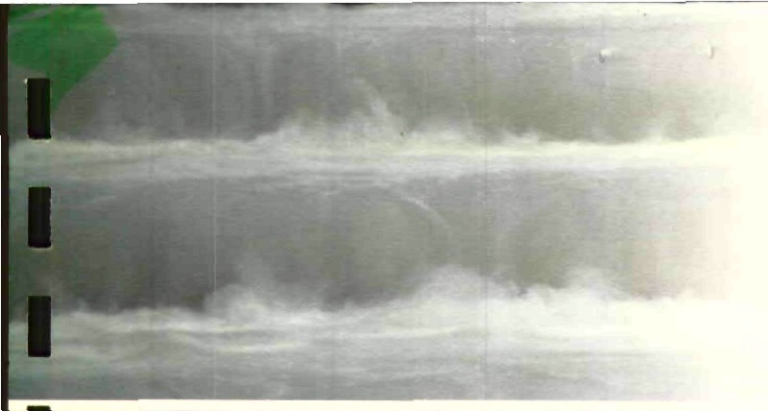

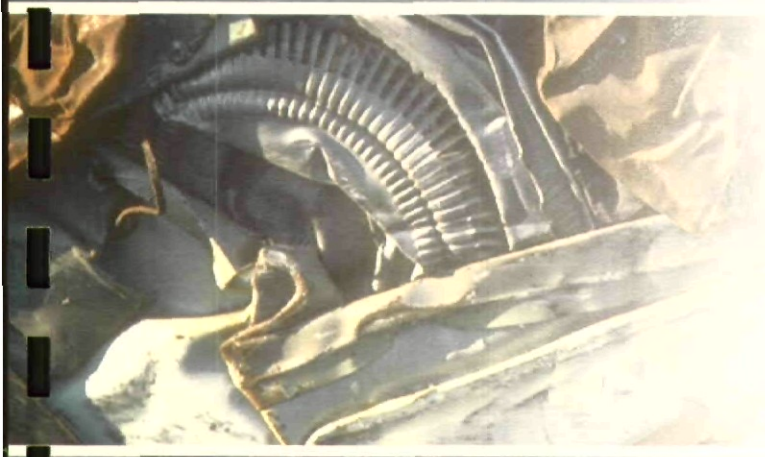

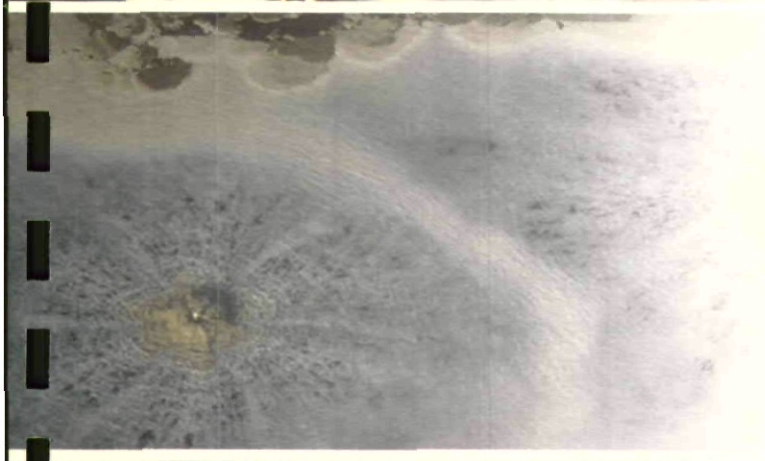

FIELD DEMONSTRATION – ENVIRONMENTAL MONITORING REPORT: PROPAT® AS DREDGED MATERIAL STABILIZING AGENT JERSEY CITY, NEW JERSEY

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JERSEY CITY, NEW JERSEY

INTRODUCTION

PROPAT® is a patented product of Hugo Neu Schnitzer East (HNSE). It is produced from processed, nonmetallic, interior materials of automobile shredder residue combined with stabilizing agents. This report is part of a project to demonstrate that PROPAT® is an effective stabilizing agent and that PROPAT®-amended dredged material (ADM) is environmentally acceptable as bulk fill material for certain upland sites. PROPAT® has been approved as interim daily landfill cover in several states and was approved as "cushion" material above a liner at the Pennsauken Landfill in Camden County, New Jersey.

The demonstration project is proceeding pursuant to a funding agreement between HNSE and the Office of New Jersey Maritime Resources (NJMR). It is also under the auspices of the New Jersey Department of Environmental Protection (NJDEP) Office of Innovative Technologies and Market Development (OIT & MD) and the Division of Solid and Hazardous Waste.

PROPAT® ADM is being studied for use at sites where appropriate engineering and/or institutional controls will be provided and maintained, such as regulated landfills, brownfield sites, and industrial properties. Furthermore, these sites would be outside areas of groundwater use. However, to demonstrate environmental acceptability, two sets of criteria were selected for comparison purposes. Bulk concentrations of contaminants were to be compared to NJDEP non-residential direct contact soil cleanup criteria (NRDCSCC). Concentrations of contaminants in synthetic or field-derived leachates were to be compared to NJDEP groundwater quality standards (GWQS) for Class II-A groundwater.

It was understood early in the process that dredged sediment, PROPAT®, and other additives used to amend the sediment may contain trace materials at concentrations that exceed NRDCSCC. These criteria are typically used as conservative benchmarks in determining appropriate remedial actions at contaminated sites. They were developed based on a model of people being directly exposed to the

various materials in a homogeneous soil matrix. PROPAT® ADM's inherent characteristics are substantially different from soil in regard to its constituents, particle sizes, particle shapes, heterogeneity, and other properties of its matrix. Therefore, NRDCSCC are not directly applicable to PROPAT®ADM and are likely to be overly conservative as any contaminants in PROPAT® are more likely to be bound up in larger particles than in a soil and less available as a medium of exposure.

NJDEP groundwater quality standards (GWQS) apply to Class II-A groundwater. The primary use for this class of groundwater is for potable water supply; hence GWQS are protective of human health for long-term exposures. Since leaching tests tend to overestimate leachability and concentrations in an actual site will be reduced by natural attenuation and groundwater dilution, exceedances of GWQS in test samples are not predictive of exceedances in the groundwater of an actual site.

The demonstration program consists of laboratory bench-scale testing, pilot field demonstration, and full-scale field demonstration with monitoring. Preliminary laboratory testing suggested that PROPAT® would serve as an effective dehydrating agent, improving handling characteristics and strength of dredged material through the addition of fibrous material (Hart Crowser, 1998).

Earlier bench-scale laboratory testing confirmed that the addition of PROPAT® and additives improve the geotechnical properties of the dredged material and reduce the leaching of contaminants. Some of the test leachates showed concentrations of some metals above NJDEP groundwater quality standards (GWQS) for Class II-A groundwater. PROPAT® and various other raw additives used in the testing, as well as mixtures of sediment and these additives, were also found to contain bulk solid concentrations of some analytes in excess of NRDCSCC (Hart Crowser, 2000a).

The second phase of the PROPAT® demonstration program consisted of a pilot field demonstration project in which dredged material was mixed with PROPAT® and pozzolanic additives. Approximately 500 cubic yards of material was mixed in a pug mill and placed on a small plot on the HNSE property in Jersey City in May 2000. The PROPAT® ADM was sampled to determine its geotechnical and environmental properties. Test results led to the following conclusions (Hart Crowser, 2000b):

- PROPAT® ADM generally meets the geotechnical and environmental criteria typically required for non-structural fill material and can be placed with conventional construction equipment under normal field conditions.

- Test leachates from some samples of amended dredged material were found to contain some metals in concentrations above Class II-A GWQS. The GWQS for aluminum was exceeded in all samples, for arsenic in 20 percent of the samples, and for sodium in 15 percent of samples.

Supplemental bench scale testing required for an acceptable use determination by NJDEP generally confirmed previous results. Samples of neat sediment, neat PROPAT®, and various mixtures with amendments displayed concentrations of some metals above those listed in the NRDCSCC.

A test cell containing PROPAT® ADM was constructed as a third phase of the program. The purpose of the test cell is to verify geotechnical and chemical analyses completed in earlier phases on samples from bench-scale and pilot-scale studies and to demonstrate the performance of PROPAT® ADM under full-scale field conditions. Information gathered may be used to project performance of the material in future applications. The construction was completed in May 2003 as reported in July 2003 (Hart Crowser, 2003).

The cell includes a geomembrane liner, approximately 5000 cubic yards of PROPAT® ADM, and a cover of vegetated topsoil. The PROPAT® ADM consists of sediment dredged from Claremont Channel amended with 30 percent PROPAT®, 18 percent coal fly ash, and 18 percent KS60 (a proprietary pozzolanic additive) by weight of wet sediment. Monitoring wells were installed within the cell to allow sampling of water within the cell and a trough was constructed to allow sampling of runoff from the top of the cell. Samples of PROPAT® ADM were collected during construction and analyzed for water content, grain size, and percent solids.

This report describes the results of environmental monitoring conducted on the completed test cell from July 2003 through January 2004. Samples of water were collected from the monitoring wells within the test cell and samples of runoff were collected from the trough. Samples were analyzed by Severn Trent laboratories for a wide range of parameters. Infiltrometer testing and temperature monitoring were also

conducted during this period. Site activities and sampling results are described below.

MONITORING WELL AND RUNOFF SAMPLING

July 1, 2003: Monitoring Well Measurements

On July 1, 2003, Hart Crowser measured water level and pumped from one monitoring well. The monitoring wells were labeled per Figure 1. The southern well is No. 1, the middle well is No. 2, and the northern well is No. 3. The depth to water and total depth of Well No. 3 were measured. The well was found to have 8.17 feet of water. This represents a volume of 5.3 gallons within the well casing. The well was pumped to dryness within a few minutes with a manual diaphragm pump. A copy of the sampling log is appended.

The lined runoff trough at the center of the north side of the cell was observed. No water was present.

July 9, 2003: Monitoring Well Sampling

On July 9, the three monitoring wells were sampled. No water was present in the runoff trough. Before sampling the wells, rinsate blanks were prepared by pouring laboratory-supplied, deionized water through the bailer that was later used for Well No. 1. These samples were labeled "RB." Water levels were measured in the three wells. The wells were each found to contain between 5.4 to 5.8 gallons of water within their casings. The wells were purged by bailing. An individual, dedicated bailer was used for each well. We removed approximately 18 gallons of water from Well No. 3, 10 gallons from Well No. 2 (bailed to dryness), and 25 gallons from Well No. 1. The water from all three wells was yellowish and some sediment was apparent in the water from Well No. 2.

The wells were then sampled by bailing. Samples were labeled W1, W2, and W3, corresponding to the wells. Duplicate samples were prepared from Well No. 1 and labeled W4. A copy of the sampling log is appended.

July 21, 2003: Runoff Observations

Rain showers occurred in the area in the early morning; therefore, we visited the site to check for runoff. The runoff trough was observed to be damp, but there was not enough water to sample.

July 22, 2003: Runoff Sampling

There had been showers and thundershowers overnight; therefore, we visited the site on the morning of July 22. There was water in the runoff trough to a depth of about 6 inches. The water was brownish in color. Samples were collected from the trough by dipping a disposable plastic cup. Samples were labeled R1. A copy of the sampling log is appended.

August 12, 2003: Runoff Sampling

Runoff was sampled on August 12. During sampling, approximately 4 inches of water was present in the through and had a slight "tea" color and bubbles on the surface.

August 14, 2003: Monitoring Well Sampling

On August 14, the three monitoring wells were sampled. No water was present in the runoff trough. Water levels were measured in the three wells. The wells were each found to contain between 5.3 to 5.9 gallons of water within their casings. The wells were purged by bailing. An individual, dedicated bailer was used for each well. We removed approximately 18 gallons of water from Well No. 3, 10 gallons from Well No. 2 (bailed to dryness), and 18 gallons from Well No. 1. The water from all three wells was yellowish.

The wells were then sampled by bailing. Samples were labeled W1, W2, and W3, corresponding to the wells. Duplicate samples were prepared from Well No. 3 and labeled W4. A copy of the sampling log is appended.

September 16, 2003: Runoff Sampling

Runoff water was sampled from the site on September 16. There was approximately 4 inches of water in the runoff trough and there was apparent algae growth.

September 17, 2003: Monitoring Well Sampling

On September 17, the three monitoring wells were sampled. No water was present in the runoff trough. Water levels were measured in the three wells. The wells were each found to contain between 4.6 to 4.8 gallons of water within their casings. The wells were purged by bailing. An individual, dedicated bailer was used for each well. We removed approximately 15 gallons of water from Well No. 3, 8 gallons from Well No. 2 (bailed to dryness), and 15 gallons from Well No. 1. The water from all three wells was yellowish.

The wells were then sampled by bailing. Samples were labeled W1, W2, and W3, corresponding to the wells. Duplicate samples were prepared from Well No. 1 and labeled W4. A copy of the sampling log is attached.

October 15, 2003: Monitoring Well and Runoff Sampling

On October 15, the three monitoring wells and the runoff trough were sampled. About 4 inches of water was present in the runoff trough. The cell had apparently been recently hydroseeded. In a telephone conversation, Craig Schantz of HNSE stated that the cell had been hydroseeded and fertilized on October 13.

Before sampling, water levels were measured in the three wells. The wells were each found to contain between 4.7 to 5.1 gallons of water within their casings. Well No. 1 was purged by bailing while Well No. 2 and Well No. 3 were purged using a peristaltic pump. We removed approximately 15 gallons of water from Well No. 3, 10 gallons from Well No. 2 (bailed to dryness), and 15 gallons from Well No. 1. The water from all three wells was yellowish.

Wells No. 1 and No. 2 were then sampled by bailing and Well No. 3 was sampled by peristaltic pump. Samples were labeled W1, W2, and W3, corresponding to the wells. Duplicate samples were prepared from Well No. 3 and labeled W4. A copy of the sampling log is attached.

January 29, 2004: Monitoring Well Sampling

On January 29, the three monitoring wells were sampled. The test cell and surrounding area were covered with 2 to 6 inches of snow and there was no runoff present in the runoff basin. Water levels were measured in each well prior to sampling. The wells were each found to have between 4.4 and 5.3 gallons of water. Well No. 1 was purged and sampled with a

hand bailer. Well No. 2 was purged using a peristaltic pump and sampled with a dedicated hand bailer. Well No. 3 was purged first with a bailer, and then the peristaltic pump. Sampling on Well No. 3 was done using a peristaltic pump. Approximately 15 gallons of water from Well No. 1, 9 gallons of water from Well No. 2 and 15 gallons of water from Well No. 3 were removed prior to sampling.

Duplicate samples were taken from well No. 3 and labeled W4. A copy of the sampling log is appended.

SAMPLE HANDLING AND ANALYSES

During sampling, bottles were filled for analyses of pesticides and PCB, semivolatile organic compounds, metals, and cyanide. As preservatives, the laboratory had added nitric acid to the bottles for metals and sodium hydroxide to the bottles for cyanide. The filled sample bottles were place in coolers with ice and shipped to Severn Trent Laboratories for analyses. Copies of the sampling logs and the chain-of-custody records for each sampling event are appended.

Severn Trent Laboratories analyzed samples for target analyte list (TAL) metals (USEPA Methods 6010B and 7470A), pesticides (USEPA Method 8081A), PCB (USEPA Method 8082), and semivolatile organic compounds (USEPA Method 8270C), and cyanide (USEPA Method 9012A).

MONITORING WELL RESULTS

A number of metals were quantified or estimated in samples from the wells, as well as several pesticides, semivolatile organic compounds, and cyanide. No PCB was detected. Positive results from analyses of the five rounds of well samples are summarized in Tables 1 through 5. Complete results for all sampling events are appended in electronic format. On the tables, results are compared to New Jersey ground water quality criteria and practical quantitation levels as presented in NJAC 7:9-6 and known as the ground water quality standards (GWQS).

In the first round (Table 1), concentrations of metals in water from Well No. 2 were generally higher than those in the other wells. This is probably related to the sediment observed in the samples from this well. In August, September and October rounds, results were generally consistent among the three wells. In the January sampling, some results

from Well No. 2 were higher, but not to the degree observed in the first round.

The rinsate blank showed only trace, estimated concentrations of common dissolved metallic ions (aluminum, barium, beryllium, calcium, potassium, manganese, sodium, and zinc) and bis(2-ethyl hexyl) phthalate (Table 1). Phthalates are used as plasticizers in plastic items and are common laboratory contaminants. Results were orders of magnitude below the findings in the wells or the standards against which the findings were compared.

Over the five rounds of sampling, concentrations from all three wells regularly exceeded GWQS for aluminum, arsenic, and nickel. With the exception of the first and fifth round findings for Well No. 2, as discussed above, no pattern was apparent in the results for these compounds over the study period. Iron also exceeded GWQS in Well No. 2 for all but the fourth sampling event. Results for Well No. 2 during the July sampling also show concentrations of cadmium, chromium, manganese and lead above GWQS (Table 1). All these compounds were below GWQS by month two and remained that way throughout.

No pesticides were detected above GWQS until the September sampling, when alpha-BHC was estimated to exceed GWQS in Well No. 2, dieldrin was estimated to exceed GWQS in all three wells, and 4,4'-DDD and 4,4'-DDT were detected above GWQS in Well No. 1 (Table 3). Neither alpha-BHC, 4,4'-DDD, nor 4,4'-DDT were detected in October samples, but dieldrin was estimated to exceed GWQS in all three wells (Table 4).

The only semivolatile organic compounds detected were phenolics. Phenol shows a possible increasing trend through the study period and is above GWQS for Well No. 1 and Well No. 2 in October (Table 4) and Well No. 2 in January (Table 5).

Cyanide was quantified in some samples. No finding exceeded GWQS.

RUNOFF RESULTS

A number of metals were quantified or estimated in samples from the runoff trough, as well as one pesticide, two semivolatile organic compounds, and cyanide. No PCB was detected. Positive results from analyses of four runoff samples are summarized in Table 6.

Because of the lack of appropriate regulatory standards for runoff and to provide consistency with the well results presented above, Table 5 includes GWQS for comparison with runoff results. Runoff samples exceeded GWQS for aluminum, iron, and manganese for the whole study period. However, concentrations of all three of these compounds decreased each month (except for manganese between September and October). Runoff samples exceeded GWQS for lead during the first two months of sampling. Lead concentrations also decreased through the study period. Arsenic concentrations exceeded GWQS during August and October. No pesticide, semivolatile, or cyanide results exceeded GWQS.

INFILTROMETER TEST

French & Parrello Associates were contracted by Hart Crowser, Inc. to perform a double-ring infiltrometer test to estimate the rate of infiltration at the PROPAT® test cell in Jersey City. Tests were performed on December 16 and 17, 2003 pursuant to procedures outlined in ASTM D 3385-94 (1994). Test results indicate that the average steady state flow rate is 6.75x10-6 centimeter per second. Naturally occurring clays typically exhibit values between 10-9 and 10-6 centimeters per second. Naturally occurring silts and tills typically exhibit values between 10-6 and 10-4 centimeters per second. Therefore, the value for PROPAT® ADM is consistent with low permeability materials at the overlap between these two broad soil classifications. The French & Parrello report is included as Appendix C.

TEMPERATURE MEASUREMENT

Information was gathered relative to the possible significance of the cycle of freezing and thawing on the material in the test cell. Information included temperature of the ambient air and temperature of the material within the test cell.

Air temperature readings from the National Weather Service station at Newark Airport were obtained for the period of October through April. This location is approximately 5 miles west of the test cell and at a similar elevation. Therefore, temperatures at the airport would be expected to be representative of those at the test cell. Daily high temperatures, as presented in Appendix D, ranged from 16°F to 88°F. Daily low temperatures ranged from 0°F to 61°F. The temperature did not rise above freezing on a total of 23 days. The longest period of sub-freezing

weather was from January 23 through January 31 (www.wunderground.com website, 2004).

On December 16, 2003, soil was observed and temperature was measured during the excavation to install the double ring infiltrometer. Frost was observed at the top of the soil, to a depth of less than an inch. The soil temperature at a depth of 12 to 18 inches was 57 F.

On January 7, 2004, soil temperatures were measured at five locations on the test cell with a Reotemp 12-inch soil thermometer. Temperatures were recorded for depths of 6 inches and 12 inches. Results are as follows:

	Temperature, F	
Test Cell Location	6-inch depth	12-inch depth
Top center, near Well 2	34	40
Top south, near Well 1	36	40
Top north, near Well 3	36	41
South slope	35	40
North slope	32	38

Note the temperature gradients between 6 inches and 12 inches. On January 29, the Reotemp thermometer was installed at a depth of 12 inches on the top of the test cell west of Well 1. Soil temperature was measured on that day as 30 F at 6 inches. Ongoing readings at 12 inches are as follows:

Date	Temperature, F
January 29	32
February 5	32
February 13	33
February 20	33
February 27	33
March 3	40
March 12	43
March 15	0
March 22	44
April 5	42
April 9	49
April 19	53

Note that even near the end of the most prolonged period of sub-freezing temperatures (late January), the soil temperature at a depth of 12 inches was 32°F. This, along with the information on temperature

gradients noted above, indicates that soil freezing occurred only to a depth of about 12 inches. The upper 6 inches is topsoil cover; therefore, only about 6 inches of amended dredge material was frozen.

CONCLUSIONS

Bulk chemical analyses reported in earlier work indicated that the dredged sediment and various individual, raw additives to be used with the sediment met most of the cleanup criteria listed by NJDEP for non-residential soils (NRDCSCC). Earlier analyses of synthetic leachates from various mixtures using various test procedures showed results below New Jersey Groundwater Quality Standards (GWQS) for semivolatile organics, pesticides, PCB, and most metals. Concentrations of aluminum, antimony, arsenic, copper, nickel, sodium, and iron were found to exceed GWQS in some leachate samples.

Results of recent sampling and analyses of water from the test cell indicate concentrations below GWQS for most analytes. We note that the GWQS are very stringent, since these are for Class II-A groundwaters, whose primary use is defined as potable water. Exceedances of GWQS for aluminum, arsenic, and nickel were noted in every round of sampling. This is consistent with earlier bench scale testing of various combinations of sediment and amendments. Iron also exceeded GWQS in one well for four of the sampling events. Results for that well, which showed evidence of more particulates than the other wells, also showed concentrations of cadmium, chromium, manganese and lead above GWQS during the first sampling round.

Pesticide results showed low concentrations with some variability. Several pesticides were detected above their respective GWQS for some wells during some sampling rounds, with no apparent pattern. The only semivolatile organic compounds detected were phenolics. Phenol was found above its GWQS in two wells, one during two sampling rounds and one during a single sampling round.

The low permeability of the material in the cell severely limits infiltration of precipitation. The liner below the cell prevents liquid from flowing out of it. These two factors suggest that there is little dilution of the water within the cell and that the average time that the water is in contact with the material is very long. Therefore, concentrations of analytes (especially those not prone to degradation) are expected to be higher in the cell water than those that would be found in a leachate that had less contact with the material.

The significance of runoff results is less clear. Concentrations of analytes in the runoff reflect some combination of material in the precipitation falling on the test cell, atmospheric fallout, material in the cover of the cell (which consists of topsoil), and material from the interior of the cell that may be transported by precipitation infiltrating the top of the cell then exiting the side slopes. In general, concentrations of analytes were below GWQS. Exceedances were noted for aluminum, iron, manganese, lead, and arsenic.

PROPAT®ADM was developed and is being evaluated for use as fill material at sites anticipated to have engineering and/or institutional controls and in geographical areas where groundwater quality concerns are not related to potable use. Examples of such sites are regulated landfills, brownfield sites, and certain industrial properties. Appropriate controls may include means to avoid direct contact of the material by humans and biota, such as caps of clean soils, pavement, or overlying buildings. Site access may also be limited by fences and the like. Institutional controls may include deed notices, declarations of environmental restriction, closure plans, and ongoing permit requirements. Based on these limitations and the data collected to date, the use of PROPAT®ADM with marginal exceedances of NRDCSCC will not pose a significant risk to human health or the environment.

In regard to groundwater, the exceedances of GWQS noted for some metals in concentrated leachates tested to date during this demonstration would be expected to be diluted and/or attenuated by natural conditions of the subsurface in actual applications. Based upon the data collected to date, the use of PROPAT®ADM as fill will not pose a significant risk to human health or the environment via groundwater.

FURTHER WORK

Monthly sampling of the wells was completed in October 2003. A quarterly monitoring schedule began in January 2004. The next quarterly sampling is scheduled for April 2004. After sufficient stabilization of leachate characteristics, or two years, whichever occurs first, sampling will be terminated. Runoff will be sampled upon occurrence of appropriate rainfall events. A final summary report will be prepared at the end of the monitoring program.

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Table 1 - Analytes Detected in Water Samples Collected from Test Cell on July 9, 2003.

	Sample Designations					
	W1	**W2**	**W3**	**W4**	**RB**	**GWQS**
Metals (ug/L)						
Silver	ND	5.1	ND	ND	ND	NA
Aluminum	613B	19800B	1130B	620B	19.0BJ	200
Arsenic	38.8	61.3	34.5	36.5	ND	8
Barium	602B	786B	510B	567B	1.2BJ	2000
Beryllium	ND	2.2BJ	ND	ND	0.45BJ	20
Calcium	1.12E6	1.36E6B	9.53E5	1.03E6	274BJ	NA
Cadmium	ND	5.9	ND	ND	ND	4
Cobalt	9.9J	20.9	9.2J	8.7J	ND	NA
Chromium	1.8J	152	1.4J	1.8J	ND	100
Copper	18.2J	414	9.5J	22.2J	ND	1000
Iron	124	27100	212	177	ND	300
Potassium	1.99E6	1.84E6	1.90E6	1.88E6	258J	NA
Magnesium	78.3J	7770	46.5J	94.6J	ND	NA
Manganese	1.7J	482	2.8J	2.3J	0.20J	50
Sodium	6.85E6	7.12E6	6.28E6	6.57E6	1150J	NA
Nickel	696	453	659	663	ND	100
Lead	ND	296	ND	ND	ND	10
Selenium	41.2	46.5	38.0	38.2	ND	50
Thallium	ND	ND	ND	ND	ND	10
Antimony	ND	8.9J	ND	ND	ND	20
Vanadium	30.7J	97.2	33.1J	31.3J	ND	NA
Zinc	6.7J	711	6.0J	8.5J	2.4J	5000
Mercury	ND	ND	ND	ND	ND	2
Pesticides (ug/L)						
Alpha-Chlordane	0.069P	0.11	0.086P	0.081P	ND	NA
Gamma-Chlordane	ND	ND	ND	ND	ND	NA
Alpha-BHC	ND	ND	ND	ND	ND	0.006
Delta-BHC	ND	ND	ND	ND	ND	NA
Dieldrin	ND	ND	ND	ND	ND	0.03
Endrin	ND	ND	ND	ND	ND	2

Table 1 continued

	Sample Designations					
	W1	**W2**	**W3**	**W4**	**RB**	**GWQS**
Pesticides (ug/L)						
Endrin aldehyde	ND	0.023JP	ND	ND	ND	NA
Endosulfan I	0.035JP	0.031JP	0.056P	0.044JP	ND	0.4
Endosulfan II	ND	ND	ND	ND	ND	NA
4-4′ DDD	ND	ND	ND	ND	ND	0.1
4-4″ DDT	ND	ND	ND	ND	ND	0.1
Heptachlor	0.058P	0.040JP	0.054P	0.058P	ND	0.4
Heptachlor epoxide	0.045JP	ND	0.053P	0.045JP	ND	0.2
Semivolatile organics (ug/L)						
2,4-Dimethylphenol	16J	16J	18J	20J	ND	100
2-Methylphenol	13J	14J	13J	15J	ND	NA
4-Methylphenol	500	500	510	590	ND	NA
Bis (2-ethylhexyl) phthalate	ND	12J	11J	ND	1.9J	30
Isophorone	ND	ND	ND	ND	ND	100
Phenol	1300	2700	1700	2000	ND	4000
4-Nitrophenol	ND	ND	ND	ND	ND	NA
Cyanide (ug/L)						
	6.6J	5.7J	104	ND	ND	200

Notes: B = Method blank contains analyte at a reportable level.

E = Scientific notation (e.g., $E^{6} = X\ 10^{6}$)

GWQS = The greater of New Jersey groundwater quality criteria and practical quantitation levels per NJAC 7:9-6.

J = Estimated result. Result is less than the reporting limit.

NA = Not available.

ND = Not detected.

P = Difference between original and confirmation analysis is greater than 40 percent.

Shaded results indicate exceedances of GWQS.

Duplicate samples from Well No. W1 were labeled W4.

Table 2 - Analytes Detected in Water Samples Collected from Test Cell on August 14, 2003.

	Sample Designations				
	W1	**W2**	**W3**	**W4**	**GWQS**
Metals (ug/L)					
Silver	1.4J	ND	ND	ND	NA
Aluminum	704B	746B	983B	957B	200
Arsenic	45.8	49.0	42.8	42.8	8
Barium	555B	610B	518B	497B	2000
Beryllium	ND	ND	ND	ND	20
Calcium	1.11E6	1.30E6	1.01E6	9.59E5	NA
Cadmium	ND	ND	ND	ND	4
Cobalt	5.6J	5.9J	5.7J	5.2J	NA
Chromium	1.4J	5.5	1.8J	1.9J	100
Copper	53.4	15.2J	6.1J	8.0J	1000
Iron	181B	619B	164B	160B	300
Potassium	2.01E6	1.96E6	2.01E6	1.91E6	NA
Magnesium	214JB	334JB	66.9JB	68.5JB	NA
Manganese	1.1J	11.2J	0.87J	0.96J	50
Sodium	6.34E6	6.73E6	5.76E6	5.87E6	NA
Nickel	541	368	529	514	100
Lead	ND	6.9	ND	ND	10
Selenium	40.0	48.9	39.9	36.7	50
Thallium	24.6J	ND	ND	ND	10
Antimony	ND	ND	ND	ND	20
Vanadium	32.5J	42.8J	36.4J	34.2J	NA
Zinc	25.4J	54.2J	ND	10.4J	5000
Mercury	ND	ND	ND	ND	2
Pesticides (ug/L)					
Alpha-Chlordane	0.016 JP	ND	0.021JP	0.031JP	NA
Gamma Chlordane	ND	ND	ND	ND	NA
Alpha-BHC	ND	ND	ND	ND	0.006
Delta-BHC	ND	ND	ND	ND	NA
Dieldrin	ND	ND	ND	ND	0.03
Endrin	ND	ND	ND	ND	2

Table 2 continued

	Sample Designations				
	W1	**W2**	**W3**	**W4**	**GWQS**
Pesticides (ug/L)					
Endrin Aldehyde	ND	ND	ND	ND	NA
Endosulfan I	ND	ND	ND	ND	0.4
Endosulfan II	ND	ND	ND	ND	NA
4-4'DDD	ND	ND	ND	ND	0.1
4-4' DDT	ND	ND	ND	ND	0.1
Heptachlor	ND	ND	ND	ND	0.4
Heptachlor epoxide	ND	ND	ND	ND	0.2
Semivolatile organics (ug/L)					
2,4-Dimethylphenol	ND	28J	ND	ND	100
2-Methylphenol	40J	24J	ND	ND	NA
4-Methylphenol	730	720	610	640	NA
Bis (2-ethylhexyl) phthalate	*ND*	*ND*	*ND*	*ND*	30
Isophorone	ND	ND	ND	ND	100
Phenol	2800	3800	2400	2600	4000
4-Nitrophenol	ND	ND	ND	ND	NA
Cyanide (ug/L)					
	14.0	20.0	14.0	15.0	200

Notes: B = Method blank contains analyte at a reportable level.

E = Scientific notation (e.g., $E^{6} = X\ 10^{6}$)

GWQS = The greater of New Jersey groundwater quality criteria and practical quantitation levels per NJAC 7:9-6.

J = Estimated result. Result is less than the reporting limit.

NA = Not available.

ND = Not detected.

P = Difference between original and confirmation analysis is greater than 40 percent.

Shaded results indicate exceedances of GWQS.

Duplicate samples from Well No. W3 were labeled W4.

Table 3 - Analytes Detected in Water Samples Collected from Test Cell on September 17, 2003.

	Sample Designations				
	W1	**W2**	**W3**	**W4**	**GWQS**
Metals (ug/L)					
Silver	ND	ND	ND	ND	NA
Aluminum	678B	633B	939 B	675 B	200
Arsenic	38.6	41.5	35.5	39.5	8
Barium	591B	659B	563 J	600 B	2000
Beryllium	0.31J,B	0.34 J,B	0.40 J, B	0.57 J, B	20
Calcium	1.17E6 B	1.42E6	1.13E6	1.19E6	NA
Cadmium	ND	ND	ND	ND	4
Cobalt	4.5J	5.0 J	4.9 J	4.4 J	NA
Chromium	1.0J	3.9 J	0.98 J	1.3 J	100
Copper	21.5J	28.2	5.7 B	18.7 J	1000
Iron	144	574	113	157	300
Potassium	1.98E6	1.93E6	2.04E6	2.03E6	NA
Magnesium	197J	526 J	134 J	163 J	NA
Manganese	0.80J	6.6 J	0.62 J	0.71 J	50
Sodium	6.77E6	7.22E6	6.60E6	6.81E6	NA
Nickel	493	369	495	505	100
Lead	ND	3.0	ND	ND	10
Selenium	40.8	48.9	42.0	41.1	50
Thallium	ND	ND	ND	ND	10
Antimony	ND	ND	ND	ND	20
Vanadium	25.0 J	31.6 J	26.4 J	25.3 J	NA
Zinc	10.9 J,B	40.9 B	13.1 J, B	7.6 J, B	5000
Mercury	ND	ND	ND	ND	2
Pesticides (ug/L)					
Alpha-Chlordane	0.36	0.23 P	0.044 B, P	0.061 P	NA
Gamma-Chlordane	0.13 P	ND	0.044 B, P	0.055 P	NA
Alpha-BHC	ND	0.034 B, P	ND	ND	0.006
Delta-BHC	*ND*	*ND*	*ND*	*0.24*	*NA*
Dieldrin	0.23 P	0.087 P	0.081 P	0.10 P	0.03
Endrin	0.96	ND	0.13 P	0.43 P	2

Table 3 continued

	Sample Designations				
	W1	**W2**	**W3**	**W4**	**GWQS**
Pesticides (ug/L)					
Endrin aldehyde	ND	0.17	ND	ND	NA
Endosulfan I	ND	ND	ND	ND	0.4
Endosulfan II	0.30 P	0.13 P	ND	ND	NA
4,4'-DDD	0.39	ND	ND	ND	0.1
4,4'-DDT	0.26	0.018 B, P	0.023 B	ND	0.1
Heptachlor	ND	ND	ND	ND	0.4
Heptachlor epoxide	0.050 P	0.17	ND	ND	0.2
Semivolatile organics (ug/L)					
2,4-Dimethylphenol	ND	ND	ND	ND	100
2-Methylphenol	6.5 B	ND	ND	ND	NA
4-Methylphenol	670	570 B	640	790	NA
Bis (2-ethylhexyl) phthalate	ND	ND	ND	ND	30
Isophorone	7.7 B	ND	ND	ND	100
Phenol	3100	3800	3200	3600	4000
4-Nitrophenol	ND	ND	ND	ND	NA
Cyanide (ug/L)					
	ND	4.0J	8.0J	5.0J	200

Notes: B = Method blank contains analyte at a reportable level.

E = Scientific notation (e.g., $E^6 = X\ 10^6$)

GWQS = The greater of New Jersey groundwater quality criteria and practical quantitation levels per NJAC 7:9-6.

J = Estimated result. Result is less than the reporting limit.

NA = Not available.

ND = Not detected.

P = Difference between original and confirmation analysis is greater than 40 percent.

Shaded results indicate exceedances of GWQS.

Duplicate samples from Well No. W1 were labeled W4.

Table 4 - Analytes Detected in Water Samples Collected from Test Cell on October 15, 2003.

	Sample Designations				
	W1	**W2**	**W3**	**W4**	**GWQS**
Metals (ug/L)					
Silver	ND	ND	ND	ND	NA
Aluminum	702	345	586	603	200
Arsenic	39.0	44.0	38.6	36.9	8
Barium	628	674	628	629	2000
Beryllium	ND	ND	ND	ND	20
Calcium	1.16E6	1.43E6	1.26E6	1.26E6	NA
Cadmium	ND	ND	ND	ND	4
Cobalt	4.0J	4.0 J	4.8 J	4.8 J	NA
Chromium	3.6J	2.2 J	0.72 J	1.2 J	100
Copper	19.4J	19.2 J	8.4 J	7.1 J	1000
Iron	152	291	62.6 J	68.0 J	300
Potassium	1.97E6	1.94E6	2.06E6	2.07E6	NA
Magnesium	155J	419 J	121 J	105 J	NA
Manganese	1.3J	4.2 J	0.62 J	0.51 J	50
Sodium	7.10E6	7.52E6	7.04E6	7.12E6	NA
Nickel	474	367	416	425	100
Lead	ND	ND	ND	ND	10
Selenium	36.5	44.0	47.3	43.9	50
Thallium	ND	ND	ND	ND	10
Antimony	ND	ND	ND	ND	20
Vanadium	24.5J	30.8 J	26.8 J	27.1 J	NA
Zinc	7.2J	36.4	4.7J	7.8 J	5000
Mercury	ND	ND	ND	ND	2
Pesticides (ug/L)					
Alpha-Chlordane	ND	ND	ND	ND	NA
Gamma-Chlordane	ND	ND	ND	ND	NA
Alpha-BHC	ND	ND	ND	ND	0.006
Delta-BHC	ND	ND	ND	ND	NA
Dieldrin	0.09 P	0.071 P	0.093 P	0.071 P	0.03
Endrin	ND	ND	ND	ND	2

Table 4 continued

	Sample Designations				
	W1	**W2**	**W3**	**W4**	**GWQS**
Pesticides (ug/L)					
Endrin aldehyde	ND	ND	ND	ND	NA
Endosulfan I	0.037J, P	ND	0.039J, P	0.027J, P	0.4
Endosulfan II	ND	ND	ND	ND	NA
4,4'-DDD	ND	ND	ND	ND	0.1
4,4'-DDT	ND	ND	ND	ND	0.1
Heptachlor	ND	ND	ND	ND	0.4
Heptachlor epoxide	0.03J,P	ND	0.027 J, P	ND	0.2
Semivolatile organics (ug/L)					
2,4-Dimethylphenol	ND	ND	ND	ND	100
2-Methylphenol	ND	ND	ND	ND	NA
4-Methylphenol	700 J	550 J	420J	490	NA
Bis (2-ethylhexyl) phthalate	ND	ND	ND	ND	30
Isophorone	ND	ND	ND	ND	100
Phenol	4300J	4600 J	3000	3400	4000
4-Nitrophenol	ND	ND	ND	ND	NA
Cyanide (ug/L)					
	ND	5.0 J	ND	ND	200

Notes: E = Scientific notation (e.g., $E^{6} = X\ 10^{6}$)

GWQS = The greater of New Jersey groundwater quality criteria and practical quantitation levels per NJAC 7:9-6.

J = Estimated result. Result is less than the reporting limit.

NA = Not available.

ND = Not detected.

P = Difference between original and confirmation analysis is greater than 40 percent.

Shaded results indicate exceedances of GWQS.

Duplicate samples from Well No. W3 were labeled W4.

Table 5 - Analytes Detected in Water Samples Collected from Test Cell on January 29, 2004.

	Sample Designations				
	W1	**W2**	**W3**	**W4**	**GWQS**
Metals (ug/L)					
Silver	ND	2.1 J	ND	ND	NA
Aluminum	368	1940	500	486	200
Arsenic	41.3	66.3	33.0	33.8	8
Barium	591	543	596	589	2000
Beryllium	ND	0.42 J,B	ND	ND	20
Calcium	1.52E6	1.69E6	1.28E6	1.27E6	NA
Cadmium	ND	ND	ND	ND	4
Cobalt	2.3 J	4.4 J	2.6 J	2.2 J	NA
Chromium	1.6 J	7.5	0.98 J	1.1 J	100
Copper	49.0	133	2.6 J	2.5 J	1000
Iron	86.2 J	4150	45.5 J	25.6 J	300
Potassium	1.88E6 MI	1.81E6	1.97E6	1.91E6	NA
Magnesium	1210 J	2510 J	101 J	97.5 J	NA
Manganese	12.8 J,B,E	18.1 J	0.29 J,B	0.29 J,B	50
Sodium	7.08E6	7.50E6	6.84E6	6.78E6	NA
Nickel	261	339	344	329	100
Lead	ND	5.0	ND	ND	10
Selenium	26.4	38.8	34.5	30.7	50
Thallium	ND	ND	ND	ND	10
Antimony	ND	4.6 J	ND	ND	20
Vanadium	19.7 J	48.0 J	20.2 J	19.8 J	NA
Zinc	6.9 J	133	2.5 J	3.2 J	5000
Mercury	ND	ND	ND	ND	2
Pesticides (ug/L)					
Alpha-Chlordane	ND	ND	ND	ND	NA
Gamma-Chlordane	0.021 J,P	ND	0.021 J,P	0.017 J,P	NA
Alpha-BHC	ND	ND	ND	ND	0.006
Delta-BHC	ND	ND	ND	ND	NA
Dieldrin	ND	ND	ND	ND	0.03
Endrin	ND	ND	ND	ND	2

Table 5 continued

	Sample Designations				
	W1	**W2**	**W3**	**W4**	**GWQS**
Pesticides (ug/L)					
Endrin aldehyde	ND	ND	ND	ND	NA
Endosulfan I	0.023 J,P	0.016 J,P	ND	ND	0.4
Endosulfan II	ND	ND	ND	ND	NA
4,4'-DDD	ND	ND	ND	ND	0.1
4,4'-DDT	ND	ND	ND	ND	0.1
Heptachlor	ND	ND	ND	0.024 J,P	0.4
Heptachlor epoxide	0.039 J,P	0.022 J,P	0.031 J,P	0.035 J,P	0.2
Semivolatile organics (ug/L)					
2,4-Dimethylphenol	21 J	19 J	16 J	16 J	100
2-Methylphenol	15 J	15 J	11 J	11 J	NA
4-Methylphenol	570 C	570 C	590 E	590 C	NA
Bis (2-ethylhexyl) phthalate	6.6 J	ND	ND	ND	30
Isophorone	ND	ND	9.8 J	ND	100
Phenol	3200	4600	3700	3900	4000
4-Nitrophenol	ND	ND	ND	ND	NA
Cyanide (ug/L)					
	16.0	17.0	10.0	10.0	200

Notes: E = Scientific notation (e.g., $E^{6} = X\ 10^{6}$)

C= Estimated result. Result concentration exceeds the calibration range.

MI= Matrix Interference

B= Method blank contamination. The associated method blank contains the target analyte at a reportable level.

GWQS = The greater of New Jersey groundwater quality criteria and practical quantitation levels per NJAC 7:9-6.

J = Estimated result. Result is less than the reporting limit.

NA = Not available.

ND = Not detected.

P = Difference between original and confirmation analysis is greater than 40 percent.

Shaded results indicate exceedances of GWQS.

Duplicate samples from Well No. W3 were labeled W4.

Table 6 - Analytes Detected in Runoff Samples Collected from Test Cell.

	Sampling Date				
	7/22/03	**8/12/03**	**9/16/03**	**10/15/03**	**GWQS**
Metals (ug/L)					
Silver	0.81J	ND	ND	ND	NA
Aluminum	5810B	1720BM	394B	225	200
Arsenic	6.1J	8.5J	4.6J	9.5J	8
Barium	125BJ	229B	54.2J,B	57.6J	2000
Beryllium	0.61J	3.0BJ	0.66J,B	ND	20
Calcium	1.84E5	4.28E5	1.79E5 B	1.73E5	NA
Cadmium	0.99J	ND	ND	ND	4
Cobalt	4.0J	2.9J	0.81J	1.3J	NA
Chromium	13.9	4.2BJ	3.5J	2.6J	100
Copper	52.0	32.0	30.7	45.8	1000
Iron	7830	2270B	510	332	300
Potassium	4.65E4	2.39E5	3.77E4	6.62E4	NA
Magnesium	1.28E4	3.3E4	1.11E4	1.58E4	NA
Manganese	292	216B	92.5	184	50
Sodium	2.19E5	1.19E6	1.38E5	1.53E5	NA
Nickel	11.6J	13.3B	4.8J	5.8J	100
Lead	73.3	18.4	7.2	5.1	10
Antimony	ND	3.4J	4.1J	4.3J	20
Selenium	ND	5.0	3.0J	2.4J	50
Vanadium	18.4J	11.8BJ	5.9J	6.1J	NA
Zinc	106	23.6J	15.6J,B	17.6J	5000
Mercury	0.16J	ND	ND	0.16J	2
Pesticides (ug/L)					
Dieldrin	0.020JP	ND	ND	ND	0.03
***Semivolatile* organics (ug/L)**					
Bis (2-ethylhexyl) phthalate	8.2J	6.0J	1.2J,B	ND	30
4- Nitrophenol	1.2J	ND	ND	ND	NA
Cyanide (ug/L)					
	5.0J	5.0J	4.0J	4.0J	200

Notes: B = Method blank contains the analyte at a reportable concentration.

E = Scientific notation (e.g., $E^6 = X\ 10^6$)

Table 6 continued

GWQS = The greater of New Jersey groundwater quality criteria and practical quantitation levels per NJAC 7:9-6.

J = Estimated result. Result is less than the reporting limit.

M = Matrix interference.

NA = Not available.

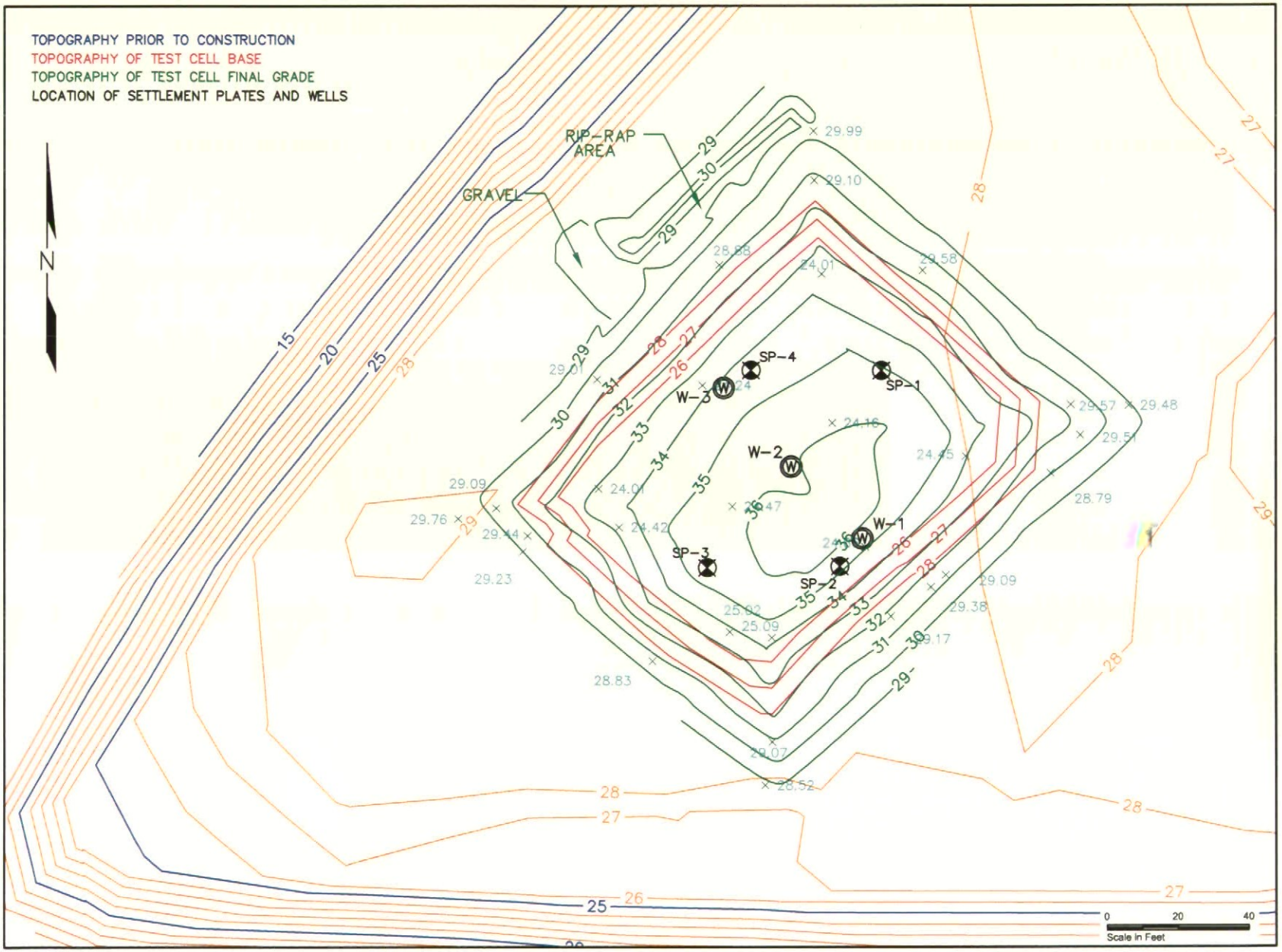
ND = Not detected.

P = Difference between original and confirmation analysis is greater than 40 percent.

Shaded results indicate exceedances of GWQS.

492428005.dwg RD 1=1

DEMONSTRATION TEST CELL TOPOGRAPHY



Note: Base map prepared from survey taken by LGA Engineering, Inc. on November 6 & 7, 2003. Topographies of the test cell base and final grade were surveyed by LGA on April 11, 2003 and May 7, 2003, respectively. Locations of the site instrumentation were also surveyed on May 7, 2003.

HARTCROWSER

4924-28-03 07/03

Figure 4

APPENDIX A
LOGS FOR WELL SAMPLING EVENTS

Water Sampling Data

Project HNSG TEST CELL Job No. 4924-28

Field Rep. A. ANDERSON, R. DESROSIERS Date 7/1/03

SAMPLE POINT	DATE SAMPLED	WELL DEPTH IN FEET	DEPTH TO WATER IN FEET	DEPTH OF WATER IN FEET	METHOD OF SAMPLING	COMMENTS	Temp	pH	CASING VOLUME IN GALLONS	PURGE VOLUME IN GALLONS (EST)
WELL #3 (N)	7/1	14.66	6.90 - 0.41 = 6.49	14.66 - 6.49 = 8.17	NA	DEPTH MEASUREMENTS ONLY. PUMPED DRY W/ BILGE PUMP.			5.3	✓
WELL #2 (CENTER	✓				✓					
WELL #1 (S)	✓				✓					

CASING VOLUME: FOR 2" ID WELL = 0.16 GAL/FT
FOR 4" ID WELL = 0.65 GAL/FT
FOR 6" ID WELL = 1.5 GAL/FT

Water Sampling Data

Project: INSE TEST CELL Job No. 4924-28

Field Rep. A. ANDERSON / E. MULLER Date 7/9/03

SAMPLE POINT	DATE SAMPLED	WELL DEPTH IN FEET	DEPTH TO WATER IN FEET	DEPTH OF WATER IN FEET	METHOD OF SAMPLING	COMMENTS	Temp	pH	CASING VOLUME IN GALLONS	PURGE VOLUME IN GALLONS (EST)
W3	7/9/03	14.68	7.60 − 1.17 = 6.43	14.68 − 6.43 = 8.25	BAILER	NORTHERNMOST WELL H2O YELLOWISH SULFUR ODOR BAILED TO ≈10"			5.4	18
W2	11	14.66	6.40 − 0.54 = 5.81	14.66 − 5.91 = 8.85	BAILER	SOME SILT BAILED TO DRY			5.8	10 BAILED DRY
W1	11	14.69	6.70 − 0.71 = 5.99	14.69 − 5.99 = 8.70	BAILER	SOUTHERNMOST WELL			5.6	25
W4	11	/	/	/	BAILER	DUPLICATE OF W1				/

CASING VOLUME: FOR 2" ID WELL = 0.16 GAL/FT
FOR 4" ID WELL = 0.65 GAL/FT
FOR 6" ID WELL = 1.5 GAL/FT

Water Sampling Data

Project HNSE TEST CELL Job No. 4924-28-04

Field Rep. A.R. ANDERSON Date 7/22/03

SAMPLE POINT	DATE SAMPLED	~~WELL~~ DEPTH IN FEET	DEPTH TO WATER IN FEET	DEPTH OF WATER IN FEET	METHOD OF SAMPLING	COMMENTS	Temp	pH	CASING VOLUME IN GALLONS	PURGE VOLUME IN GALLONS (EST)
RUNOFF TROUGH	7/22	NA	NA	0.5	BAIL WITH PLASTIC CUP	SAMPLE ID "R1"				

CASING VOLUME: FOR 2" ID WELL = 0.16 GAL/FT
FOR 4" ID WELL = 0.65 GAL/FT
FOR 6" ID WELL = 1.5 GAL/FT

Water Sampling Data

Project HNSE TEST CELL Job No. 4924-28

Field Rep. A. ANDERSON / E. GORLESKI Date 8/14/03

SAMPLE POINT	DATE SAMPLE D	WELL DEPTH IN FEET	DEPTH TO WATER IN FEET	DEPTH OF WATER IN FEET	METHOD OF SAMPLING	COMMENTS	Temp	pH	CASING VOLUME IN GALLONS	PURGE VOLUME IN GALLONS (EST)
W3	8/14	14.68	6.80-0.72 = 6.08	8.60	BAILER	YELLOWISH			5.6	18
W2	8/14	14.70	7.20-0.71 = 6.49	8.21	BAILER	YELLOWISH, SLIGHT SILT BAILED DRY			5.3	10
W1	8/14	14.70	6.60-0.93 = 5.67	9.03	BAILER	YELLOWISH			5.9	18
W4	11	/	/	/	11	DUPLICATE OF W3			/	/

CASING VOLUME: FOR 2" ID WELL = 0.16 GAL/FT
FOR 4" ID WELL = 0.65 GAL/FT
FOR 6" ID WELL = 1.5 GAL/FT

14.68 8.2 .65 5.3 9.0 1.5

7.20 .71 6.49 14.20 6.49 8.21

6.60 .93 5.67 14.70 5.67 9.03

5.80 .72 5.08 14.68 6.08 8.60

8.6 .65 5.6 4.30 5.16 5590

9.03 .65 5.9 4.51 5.41 5.86

Water Sampling Data

Project HNSE TEST CELL Job No. 492428-04

Field Rep. A. ANDERSON, E. GORLESKI Date 9/17/03

SAMPLE POINT	DATE SAMPLE D	WELL DEPTH IN FEET	DEPTH TO WATER IN FEET	DEPTH OF WATER IN FEET	METHOD OF SAMPLING	COMMENTS	Temp	pH	CASING VOLUME IN GALLONS	PURGE VOLUME IN GALLONS (EST)
W1	9/17	14.67	8.0 - 0.79 = 7.21	14.67 - 7.21 = 7.46	BAIL				4.8	15
W2	"	14.65	8.2 - 0.62 = 7.58	14.65 - 7.58 = 7.07	"	BAILED TO ≈ 4"			4.6	8
W3	"	14.67	8.3 - 0.72 = 7.58	14.67 - 7.58 = 7.09	"				4.6	15
W4	"				"	DUPLICATE OF W1				

CASING VOLUME: FOR 2" ID WELL = 0.16 GAL/FT
(FOR 4" ID WELL = 0.65 GAL/FT)
FOR 6" ID WELL = 1.5 GAL/FT

Water Sampling Data

Project HUGO NEU SCHWEIZER EAST Job No. 492428-04

Field Rep. A. ANDERSON, E. GORLESKI Date 10/15/03

SAMPLE POINT	DATE SAMPLE D	WELL DEPTH IN FEET	DEPTH TO WATER IN FEET	DEPTH OF WATER IN FEET	METHOD OF SAMPLING	COMMENTS	Temp	pH	CASING VOLUME IN GALLONS	PURGE VOLUME IN GALLONS (EST)
W1	10/15	14.70	7.5 - 0.69 6.81	7.89	BAILER	PURGED & BAILER			5.1	15
W2	11	14.68	8.0 - 0.60 7.40	7.28	BAILER	PURGED & PERISTALTIC PUMP. PURGED DRY			4.7	10
W3	11	14.70	7.5 - 0.45 7.05	7.65	PERISTALTIC PUMP	PURGED & PERISTALTIC PUMP			5.0	15

CASING VOLUME: FOR 2" ID WELL = 0.16 GAL/FT
FOR 4" ID WELL = 0.65 GAL/FT
FOR 6" ID WELL = 1.5 GAL/FT

Water Sampling Data

Project HNSE TEST CELL Job No. 492428-05

Field Rep. A. ANDERSON, E. GORLESKI Date 1/29/04

SAMPLE POINT	DATE SAMPLED	WELL DEPTH IN FEET	DEPTH TO WATER IN FEET	DEPTH OF WATER IN FEET	METHOD OF SAMPLING	COMMENTS	Temp	pH	CASING VOLUME IN GALLONS	PURGE VOLUME IN GALLONS (EST)
W1	1/29	14.67	7.6-1.01 =6.59	8.08		PURGED & BAILER SAMPLED & BAILER			5.25	15
W2	1/29	14.67	8.1-0.7 = 7.3	7.37		PURGED & PER. PUMP SAMPLED & BAILER			4.8	9
W3	11	14.66	8.5-0.55 =7.95	6.71		PURGED & BAILER, THEN PUMP SAMPLED & PUMP			4.4	15
W4	11	—	—	—		DUPLICATE OF W3			—	—

CASING VOLUME: FOR 2" ID WELL = 0.16 GAL/FT
FOR 4" ID WELL = 0.65 GAL/FT
FOR 6" ID WELL = 1.5 GAL/FT

CLEAR, BREEZY 20-25°
INSTALLED THERMOMETER
SNOW ON GROUND

APPENDIX B
CHAIN OF CUSTODY DOCUMENTS FOR SAMPLES

Chain of Custody Record

SEVERN TRENT STL

Severn Trent Laboratories, Inc.

STL Pittsburg..
450 William Pitt Way, Bldg. 6
Pittsburgh, PA 15238

STL-4124 (0901)

Client: HART CROWSER 429851	Project Manager: A. ANDERSON / R. DESROSIERS	Date: 7/9/03	Chain of Custody Number: 186997
Address: 150 WARREN ST	Telephone Number (Area Code)/Fax Number: 201-985-8100 / 201-985-8182	Lab Number:	Page 1 of 1
City: JERSEY CITY; State: NJ; Zip Code: 07302	Site Contact:	Lab Contact: C. GAMBER	
Project Name and Location (State): HNSE JERSEY CITY, NJ	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.: QUOTE # 53708			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H_2SO_4	HNO_3	HCl	NaOH	ZnAc/NaOH	Analysis: PEST/PCB	BNA	TAL METALS	CN	Special Instructions/ Conditions of Receipt
W1	7/9			X			4		1		1		X	X	X	X	
W2	11			X			4		1		1		X	X	X	X	
W3	11			X			4		1		1		X	X	X	X	
W4	11			X			4		1		1		X	X	X	X	
RB	11			X			4		1		1		X	X	X	X	
2 COOLERS																	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☒ 21 Days ☐ Other _____

QC Requirements (Specify)

1. Relinquished By: A Anderson	Date: 7/9/03	Time: 16:00	1. Received By	Date	Time
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

4924-28

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT STL

Severn Trent Laboratories, Inc.

STL Pittsburgh
450 William Pitt Way, Bldg. 6
Pittsburgh, PA 15238

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
HART CROWSER	A.R. ANDERSON	7/22/03	186996
Address 150 WARREN ST	**Telephone Number (Area Code)/Fax Number** 201-985-8100 / 201-985-8182	**Lab Number**	**Page** 1 of 1
City JERSEY CITY **State** NJ **Zip Code** 07302	**Site Contact**	**Lab Contact** C. GAMBER	
Project Name and Location (State) HNSE JERSEY CITY, NJ	**Carrier/Waybill Number**		
Contract/Purchase Order/Quote No. QUOTE #53708			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H_2SO_4	HNO_3	HCl	NaOH	ZnAc/NaOH	Analysis: BNA	PEST/PCB	TAL METALS	CN	Special Instructions/ Conditions of Receipt
R1	7/22			X			4		1		1		X	X	X	X	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☒ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By A. Anderson	7/22/03		1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

HC 4924-28-04

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT STL

Severn Trent Laboratories, Inc.

STL Pittsburgh
450 William Pitt Way, Bldg. 6
Pittsburgh, PA 15238

STL-4124 (0901)

Client: HART CROWSER	Project Manager: A. ANDERSON	Date: 8/12/03	Chain of Custody Number: 186999
Address: 150 WARREN ST	Telephone Number (Area Code)/Fax Number: 201-985-8100 / 201-985-8182	Lab Number:	Page 1 of 1
City: JERSEY CITY / State: NJ / Zip Code: 07302	Site Contact:	Lab Contact: C. GAMBER	
Project Name and Location (State): HNSE NJ	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.: QUOTE # 53708			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	Analysis: PEST/PCB	BNA	METALS	CYANIDE
R1 (2 BOTTLES)	8/12			X			X						X			
R1 (2 BOTTLES)	11			X			X							X		
R1	11			X					X						X	
R1	11			X							X					X

Special Instructions/ Conditions of Receipt

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☒ 21 Days ☐ Other _____

QC Requirements (Specify)

1. Relinquished By: A Anderson	Date: 8/12/03	Time:	1. Received By	Date:	Time:
2. Relinquished By	Date:	Time:	2. Received By	Date:	Time:
3. Relinquished By	Date:	Time:	3. Received By	Date:	Time:

Comments:

DISTRIBUTION: WHITE - Returned to Client with Report: CANARY - Stays with the Sample: PINK - Field Copy

Chain of Custody Record

Severn Trent Laboratories, Inc.

STL Pittsburg..
450 William Pitt Way, Bldg. 6
Pittsburgh, PA 15238

STL-4124 (0901)

Client: HART CROWSER	Project Manager: A. ANDERSON	Date: 8/19/03	Chain of Custody Number: 186998
Address: 150 WARREN ST	Telephone Number (Area Code)/Fax Number: 201-985-8100 / 201-985-8182	Lab Number:	Page 1 of 1
City: JERSEY CITY — State: NJ — Zip Code: 07302	Site Contact:	Lab Contact: C. GAMBER	
Project Name and Location (State): HNSE	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.: QUOTE # 53708			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed	Soil	Containers & Preservatives: Unpres	H_2SO_4	HNO_3	HCl	NaOH	ZnAc/NaOH	Analysis: PEST/PCB	BNA	METALS	CN	Special Instructions/ Conditions of Receipt
W1	8/14			X			4		1		1		X	X	X	X	
W2	"			X			4		1		1		X	X	X	X	
W3	"			X			4		1		1		X	X	X	X	
W4	"			X			4		1		1		X	X	X	X	
2 COOLERS																	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☒ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: A Anderson	8/19/03		1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT STL

Severn Trent Laboratories, Inc.

STL Pittsburgh
450 William Pitt Way, Bldg. 6
Pittsburgh, PA 15238

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
HART CROWSER	A.R. ANDERSON	9/16/03	185665
Address 150 WARREN ST	**Telephone Number (Area Code)/Fax Number** 201-985-8100 / 201-985-8182	**Lab Number**	**Page** 1 of 1
City JERSEY CITY **State** NJ **Zip Code** 07302	**Site Contact**	**Lab Contact** C. GAMBER	
Project Name and Location (State) HNSE JERSEY CITY, NJ	**Carrier/Waybill Number**		
Contract/Purchase Order/Quote No. QUOTE # 53708			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed	Soil	Containers & Preservatives: Unpres	H_2SO_4	HNO_3	HCl	NaOH	ZnAc/NaOH	Analysis: BNA	PEST/PCB	TAL METALS	CN	Special Instructions/ Conditions of Receipt
R1	9/16			X			4		1		1		X	X	X	X	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☒ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By A Anderson	9/16/03		1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

HC 492428-04

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

Severn Trent Laboratories, Inc.

STL Pittsburgh
450 William Pitt Way, Bldg. 6
Pittsburgh, PA 15238

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
HART CROWSER	A. ANDERSON	9/17/03	185664
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page** 1 of 1
811 CHURCH RD, SUITE 236	856-773-4101 / 856-773-4106		
City / **State** / **Zip Code**	**Site Contact**	**Lab Contact**	
CHERRY HILL / NJ / 08002		G. GAMBER	
Project Name and Location (State)	**Carrier/Waybill Number**		
HNSE JERSEY CITY			
Contract/Purchase Order/Quote No.			
QUOTE # 53708			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: PEST/PCB	BNA	TAL METALS	CN	Special Instructions/ Conditions of Receipt
W1	9/17			X			4		1		1		X	X	X	X	
W2	"			X			4		1		1		X	X	X	X	
W3	"			X			4		1		1		X	X	X	X	
W4	"			X			4		1		1		X	X	X	X	
2 COOLERS																	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: A. Anderson	9/17		1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

STL Severn Trent Laboratories, Inc.

STL Pittsburgh
450 William Pitt Way, Bldg. 6
Pittsburgh, PA 15238

STL-4124 (0901)

Client: HART CROWSER 555671	Project Manager: A. ANDERSON / E. GORLESKI	Date: 10/15/03	Chain of Custody Number: 188596
Address: 811 CHURCH RD	Telephone Number (Area Code)/Fax Number: 201-385-3423 / 856-773-4101	Lab Number:	Page 1 of 1
City: CHERRY HILL; State: NJ; Zip Code: 08002	Site Contact:	Lab Contact:	
Project Name and Location (State): HNSE (NJ)	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.: 53708			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed	Sol	Containers & Preservatives: Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: PEST/PCB	BNA	METALS	CN	Special Instructions/ Conditions of Receipt
W1	10/15/03			X			4		1		1		X	X	X	X	
W2	"			X			4		1		1		X	X	X	X	
W3	"			X			4		1		1		X	X	X	X	
W4	"			X			4		1		1		X	X	X	X	
R1	"			X			4		1		1		X	X	X	X	
2 COOLERS																	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☒ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: A. Anderson	10/15/03		1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT STL

Severn Trent Laboratories, Inc.

STL Pittsburgh
450 William Pitt Way, Bldg. 6
Pittsburgh, PA 15238

TL-4124 (0901)

Client: HART CROWSER (555671)	Project Manager: A. ANDERSON	Date: 1/29/04	Chain of Custody Number: 182272
Address: 811 CHURCH RD	Telephone Number (Area Code)/Fax Number: 201-385-3425 / 201-385-0068	Lab Number: 53708	Page 1 of 1
City: CHERRY HILL — State: NJ — Zip Code: 08002	Site Contact	Lab Contact: C. GAMBER	
Project Name and Location (State): HNSE JERSEY CITY, NJ	Carrier/Waybill Number		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: PEST/PCB	BNA	METALS	CN
MW1	1/29			X			4		1		1		X	X	X	X
MW2	1/29			X			4		1		1		X	X	X	X
MW3	1/29			X			4		1		1		X	X	X	X
MW4	1/29			X			4		1		1		X	X	X	X
2 COOLERS																

Special Instructions/ Conditions of Receipt

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☒ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1 Relinquished By: A. Anderson	1/29/04		1. Received By		
2 Relinquished By			2. Received By: Patrick R. Dunn	1/30/04	0950
3 Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

APPENDIX C
FRENCH AND PARRELLO INFILTROMETER TEST REPORT

FRENCH & PARRELLO
ASSOCIATES, P.A.
CONSULTING ENGINEERS
Since 1974

670 NORTH BEERS STREET BLDG. #3
HOLMDEL, NEW JERSEY 07733
(732) 888-7700
http://www.fpawww.com
email: fpa@fpawww.com

December 19, 2003

LAURENCE E. FRENCH, P.E.
ARGO T. PARRELLO, P.E.
JAMES B. HELLER, P.E.
JOSEPH M. EDWARDS, P.E.
SCOTT D. WATKINS, P.E.

Andy Anderson
Hart Crowser
811 Church Road – Suite 236
Cherry Hill, NJ 08002

Re: Field Infiltrometer Testing Services
Hugo Neu Schnitzer East
Port Liberty Test Site
Jersey City, New Jersey
FPA No 02F084AC1

Gentlemen:

Attached please find copies of reports describing the daily field activity observed by our representatives on December 16 & 17, 2003 at the referenced project site.

The attached test results indicate that the average steady state flow rate of 4×10^{-4} cm/min (6.75×10^{-6} cm/sec) was observed. This infiltrometer rate can be used in assessing the expected flows through this test cell.

Should you have any questions concerning any of the items discussed in these reports, please do not hesitate to contact us.

Very truly yours,

FRENCH & PARRELLO ASSOCIATES, P.A.

David I. Calnan, P.E.
Department Manager
Field & Laboratory Services

DIC/jc

Attachments

FPA

FRENCH & PARRELLO
ASSOCIATES, P.A.
CONSULTING ENGINEERS

670 North Beers Street, Building No. 3
Holmdel, New Jersey 07733
Phone: (732) 888-7700

Date: 12/16/03	***Job No.***: 03F084A
Project: Hugo Neu Schnitzer	
Location: Jersey City, NJ	
Contractor: Hart Crowser	***Owner:***
Weather: Sunny	***Temp***: 30's – 50's
Present at Site: Ryan Tumpey, Adam French	
Andrew Anderson – Hart Crowser	

TO: _____

_____

_____

_____

FIELD REPORT

THE FOLLOWING WAS NOTED:

The writer and Adam French of FPA arrived onsite and met Andrew Anderson of Hart Crowser. Mr. Anderson pointed out the location that the double-ring infiltometer was to be placed and was present throughout the setup of the test equipment. The writer and Mr. French proceeded to remove approximately 6" of topsoil in a four foot by four foot section along the centerline on top of the test cell near the middle of the three test wells. The underlying material was then leveled and trenches approximately 1" wide were dug for the two rings. The inner ring was sunk 2.5" down from the leveled grade and the outer ring was sunk 5". Both rings were then seated and leveled and the trenches were backfilled and recompacted by hand using a mix of the original material and a bentonite slurry. A representative soil sample of the material to be tested was taken from an adjacent hole and brought back to the FPA laboratory for grain size analysis. The rings and Marriote tubes were then filled with tap water and allowed to equalize. The water level in the inner ring was 15.24cm and the level of water in the annular space was 15.08cm. The Marriote tubes were then refilled to levels to establish a head of 3 ¼". The test was then run according to the procedures outlined in ASTM D 3385-94.

Copies to: Field File

Signed _____

The writer took readings at 15 minute intervals for the first hour, 30 minute intervals for the second hour and 60 minute intervals for the next three hours. At this point, it was too dark to continue the test so the inner ring was covered and both tanks were left on to provide a continuous flow of water until the test could be performed again the following morning. Please see the attached sheets for the test results.

Copies to: Field File

Signed _____

Double-Ring Infiltrometer Test Report

FRENCH & PARRELLO ASSOCIATES, P.A. CONSULTING ENGINEERS

Project Name:	Hugo Neu Schnitzer East	**Date:**	12/16/03
Project Number:	03F084A	**Soil Classification:**	
Tested By:	Ryan Tumpey, Adam French	**Checked By:**	David Calnan

Penetration of Rings (cm):	**Inner**	**Outer**	**Liquid Level Maintained by:**	Marriote Tubes	**Permeant Used:**	Tap Water	Ground Temp (°C):	13.9
	6.35	12.7						

Equipment Constants:	**Area (sq.cm)**	**Permeant Depth (cm)**	**Permeant Container No.:**	**Height Change in Permeant Container (cc/cm):**
Inner Ring:	720.70	15.24	1	81.30
Annular Space:	2186.88	15.08	2	182.82

Trial #:	Date	Time (hr:min)	Elasped Time (min)	Flow Readings				Permeant Temp (°C)	Incr. Infiltration Velocity (cm/min)		Remarks / Weather
				Inner Ring		Annular Space					
				Rdg (mL)	Flow (cc)	Rdg (mL)	Flow (cc)		Inner	Annular	
1	12/16/03	0:00	15	3000	20	5100	170	11.5	1.85E-03	5.18E-03	Sunny, Calm
	12/16/03	0:15	(15)	2980		4930					
2	12/16/03	0:15	15	2980	10	4930	155	11.5	9.25E-04	4.73E-03	Sunny, Calm
	12/16/03	0:30	(30)	2970		4775					
3	12/16/03	0:30	15	2970	10	4775	225	11.4	9.25E-04	6.86E-03	Sunny, Calm
	12/16/03	0:45	(45)	2960		4550					
4	12/16/03	0:45	15	2960	0	5250	50	11.2	0.00E+00	1.52E-03	Sunny, Calm - refilled tank #2
	12/16/03	1:00	(60)	2960		5200					
5	12/16/03	1:00	30	2960	10	5200	0	11	4.63E-04	0.00E+00	Sunny, Calm
	12/16/03	1:30	(90)	2950		5200					
6	12/16/03	1:30	30	2950	0	5200	0	10.7	0.00E+00	0.00E+00	Sunny, Calm
	12/16/03	2:00	(120)	2950		5200					
7	12/16/03	2:00	60	2950	15	5200	-50	10.1	3.47E-04	-3.81E-04	Partly Sunny, Light Wind
	12/16/03	3:00	(180)	2935		5250					
8	12/16/03	3:00	60	2935	20	5250	100	9.5	4.63E-04	7.62E-04	Dusk, Light Wind
	12/16/03	4:00	(240)	2915		5150					

Trial #:	Date	Time (hr:min)	Elasped Time (min)	Flow Readings				Permeant Temp (°C)	Incr. Infiltration Velocity (cm/min)		Remarks / Weather
				Inner Ring		Annular Space					
				Rdg (mL)	Flow (cc)	Rdg (mL)	Flow (cc)		Inner	Annular	
9	12/16/03	4:00	60	2915	15	5150	650	8.9	3.47E-04	4.95E-03	
	12/16/03	5:00	(300)	2900		4500					Dusk, Light Wind

FPA

FRENCH & PARRELLO
ASSOCIATES, P.A.
CONSULTING ENGINEERS

670 North Beers Street, Building No. 3
Holmdel, New Jersey 07733
Phone: (732) 888-7700

TO: _____

Date: 12/17/03	**Job No.**: 03F084A
Project: Hugo Neu Schnitzer	
Location: Jersey City, NJ	
Contractor: Hart Crowser	**Owner:**
Weather: Rain / Heavy Rain / Windy	**Temp**: 40's
Present at Site: Ryan Tumpey	

FIELD REPORT

THE FOLLOWING WAS NOTED:

The writer arrived onsite to perform double-ring infiltometer testing. The writer noted that the tank feeding the water to the annular space had completely drained overnight. The writer refilled the outer tank to establish a head of 3 ¾" again and then restarted the test. The test was run according to the procedures outlined in ASTM D 3385-94 with the writer taking readings at 60 minute intervals. The test was run until the recorded data showed a fairly constant rate of flow in the inner ring during the 60 minute intervals from both 12/16/03 and 12/17/03. The test was then ended, the equipment was removed and the writer attempted to backfill the excavated hole. These efforts were hampered by heavy rain and the hole being filled with water. Please see the attached sheet for test results.

Copies to: Field File

Signed _____

Double-Ring Infiltometer Test Report

FRENCH & PARRELLO ASSOCIATES, P.A. CONSULTING ENGINEERS

Project Name:	Hugo Neu Schnitzer East	**Date:**	12/17/03
Project Number:	03F084A	**Soil Classification:**	
Tested By:	Ryan Tumpey	**Checked By:**	David Calnan

Penetration of Rings (cm):	**Inner** 6.35	**Outer** 12.7	**Liquid Level Maintained by:**	Marriote Tubes	**Permeant Used:**	Tap Water	**Ground Temp (°C):** 8.9

Equipment Constants:	**Area (sq.cm)**	**Permeant Depth (cm)**	**Permeant Container No.:**	**Height Change in Permeant Container (cc/cm):**
Inner Ring:	720.70	15.24	1	81.30
Annular Space:	2186.88	15.08	2	182.82

Trial #:	Date	Time (hr:min)	Elasped Time (min)	Flow Readings: Inner Ring Rdg (mL)	Inner Ring Flow (cc)	Annular Space Rdg (mL)	Annular Space Flow (cc)	Permeant Temp (°C)	Incr. Infiltration Velocity (cm/min): Inner	Annular	Remarks / Weather
	12/17/03	5:00	937	2900	370	4500	4500	11.5	**5.48E-04**	**2.20E-03**	Heavy Rain, Windy
1	12/17/03	20:37	(1237)	2530		0					
	12/17/03	20:37	60	2530	10	4200	500	11.5	**2.31E-04**	**3.81E-03**	Heavy Rain, Windy - Refilled Tank #2
2	12/17/03	21:37	(1297)	2520		3700					
	12/17/03	21:37	60	2520	20	3700	25	11.4	**4.63E-04**	**1.91E-04**	Rain, Windy
3	12/17/03	22:37	(1357)	2500		3675					
	12/17/03	22:37	60	2500	15	4000	50	11.2	**3.47E-04**	**3.81E-04**	Light Rain, Windy - Refilled Tank #2
4	12/17/03	23:37	(1417)	2485		3950					
	12/17/03	23:37	60	2485	15	3950	150	11	**3.47E-04**	**1.14E-03**	Rain, Windy
5	12/17/03	0:37	(1477)	2470		3800					

APPENDIX D
RECENT WEATHER DATA FOR NEWARK AIRPORT

Recent Weather Temperature Data for Newark Airport Temperature (F)																				
	October 2003			November 2003			December 2003			January 2004			February 2004			March 2004			April 2004		
Day	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
1	56	61	50	65	77	52	43	53	33	39	46	32	27	35	18	51	63	39	50	55	44
2	52	60	44	62	68	56	30	37	23	42	48	36	27	38	16	57	69	44	46	49	33
3	49	58	39	69	81	56	27	33	20	48	53	43	32	41	23	54	62	46	46	52	40
4	54	59	48	59	64	53	32	41	23	46	54	37	37	44	29	38	46	31	42	51	32
5	52	61	43	56	60	52	30	34	25	39	40	37	30	36	24	46	47	44	38	46	30
6	51	61	41	56	61	51	26	28	24	32	40	23	34	37	30	55	64	45	44	57	31
7	53	66	44	54	58	49	25	29	21	23	27	18	35	43	27	47	54	40	57	68	45
8	62	73	51	42	50	34	30	37	22	25	31	18	26	32	20	38	42	33	49	57	41
9	67	78	55	37	44	29	32	38	25	17	28	6	34	45	22	37	42	31	54	63	55
10	60	64	56	39	48	30	41	51	31	9	16	2	43	50	35	41	45	36	52	63	41
11	64	73	54	44	53	34	50	59	40	17	27	6	36	41	30	47	58	35	48	53	43
12	67	73	61	52	55	49	38	43	32	31	37	24	34	40	27	42	49	34	48	55	41
13	65	74	56	50	60	40	31	35	27	31	44	17	38	44	31	38	45	30	51	59	42
14	60	67	52	41	47	35	33	40	26	13	17	9	38	43	32	34	43	25	53	59	47
15	58	66	50	44	50	37	34	38	30	10	18	1	25	33	17	49	60	38	54	61	46
16	56	67	45	43	51	34	37	45	28	13	25	0	24	34	13	37	43	30	52	64	40
17	52	57	47	49	52	45	43	53	33	26	34	17	28	35	20	30	31	28	63	80	45
18	51	58	43	51	56	46	34	36	31	31	35	26	37	44	29	34	40	27	63	74	51
19	52	61	42	61	65	56	31	34	28	23	26	20	39	48	29	38	43	33	68	88	47
20	49	60	38	51	57	44	33	39	27	23	28	17	35	40	30	41	52	30			
21	62	73	51	54	67	41	32	39	24	22	28	15	44	54	34	41	51	30			
22	49	57	40	54	62	45	41	50	31	29	39	19	40	45	34	32	27	36			
23	42	47	37	48	56	39	49	56	42	16	19	12	39	48	29	36	48	23			
24	44	53	34	49	57	40	50	56	44	16	23	9	35	39	31	47	62	32			
25	48	61	34	41	46	36	39	44	33	13	18	7	33	43	23	48	52	44			
26	64	70	57	40	46	34	36	43	29	19	22	15	36	45	26	55	64	45			
27	58	65	51	45	53	37	44	54	34	22	24	19	38	48	27	62	72	51			
28	52	59	44	55	64	45	47	64	30	24	29	19	44	59	29	52	59	45			
29	54	60	48	43	49	37	43	55	31	22	27	16	47	62	32	43	49	36			
30	52	62	41	44	50	37	44	52	36	21	24	17				41	45	36			
31	58	70	46				41	48	33	21	27	14				44	48	40			

http://www.wunderground.com/history/airport/KEWR/2004/3/1/DailyHistory.html (March, 2004)