast onto the remnant deposits and incorporated into the filling operation on Site 2 before placement of the 8" clean subgrade leveling course. During initial placement, heavy rains caused the river to raise to almost flood stages which eroded the toe of the 2:1 cut slopes. Additional rip-rap was placed along the toe to re-build these slopes. The GCL layer was placed on top of the 5 foot strip of bedding stone then covered with rip-rap. See Detail 4 of the as-built drawings.

b. SITE 3 - The bedding stone/rip-rap protection work began October, 1990 and was completed December, 1990. Two (2) types of construction methods (see Details 4 and 5) were used in constructing this system. At the north central portion and at the north point of the slope, rip-rap was placed from top of slope to the toe and into the river bottom. Rip-rap was also tapered from the top of slope, 2 feet above the 100 year flood contour level, into the existing rip-rap to insure stability.

c. SITE 4 - River bank stabilization work began on November, 1990 and was completed April, 1991. The existing slope was a balanced cut and fill using a 235 Cat excavator. The existing top of slope was moved toward the river in some areas to avoid filling into the river. Generally, a 235 Cat placed the bedding stone and rip-rap in conjunction with the geotextile and the completed cap.

d. SITE 5 - Prior to production work at this site, a test fill was constructed at the southern end of the site near the Scott Paper Plant. This work was performed, inspected and the techniques approved by the Engineer in October, 1990. There was approximately an 800 foot section of shore line that had previously been protected with 6" to 24" rip-rap. There was also a stable stand of vegetation on the slope consisting of 4" to 8" diameter small trees. By direction from the USEPA, these trees were cut and the existing rip-rap was not disturbed. Tree stumps were left inplace. The remaining rip-rap areas were placed on a 4:1 slope and feathered into this slope to create a stable flow transition. Geotextile and the 12" bedding stone was placed from the anchor trench at the top of slope to the existing rip-rap. After completion of the bedding stone, a single lift of 6"-18"rip-rap was placed from the top of slope to the river bottom (integrating the existing rip-rap). At the north point, there was no existing rip-rap or bedding stone, therefore, geotextile and rip-rap were placed the full length of the slope as designed. The rip-rap work was completed November, 1990. Canonie switched placement methods from a 973 Cat track loader to a 235 Cat excavator, two (2) days into this operation to improve production.

9. Surface Drainage Channels

The surface drainage channels were constructed on all of the sites as shown on the as-built drawings. Stream transfer channels were also placed on Sites 2, 3, and 4. Initial cuts into this contaminated soil were completed during the initial site preparation works, allowing contaminated soil to be

incorporated into the original fills well below the GCL grades. The excavations were cut 1 foot $\pm$ below planned subgrade at 3:1 slopes. During the site delineation program which commenced after the original site grading, the original site boundary (top of perimeter channel) had to be moved from 10 feet to 50 feet further up slope. In most cases, the revised site boundary was incorporated into the 3:1 slope by tapering the surface from the new site boundary to the top of the original slope at 3:1 inclination or though a series of benches and 3:1 slopes. After the grading was complete, one (1) foot of clean material was placed, compacted and graded with a bulldozer. The GCL and remaining components were then placed and soil erosion matting installed along the perimeter channels to serve as stabilization until vegetation was established. (See Detail 2 of the as-built drawings.)

The stream transfer channels were placed on Sites 2, 3, and 4. These channels drained the perimeter channels at various areas incorporated into the grading plan or at places where off-site water sources ran year around. After the grading and clean material were in place, GCL was deployed along the transfer channels and anchored. Then, a 60 ml HDPE liner system was installed. Geotextile was then placed and anchored with the liner. (See Detail 10 of the as-built drawings.)

Originally, Fabriform matting and grout were designed for the transfer channels. However, due to construction concerns by both NYDEC and the Corps of Engineers, rip-rap and bedding stone were used as an Approved Equal for channel erosion protection. A 235 Cat excavator was used to place 6 to 12 inches of bedding material followed by 12 inches of 6 to 12 inch rip-rap. The channels were completed in conjunction with the GCL layer and drainage sand of the cap system. At various locations on Sites 2, 3, 4, and 5 off-site water during rain events warranted placement of rip-rap erosion control strip berms placed from the perimeter channel flow line to the edge of the capped area and tied into existing ground. These rip-rap berms prevented erosion and stabilized the cap system along the cap boundary interface. In most instances, during the placement of the perimeter channels and stream transfer channels, the collected water was diverted through a series of temporary PVC pipe transfer lines.

The collection and disposal of surface water was an ongoing feature of the construction work until completion of the cap and diversion channels. Where heavy flows occurred, water was diverted via PVC pipe from the off-site point source directly into the river. This reduced erosion and eliminated contaminated water from being discharged into the river.

Infiltration collection piping was originally proposed to be installed only in the perimeter channels within drainage areas or areas where these surface water channels were fed by capped portions of the site, principally on Sites 3 and 4. However, observations at Site 3 clearly demonstrated the need to install these pipes in all areas except at Site 5 where the work had been completed. The piping consisted of 4" PVC pipe with a geotextile sock to serve as a filter. All pipes were installed along the flow line of the perimeter channels after deployment of the GCL layer. The system worked very well.

IV. DESIGN CHANGES, FIELD CHANGES AND ENHANCEMENTS DUE TO SITE CONDITIONS

A. Remnant Deposit - Site 2

1. Grades along the southern portion of the site just past the main stream transfer channel were raised 6 to 12 inches to accommodate increased quantities of contaminated soil encountered during the cutting of 2:1 slopes and general site regrading before placement of the subgrade sand leveling layer.

2. Grading of the final 60 feet of drainage channel was adjusted by slight widening of the cross-section to better accommodate seepage. Rip-rap was also placed along the sides of the channel using strip berms with 6 to 8 inch rip-rap. This enhanced erosion protection.

3. Rip-rap along the slope adjacent to the river was keyed into the existing ground to enhance erosion protection and prevent scouring.

4. During the site delineation program performed by Canonie, the existing cap was extended where PCB levels of 5 ppm or greater were encountered. This insured capping of all contaminated areas beyond the limits of the Consent Decree. The limits of the cap above the 140 foot contour interval indicate where this occurred.

5. Rip-rap strips were added along channels to the sources of off-site water to assure containment and channelization of flows in a controlled manner. This precluded meandering of inflow sources. The areas extending out of the capping limits indicate where this occurred.

6. The location of the perimeter channels were adjusted as necessary to accommodate grading plan changes with final locations shown on the drawings.

7. In lieu of Fabriform, a composite of geotextile, bedding stone and rip-rap were used as recommended by the Corps of Engineers.

8. Four (4) inch PVC and four (4) inch ADS-HDPE pipe were installed to improve drainage collection at the site. They are located in the upgradient surface water collection channels below the rip-rap layer.

B. <u>Remnant Deposit - Site 3</u>

1. Rip-rap was placed around bridge Pier 7 footing and at the east abutment of the bridge in lieu of soil to improve stability.

2. The stream transfer channel was changed from Fabriform to a stone composite, See III, A, Item 7.

3. A 36 inch diameter CMP culvert pipe was placed in the completed perimeter channel after placement of the GCL layer. Rip-rap was also placed on the inlet and outlet sides of both road and surface water channels to reduce maintenance and enhance soil erosion protection. The pipe was used to construct a crossing over the channel. (See Drawing 9123-AB3).

4. At several areas along the existing shoreline rip-rap at Site 3, the two (2) foot elevation criteria above the 100-year storm contour interval was met. Therefore, the cap was tied into this rip-rap. Contaminated soil was removed from stone during grading operations and incorporated as fill under the cap.

5. The cap delineation program performed by Canonie indicated that some contamination extended along the southern tip of Site 3. Therefore, the cap was extended as reflected on Drawing 9123-AB3..

6. During the Canonie delineation program, several cap extensions along the northern end of the site were made beyond the 140 foot initial contour limit to insure containment. In some cases, where tying the cap into the existing ground at a 3:1 slope could not be accomplished, benches were constructed at subgrade and the cap was extended. The extended areas are shown on Drawing 9123-AB4.

7. Four (4) inch PVC pipe was placed along the flow line of perimeter channels to improve flow conditions and to serve as further protection of the GCL layer by preventing infiltration. These pipes are located below the rip-rap in the channels.

8. The stream transfer channel was straightened and the grading plan was adjusted at the perimeter channel to improve HDPE liner installation. Comparing the design drawings with the As-built drawings clearly shows what realignments were made.

9. The Canonie delineation program found the small island of land just up river of Site 3 to be contaminated. The grading plan was adjusted to facilitate capping of this area and maintain positive drainage. The extended area can be seen by comparing the design with the As-built documentation.

C. Remnant Deposit - Site 4

1. Per the Canonie site delineation program, the cap was extended to the north together with additional river bank rip-rap protection. Comparison of design versus As-built documentation clearly shows the extended area.

2. Portions of the surface water diversion channels were rip-rap lined because vegetation was not sufficient to prevent erosion. These are the "Y"shaped channels shown in Drawing 9123-AB5.

3. Several perimeter channel locations at the edge of the Claymax limits were adjusted to match field conditions and were rip-rap lined to improve stability. The rip-rap portions are noted on the As-built drawings.

4. The HDPE stream transfer lining system was enclosed in concrete to insure integrity of the cap system. See Detail 9 of the As-built drawings.

5. Similar to all other stream transfer channels, the Fabriform liner was replaced with a rip-rap composite per Corps of Engineers requirements.

6. Due to soft soil conditions in the central area of the site, the grade was raised three (3) to four (4) feet to improve drainage, accommodate settlement and to bridge the area to accommodate construction activities. See Detail 10 of the As-built drawings.

7. The cap was extended toward the river and the top of the river bank slope moved outward. The 2:1 river bank slope was cut into the existing bank and the contaminated soil was incorporated as site fill under the cap.

8. An additional stream transfer channel was installed because of grade changes at the southern portion of the site and to accommodate a future emergency spillway for the pond created from borrow excavation adjacent to the Remnant Site. As-built drawings delineate these adjustments. This is the channel located at coordinates N 191, 300; E 694, 700.

9. A 16 inch and 30 inch diameter culvert was added in the discharge channels to provide access across the site for inspection and maintenance. See Drawing 9123-AB5.

10. Contaminated soil was removed from the existing 18" ϕ water line area and GCL was adjusted to accommodate field conditions. See Detail 13 of As-built drawings.

D. <u>Remnant Deposit - Site 5</u>

1. The cap was extended to the fence line after the Canonie delineation work found that contaminated soils existed beyond the original estimated boundary limits of the closure plan.

2. Two (2) 30" inch diameter CMP culvert pipes were installed in the perimeter channel to allow for access and future maintenance of the site. These are located near the Scott Paper entrance gate on Drawing 9123-AB6.

3. A 15 inch diameter HDPE pipe was installed to replace an existing 15 inch combination storm sewer pipe which was broken and well below the GCL grade. This new pipe was placed above the GCL layer to allow for maintenance of the new line in clean material. The pipe was placed on three (3) feet of fill and covered with three (3) feet of soil which created a topographic high that was graded at 5:1 side slopes and tied into the final cap grades. See Drawing 9123-AB6.

4. A 36 inch CMP culvert was placed across a drainage channel to allow for the 15 inch storm water pipe to cross the perimeter channel. See Drawing 9123-AB6 near coordinates N 1192, 300; E 696, 200.

5. Rip-rap was placed on the inlet and outlet sides of the 36 inch CMP pipe for flow control and erosion protection as shown by the shaded area on Drawing 9123-AB6.

6. Rip-rap strip berms were added for additional protection of the existing ground to control run-on from upgradient areas into the drainage channels. Furthermore, the perimeter channel was enlarged and protected with geotextiles and four (4) to eight (8) inches of rip-rap to replace grass lining to enhance erosion protection.

7. The cap was extended in several areas because the Canonie site delineation work found contaminated materials beyond the original limits of the cap. Consequently, some grade changes were necessary.

E. Bridge Construction

1. The bearing pad elevations were adjusted on the bridge abutments at both the east and west sides in order to accommodate a match between the concrete approach ramp and the bridge decking. Bearing plate dimensions used in the design differed from those shipped to the site.

2. In lieu of filling the pier legs with concrete, to achieve the necessary dead weight, concrete filled pipes were affixed to the structure to create the weight. This allowed for continuing use of the leveling screws to adjust the bridge, as necessary.

V. CERTIFICATION THAT REMEDY IS OPERATIONAL AND FUNCTIONAL

The work was performed in accordance with the intent of the design and regulatory requirements for the remedial action. The major requirements were:

1. Regrade the area to provide positive drainage towards the river.

2. Control surface water drainage upgradient such that inflow is diverted from the covered area.

3. Construct a cover system per the design to prevent the inflow of rainfall infiltration from draining into the contaminated soils.

4. Provide a drainage layer above the low permeability Claymax layer to control infiltration.

5. Place at least six (6) inches of topsoil over the cover and vegetate.

6. Stabilize the riverbank with riprap.

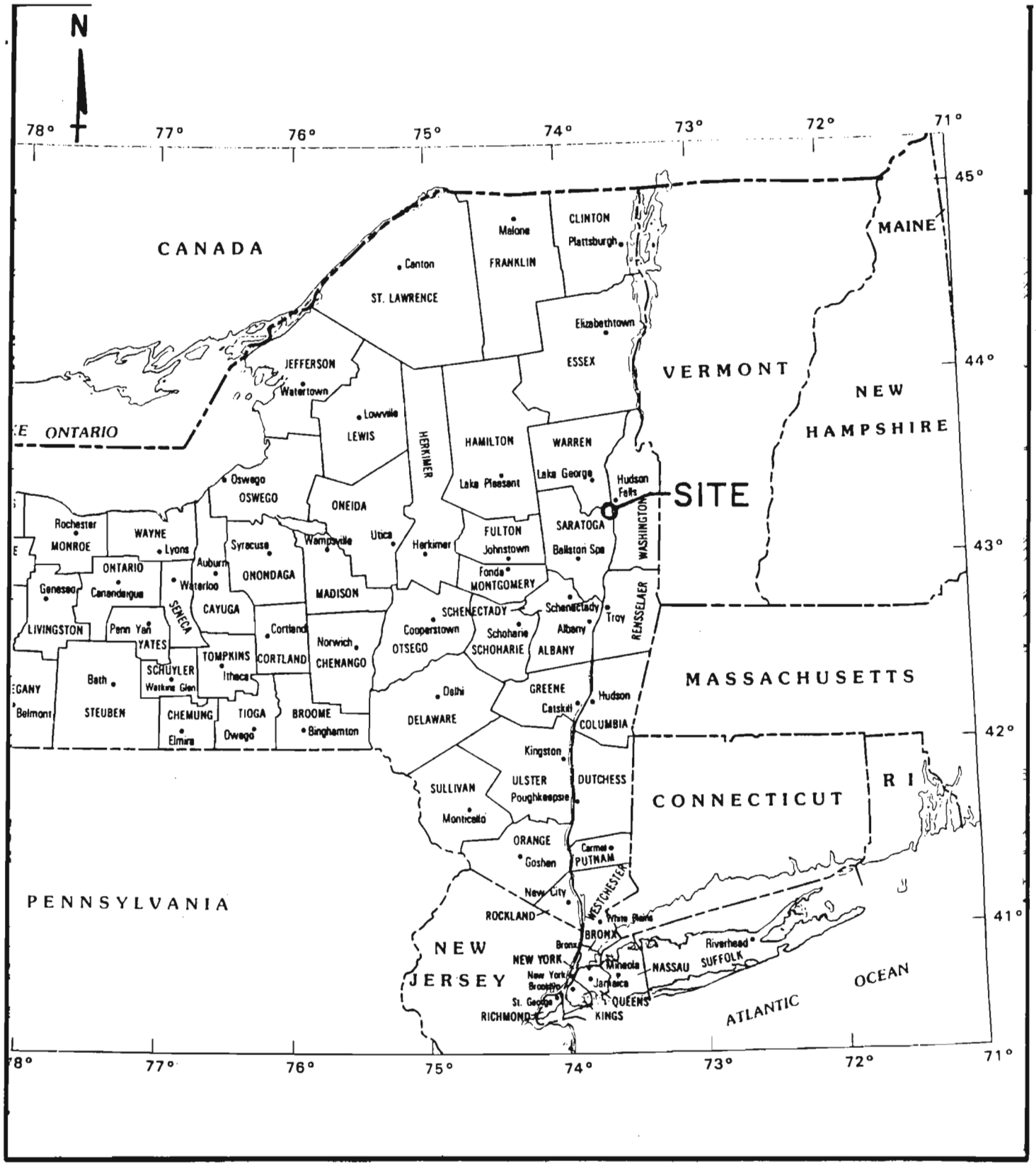
7. Provide a methane venting system to release gases generated by the decomposition of the underlying organics.

The cover design was adjusted, as a result of Canonie's field investigation, to insure that all contaminated areas with levels of PCB's of 5 ppm or greater were sealed by the cover system. The as-built drawings prepared for this project reflect the actual work performed to insure compliance with this mandate. A statement prepared by General Electric certifying that this work was completed and that the data reflects the actual work performed is presented in Appendix F.

VI. OPERATIONS AND MAINTENANCE

As part of the final remediation work, a post-construction operation and maintenance plan has been prepared and was submitted August 20, 1992. This plan requires quarterly inspection for the first year followed by annual inspections thereafter pending results of findings after the first year of observations. In addition, inspections will also be performed after significant rainfall events as described in the document.

The document contains a detailed checklist for each site as well as a guidance map of each site to assist the inspector. Each checklist form contains the items to be inspected, and areas have been set aside for notes of the observations and the suggested maintenance work to be performed. Upon completion of the maintenance activities, a report will be issued which will include a copy of the inspection report and verification that repairs have been completed.



1:50 000 SCALE

2 1 0 1 2 MILES

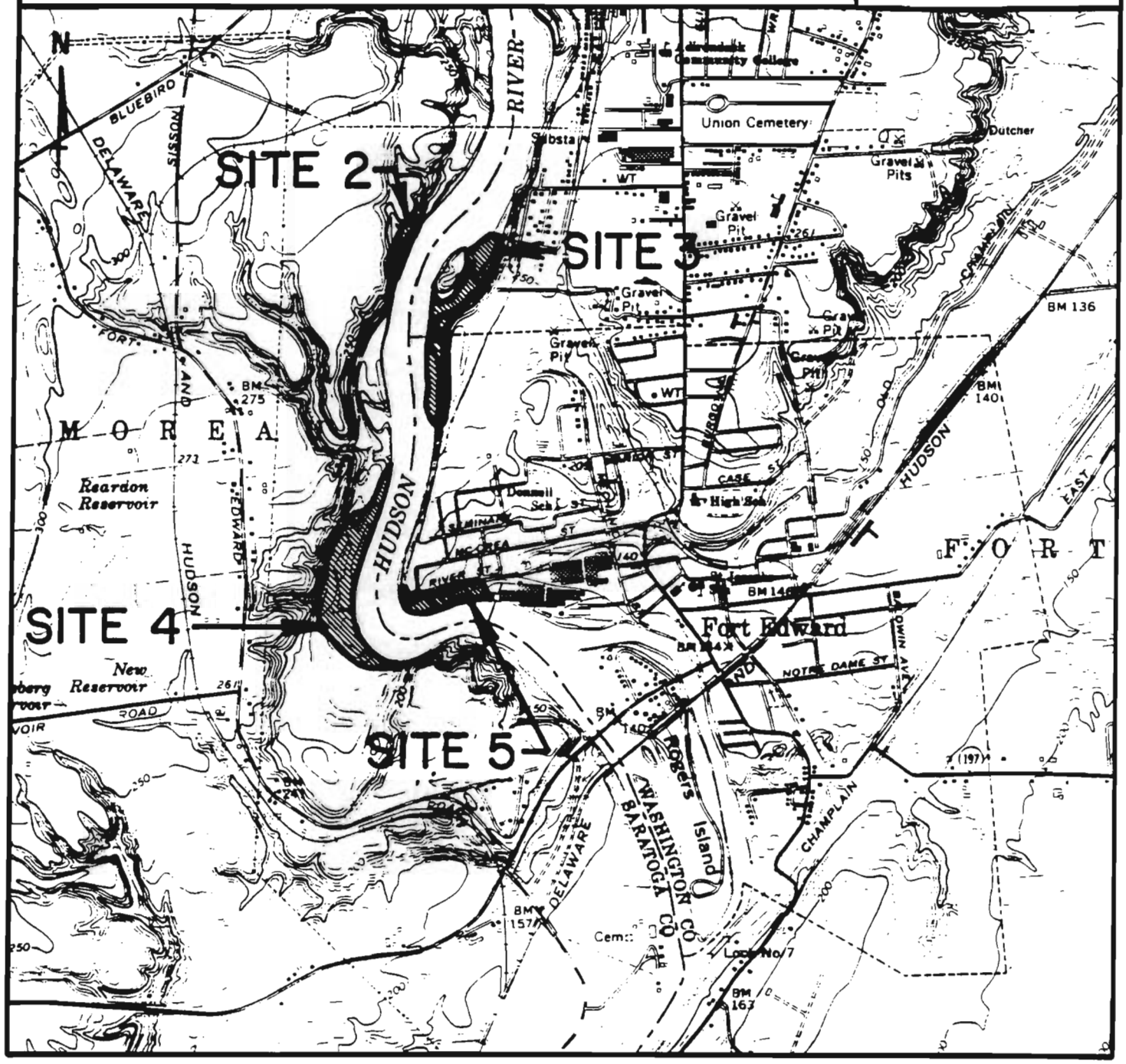
REGIONAL LOCATION PLAN

FIGURE 1

REFERENCE MAP :

U.S.G.S. 7.5 MINUTE
HUDSON FALLS, NEW YORK, QUADRANGLE, 1964,
FIELD CHECKED 1966.

QUADRANGLE LOCATION



SCALE 1 : 24000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

SITE LOCATION PLAN

FIGURE 2

APPENDIX A

LIST OF DESIGN DRAWINGS

PROJECT DRAWING LIST

GENERAL ELECTRIC COMPANY
HUDSON RIVER - WEST BANK ACCESS ROAD
PROJECT NO. 89E123

Drawing No.	Description
9123-AR1	Title Sheet
9123-AR2	General Site Plan
9123-AR3	Access Road Plan Reach 1 - Sheet 1 of 2
9123-AR4	Access Road Plan Reach 1 - Sheet 2 of 2
9123-AR5	Horizontal Control Geometry
9123-AR6	Profile Along Center Line of Access Road Reach 1 - Sheet 1 of 2
9123-AR7	Profile Along Center Line of Access Road Reach 1 - Sheet 2 of 2
9123-AR8	Cross Sections Reach 1 - Sheet 1 of 3
9123-AR9	Cross Sections Reach 1 - Sheet 2 of 3
9123-AR10	Cross Sections Reach 1 - Sheet 3 of 3
9123-AR11	Details and Sections
9123-AR12	Access Road Plan Reach 2 South - Sheet 1 of 2
9123-AR13	Access Road Plan Reach 2 South - Sheet 2 of 2
9123-AR14	Horizontal Central Geometry Reach 2 South and Reach 4
9123-AR15	Profile Along Center Line of Access Road Reach 2 South - Sheet 1 of 2
9123-AR16	Profile Along Center Line of Access Road Reach 2 South - Sheet 2 of 2
9123-AR17	Cross Sections Reach 2 South
9123-AR18	Details and Sections Reach 2 South
9123-AR19	Access Road Plan Reach 4
9123-AR20	Profile Along Center Line of Access Road Reach 4
9123-AR21	Cross Section Reach 4
9123-AR22	Details and Sections Reach 4
9123-AR23	Access Road Plan Reach 2 North
9123-AR24	Horizontal Control Geometry
9123-AR25	Profile Along Center Line of Access Road Reach 2 Borth
9123-AR26	Cross Sections Reach 2 North - Sheet 1 of 2
9123-AR27	Cross Sections Reach 2 North - Sheet 2 of 2
9123-AR28	Details and Sections Reach 2 North

(APPA.HR)

PROJECT DRAWING LIST

GENERAL ELECTRIC COMPANY
HUDSON RIVER - PCB REMNANT SITE REMEDIATION
PROJECT NO. 89E123

Drawing No.	Description - "Site Remediation"
9123-SR1	Title Sheet
9123-SR2	General Site Plan
9123-SR4	Finished Plans Site 2 and 3
9123-SR5	Finished Grading Plan
9123-SR6	Cross Sections A-A, B-B and C-C
9123-SR7	Cross Sections D-D and E-E
9123-SR8	Cross Sections F-F and G-G
9123-SR9	Cross Sections H-H, J-J and M-M
9123-SR10	Cross Section K-K
9123-SR11	Cross Section L-L
9123-SR12	Cross Section N-N
9123-SR13	Cross Sections P-P and
9123-Sr14	Details
9123-SR15	Details

Drawing No.	Description - "Temporary Bridge"
9123-BR1	Title Sheet
9123-BR2	Temporary Bridge Alignment
9123-BR3	Temporary Bridge Plan Elevation and Details
9123-BR4	Temporary Bridge Support Details
9123-BR5	Temporary Bridge Support Details

Drawing No.	Description - "Gates"
1217-GL1	Site 2 - Proposed Gate Location
1217-GL2	Site 3 - Proposed Gate Location
1217-GL3	Site 4 - Proposed Gate Location
1217-GL4	Site 5 - Proposed Gate Location

(APPA.HR)

APPENDIX B

LIST OF CONTRACTORS

Canonie Environmental

Canonie Environmental
500 North Gulph Road - Third Floor
King of Prussia, Pennsylvania 19406

Phone [illegible]
Fax [illegible]

90-076

May 22, 1992

Mr. John Boschuk, Jr., P.E.
J & L Engineering, Inc.
938 South Central Avenue
Canonsburg, PA 15317

Vendor List
Fort Edward Remnant Deposit Sites
Fort Edward, New York

Dear Mr. Boschuk:

As requested, a list of all vendors and subcontractors involved in the above-referenced project is attached. Feel free to call if you have any questions.

Very truly yours,

Michael J. Bensing

Michael J. Bensing, P.E.
Project Supervisor

MJB/hmcj

Attachment

cc: William Goeckler, General Electric Company
Jeffrey Klaiber, Canonie

Remant Deposit Capping Project Subcontractors/Suppliers List		
Company Name & Address	Subcontractor/ Supplier	Description
Ramsco 453 North Pearl Street Albany, NY 12204	Supplier	Schedule 40 Piping
Anvil Fence & Supply Co., Inc. 1626 Route 9 Clifton Park, NY 12065 (513) 383-0500	Supplier	Fencing and hardware
Adirondack Highway Materials 179 Dix Avenue Hudson Falls, NY 12834	Supplier	Orange construction fence and culvert piping
Liner Technology 27 Canal Road Menands, NY 12204	Subcontractor	HDPE liner installation
American Excelsior Co. 214 N. Lexington Pittsburgh, PA 15208	Supplier	Mulch for seed
Johnson's Fuel Service, Inc. P.O. Box 59 Granville, NY 12832 (518) 642-2900	Supplier	Propane
Palco Linings, Inc. 2500 B. Hamilton Blvd. P.O. Box 526 S. Plainfield, NJ 07080	Subcontractor	30 mil PVC boot
Rist-Frost Associates, P.C. P.O. Box 838 21 Bay Street Glen Falls, NY 12801	Subcontractor	Surveying services
D.A. Collins Construction Co. P.O. Box 191 Mechanicville, NY 12118	Subcontractor	Bridge building, equipment rental
Jointa Lime Company 209 Warren Street Glen Falls, NY 12801 (518) 792-5029	Supplier	Riprap, filter stone, topsoil

Remant Deposit Capping Project Subcontractors/Suppliers List		
Company Name & Address	Subcontractor/ Supplier	Description
Mirafi Inc. (Fluid Systems) P.O. Box 240967 Charlotte, NC 28224	Supplier	Filter cloth and silt fence
Hudson Environmental 248 Queensbury Avenue P.O. Box 4601 Queensbury, NY 12804 (518) 792-3863	Subcontractor	Air analysis
Trinity Environmental Tech. 62 East First Street Mound Valley, KS 67354 (316) 326-3222	Subcontractor	PCB air analysis
David Chaves Excavating, Inc. P.O. Box 124 Little Pond Road Londonderry, VT 05148 (802) 824-3140	Subcontractor	Mulched trees for wood chips
Burns International Security P.O. Box 30185 Tampa, FL 33630	Subcontractor	24 hour security service
Vellano Bros., Inc. 7 Hemlock Street Latham, NY 12110 (800) 342-9855	Supplier	Gas vent pipe
Fluid Systems, Inc. 32 Triangle Park Drive Cincinnati, OH 45246	Supplier	Filter cloth
Aramsco Mid Atlantic Park P.O. Box 18 1655 Imperial Way Thorofare, NJ 08086	Supplier	Health, safety and medical supplies

Remant Deposit Capping Project Subcontractors/Suppliers List		
Company Name & Address	Subcontractor/ Supplier	Description
Agway Route 4 P.O. Box 363 Upper Broadway Fort Edward, NY 12824	Supplier	Seed, mulch
CFP, Inc. P.O. Box 567 Pineville, NC 28134 (800) 548-0046	Supplier	Miramat
Dow Construction 365 Reynolds Road Fort Edward, NY 12828 (518) 798-4315	Supplier	Topsoil
Peckham Materials Corp. P.O. Box 853C White Plains, NY 10603	Supplier	Riprap
HFH Construction Co., Inc. P.O. Box 636 Dix Avenue Glen Falls, NY 12801 (518) 792-6294	Subcontractor	Install chain link fencing

CONTRACTOR: **REMEDIATION, INC.**
P. O. Box 97
Dover, PA 17315-0097

(Excavating, Clearing, Seeding, Road Construction)

Remnant Deposit Capping Project Subcontractors/Suppliers List		
Company Name & Address	**Subcontractor/ Supplier**	**Description**
K&J Electric Co., Inc. 11 Walnut Street Glens Falls, NY 12801	Subcontractor	Electrical Work
W.J. Rourke Associates P.O. Box 1434 10264 Saratoga Road S. Glens Falls, NY 12803	Subcontractor	Surveying
Jointa Lime Company 209 Warren Street P.O. Box 536 Glens Falls, NY 12801	Subcontractor	Stone Delivery and Trucking
Schultz Construction, Inc. Pine Crest Eleven Industrial Park P.O. Box 417 Round Lake, NY 12151	Subcontractor	Excavating, Clearing, Seeding, Road Placement
Chaves Waste Wood Recycler P.O. Box 124 Londonderry, VT 05148	Subcontractor	Stump Grinder
HFH Construction Co., Inc. P.O. Box 636, Dix Avenue Glens Falls, NY 12801	Subcontractor	Fencing
E. Galusha & Sons Construction Co. Patten Mills Road Johnsburg, NY	Subcontractor	Trucking and Material Delivery
Clear Construction 35 Sisson Road Moreau, NY 12807	Subcontractor	Trucking and Excavating

APPENDIX C

LIST OF AS-BUILT DRAWINGS

LIST OF AS-BUILT DRAWINGS

GENERAL ELECTRIC COMPANY
HUDSON RIVER

Drawing No.	Description
9123-AB1	General Site Plan
9123-AB2	Site 2 - As-Built Plan
9123-AB3	Site 3 - As-Built Plan - Sheet 1 of 2
9123-AB4	Site 3 - As-Built Plan - Sheet 2 of 2
9123-AB5	Site 4 - As-Built Plan
9123-AB6	Site 5 - As-Built Plan
9123-AB7	Details
9123-AB8	Details
9123-AB9	Site 2 Final (W.J. Rourke Associates Drawing)
9123-AB10	Site 2 Filter Sand (W.J. Rourke Associates Drawing)
9123-AB11	Site 2 Top of Subgrade (W.J. Rourke Associates Drawing)
9123-AB12	Site 2 Original (W.J. Rourke Associates Drawing)
9123-AB13	Site 3 Final (W.J. Rourke Associates Drawing)
9123-AB14	Site 3 Filter Sand (W.J. Rourke Associates Drawing)
9123-AB15	Site 3 Top of Subgrade (W.J. Rourke Associates Drawing)
9123-AB16	Site 3 Original (W.J. Rourke Associates Drawing)
9123-AB17	Site 4 Final (W.J. Rourke Associates Drawing)
9123-AB18	Site 4 Filter Sand (W.J. Rourke Associates Drawing)
9123-AB19	Site 4 Top of Subgrade (W.J. Rourke Associates Drawing)
9123-AB20	Site 4 Original (W.J. Rourke Associates Drawing)
9123-AB21	Site 5 Final (W.J. Rourke Associates Drawing)
9123-AB22	Site 5 Filter Sand (W.J. Rourke Associates Drawing)
9123-AB23	Site 5 Top of Subgrade (W.J. Rourke Associates Drawing)
9123-AB24	Site 5 Original (W.J. Rourke Associates Drawing)

APPENDIX D

HYDRAULIC CONDUCTIVITY TEST RESULTS

ENGINEER John Boschuk, Jr.

DATE ASSIGNED 08-14-1990

DATE DUE

JOB No. 90S814-01

JOB NAME J&L Engineering, Inc.

G.E. - Hudson RIver

89E123

DATE REC. 06-19-1990

DATE CMP. 08-30-1990

REC. BY DAG

Page No.

SUMMARY OF LABORATORY TEST RESULTS

BORING and SAMPLE No	DEPTH feet	CLASSIFICATION	PERM k cm/sec (Initial)	NATURAL WATER CONTENT (%) (Initial)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	UNCON. COMPRESS: STRESS (tsf)	UNCON. COMPRESS: STRAIN (%)	UNIT DRY WGT (pcf) (Initial)	SPECIFIC GRAVITY	GRAIN SIZE: SIEVE	GRAIN SIZE: HYDR.	OPT MOIST	CONSOLID.	TRIAXIAL: UU	TRIAXIAL: $\overline{CIU}$	TRIAXIAL: CELL PRESSURE (psi)	TRIAXIAL: BACK PRESSURE (psi)
Lot 245	Roll 42596	CLAYMAX	5.7×10^{-10}	51.8					43.9									
Lot 248	Roll 42496	CLAYMAX	7.8×10^{-10}	28.5					46.5									
Lot 250	Roll 2416	CLAYMAX	6.9×10^{-10}	41.8					50.6									
Lot 255	Roll 41712	CLAYMAX	8.0×10^{-10}	39.6					53.1									

* See Test Curves V TEST COMP and CHECKED ● TEST IN PROGRESS

S 21.0(11-88)

ENGINEER John Boschuk, Jr.

DATE ASSIGNED 09-20-90

DATE DUE

JOB No 90S814-02

JOB NAME J&L Engineering, Inc.
GE - Hudson River

DATE REC 09-20-90

DATE CMP 03-27-91

REC BY DAG

Page No

SUMMARY OF LABORATORY TEST RESULTS

Initial Initial

LOT NO.	ROLL NO.	CLASSIFICATION	PERM k cm/sec	NATURAL WATER CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT	ATTERBERG LIMITS PLASTIC LIMIT	UNCON COMPRESS STRESS (tsf)	UNCON COMPRESS STRAIN (%)	UNIT DRY WGT (pcf)	SPECIFIC GRAVITY	GRAIN SIZE SIEVE	GRAIN SIZE HYDR.	OPT MOIST	CONSOLID.	TRIAXIAL UU	TRIAXIAL $\overline{CIU}$	TRIAXIAL CELL PRESSURE (psi)	TRIAXIAL BACK PRESSURE (psi)
68	62409		6.3×10^{-10}	35.7					51.6									
68	62429		1.1×10^{-9}	43.2					49.2									
110	59378		6.4×10^{-10}	45.4					43.1									
112	59030		9.1×10^{-10}	47.8					54.2									
112	59070		7.6×10^{-10}	54.9					50.6									
112	59080		5.9×10^{-10}	40.2					63.1									
113	59007		5.9×10^{-10}	59.4					54.6									
224	24840		8.4×10^{-10}	32.6					42.8									
242	42728		4.0×10^{-10}	44.2					50.8									
243	42674		1.1×10^{-9}	44.2					50.8									
243	42701		7.2×10^{-10}	44.9					48.5									
244	42659		1.1×10^{-9}	53.0					45.1									
246	42619		4.4×10^{-10}	31.6					52.5									
257	41469		1.9×10^{-9}	32.0					42.2									
258	41440		5.3×10^{-10}	40.0					47.2									

* See Test Curves V TEST COMP and CHECKED ● TEST IN PROGRESS

ENGINEER John Boscnuk, Jr.

DATE ASSIGNED 09-20-90

DATE DUE

JOB No. 905814-02

JOB NAME J&L Engineering, Inc.
GE - Hudson River

DATE REC. 09-20-90

DATE CMP. 03-27-91

REC. BY DAG

Page No

SUMMARY OF LABORATORY TEST RESULTS

Initial (Natural Water Content) Initial (Unit Dry Wgt)

LOT NO.	ROLL NO.	CLASSIFICATION	PERM k cm/sec	NATURAL WATER CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	UNCON COMPRESS: STRESS (tsf)	UNCON COMPRESS: STRAIN (%)	UNIT DRY WGT (pcf)	SPECIFIC GRAVITY	GRAIN SIZE: SIEVE	GRAIN SIZE: HYDR.	OPT MOIST	CONSOLID.	TRIAXIAL: U-U	TRIAXIAL: C̄IU	TRIAXIAL: CELL PRESSURE (psi)	TRIAXIAL: BACK PRESSURE (psi)
259	41358		1.9×10^{-10}	46.0					71.7									
259	41379		2.7×10^{-10}	25.5					48.3									

* See Test Curves V TEST COMP and CHECKED ● TEST IN PROGRESS

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J & L ENGINEERING INC.	DATE	:	8-30-90
Project Location	:	G.E. HUDSON RIVER	Job No.	:	90S814-02
Sample Number	:	LOT 248	Tested By	:	J.B.
Description	:	ROLL 42496			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.23	Final Height (in)	:	0.33
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.85
Initial Wet Weight (g)	:	21.80			
Wet Density (pcf)	:	59.76			
Moisture Content %	:	28.50			
Dry Density (pcf)	:	46.50			
Wet Density (psf)	:	1.12			
Dry Density (psf)	:	0.87			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	3.00
Length, L	(in)	:	0.33
Area, A	(sqin)	:	6.38
Head, h	(psi)	:	15.00
Time, t	(min)	:	1150
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 7.81E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J & L ENGINEERING INC.	DATE	:	8-30-90
Project Location	:	G.E. HUDSON RIVER	Job No.	:	90S814-02
Sample Number	:	LOT 245	Tested By	:	J.B.
Description	:	ROLL 42596			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.24	Final Height (in)	:	0.36
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.85
Initial Wet Weight (g)	:	25.90			
Wet Density (pcf)	:	66.71			
Moisture Content %	:	51.80			
Dry Density (pcf)	:	43.94			
Wet Density (psf)	:	1.33			
Dry Density (psf)	:	0.88			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	3.70
Length, L	(in)	:	0.36
Area, A	(sqin)	:	6.38
Head, h	(psi)	:	15.00
Time, t	(min)	:	2150
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 5.67E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J & L ENGINEERING INC.	DATE	:	8-30-90
Project Location	:	G.E. HUDSON RIVER	Job No.	:	90S814-02
Sample Number	:	LOT 250	Tested By	:	J.B.
Description	:	ROLL 2416			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.27	Final Height (in)	:	0.38
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.85
Initial Wet Weight (g)	:	30.90			
Wet Density (pcf)	:	71.81			
Moisture Content %	:	41.80			
Dry Density (pcf)	:	50.64			
Wet Density (psf)	:	1.59			
Dry Density (psf)	:	1.12			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	1.50
Length, L	(in)	:	0.38
Area, A	(sqin)	:	6.38
Head, h	(psi)	:	15.00
Time, t	(min)	:	750
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 6.90E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J & L ENGINEERING INC.	DATE	:	8-30-90
Project Location	:	G.E. HUDSON RIVER	Job No.	:	90S814-02
Sample Number	:	LOT 255	Tested By	:	J.B.
Description	:	ROLL 41712			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.21	Final Height (in)	:	0.37
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.85
Initial Wet Weight (g)	:	25.60			
Wet Density (pcf)	:	74.12			
Moisture Content %	:	39.60			
Dry Density (pcf)	:	53.09			
Wet Density (psf)	:	1.32			
Dry Density (psf)	:	0.94			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	4.30
Length, L	(in)	:	0.37
Area, A	(sqin)	:	6.38
Head, h	(psi)	:	15.00
Time, t	(min)	:	1800
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 8.02E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	68	Tested By	:	G.N.
ROLL #	:	62409			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.26	Final Height (in)	:	0.39
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	29.00			
Wet Density (pcf)	:	70.02			
Moisture Content %	:	35.70			
Dry Density (pcf)	:	51.60			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	3.40
Length, L	(in)	:	0.39
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1946
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 6.34E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	68	Tested By	:	G.N.
ROLL #	:	62429			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.26	Final Height (in)	:	0.35
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	29.40			
Wet Density (pcf)	:	70.44			
Moisture Content %	:	43.20			
Dry Density (pcf)	:	49.19			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	4.20
Length, L	(in)	:	0.35
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1265
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 1.10E-09 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	110	Tested By	:	G.N.
ROLL #	:	59378			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.21	Final Height (in)	:	0.24
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	21.40			
Wet Density (pcf)	:	62.69			
Moisture Content %	:	45.40			
Dry Density (pcf)	:	43.12			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	5.60
Length, L	(in)	:	0.24
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1945
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 6.42E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO. INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	112	Tested By	:	G.N.
ROLL #	:	59030			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.15	Final Height (in)	:	0.19
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	19.70			
Wet Density (pcf)	:	80.11			
Moisture Content %	:	47.80			
Dry Density (pcf)	:	54.20			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	8.40
Length, L	(in)	:	0.19
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1622
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 9.05E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	112	Tested By	:	G.N.
ROLL #	:	59070			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.17	Final Height (in)	:	0.18
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	21.70			
Wet Density (pcf)	:	78.44			
Moisture Content %	:	54.90			
Dry Density (pcf)	:	50.64			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	7.50
Length, L	(in)	:	0.18
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1644
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 7.59E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	112	Tested By	:	G.N.
ROLL #	:	59080			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.17	Final Height (in)	:	0.26
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	24.90			
Wet Density (pcf)	:	88.46			
Moisture Content %	:	40.20			
Dry Density (pcf)	:	63.09			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	4.70
Length, L	(in)	:	0.26
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1945
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 5.91E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	113	Tested By	:	G.N.
ROLL #	:	59007			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.16	Final Height (in)	:	0.19
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	22.10			
Wet Density (pcf)	:	87.01			
Moisture Content %	:	59.40			
Dry Density (pcf)	:	54.59			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	6.40
Length, L	(in)	:	0.19
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1945
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 5.94E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO. INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-25-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT#	:	224	Tested By	:	G.N.
ROLL#	:	24840			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.26	Final Height (in)	:	0.30
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	23.60			
Wet Density (pcf)	:	56.76			
Moisture Content %	:	32.60			
Dry Density (pcf)	:	42.81			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	4.10
Length, L	(in)	:	0.30
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1377
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 8.42E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	242	Tested By	:	G.N.
ROLL #	:	42728			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.27	Final Height (in)	:	0.42
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	31.40			
Wet Density (pcf)	:	73.24			
Moisture Content %	:	44.20			
Dry Density (pcf)	:	50.79			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	2.00
Length, L	(in)	:	0.42
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1945
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 4.04E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO. INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	243	Tested By	:	G.N.
ROLL #	:	42674			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.22	Final Height (in)	:	0.36
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	26.40			
Wet Density (pcf)	:	73.18			
Moisture Content %	:	44.20			
Dry Density (pcf)	:	50.75			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	4.00
Length, L	(in)	:	0.36
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1262
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 1.06E-09 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	243	Tested By	:	G.N.
ROLL #	:	42701			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.25	Final Height (in)	:	0.36
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	28.90			
Wet Density (pcf)	:	70.33			
Moisture Content %	:	44.90			
Dry Density (pcf)	:	48.54			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	4.20
Length, L	(in)	:	0.36
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1945
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 7.25E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	244	Tested By	:	G.N.
ROLL #	:	42659			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.27	Final Height (in)	:	0.37
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	29.70			
Wet Density (pcf)	:	69.02			
Moisture Content %	:	53.00			
Dry Density (pcf)	:	45.11			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	4.70
Length, L	(in)	:	0.37
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1500
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 1.08E-09 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-25-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT#	:	246	Tested By	:	G.N.
ROLL#	:	42619			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.27	Final Height (in)	:	0.35
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	30.50			
Wet Density (pcf)	:	69.06			
Moisture Content %	:	31.60			
Dry Density (pcf)	:	52.48			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	1.90
Length, L	(in)	:	0.35
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1436
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 4.39E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-25-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT#	:	257	Tested By	:	G.N.
ROLL#	:	41469			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.21	Final Height (in)	:	0.22
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	18.90			
Wet Density (pcf)	:	55.63			
Moisture Content %	:	32.00			
Dry Density (pcf)	:	42.15			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	13.00
Length, L	(in)	:	0.22
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1437
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 1.89E-09 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	258	Tested By	:	G.N.
ROLL #	:	41440			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.29	Final Height (in)	:	0.39
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	30.80			
Wet Density (pcf)	:	66.11			
Moisture Content %	:	40.00			
Dry Density (pcf)	:	47.22			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	2.80
Length, L	(in)	:	0.39
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1945
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 5.29E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-20-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT #	:	259	Tested By	:	G.N.
ROLL #	:	41358			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.17	Final Height (in)	:	0.29
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	28.80			
Wet Density (pcf)	:	104.72			
Moisture Content %	:	46.00			
Dry Density (pcf)	:	71.73			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	0.90
Length, L	(in)	:	0.29
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1262
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 1.91E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	J&L ENGINEERING	DATE	:	2-25-91
Project Location	:	HUDSON RIVER	Job No.	:	90S814-01
LOT#	:	259	Tested By	:	G.N.
ROLL#	:	41379			

Cell Number : Fluid : DEAIRED WATER B-Parameter : 1

Physical Property Data

Initial Height (in)	:	0.26	Final Height (in)	:	0.40
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	25.40			
Wet Density (pcf)	:	60.62			
Moisture Content %	:	25.50			
Dry Density (pcf)	:	48.30			

Test Parameters

Cell Pressure	(psi)	:	25.00
Head Water	(psi)	:	23.30
Tail Water	(psi)	:	8.30

Permeability Input Data

Flow, Q	(cc)	:	1.00
Length, L	(in)	:	0.40
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	15.00
Time, t	(min)	:	1407
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 2.66E-10 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

APPENDIX E

CANONIE DECOMMISSIONING CERTIFICATION

Canonie Environmental

Canonie Environmental
500 North Gulph Road - Third Floor
King of Prussia, Pennsylvania 19406

Phone 215-337-2551
Fax: 215-337-0560

90-076

May 22, 1992

Mr. John Boschuk, Jr., P.E.
J & L Engineering, Inc.
938 South Central Avenue
Canonsburg, PA 15317

Decontamination and Decommissioning of Construction Equipment
Fort Edward Remnant Deposit Sites
Fort Edward, New York

Dear Mr. Boschuk:

In accordance with Paragraph H, Item 2(a), page 21 of the Consent Decree, this document serves as verification by the Contractor that all remedial equipment has been decontaminated, dismantled and removed from the site.

Very truly yours,

Michael J. Bensing

Michael J. Bensing, P.E.
Project Supervisor

MJB/hmcj

cc: William Goeckler, General Electric Company
Jeffrey Klaiber, Canonie

APPENDIX F

CERTIFICATION STATEMENT

BY JOHN G. HAGGARD

HUDSON RIVER REMNANT DEPOSITS
REMEDIAL ACTION REPORT
CERTIFICATION STATEMENT

"I certify that the information contained in or accompanying this submission is to the best of my knowledge true, accurate and complete. This report was generated by personnel under contract to GE. I certify, as the company official having supervisory responsibility for the contractor who, acting under my instructions, made the verification, that this information is true, accurate and complete."

John S. Haggard, on behalf of the General Electric Co.

John G. Haggard
Engineering Project Manager

9/24/92
Date

APPENDIX G

FINAL INSPECTION REPORT

APPENDIX G

FINAL INSPECTION

A final inspection of the remedial action at the remnant deposits was held on September 16, 1992. Attendees included:

Douglas Tomchuk	USEPA
James M. Conway	U.S. Army Corps of Engineers
Bill Ports	NYSDEC
John Grathwol	NYSDEC
Bob Knizek	NYSDEC
Ed Tabor	NYSDEC
John Haggard	General Electric
Michael O'Donnell	General Electric
Bill Wright	General Electric
Jack Boschuk	J&L Engineering
Joe Slack	Dunn Geoscience
Bill Rourke	Rourke Surveyors
Peter Taylor	Taylor Photographic

Several items were noted during the final inspection which will require attention during the maintenance period. It was also noted that at several spots on remnant deposits 3 and 5, the rip-rap was too small. It was determined that no corrective action was necessary as part of the remedial action, but that these areas should be checked during future maintenance inspections.