report. 932109. 1984-07-01.
Task 3 _ Round 1

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Woodward-Clyde Consultants

INVESTIGATION AND ASSESSMENT
OE THE LOCKPORT COAL TAR SITE

TASK 3 REPORT
BORING AND WELL INSTALLATION
AND
EIRST ROUND GROUND-WATER SAMPLING

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July 1984
82C4495

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1.0 SUMMARY

The Task 3 boring and well installation program and the first round of Task 3 ground-water sampling hove been completed for the Lockport Coal Tor Site. Results of investigations indicate that: 1) site soil contamination is not localized, but it is particularly concentrated in one area; 2) vertical fractures allowing downward migration of contaminants ore present in bedrock beneath the site; 3) highest concentrations of contaminants ore present in ground water in on area extending northeast from the western end of the site; and 4) the mechanism by which cool tor contaminants ore migrating is complex. Continuing Task 3 sampling and installation of additional wells ore recommended.

2.0 INTRODUCTION

This report presents the results of Woodward-Clyde Consultants' (WCC) Task 3 investigation at New York State Electric and Gas (NYSEG) Corporation's Lockport Cool Tor Site. The report includes results of both the boring and well installation program and the first quarterly round of Task 3 sampling and analysis.

The purpose of the Task 3 program was to address questions regarding the source of potential contaminants, the pathways of contaminants to local ground water, and the distribution of any contaminants that may exist within the surface and ground waters. Specific objectives of Task 3 studies were: 1) to investigate site soils for areas of existing coal tor; 2) to investigate (to the degree possible) bedrock fractures os the pathways by which coal tar compounds may migrate from soils into bedrock and the ground-water system; 3) to delineate the distribution of cool tor compounds within the ground water beneath and adjacent to the site; and 4) to provide the necessary information to complete subsequent tasks (risk analysis and preliminary remedial design).

The study was performed in accordance with WCC's revised proposals dated 7 October 1982 and 9 September 1983. Field work was initiated on 18 October 1983

and completed on 2 December 1983. The Task 3 field program included drilling of six shallow auger borings, excavation of five test pits, installation of 13 monitoring wells, drilling of two inclined core borings, performance of in-situ permeability tests in 16 new and existing wells, and collection of three rounds of canal water samples. Water samples from 19 wells were collected and analyzed os the first quarterly round of Task 3 ground water sampling. A site area location plan is shown in Figure 1.

3.0 INVESTIGATIONS

3.1 Test Trenches and Soil Auger Borings

A limited on-site soil exploration program was undertaken in order to bound areas of existing coal tars within site soils and better define the potential contaminant source. Six soil auger borings and five test trenches were excavated as part of the program. Auger boring and test trench logs ore included in Appendices A and B, respectively. Boring and trench locations ore shown in Figure 2.

Drilling and excavation equipment and operators were supplied by NYSEG, and borings and trenches were inspected and logged by WCC's site hydrogeologist. Both auger borings and test trenches were generally advanced to refusal, with borings ranging from 4 feet to 15 feet in depth and trenches ranging from 2.5 feet to 12 feet in depth. Five selected soil samples were analyzed for the cool tor indicator parameters of total phenols, volatile aromatics, and poly-aromatic hydrocarbons. Results of the site soil Investigation program ore discussed in Section 4.1.

3.2 Monitoring Wells

Thirteen monitoring wells were installed to address questions regarding the character and suspected distribution of observed coal tor compounds within the ground water. Well locations ore shown in Figure 1, well data ore summarized in Table 1,

and boring logs and well installation reports are included in Appendices A and C, respectively. Wells were drilled by North Star Drilling Company under WCC's supervision. Most wells ore approximately 50 feet deep, but well depths range from 30 feet to 70 feet.

Well locations were selected based on results of Task I and Task 2 investigations and were designed to provide information concerning both upgradient and downgradient conditions. Installation of three of the thirteen wells (MW-14, MW-15, and MW-16) was contingent upon finding contaminants in other wells. Samples from MW-8, MW-9, and MW-13 were collected and analyzed early in the investigation program, and because analytical results indicated that these three wells were not beyond the limits of the ground-woter contamination, oll three contingency wells were also installed.

Wells MW-6, MW-7 and MW-12 were installed with bentonite seals to isolate the Rochester Shale Member from the overlying DeCew Member and the Gasport Member of the Lockport Dolomite. Well MW-6 and MW-12 ore each located adjacent to a well completed in the Lockport Dolomite, to form nested well pairs. Well MW-7 is located adjacent to on unsealed well penetrating the Rochester. The purpose of the nested wells is to define the vertical ground-woter gradient os well os the vertical variation in ground-water quality. Except for wells MW-6, MW-7 and MW-12, all wells are completely open in rock.

To avoid cross contamination, all drilling equipment potentially in contact with contaminated soil, rock, and/or water was decontaminated before beginning each new hole. The decontamination procedure consisted of a detergent rinse, followed by an acetone rinse, followed by a clean water rinse. Wells were advanced through overburden either by hollow stem augers or temporary casing, os indicated on boring logs. Split spoon soil samples were collected at 5-foot intervals. Soil samplers were decontaminated before collection of each sample.

For wells left open in rock, a rock socket was drilled using a roller cone bit, and 3-inch inside diameter (I.D.) block steel casing was set approximately 2 feet into rock. The casing annulus was grouted to 0.5 feet below grade and allowed to set overnight

to form a secure seal. Except as indicated on boring logs, wells were advanced through rock with a diamond-set non-coring bit on on NX core barrel. Wells MW-10 and MW-17 were cored through rock to provide additional information regarding the bedrock section.

For wells sealed in rock (MW-6, MW-7, and MW-12), borings were reamed in rock to a nominal diameter of 4 inches. Approximately 6 inches of sand was placed in the bottom of the hole to underlie a 10-foot length of 2-inch i.D. stainless steel screen, coupled to a block steel riser pipe. Filter sand was placed around the screen, extending to approximately 2 feet above the top of the screen. Bentonite pellets were placed above the sand pock to form a seal approximately 2 feet thick. The remaining onnulus was grouted to grade for MW-7 and to 0.5 inches below grade for MW-6 and MW-12.

A locking cop and a riser pipe stick-up of approximately 2 feet was provided for wells MW-7, MW-8 and MW-16 to facilitate sampling during periods of snow accumulation. At other wells, cast iron utility boxes were installed approximately flush with the ground surface. All wells were developed by repeated air-lifting to dryness. Each well was air-lifted six times, with partial recharge between lifts.

3.3 Permeability Tests

To estimate the hydraulic conductivity (permeability) of bedrock in the site area, slug tests were performed in 16 new and previously installed monitoring wells. Well MW-15 was not tested because the well was obstructed by a lodged boiler. Test results ore summarized in Table 2 and discussed in Section 4.3.

The slug test consists essentially of measuring the rote at which the water level in a monitoring well declines after a known volume ("slug") is introduced instantaneously, or conversely, the rote at which the water level in a well rises after a slug is removed. Because the volume of the slug is small compared to the volume of water in the aquifer, the test is on estimate of hydraulic conductivity only in the vicinity of the well.

At the start of the test, the slug was quickly and smoothly lowered into the well until immersed. The water level was allowed to return to the static level os recorded prior to immersion. The slug was then quickly removed from the well. Changes in millivolts produced by the pressure transducer, which reflected the change in water level, were recorded on a strip chart. The test was considered complete when the water level again returned to the static level. A computer program based on the techniques of Cooper, Bredehoeft, and Papadopoulos (1967) and Bouwer and Rice (1976) was used to calculate permeability.

3.4 Exploratory Borings

Two inclined core borings were drilled to investigate the potential for bedrock fractures to act as vertical conduits for contaminants to move from soil to ground water contained in bedrock. Boring locations ore shown in Figure 1, boring data ore summarized in Table 1 and boring logs ore included in Appendix A. Boring B-3-1 was drilled on the site to Intercept any vertical fractures in bedrock beneath a known location of coal tor within site soils. Boring B-3-2 was drilled in a potential path of contaminant flow from the site to the seeps at the canal wall.

Both borings were inclined 35° from the vertical along a N70W azimuth. This orientation was based on results of Task 1 geologic mapping and was selected so os to favor interception of any northeast-striking fracture sets. No soil samples were collected. Borings were advanced through rock by NX coring and were grouted to the ground surface upon completion. Drilling equipment was decontaminated following the some procedures os for monitoring well installation. All recovered core was logged by WCC's site hydrogeologist.

3.5 Canal Water Sampling

To evaluate the effect of ground-woter quality on the surface water regime of the canal, three locations in the canal were sampled and analyzed for the coal tor indicator parameters of total phenol, volatile aromatics, and poly-aromotic hydrocarbons.

Three sampling events were scheduled before canal drainage in order to evaluate consistency and any time-dependent effects. Samples were collected at the same three locations on 20 October, 11 November, and 18 November 1983 before canal lowering was begun on 21 November.

Samples were collected by lowering a 3-foot long stainless steel bailer to a depth of approximately 10 feet below the water surface at a distance of 3 to 10 feet from the southeast canal wall. The bailer was rinsed with distilled water and acetone between samples.

Two of the three sampling locations are shown in Figure 1. Location CSL-1 is upstream of the observed seeps, approximately 820 feet southwest of MW-1 at a point thought to be beyond the influence of ground-water seepage from the substation. Location CSL-2 is approximately 250 feet downstream of MW-1 (Figure 1). Location CSL-3 is not shown in Figure 1 but is farther downstream from the seep area, just above the conol locks, approximately one-quarter mile northeast of the Transit Street Bridge.

Analytical results ore summarized in Table 4 and are discussed in Section 4.3.

3.6 First Round Ground-Water Sampling

The first round of Task 3 ground-water samples was collected from 18 new and previously installed wells on 28 November - 2 December 1983. Well MW-15 was not sampled at that time because a bailer had become lodged in the well during evacuation; MW-15 was sampled on 21 December 1983. All samples were analyzed for total phenol, volatile aromatics, and poly-aromatic hydrocarbons by General Testing Corporation.

Prior to collection of samples, a minimum of three volumes of water present in each well were balled utilizing a PVC bailer. Four samples were generally collected at each well. For analysis of aromatic organic compounds, two septum vials were

filled. Additional larger samples were collected for analysis of other compounds. To minimize the opportunity for cross contamination, sampling was sequenced from the least potentially contaminated wells to the more highly potentially contaminated wells. An individual bailer was assigned for use at each well, and a minimum of two bail-fulls were discarded before a sample was collected.

Results of chemical analyses of first round Task 3 sampling are summarized in Table 5 and are discussed in Secton 4.

4.0 RESULTS

4.1 Soil Conditions

Soil conditions were generally similar to those observed in Task 2 investigations. Geologic cross sections compiling information from both Task 2 and Task 3 investigations are shown in Figures 3, 4, and 5. Where ground surface elevations were approximately 600 feet or higher, generally northeast and soùtheast of the site, fill material was underlain by interlayered red-brown silt, fine sand and gravelly clay. These soils are believed to be stratified glacial lake deposits and glacial till. Overburden thickness in this area was found to be generally greater than 15 feet, ranging from 14.8 feet at MW-6 to 31.5 feet at MW-14.

Where ground surface elevations were less than approximately 600 feet, generally northwest and southwest of the site, soil types were more variable and appeared to consist largely of man-made fill. Observed soils included gray-brown silt, clay, and fine sand and red-brown sandy silt, silty clay and gravel. Organic materials were frequently observed. Overburden thickness in this area was typically 12 feet or less but ranged from zero at MW-16 to 17.0 at MW-2.

Coal tar contamination in site soils was more widespread than supposed before Task 3 investigations. All test pits and four of the six soil auger borings drilled on site encountered indications of coal tar beginning at depths ranging from 6 inches to

12 feet. Concentrations appeared to increase with depth and were generally greatest immediately above the top of rock. Test trench TT-2 (Figure 2) exposed three wooden sump pits, each filled to the top with black liquid believed to be coal tar. Each pit was approximately 7 feet by 5 feet by 3.5 feet and was covered with hand-hewn stone slabs. Coal tar odors were also detected in offsite soil fill near the ground surface in wells MW-6 and MW-9, and at depth 10 feet in MW-10.

Chemical analyses of selected soil samples verified that compounds typical of coal tors were present in site soils over a wide area. As shown In Table 4, trace to very high levels of phenols, volatile aromatics and poly-aromatic hydrocarbons were detected in all samples. Sample S-2 from the coal tar sump pit in test trench TT-2 had maximum concentrations of most indicators, os high os 2440 parts per million (ppm) total phenol and 29,000 ppm naphthalene.

4.2 Rock Conditions

Detailed descriptions of bedrock stratigraphy in the site vicinity are provided in WCC's Task I report. Geologic cross sections showing inferred contacts are shown in Figures 3, 4, and 5. As during Task 2 investigations, a distinct contact was observed between the light gray, fossiliferous dolomite of the Gasport Member and the dark gray shaly dolomite of the DeCew Member. The DeCew Member was found to grade into the underlying dark gray limey shale of the Rochester Shale Member.

Rock core recovered from the Gasport Member was generally closely fractured in the upper I to 2 feet. Condition of fracture surfaces throughout the Gasport was variable. Some fracture surfaces were observed to be unweathered while others were more deeply weathered and clay-coated. Fractures observed in vertical core borings MW-10 and MW-17 were generally near horizontal, but inclined borings B-3-1 and B-3-2 intercepted fractures at high angles to the near-horizontal bedding planes. Stylolites and vuggy zones were frequently encountered. No evidence of coal tor contamination in the Gasport Member was observed except in wells MW-8 and MW-15, where odors were detected during drilling.

Loss of drilling fluid, indicating zones of high permeability, occurred on two occasions during Task 3 drilling, both times near the top of the DeCew Member, in B-3-2 and MW-11. Condition and orientation of fracture surfaces in the DeCew Member were generally similar to that observed in the Gasport. Stylolites and vugs were likewise encountered. Visual and olfactory evidence of coal tar contamination in the DeCew Member was encountered only in the four cored borings, B-3-1, B-3-2, MW-10, and MW-17 and in MW-15. In these borings, coal tar could be seen and smelled on fracture surfaces parallel to bedding and also along fresh mechanical breaks produced by hammer blows.

The Rochester Shale Member typically appeared to have slightly fewer fractures than either the Gasport or DeCew Members. Strong coal tor odors and/or slicks were noted during all drilling in the Rochester Shale except for wells MW-7 and MW-14. An oily film and petroleum odor were noted in the Rochester Shale in well MW-14. In recovered core, mineralized vugs and fresh mechanical breaks were both found to emit strong coal tar odors, and fractures surfaces had iridescent coatings.

The elevation of the bedrock surface as encountered in borings was plotted and contoured as shown in Figure 6. The site appears to be situated on a bedrock high. The highest bedrock elevations in the area were encountered in well MW-7 and boring B-3-2 at the western end of the site. As shown in Figure 6, elevations higher than 588 feet were encountered within a roughly triangular area that extends from boring B-2 on Genesee Street, southwest to the 1939 Sewer Improvement Plan boring on State Road, and southeast to monitoring well MW-4 on Saxton Street. The bedrock surface appears to slope away from this triangular area in all directions except the southeast, where high elevations may continue beyond MW-4. The bedrock surface slopes approximately 500 feet per mile toward the canal south of the Transit Street Bridge and probably less than 100 feet per mile elsewhere.

The contact between the Gasport Member and the DeCew Member was found to be more irregular and less planar than the top of the bedrock surface. However, the site also appears to be situated on a high point of the DeCew Member. The contact

generally dips toward the canal with an anomalously low area north of the site in the vicinity of wells MW-11, MW-12 and MW-17. As shown in the geologic cross sections (Figures 3, 4, and 5) the top of the DeCew attains relative high points at the site and also at well MW-9 northeast of the site, well MW-2 northwest of the site, and boring B-1 south of the site.

4.3 Ground-Water Conditions

4.3.1 Ground-Water Flow

Permeability values calculated from in-situ testing in bedrock are summarized in Table 2. Generally, permeability was on the order of 10^{-4} cm/sec to 10^{-5} cm/sec, with calculated values ranging from 2.5×10^{-6} cm/sec in MW-7 to 1.8×10^{-3} cm/sec in MW-12. Permeability calculated for wells sealed in the Rochester Shale Member (MW-6, MW-7, and MW-12) was not consistently different from that calculated for wells spanning all three rock stratigraphic units.

Water levels in monitoring wells were measured at completion and several times both before and after the canal level was lowered for the winter months. Hydrographs for the period 25 October 1983 through 21 December 1983 for all newly installed and previously existing wells are shown in Figures 7, 8, and 9. As expected, ground-water elevations typically dropped after canal lowering, but wells sealed in the Rochester Shale showed a much greater response than other wells (Figure 9). Among unsealed wells, response to canal lowering was generally greatest in those wells nearest the canal (MW-1, MW-13, MW-16 and MW-8, Figure 8). Exceptions were noted at MW-2 and MW-15, which although near the canal, showed only erratic or very slight changes in water levels at the time of canal lowering. Recorded water levels in approximately half the monitoring wells rose during the month of December (Figures 7, 8, and 9). This may be due to increased recharge from snowmelt or possibly due to the formation of ice dams at the exposed rock face in the canal. No correlation between permeability and well response was apparent.

Water levels in wells sealed in the Rochester Member were found to be variably 3 feet to 38 feet lower than water levels in adjacent unsealed wells. A significant downward ground-water gradient thus exists in the site area.

Water level elevations measured shortly before canal lowering were plotted and contoured as shown in Figure 10. Sealed wells MW-6, MW-7, and MW-12 were excluded from contouring. As concluded from Task 2 studies, the local ground-water gradient is to the north-northwest, toward the canal. The steepest gradient, 0.13 (660 feet per mile) was observed south of the Transit Street Bridge. Elsewhere, gradients were approximately 0.05 to 0.08 (260 to 420 feet per mile).

The configuration of the ground-water table as shown in Figure 10 does not entirely correspond to the bedrock surface shown in Figure 6. Ground-water flow is directed away from the site only to the north and northwest, but the bedrock surface slopes away from the site to the east and south as well. Ground-water flow directions thus do not appear to be controlled by the bedrock-overburden interface alone.

4.3.2 Water Quality

Task 2 sampling results are summarized in Table 3, and Task 3 results are summarized in Tables 4 and 5. Task 3 analytical results are presented in Appendix D. As shown, detection limits may be variable, generally increasing with increasing concentrations, due to analytical techniques.

Results of previous sampling at monitoring wells MW-1, MW-2, MW-3, MW-4, and IW-2 were compared with results of recent Task 3 sampling at the same wells. Significant increases in all coal tar indicator parameters were observed in well MW-1 since May 1983. Concentrations of the same parameters decreased in well MW-2 and showed relatively little change in well MW-3. Some poly-aromotic hydrocarbons were detected in November 1983 in wells MW-4 and IW-2, where none had been detected in previous sampling (Table 5).

Comparison of analyses of samples collected from wells MW-8, MW-9, and MW-13 on 7 November and on 28 November suggests that parameter concentrations can vary even over short time intervals (Tables 4 and 5). In monitoring well MW-8, concentrations of all parameters except total phenol decreased significantly during this three-week period. Phenol concentrations increased slightly. In wells MW-9 and MW-13, concentrations of most parameters decreased slightly or remained approximately the same. Low levels of phenol were detected in the second sample collected from MW-13 where none hod been detected in the earlier sample. These short term variations in ground-water chemical quality may be the result of delayed well response after development or may be related to canal lowering.

The lateral distribution of representative coal tor indicator parameters was evaluated by plotting and contouring concentration values in ppm. For consistency, only data from those wells completed in the Rochester Shale Member were contoured; data from wells IW-1, IW-2, and MW-11 were excluded. Because of the wide range in concentration values, a logarithmically scaled contour interval was used, and contours were generally logarithmically Interpolated between data points. The resulting contour maps shown in Figures 11, 12, 13, and 14 show the distribution of total phenol, total volatile aromatics (Method 602 Series), total poly-aromatic hydrocarbons (Method 610 Series), and naphthalene. For all parameters, no consistent relationship between bedrock permeability and contaminant concentrations was apparent.

The possible existence of off-site sources for observed cool tor indicator parameters in ground water was not specifically examined. A gas station is located just north of the western end of the site, across LaGrange Street. Of the three groups of cool tor indicator parameters, i.e. phenols, volatile aromatics and poly-oromotic hydrocarbons, volatile aromatics are also commonly associated with gasoline.

Phenol was detected in all wells except MW-15. As shown in Figure 11, phenol concentrations greater than 1 ppm were limited to the western end of the site, with a maximum of 9.17 ppm at MW-10 just north of the site across LaGrange Street. Concentrations appeared to generally decrease in all directions away from this maximum,

and concentrations observed in the peripheral wells MW-15, MW-13, MW-9, MW-14, MW-5, and MW-16 were less than 0.01 ppm.

Distribution of volatile aromatics, poly-aromotic hydrocarbons, and naphthalene in ground water was slightly different from that of total phenol. Within samples, a correlation was observed between concentrations of volatile aromatics and concentrations of poly-aromatic hydrocarbons. As shown in Figures 12, 13, and 14, highest concentrations were observed in a narrow area extending northeast from the western end of the site. Concentrations decreased in all directions away from this maximum except to the northeast, where high concentrations may continue beyond MW-15. Concentration gradients of these groups of contaminants do not correlate with the observed ground-water gradient east, south, and northeast of the site. The relatively high concentrations detected at wells MW-10, MW-12, and MW-15 indicate that a large portion of the poly-aromatic hydrocarbons and volatile aromatics may be migrating transverse to the inferred ground-water gradient shown in Figure 10. The linear configuration suggests that the primary migration path is selective and may be at least partially controlled by a northeast-trending set of bedrock fractures, possibly the some set which defines the canal.

The relatively low levels of volatile aromatics and poly-aromatic hydrocarbons detected at wells MW-14, MW-4, and MW-5 indicate that some upgradient migration has taken place, if it is assumed that the contaminants have an on-site source and that no other source upgradient of wells MW-14, MW-4 and MW-5 exists. The distribution of volatile aromatics does not preclude the possibility that post or present activities at the gas station across the street from the site may be a contributing source of the volatile aromatic compounds in ground water. An oily coating, possibly gasoline, was observed in the first evacuation bail collected from well MW-17. This well, located immediately downgradient of the gas station, showed the maximum concentration of volatile aromatics in the site area (54 ppm), although the some order of magnitude was observed at wells MW-7, MW-3, and MW-10.

The vertical distribution of contaminants was evaluated by comparing concentrations in nested deep and shallow or unsealed wells (MW-6/IW-2, MW-12/MW-11,

and MW-7/MW-3). As shown in Table 5, concentrations of poly-aromatic hydrocarbons, including naphthalene, were much higher in wells sealed in the Rochester Member (MW-6, MW-12, and MW-7) than in the adjacent shallow wells (IW-2, MW-11) and the unsealed well (MW-3) near MW-7. Concentrations of other parameters were generally similar in nested well pairs, but the on-site well sealed in the Rochester Member (MW-7) had a higher phenol concentration than the nearby unsealed well also penetrating the Rochester (MW-3).

The coal tar indicator parameters found in ground water in the site area were not consistently present in surface water samples collected from the canal. As shown in Table 4, phenols were detected only in the first sampling event and reached a maximum concentration of 0.157 ppm at CSL-2 just downstream of the seep location. No volatile aromatics were detected in any samples. Naphthalene was also never detected, but low levels of other poly-aromatic hydrocarbons were detected at CSL-1 and CSL-2 during the second and third sampling events. The only contaminants detected at CSL-3, one-quarter mile downstream of the seep location, were low levels of phenol in the first sampling event, anthracene/phenanthrene in the second sampling event, and pyrene in the third sampling event. During the second sampling event, the total concentration of poly-aromatic hydrocarbons was higher upstream of the site (CSL-1) than downstream of the site (CSL-2 and CSL-3). Generally, concentrations of all tested coal tar indicator parameters were below or just slightly above detection limits, and it is not clear whether the trace levels detected in the canal water have an on-site source.

5.0 CONCLUSIONS

Coal tor contamination of site soils is widespread, but highest concentrations appear to be centered at the sump pits at the western end of the site. The presence of additional undiscovered sump pits on site is not precluded. Based on field observations, additional minor coal tar contamination sources may be present in off-site soil fill materials. A gas station located across the street from the site must also be considered as a potential source of volatile aromatics, because of the relatively high concentrations

detected in an adjacent downgradient well and the observation of a gasoline-like coating during well evacuation.

Near-vertical fractures, potentially acting os conduits, are present in bedrock underlying the site. The upper 1 to 2 feet of rock were generally closely fractured, and loss of drilling fluid may indicate an additional discontinuous fractured horizon near the top of the DeCew Member. Bedrock permeability was calculated to be on the order of 10^{-4} cm/sec to 10^{-5} cm/sec and is likely to be primarily fracture permeability. No correlation between permeability and well response to canal lowering was apparent. Correlation between permeability and contaminant concentrations in ground water was likewise not apparent.

A significant downward vertical gradient exists between ground water in the Rochester Member and that in overlying units. The lateral ground-water gradient ranges from 0.05 to 0.13. Local ground-water flow may be independent of the configuration of the bedrock surface.

Coal tar compounds detected in ground water in the site area were similar to compounds detected in site soils. Highest concentrations were observed in an area extending northeast from the site. The highest level of volatile aromatics was measured in well MW-17, immediately downgradient of the gas station across the street from the site. Volatile aromatics and poly-aromatic hydrocarbons appear to hove migrated at least 800 feet northeast of the site, based on the presence of 27.5 ppm total poly-aromatic hydrocarbons in well MW-15. This migration was probably controlled by fracture flow within rock. Poly-aromatic hydrocarbons, including naphthalene, became more concentrated with depth. Because some contaminants were detected in upgradient wells, contaminant migration does not appear to be governed by the lateral ground-water gradient alone.

Migration of cool tor contaminants from site soils to ground water within bedrock is believed to occur by percolation downward through overburden to the bedrock surface. Infiltration water then flows laterally along the bedrock surface or within the upper few feet of fractured rock. Near-vertical fractures in bedrock and the downward

vertical ground-water gradient allow downward migration of contaminants to lower horizons in bedrock.

Mechanisms of coal tar migration ore complex. Because of the hydrodynamic conditions at the site and because of the interactive nature of the various driving forces, the true contaminant transport mechanism cannot be precisely defined.

Within bedrock, a number of driving forces are believed to cause migration of contaminants in directions not necessarily the some as the local ground-water gradient. These driving forces may include capillary pressure, buoyant forces, dispersion, and osmotic pressure. The direction and magnitude of the forces are affected by numerous physical and chemical properties of the ground-water, coal-tar, rock system, such os viscosity differences, specific-gravity differences, interfacial properties, relative concentrations, system temperature and pressure, and the presence or absence of surface-active agents or dissolved gases. Constituents of coal tar may be present in the subsurface as substances dissolved in water, as liquid phases immiscible with water, or as emulsions. Each of these fractions will show different responses to each driving force. In addition, the magnitude of the individual forces may vary independently with time.

The quality of canal water downstream of the site is not greatly different from that upstream of the site for the analyzed parameters. Previously performed Task 2 analyses had indicated that chromatogram scans of canal seeps were virtually identical to chromatogram scans of site soils believed to be contaminated with coal tar. Concentrations of coal tar contaminants in ground water reaching the canal are believed to be reduced by both dilution and volatilization.

6.0 RECOMMENDATIONS

We recommend that all additional rounds of samples be collected from all 19 existing wells to evaluate time-dependent variations in contaminant concentrations.

We also recommend installation of additional wells. Canal water samples should be collected from three locations during each quarterly sampling event after 1984 refilling. We also recommend that water levels be recorded on a monthly basis in order to evaluate seasonal fluctuations in ground-water levels.

Quarterly sampling and monthly water-level readings should continue through August 1984 as planned, or for as long a period as required to establish a data base sufficient for valid statistical analysis. Results of continuing Task 3 sampling will provide input necessary for the development of a conceptual physical model for Task 4 risk assessment.

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TABLE 1

BORING AND WELL DATA

Boring No.	Existing Ground Elev.	Depth of Boring	Elev. of Top of Rock	Elev. of Top of DeCew	Elev. of Top of Rochester	Elev. of Water[f]
B-1	607.94	50.0	585.6	574.6	564.7	601.5[b]
B-2	596.32	38.8	588.1	568.6	564.0	a
B-3	607.32	41.8	587.6	574.7	a	606.0[b]
B-3-1[e]	603.39	51.5	589.3	574.4	561.4	d
B-3-2[e]	595.89	50.0	587.2	569.0	563.9	d
MW-1	594.33	48.0	586.4	573.1	566.8	574.2
MW-2	595.00	50.7	578.0	575.2	564.7	576.0
MW-3	600.95	60.0	588.5	572.0	560.8	593.0
MW-4	627.57	82.2	588.2	571.8	563.0	607.7
MW-5	604.91	50.0	586.3	570.9	561.9	597.5
MW-6	604.41	50.0	589.6	574.4	567.9	590.2
MW-7	600.48	55.0	589.8	573.0	560.5	590.0
MW-8	574.47	30.0	570.2	565.5	558.0	564.5
MW-9	602.12	50.0	585.3	575.6	569.6	593.4
MW-10	597.97	50.0	586.0	573.5	564.5	588.9
MW-11	596.49	30.0	587.1	570.0	a	588.6
MW-12	596.35	53.5	586.8	568.9	563.9	583.7
MW-13	593.73	50.0	585.3	568.7	561.7	570.7
MW-14	617.12	70.0	585.6	571.1	563.6	605.2
MW-15	591.31	50.0	586.0	573.8	565.3	578.3
MW-16	574.69	30.0	583.5	568.2	560.7	566.9
MW-17	594.36	35.0	586.4	569.9	563.4	582.0[g]
IW-1	594.37	11.6	586.5	a	a	587.3
IW-2	604.93	21.0	586.9	a	a	603.0
B# 15*	593	69.5	587	568.5	c	c
B# 16*	594.5	70	582.5	c	c	c
B# 17*	598	73	588.2	c	c	c

*These borings from 1939 New York State Sewer Improvement Plan. (Ground elevations from base map by Lockwood Support Services.)

NOTE: All elevations are in feet

a - Not encountered
b - Water level before casing was pulled
c - Cannot be interpreted from boring log
d - Not determined
e - Inclined 35° from vertical, to N70W
f - Water level measured on 17 or 18 November 1983
g - Water level measured 14 November

D65/150

TABLE 2

PERMEABILITY TEST DATA

Well No.	Interval Tested (Depth, Feet)	Permeability cm/sec
MW-1	29.5 - 48.0	8.2×10^{-5}
MW-2	20.5 - 50.7	3.9×10^{-5}
MW-3	11.7 - 60.0	5.8×10^{-5}
MW-4	19.0 - 82.2	1.9×10^{-4}
MW-5	21.8 - 50.0	2.3×10^{-4}
MW-6*	39.5 - 49.5	9.5×10^{-6}
MW-7*	44.5 - 54.5	2.5×10^{-6}
MW-8	20.0 - 30.0	1.1×10^{-4}
MW-9	19.0 - 50.0	1.7×10^{-4}
MW-10	14.0 - 50.0	3.0×10^{-4}
MW-11	10.0 - 30.0	8.7×10^{-4}
MW-12*	43.7 - 52.8	1.8×10^{-3}
MW-13	27.4 - 50.0	2.5×10^{-4}
MW-14	11.75 - 70.0	5.1×10^{-4}
MW-16	12.0 - 30.0	1.1×10^{-4}
MW-17	21.7 - 35.0	3.7×10^{-5}

*Wells sealed in Rochester Shale Member.

All permeability values calculated from slug tests.

Table 3

Chemical Parameters Detected in One or More Samples at the Lockport Coal Tar Site

		February 2-3, 1983							May 4, 1983				
		Sample Location							Sampling Location				
Parameter	Units[a]	Soil	Seep 1	Seep 2	MW-1	MW-2	MW-3	MW-4	IW-2	MW-1	MW-2	MW-3	MW-4	IW-2
Total Phenol	ppm	8.4[b]	1.971	0.045	0.028	0.030	0.747	ND	0.016	ND	0.115	0.424	0.022	ND
BOD (5 day)	ppm	NA	420	15.6	11.7	19.2	120	6.3	7.2					
Chromium (total)	ppm	9.5[b]	1.45	ND	ND	ND	ND	ND	ND					
Chromium (hexavalent)	ppm	NA	0.28	ND	ND	ND	ND	ND	ND					
Copper	ppm	16.5[b]	1.53	ND	ND	ND	ND	ND	ND					
Zinc	ppm	30[b]	7.2	0.03	ND	ND	ND	ND	0.08					
Antimony	ppm	26[b]	0.9	ND	ND	ND	0.3	0.4	ND					
Method 602 (Aromatics)														
Benzene	ppm	ND	0.059	ND	0.066	ND	3.05	ND	0.014	0.014	1.58	4.12	0.003	0.008
Toluene	ppm	0.071[b]	ND	ND	0.120	ND	2.38	ND	0.003	ND	0.95	3.90	0.003	0.003
Ethyl Benzene	ppm	0.072[b]	ND	ND	0.033	ND	0.73	ND	ND	0.001	0.43	1.61	ND	0.001
p-Xylene	ppm	ND	0.072	0.002	0.019	ND	0.20	ND	ND	0.010	0.48	0.34	ND	0.001
o-Xylene	ppm	ND	0.120	0.025	0.032	ND	0.39	ND	0.002	0.020	0.57	0.57	ND	0.001
Styrene	ppm	ND	ND	ND	0.004	ND	0.51	ND	ND	ND	ND	0.43	ND	ND
n-Propylbenzene	ppm	ND	ND	ND	0.003	ND	0.03	ND	ND	ND	0.07	ND	ND	ND
Method 604 (phenolics)														
Phenol	ppm	ND	ND	0.03	ND	ND	ND	ND	ND					
4-chloro-3-Methylphenol	ppm	ND	0.60	ND	ND	ND	ND	ND	ND					
Dinitraphenol	ppm	ND	3.5	ND	ND	ND	ND	ND	ND					
Pentachloraphenol	ppm	ND	2.7	ND	ND	ND	ND	ND	ND					
Base Neutrals														
Acenaphthene	ppb	48,000	310	140	ND	NA	190	ND	ND	60	ND	5,700	ND	ND
Acenaphthylene	ppb	16,000	440	110	ND	NA	570	ND	ND					
Anthracene	ppb	15,000	110	27	ND	NA	130	ND	ND					
Benzo (A) Anthracene	ppb	20,000	100	16	ND	NA	81	ND	ND					
Benzo (A) pyrene	ppb	14,000	ND	ND	ND	NA	51	ND	ND					
3,4-Benzofluoranthene	ppb	19,000	13	13	ND	NA	69	ND	ND					
Benzoperylene	ppb	5,600	ND	ND	ND	NA	43	ND	ND					
Benzo (K) fluoranthene	ppb	19,000	13	13	ND	NA	69	ND	ND					
Bis(2-Ethylhexyl)Phthalate	ppb	ND	84	ND	ND	NA	ND	ND	ND					
Chrysene	ppb	14,000	67	10	ND	NA	60	ND	ND					
Fluoranthene	ppb	32,000	240	37	ND	NA	120	ND	ND					
Indeno (1,2,3-CD) Pyrene	ppb	9,600	ND	ND	ND	NA	ND	ND	ND					
Naphthalene	ppb	220,000	3,100	79	250	NA	5,700	ND	ND	750	280	28,300	ND	ND
Phenanthrene	ppb	96,000	750	120	ND	NA	500	ND	ND	66	180	10,000	ND	ND
Pyrene	ppb	52,000	320	44	ND	NA	140	ND	ND					

NOTES:

a. ppm means mg/l for water samples and mg/kg for soil sample.
ppb means ug/l for water samples and ug/kg for soil sample.

b. Sample collected November 23, 1982, delivered to laboratory December 6, 1982.

NA means not analyzed
ND means not detected (detection limits may vary)

TABLE 4

CHEMICAL ANALYSES - TASK 3 SOIL, SURFACE WATER AND PRELIMINARY GROUND WATER SAMPLING

NYSEG COAL TAR SITE

(Chemical Parameters Detected in One or More Samples)

		19-21 October 1983 Sample Location[b]								7 November 1983 Sample Location			11 November 1983 Sample Location			18 November 1983 Sample Location		
Parameter	Units[a]	CSL-1	CSL-2	CSL-3	TT-2/S-1[b]	TT-5/S-1[b]	TT-2/S-2[b]	AB-4/S-1[b]	AB-6/S-1[b]	MW-8	MW-9	MW-13	CSL-1	CSL-2	CSL-3	CSL-1	CSL-2	CSL-3
Total Phenol	ppm	0.005	0.157	0.010	0.73	3.69	2440	1.06	0.42	0.010	0.047	ND	ND	ND	ND	ND	ND	ND
Method 602 (Aromatics)																		
Benzene	ppm	ND	ND	ND	0.041	0.008	128	6.6	0.09	0.180	0.005	0.004	ND	ND	ND	ND	ND	ND
Toluene	ppm	ND	ND	ND	0.069	0.006	155	26.0	0.05	0.015	0.003	0.004	ND	ND	ND	ND	ND	ND
Ethyl Benzene	ppm	ND	ND	ND	0.0116	0.007	10.4	53.1	0.91	0.260	0.011	0.009	ND	ND	ND	ND	ND	ND
p-Xylene	ppm	ND	ND	ND	0.0979	0.002	25.5	1.5	1.619	0.024	0.006	0.012	ND	ND	ND	ND	ND	ND
m-Xylene	ppm	ND	ND	ND		0.008	79.4	60.4		0.018	0.010	0.027	ND	ND	ND	ND	ND	ND
o-Xylene	ppm	ND	ND	ND	0.023	0.004	46.0	11.3	1.05	0.040	0.010	0.019	ND	ND	ND	ND	ND	ND
Styrene	ppm	ND	ND	ND	0.022	0.029	104	14.8	2.19	0.001	0.002	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ppm	ND	ND	ND	0.006	0.003	4.9	4.8	2.09	0.023	0.002	ND	ND	ND	ND	ND	ND	ND
Method 610 (Poly-Aromatic Hydrocarbons)																		
Acenaphthene	ppm	ND	ND	ND	2.5	3.8	3000	250	6.5	1.28	0.045	0.006	ND	ND	ND	ND	ND	ND
Acenaphthylene	ppm	ND	ND	ND	1.8	3.6	4500	960	0.6	0.15	0.087	0.013	ND	ND	ND	ND	ND	ND
Anthracene[c]	ppm	ND	ND	ND	23	3.5	13,700	4600	14	2.08	0.19	0.020	0.017	0.018	0.006	0.002	0.004	ND
Benzo (A) Anthracene	ppm	ND	ND	ND	22	40	2000	330	12	0.16	0.043	ND	0.013	0.015	ND	ND	ND	ND
Benzo (A) pyrene	ppm	ND	ND	ND	27	52	1500	360	12	0.15	0.051	ND	0.010	ND	ND	ND	0.008	ND
Benzoperylene	ppm	ND	ND	ND	10	15	300	69	7.6	0.039	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (K) fluoranthene[d]	ppm	ND	ND	ND	24	44	1600	210	11	0.092	0.050	ND	0.005	ND	ND	ND	0.007	ND
Chrysene	ppm	ND	ND	ND	16	33	1300	340	88	0.13	0.039	ND	0.013	0.015	ND	ND	ND	ND
Fluoranthene	ppm	ND	ND	ND	25	118	5300	690	18	0.61	0.034	0.005	0.006	0.009	ND	0.002	0.005	ND
Fluorene	ppm	ND	ND	ND	3.4	4.5	4500	1300	5.7	2.03	0.10	0.028	0.010	ND	ND	ND	ND	ND
Indeno (1,2,3-CD) Pyrene[e]	ppm	ND	ND	ND	26	24	490	80	5.8	0.053	0.020	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ppm	ND	ND	ND	4.1	3.8	29,000	1900	49	0.85	0.075	ND	ND	ND	ND	ND	ND	ND
Pyrene	ppm	ND	ND	ND	24	948	4500	1000	18	2.81	0.064	0.006	0.011	0.006	ND	0.003	0.006	0.003

Notes:

a. ppm means mg/l for water samples and ug/g for soil samples.
b. Soil samples
c. Eluites with Phenanthrene
d. Eluites with Benzo (H) Fluoranthene
e. Eluites with Dibenzo (A,H) Anthracene
f. Less than 5 ppm
g. Eluites with m-Xylene
h. CSL means canal sampling location
TT means test trench
AB means auger boring

ND means not detected (detection limits may vary)

TABLE 5

CHEMICAL ANALYSES - TASK 3 FIRST ROUND SAMPLING

NYSEG COAL TAR SITE

(Chemical Parameters Detected in One or More Samples)

28 November 1983 - 2 December 1983
Sample Location

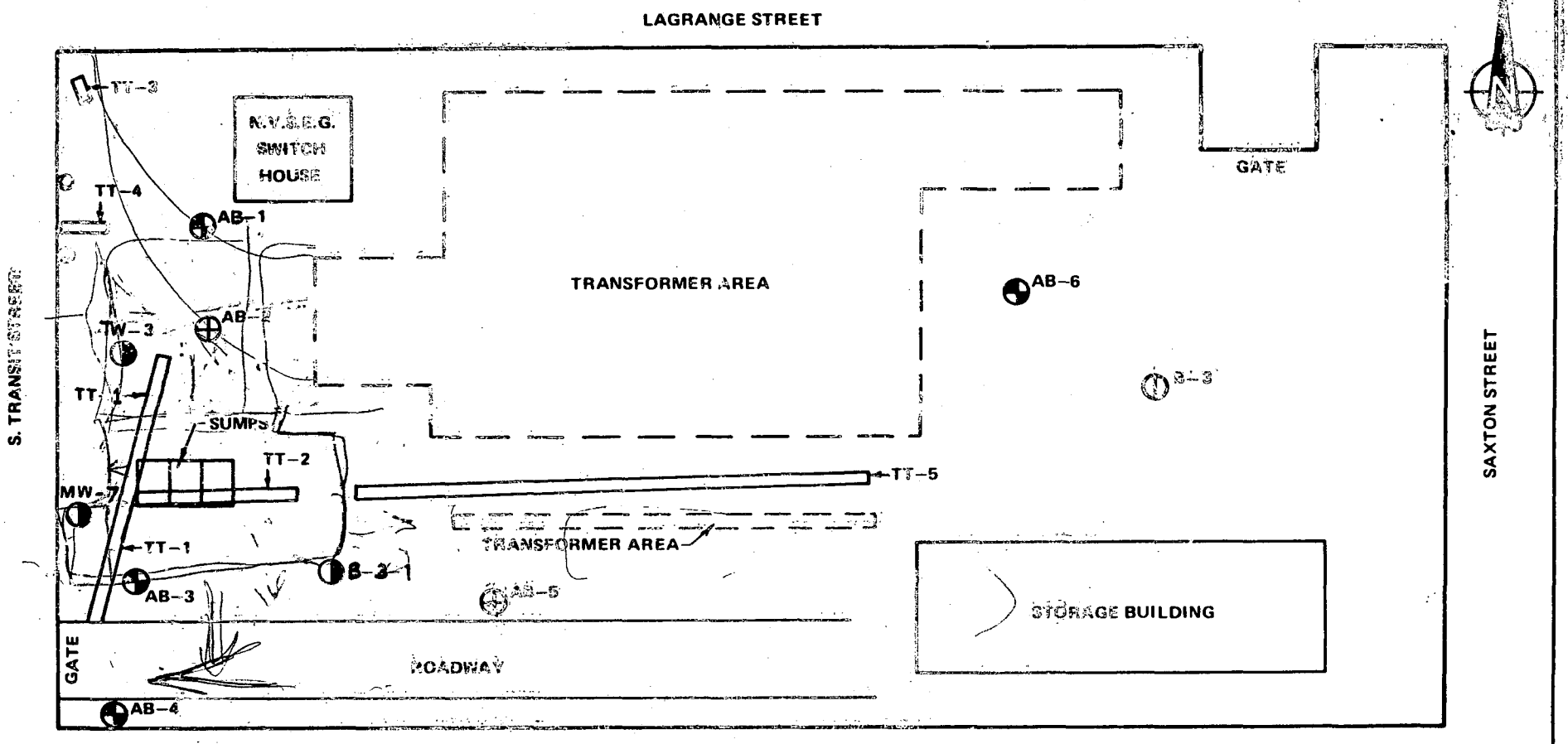
Parameter	Units[a]	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15[f]	MW-16	MW-17	IW-1	IW-2
Total Phenol	ppm	0.085	0.081	1.09	0.014	0.005	0.010	6.38	0.014	0.005	9.17	0.057	0.021	0.006	0.007	ND	0.008	0.151	0.017	0.020
Method 602 (Aromatics)																				
Benzene	ppm	0.170	0.520	4.18	0.003	0.005	0.008	3.56	0.052	0.011	6.36	1.06	0.33	ND	0.001	0.012	0.002	2.3	ND	ND
Toluene	ppm	0.230	0.220	3.78	ND	0.001	0.029	3.44	0.005	0.007	4.98	1.46	0.61	ND	0.007	0.027	0.003	11.4	0.005	0.001
Ethyl Benzene	ppm	0.260	0.190	1.96	ND	0.004	0.013	0.99	0.044	0.003	1.01	0.61	1.34	ND	ND	0.057	0.026	4.8	0.004	ND
p-Xylene	ppm	0.041	0.230	0.42	ND	0.002	0.006	0.26	0.012	0.005	0.68	1.06	0.10	ND	ND	0.120	0.007	5.7	0.005	ND
m-Xylene	ppm	0.081	0.110	1.06	ND	ND	0.017	0.67	0.009	ND	1.63	1.22	0.35	ND	ND	0.097	0.007	15.1	0.010	0.001
o-Xylene	ppm	0.062	0.280	0.74	ND	0.002	0.011	0.46	0.014	0.003	1.16	1.47	0.54	ND	ND	0.076	0.015	10.9	0.008	ND
Styrene	ppm	0.005	ND	0.56	ND	ND	ND	0.90	0.001	ND	0.42	ND	ND	ND	ND	ND	ND	ND[e]	ND	ND
n-Propylbenzene	ppm	0.014	0.083	ND	ND	ND	0.002	0.048	0.007	ND	0.04	0.06	0.09	ND	ND	ND	ND	3.9	0.002	ND
Method 610 (Poly-Aromatic Hydrocarbons)																				
Acenapthene	ppm	0.14	0.017	1.9	ND	ND	0.003	22	0.12	0.072	1.7	0.30	37	0.007	ND	3.9	ND	4.7	ND	0.008
Acenapthylene	ppm	0.088	0.013	3.2	ND	0.012	0.003	49	0.049	0.016	2.2	ND	1.8	0.021	ND	7.6	ND	2.4	ND	ND
Anthracene[b]	ppm	0.20	0.054	6.2	0.003	0.007	0.011	99	0.25	0.12	34	0.92	97	0.002	ND	3.1	ND	3.4	ND	0.007
Benzo (A) Anthracene	ppm	ND	0.012	0.88	ND	ND	ND	11	0.022	ND	0.58	0.25	2.5	ND	ND	ND	ND	0.18	ND	ND
Benzo (A) pyrene	ppm	ND	0.014	0.86	ND	ND	ND	11	0.025	0.008	0.55	0.13	2.6	ND	ND	ND	ND	ND	ND	ND
Benzo (g,h,i) perylene	ppm	ND	ND	0.24	ND	ND	ND	2.9	0.002	ND	ND	ND	0.59	ND	ND	ND	ND	ND	ND	ND
Benzo (K) fluoranthene[c]	ppm	ND	0.008	0.57	ND	ND	ND	7.1	0.015	ND	0.31	0.069	1.5	ND	ND	ND	ND	0.12	ND	0.004
Chrysene	ppm	0.43	0.011	0.77	0.006	0.006	0.036	8.0	0.016	0.011	0.37	0.27	1.8	ND	ND	ND	ND	0.16	ND	0.016
Fluoranthene	ppm	0.23	0.032	1.5	0.002	0.003	0.037	31	0.050	0.014	1.1	0.34	4.4	0.007	0.003	ND	ND	0.46	ND	0.016
Fluorene	ppm	0.095	0.022	2.7	ND	0.005	ND	38	0.13	0.068	1.6	0.40	7.1	0.017	ND	7.3	ND	2.6	ND	0.007
Indeno (1,2,3-CD) Pyrene[d]	ppm	ND	ND	0.27	ND	ND	ND	3.5	0.004	ND	ND	ND	0.66	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ppm	3.0	0.011	22	ND	0.012	0.034	97	0.12	0.077	54	0.42	37	0.002	ND	5.6	ND	47	ND	0.002
Pyrene	ppm	0.33	0.026	1.7	0.003	0.003	0.041	33	0.051	0.017	1.2	0.40	5.5	0.009	0.003	ND	ND	0.37	ND	0.019

Notes:

a. ppm means mg/l
b. Elutes with Phenanthrene
c. Elutes with Benzo (B) Fluoranthene
d. Elutes with Dibenzo (A,H) Anthracene
e. Less than 1 ppm
f. Sampled 21 December 1983

ND means not detected (detection limits may vary)

Woodward-Clyde Consultants



LEGEND

- AB-1 AUGER BORING WITH COAL TAR OBSERVED
- AB-2 AUGER BORING WITH NO COAL TAR OBSERVED
- MW-3 MONITOR WELL LOCATION AND NUMBER
- B-1 INCLINED BORING LOCATION AND NUMBER (ARROW SHOWS DIRECTION OF INCLINATION)
- B-3 BORING LOCATION AND NUMBER
- TT-1 TEST TRENCH LOCATION AND NUMBER
- TELEPHONE POLE

0 25 50 FT
SCALE

NOTE:
LOCATIONS ARE APPROXIMATE

DETAILED SITE LOCATION PLAN

NYSEG LOCKPORT COAL TAR SITE

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	CIG	SCALE:	AS SHOWN	PROJ. NO.:	82C4495
CK'D. BY:	DRG	DATE:	23 MAY 1984	FIO. NO.:	2


LARGE
MAPS

MW-15
MW-13
MW-14
MW-9
MW-4
SITE LIMITS
B-3
IW-2
MW-6
CSL-2
ERIE
CANAL
MW-11
MW-12
PB-2
B-3-2
MW-1
IW-1
MW-17
MW-10
B-3-1
MW-7
MW-3
MW-5
B-1
B'
MW-2
MW-8
C'
MW-16
A'
CSL-1

EXPLANATION

MW-4 WCC MONITORING WELLS/BORINGS

A — A' LOCATION OF GEOLOGIC CROSS SECTION A–A'

CSL-1 CANAL WATER SAMPLING LOCATION

NOTES:

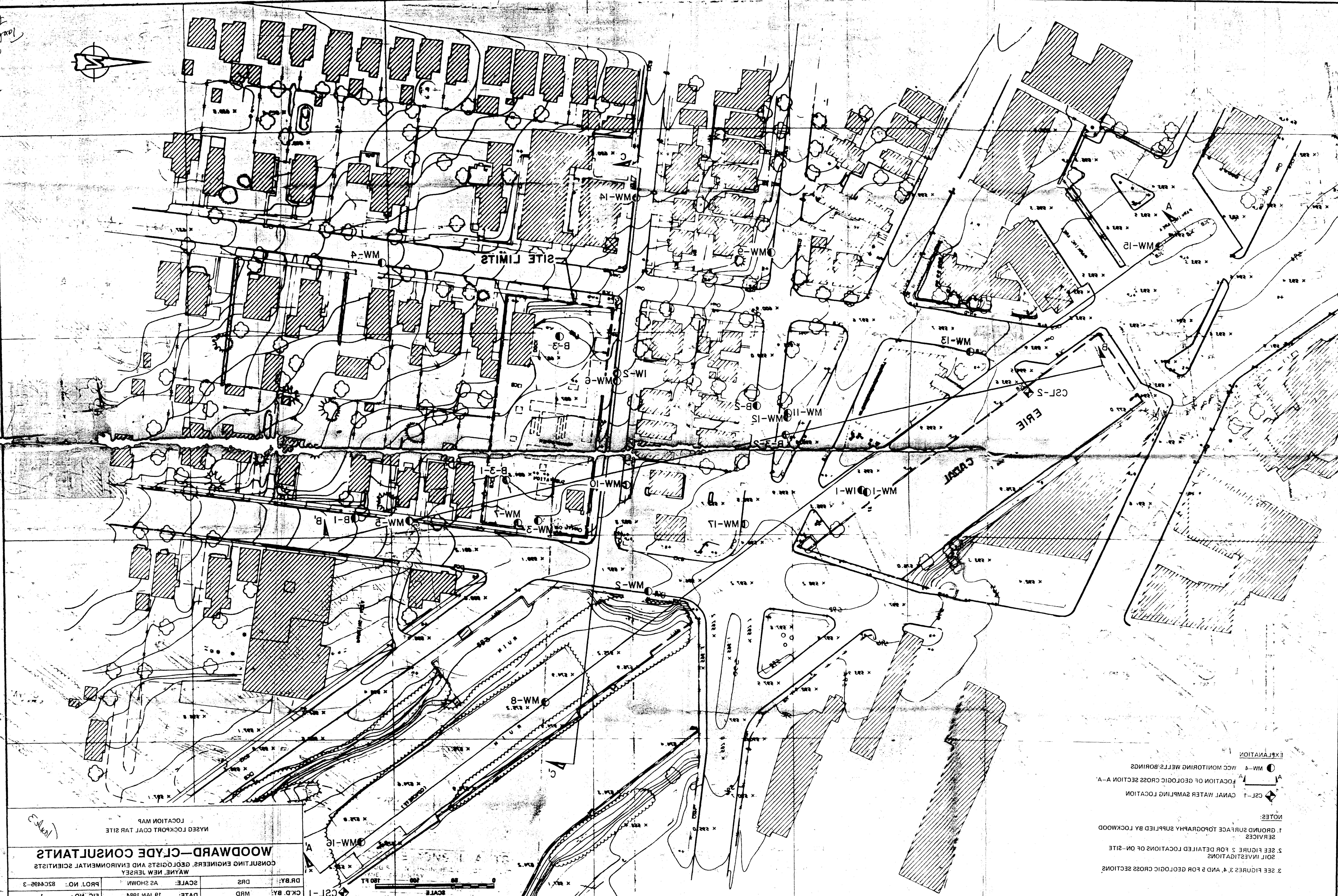
1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. SEE FIGURE 2 FOR DETAILED LOCATIONS OF ON–SITE SOIL INVESTIGATIONS
3. SEE FIGURES 3, 4, AND 5 FOR GEOLOGIC CROSS SECTIONS

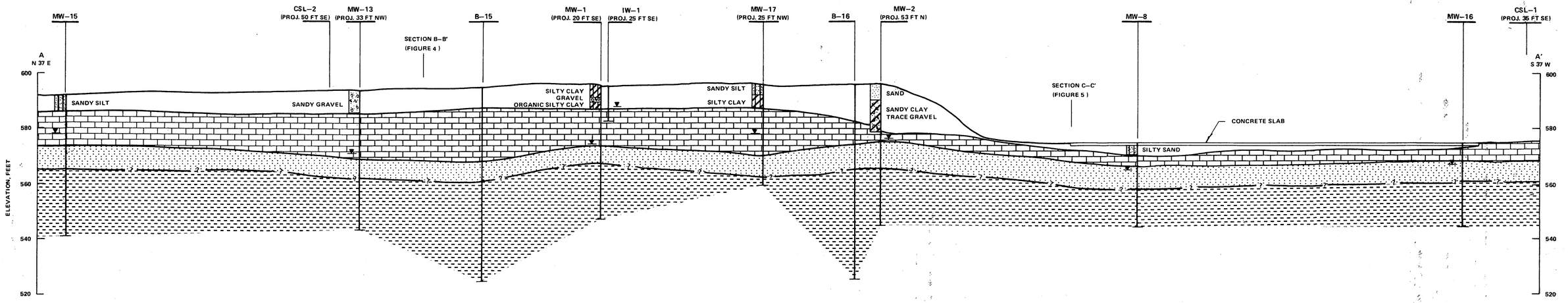
0 50 100 150 FT
SCALE

LOCATION MAP
NYSEG LOCKPORT COAL TAR SITE

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY:	DRS	SCALE:	AS SHOWN	PROJ. NO.:	82C4495–3
CK'D. BY:	MRD	DATE:	19 JAN 1984	FIG. NO.:	1


SITE LIMITS
ERIE
CANAL
MW-1
IW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-16
MW-17
IW-2
B-1
B-2
B-3
B-3-1
CSL-1
CSL-2
EXPLANATION
MW-4 WCC MONITORING WELLS/BORINGS
LOCATION OF GEOLOGIC CROSS SECTION A-A'
CSL-1 CANAL WATER SAMPLING LOCATION
NOTES:
1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. SEE FIGURE 2 FOR DETAILED LOCATIONS OF ON-SITE SOIL INVESTIGATIONS
3. SEE FIGURES 3, 4, AND 5 FOR GEOLOGIC CROSS SECTIONS
SCALE
LOCATION MAP
NYSEG LOCKPORT COAL TAR SITE
WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY
DR.BY: DRS
SCALE: AS SHOWN
PROJ. NO.: 82C4495-3
CK'D. BY: MRD
DATE: 19 JAN 1984
FIG. NO.: 1



NOTES:

1. SEE FIGURE 1 FOR LOCATION OF SECTION
2. GROUND SURFACE ELEVATIONS SUPPLIED BY BY LOCKPORT SUPPORT SERVICES
3. GEOLOGIC CONTACTS PROM BORINGS BY WOODWARD–CLYDE CONSULTANTS, EXCEPT B–15 AND B–16, FROM NEW YORK STATE 1939 SEWER IMPROVEMENT PLAN

LEGEND

- OVERBURDEN
- GASPORT MEMBER
- DECEW MEMBER
- ROCHESTER SHALE MEMBER
- GROUND WATER ELEVATION MEASURED 17 NOVEMBER 1983
- CSL–2 CANAL WATER SAMPLING LOCATION

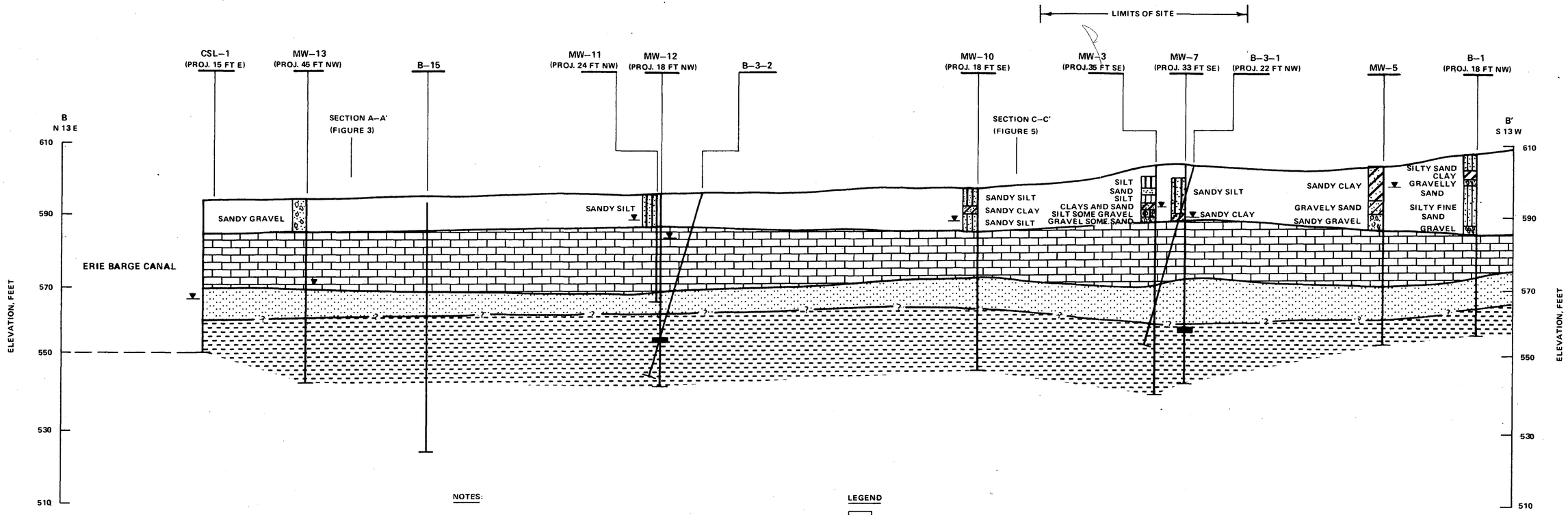
0 50 100 FT

HORIZONTAL SCALE
VERTICAL EXAGGERATION = 2.5 X

GEOLOGIC CROSS SECTION A–A'
NYSEG LOCKPORT COAL TAR SITE

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY: DRS	SCALE: AS SHOWN	PROJ. NO.: 82C4495–3
CK'D. BY: MRD	DATE: 16 JAN 1984	FIG. NO.: 3



NOTES:

1. SEE FIGURE 1 FOR LOCATION OF SECTION
2. GROUND SURFACE ELEVATIONS SUPPLIED BY LOCKPORT SUPPORT SERVICES
3. GEOLOGIC CONTACTS FROM BORINGS BY WOODWARD–CLYDE CONSULTANTS EXCEPT B–15 FROM NEW YORK STATE 1939 SEWER IMPROVEMENT PLAN

LEGEND

- OVERBURDEN
- GASPORT MEMBER
- DECEW MEMBER
- ROCHESTER SHALE MEMBER
- GROUND WATER ELEVATION MESAURED 17 NOVEMBER 1983
- CSL–2 CANAL WATER SAMPLING LOCATION
- BENTONITE SEAL

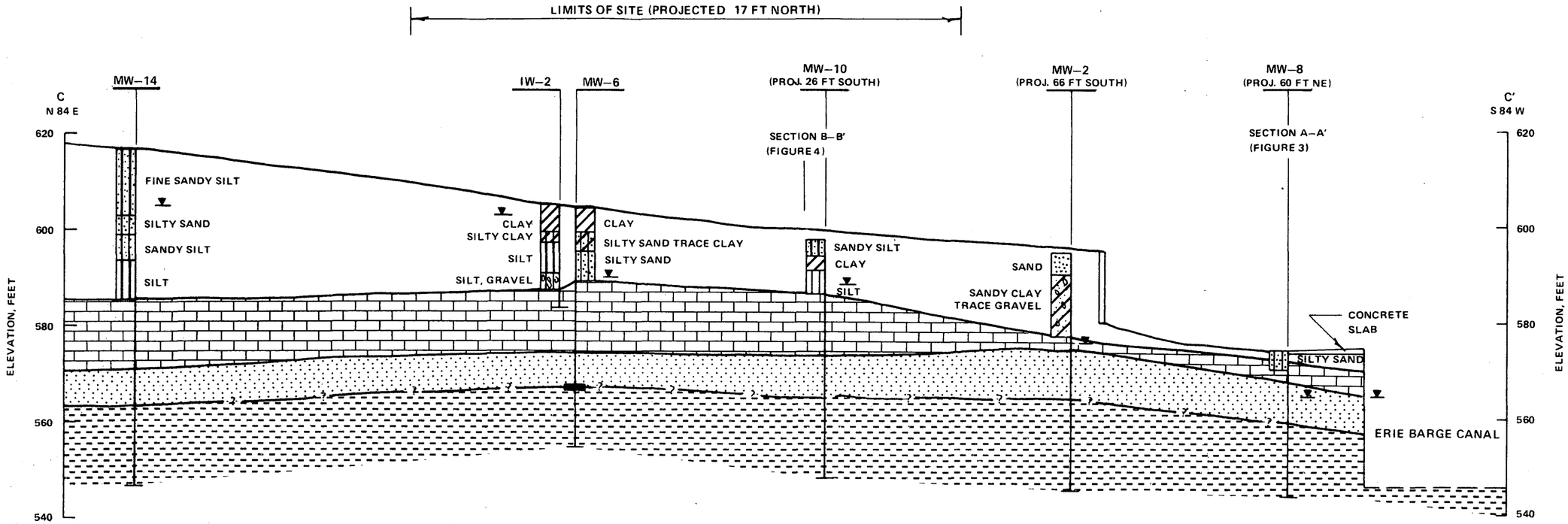
0 50 10 FT

HORIZONTAL SCALE
VERTICAL EXAGGERATION = 2.5 X

GEOLOGIC CROSS SECTION B–B'
NYSEG LOCKPORT COAL TAR SITE

WOODWARD–CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	DRS	SCALE:	AS SHOWN	PROJ. NO.:	82C4485–3
CK'D. BY:	MRD	DATE:	17 JAN 1984	FIG. NO.:	4



NOTES:

1. SEE FIGURE 1 FOR LOCATION OF SECTION
2. GROUND SURFACE ELEVATIONS SUPPLIED BY LOCKWOOD SUPPORT SERVICES
3. GEOLOGIC CONTACTS FROM BORINGS BY WOODWARD–CLYDE CONSULTANTS

LEGEND

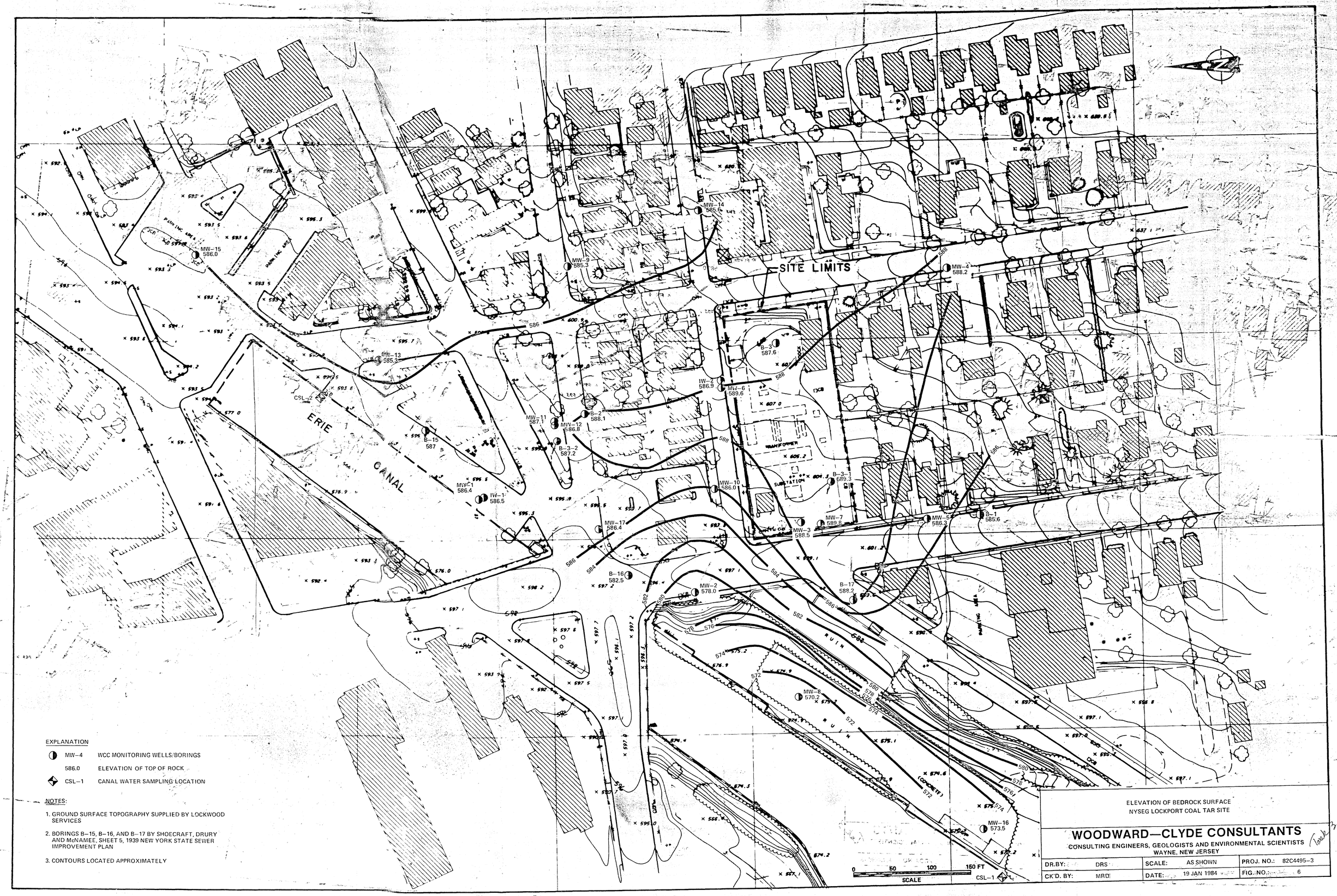
- OVERBURDEN
- GASPORT MEMBER
- DECEW MEMBER
- ROCHESTER SHALE MEMBER
- GROUND WATER ELEVATION MEASURED 17 NOVEMBER 1983
- BENTONITE SEAL

0 50 100 FT
HORIZONTAL SCALE
VERTICAL EXAGGERATION = 2.5 X

GEOLOGIC CROSS SECTION C–C'
NYSEG LOCKPORT COAL TAR SITE

WOODWARD–CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	DRS	SCALE:	AS SHOWN	PROJ. NO.:	82C4495--3
CK'D. BY:	MRD	DATE:	13 JAN 1984	FIG. NO.:	5



EXPLANATION

MW-4	WCC MONITORING WELLS/BORINGS
586.0	ELEVATION OF TOP OF ROCK
CSL-1	CANAL WATER SAMPLING LOCATION

NOTES:

1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. BORINGS B-15, B-16, AND B-17 BY SHOECRAFT, DRURY AND McNAMEE, SHEET 5, 1939 NEW YORK STATE SEWER IMPROVEMENT PLAN
3. CONTOURS LOCATED APPROXIMATELY

ELEVATION OF BEDROCK SURFACE
NYSEG LOCKPORT COAL TAR SITE

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY: DRS	SCALE: AS SHOWN	PROJ. NO.: 82C4495-3
CK'D. BY: MRD	DATE: 19 JAN 1984	FIG. NO.: 6

EXPLANATION

◐	MW-4	WCC MONITORING WELLS/BORINGS
	586.0	ELEVATION OF TOP OF ROCK
◈	CSL-1	CANAL WATER SAMPLING LOCATION

NOTES:

1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. BORINGS B-15, B-16, AND B-17 BY SHOECRAFT, DRURY AND McNAMEE, SHEET 5, 1939 NEW YORK STATE SEWER IMPROVEMENT PLAN
3. CONTOURS LOCATED APPROXIMATELY

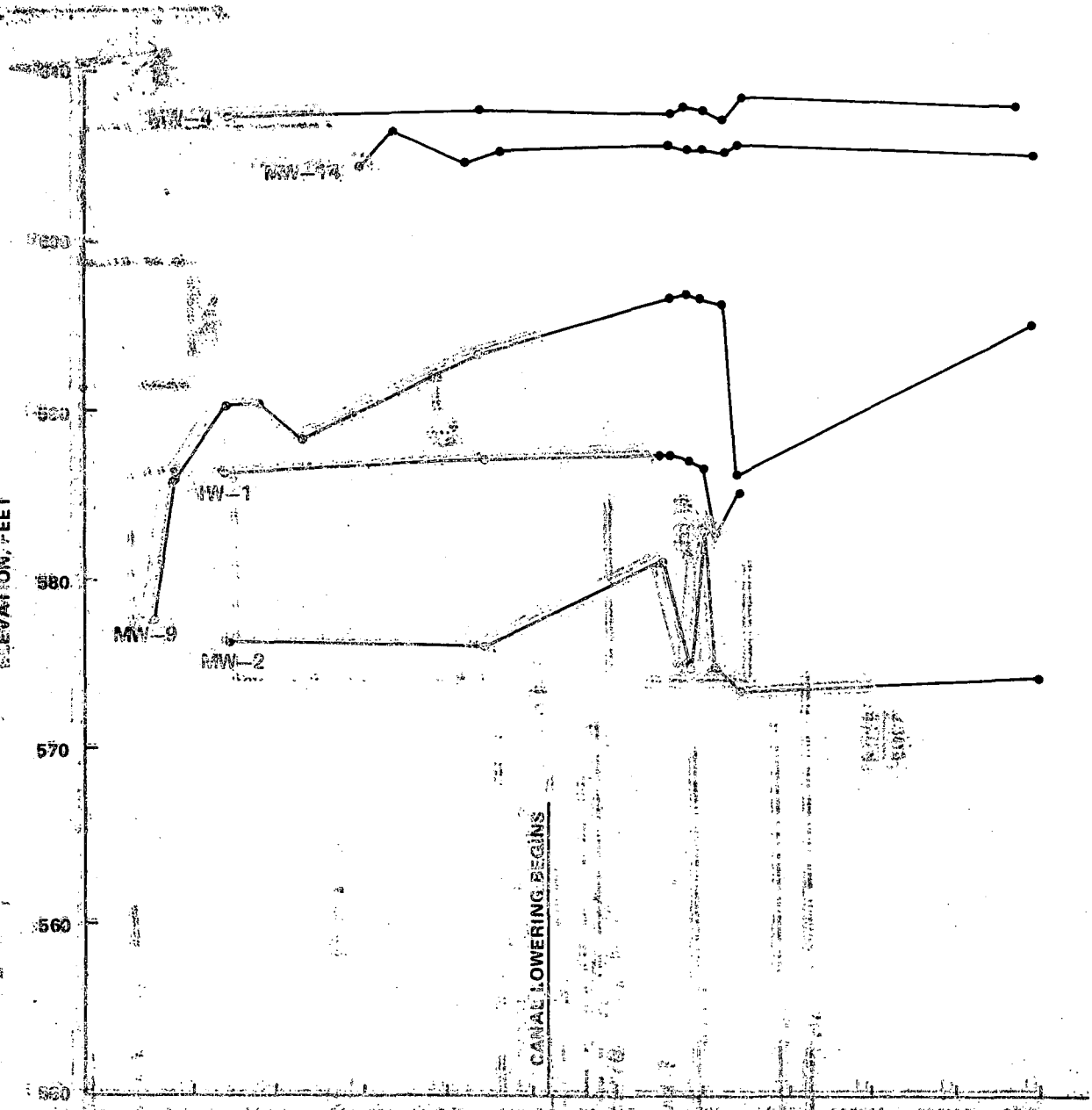
SCALE: 0 50 100 150 FT

ELEVATION OF BEDROCK SURFACE
NYSEG LOCKPORT COAL TAR SITE

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY: DRS	SCALE: AS SHOWN	PROJ. NO.: 82C4495-3
CK'D. BY: MRB	DATE: 19 JAN 1984	FIG. NO.: 6

Table 3 Figure(?)



NOTES:

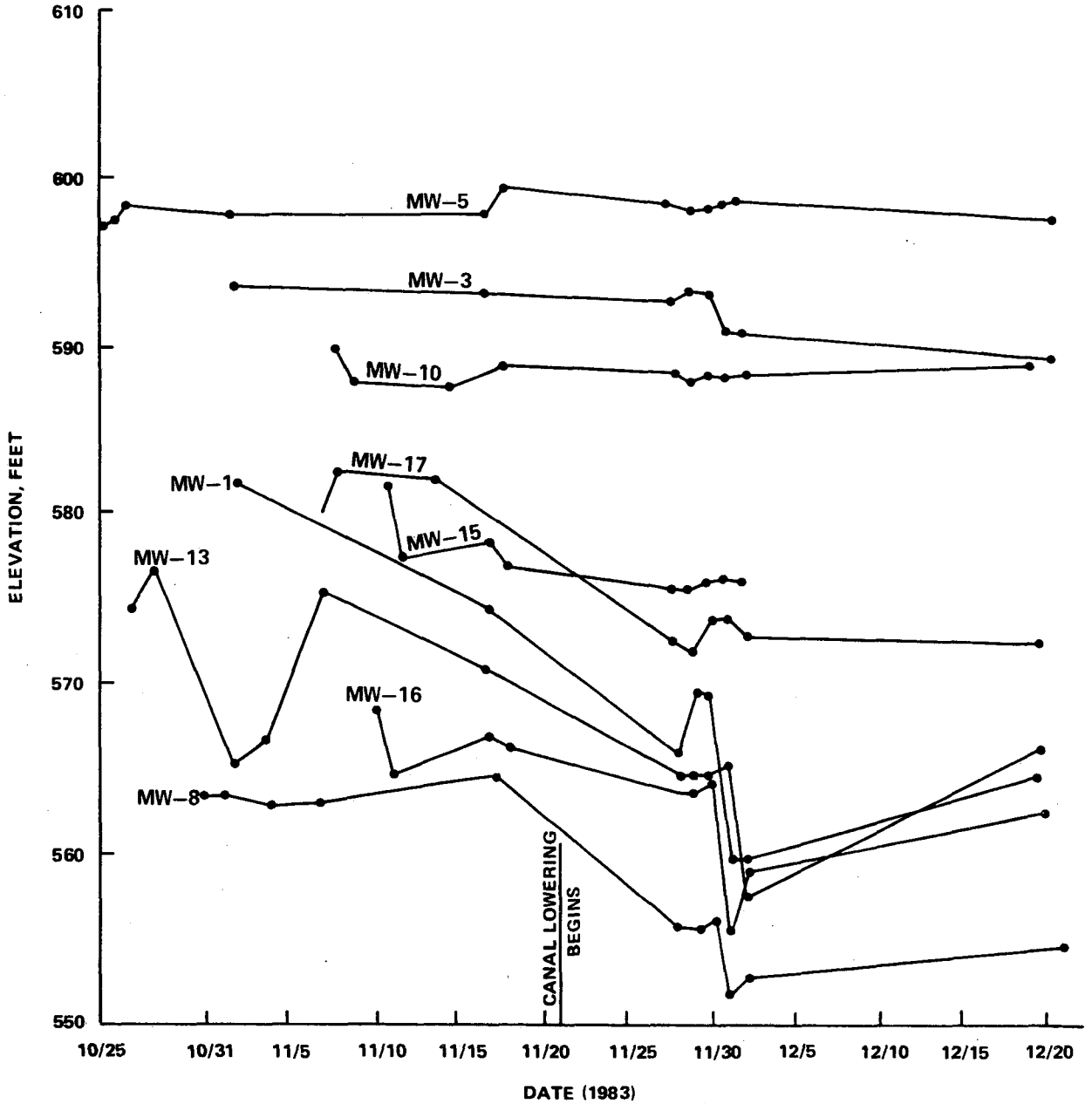
1. READINGS FOR WELLS INSTALLED IN 1983 BEGIN AT TIME OF COMPLETION
2. WELLS MW-2, MW-4, MW-9, AND MW-14 ARE OPEN IN ROCK
3. WELL MW-1 IS SCREENED THROUGH LOWER 3 FEET OF OVERBURDEN AND UPPER 2 FEET OF ROCK

HYDROGRAPHS FOR WELLS
MW-1, MW-2, MW-4, MW-9, AND MW-14

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY: DRS	SCALE: AS SHOWN	PROJ. NO.: 82C4495-3
CHKD. BY: MMD	DATE: 10 JAN 1984	FIG. NO.: 7



NOTES:

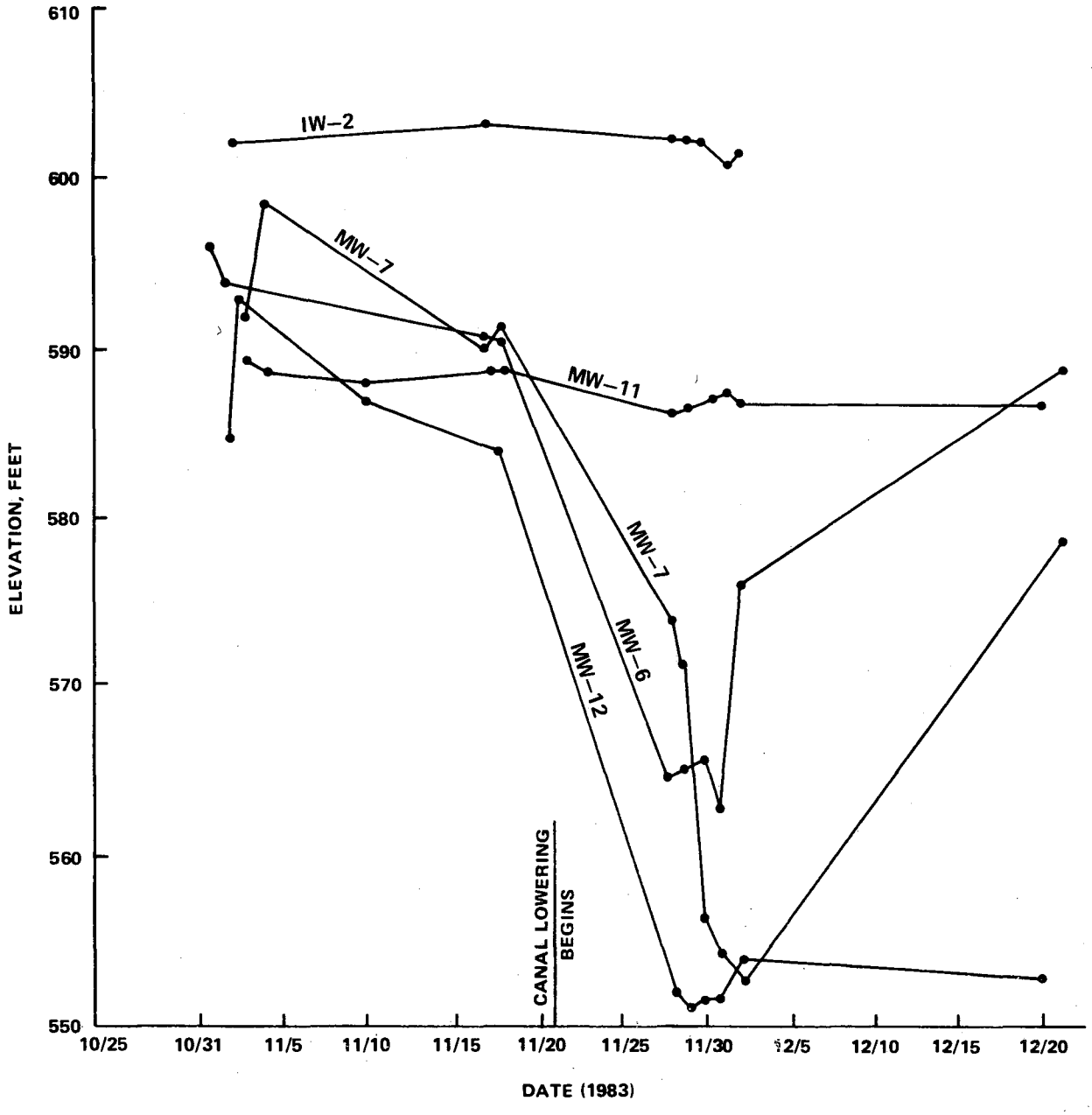
1. READINGS FOR WELLS INSTALLED IN 1983 BEGIN AT TIME OF COMPLETION
2. ALL WELLS ARE OPEN IN ROCK

HYDROGRAPHS FOR WELLS
MW–1, MW–3, MW–5, MW–8, MW–10,
MW–13, MW–15, MW–16, AND MW–17

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	DRS	SCALE:	AS SHOWN	PROJ. NO.:	82C4495–3
CK'D. BY:	MRD	DATE:	10 JAN 1983	FIG. NO.:	8



NOTES:

1. READINGS FOR WELLS INSTALLED IN 1983 BEGIN AT TIME OF COMPLETION
2. WELLS MW–6, MW–7 AND MW–12 ARE SEALED IN ROCHESTER MEMBER
3. WELL MW–11 IS OPEN IN DECEW AND GASPORT MEMBERS ONLY
4. WELL IW–2 IS SCREENED THROUGH LOWER 3 FEET OF OVERBURDEN AND UPPER 2 FEET OF ROCK
5. WELLS MW–11 AND MW–12 ARE NESTED WELLS
6. WELLS IW–2 AND MW–6 ARE NESTED WELLS

HYDROGRAPHS FOR WELLS

IW–2, MW–6, MW–7, MW–11, AND MW–12

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

WAYNE, NEW JERSEY

DR. BY:	ORS	SCALE:	AS SHOWN	PROJ. NO.:	82C4495–3
CK'D. BY:	MRD	DATE:	11 JAN 1983	FIG. NO.:	9

EXPLANATION

MW-4 WCC MONITORING WELLS/BORINGS

578.3 ELEVATION OF GROUND WATER MEASURED 17 AND 18 NOVEMBER 1983

CSL-1 CANAL WATER SAMPLING LOCATION

NOTES:

1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. SEALED ROCK WELLS (MW-6, MW-7, AND MW-12) WERE NOT INCLUDED IN CONTOURING
3. WELL IW-1 WAS NOT INCLUDED IN CONTOURING BECAUSE OF QUESTIONABLE READING
4. WATER LEVEL AT MW-17 WAS MEASURED 14 NOVEMBER AND EXTRAPOLATED TO 17 NOVEMBER FROM HYDROGRAPH, FIGURE 8
5. CONTOURS LOCATED APPROXIMATELY

INFERRED GROUND WATER CONTOUR MAP
NYSEG LOCKPORT COAL TAR SITE

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

Task 3

DR.BY:	DRS	SCALE:	AS SHOWN	PROJ. NO.:	82C4495-3
CK'D. BY:	MRD	DATE:	19 JAN 1984	FIG. NO.:	10

SITE LIMITS

ERIE CANAL

MW-15 578.3
MW-13 570.2
CSL-2
MW-1 574.2
IW-1 587.3
MW-11 588.6
MW-12 583.7
B-2
B-3-2
MW-17 582.0
MW-14 605.2
MW-9 593.4
MW-4 607.7
IW-2 603.0
MW-6 590.2
B-3
MW-10 588.9
B-3
MW-7 590.0
MW-5 597.3
MW-3 593.0
B-1
MW-2 576.0
MW-8 564.5
MW-16 566.9
CSL-1

EXPLANATION

MW-4	WCC MONITORING WELLS/BORINGS
572.3	ELEVATION OF GROUND WATER MEASURED 17 AND 18 NOVEMBER 1983
CSL-1	CANAL WATER SAMPLING LOCATION

NOTES:

1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. SEALED ROCK WELLS (MW-6, MW-7, AND MW-12) WERE NOT INCLUDED IN CONTOURING
3. WELL IW-1 WAS NOT INCLUDED IN CONTOURING BECAUSE OF QUESTIONABLE READING
4. WATER LEVEL AT MW-17 WAS MEASURED 14 NOVEMBER AND EXTRAPOLATED TO 17 NOVEMBER FROM HYDROGRAPH, FIGURE 8
5. CONTOURS LOCATED APPROXIMATELY

0 50 100 150 FT
SCALE

INFERRED GROUND WATER CONTOUR MAP
NYSEG LOCKPORT COAL TAR SITE

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY:	DRS	SCALE: AS SHOWN	PROJ. NO.: 82C4495-3
CK'D. BY:	MRD	DATE: 19 JAN 1984	FIG. NO.: [illegible]-10

MW–15
ND

MW–9
0.005

MW–14
0.007

SITE LIMITS

MW–4
0.014

SWK–13
0.006

B–3

IW–2
0.020

MW–6
0.010

CSL–2

MW–11
0.057

MW–12
0.021

B–2

B–3–2

ERIE CANAL

MW–1
0.085

IW–1
0.017

MW–10
9.17

SUBSTATION

MW–7
6.38

MW–3
1.09

MW–5
.005

MW–17
0.151

MW–2
0.081

RUIN

MW–8
0.014

MW–16
0.008

CSL–1

0 50 100 150 FT
SCALE

EXPLANATION

- MW–4 — WCC MONITORING WELLS/BORINGS
- 0.005 — CONCENTRATION OF TOTAL PHENOL IN PPM
- CSL–1 — CANAL WATER SAMPLING LOCATION

NOTES:

1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. CONTOURS AT 0.01, 0.1, 1, AND 1 PPM
3. CHEMICAL ANALYSIS PERFORMED BY GENERAL TESTING CORP. ON SAMPLES COLLECTED 28 NOVEMBER – 2 DECEMBER 1983 MW–15 WAS SAMPLED ON 21 DECEMBER 1983
4. WELLS IW–1, IW–2, AND MW–11 NOT INCLUDED IN CONTOURING

CONCENTRATIONS OF TOTAL PHENOL IN GROUND WATER
NOVEMBER 1983
NYSEG LOCKPORT COAL TAR SITE

WOODWARD–CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY:	DRS	SCALE:	AS SHOWN	PROJ. NO.:	82C4495–3
CK'D. BY:	MRD	DATE:	19 JAN 1984	FIG. NO.:	11

EXPLANATION

- MW-4 WCC MONITORING WELLS BORINGS
- 0.005 CONCENTRATION OF TOTAL PHENOL IN PPM
- CSL-1 CANAL WATER SAMPLING LOCATION

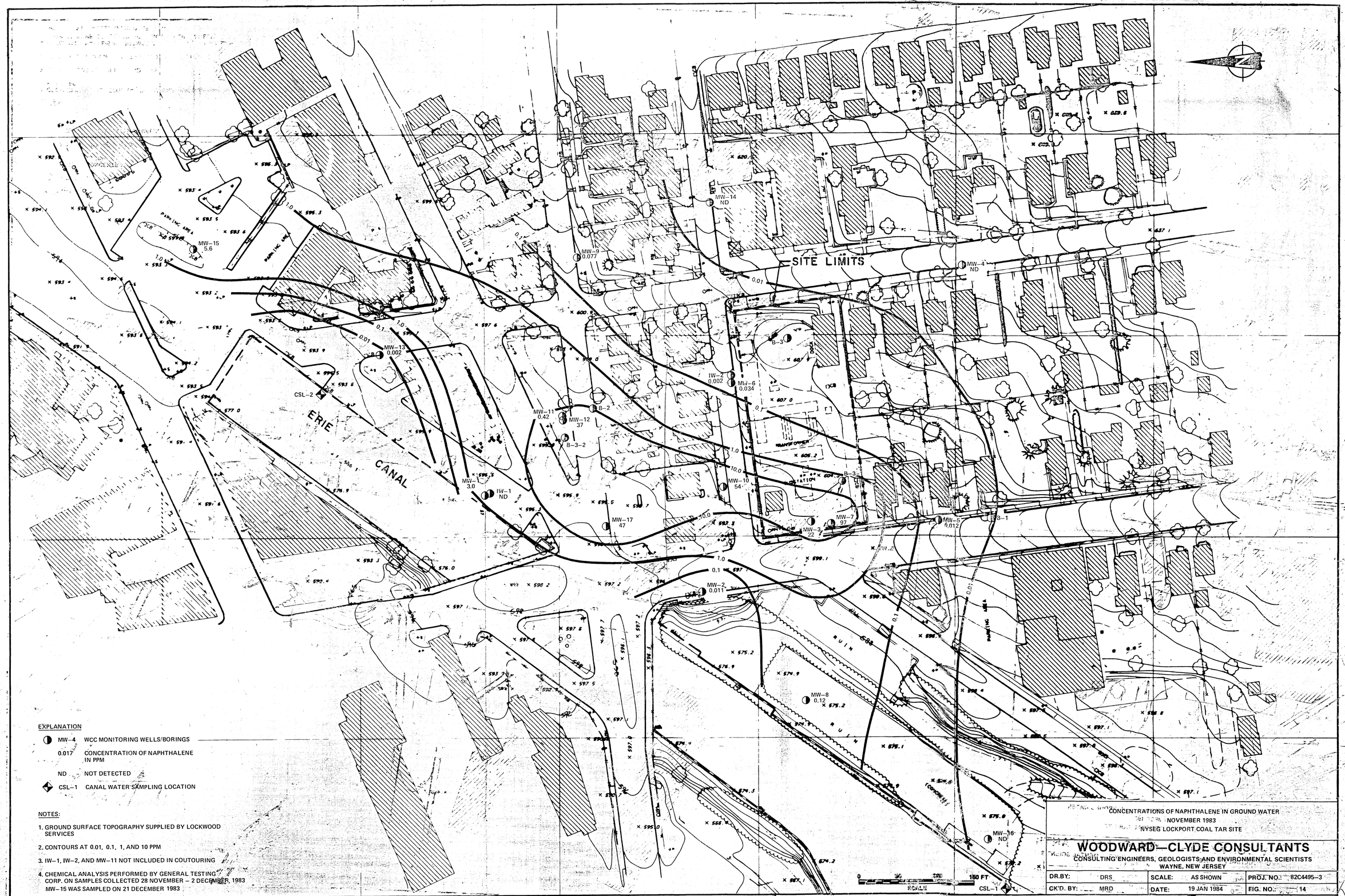
NOTES:

1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. CONTOURS AT 0.01, 0.1, 1, AND 1 PPM
3. CHEMICAL ANALYSIS PERFORMED BY GENERAL TESTING CORP. ON SAMPLES COLLECTED 28 NOVEMBER - 2 DECEMBER 1983 MW-15 WAS SAMPLED ON 21 DECEMBER 1983
4. WELLS IW-1, IW-2, AND MW-11 NOT INCLUDED IN CONTOURING

CONCENTRATIONS OF TOTAL PHENOL IN GROUND WATER
NOVEMBER 1983
NYSEG LOCKPORT COAL TAR SITE

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY:	DRS	SCALE:	AS SHOWN	PROJ. NO.:	82C4495-3
CK'D. BY:	MRD	DATE:	19 JAN 1984	FIG. NO.:	11



EXPLANATION

- MW-4 — WCC MONITORING WELLS/BORINGS
- 0.017 — CONCENTRATION OF NAPHTHALENE IN PPM
- ND — NOT DETECTED
- CSL-1 — CANAL WATER SAMPLING LOCATION

NOTES:

1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. CONTOURS AT 0.01, 0.1, 1, AND 10 PPM
3. IW-1, IW-2, AND MW-11 NOT INCLUDED IN COUTOURING
4. CHEMICAL ANALYSIS PERFORMED BY GENERAL TESTING CORP. ON SAMPLES COLLECTED 28 NOVEMBER – 2 DECEMBER, 1983
   MW-15 WAS SAMPLED ON 21 DECEMBER 1983

CONCENTRATIONS OF NAPHTHALENE IN GROUND WATER
NOVEMBER 1983
NYSEG LOCKPORT COAL TAR SITE

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY:	DRS	SCALE:	AS SHOWN	PROJ. NO.:	82C4495-3
CK'D. BY:	MRD	DATE:	19 JAN 1984	FIG. NO.:	14

SITE LIMITS

ERIE CANAL

MW-15 3.6

MW-13 0.002

MW-14 ND

MW-9 0.077

MW-4 ND

MW-5 0.034

MW-11 0.42

MW-12 37

MW-1 ND

MW-10 54

MW-17 47

MW-3 22

MW-7 97

MW-2 0.011

MW-8 0.12

MW-16 ND

CSL-2

B-2

B-3-2

B-3

B-1

EXPLANATION

- MW-4 — WCC MONITORING WELLS/BORINGS
- 0.017 — CONCENTRATION OF NAPHTHALENE IN PPM
- ND — NOT DETECTED
- CSL-1 — CANAL WATER SAMPLING LOCATION

NOTES:

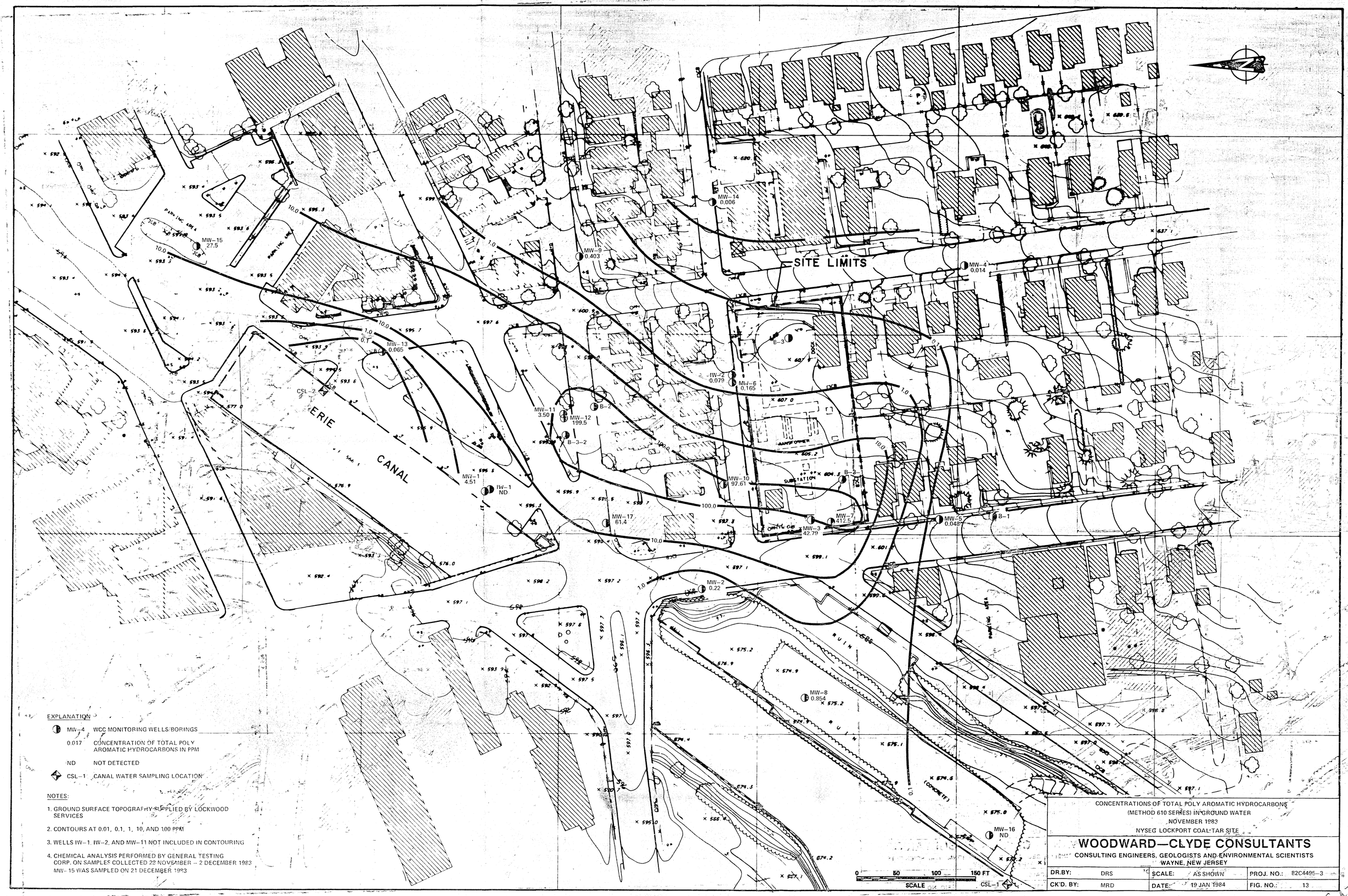
1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. CONTOURS AT 0.01, 0.1, 1, AND 10 PPM
3. IW-1, IW-2, AND MW-11 NOT INCLUDED IN COUTOURING
4. CHEMICAL ANALYSIS PERFORMED BY GENERAL TESTING CORP. ON SAMPLES COLLECTED 28 NOVEMBER – 2 DECEMBER, 1983
   MW-15 WAS SAMPLED ON 21 DECEMBER 1983

SCALE: 0 100 150 FT

CONCENTRATIONS OF NAPHTHALENE IN GROUND WATER
NOVEMBER 1983
NYSEG LOCKPORT COAL TAR SITE

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY: DRS	SCALE: AS SHOWN	PROJ. NO.: 82C4485-3	
CK'D. BY: MRO	DATE: 19 JAN 84	FIG. NO.: 14	



EXPLANATION

- MW-4 WCC MONITORING WELLS/BORINGS
- 0.017 CONCENTRATION OF TOTAL POLY AROMATIC HYDROCARBONS IN PPM
- ND NOT DETECTED
- CSL-1 CANAL WATER SAMPLING LOCATION

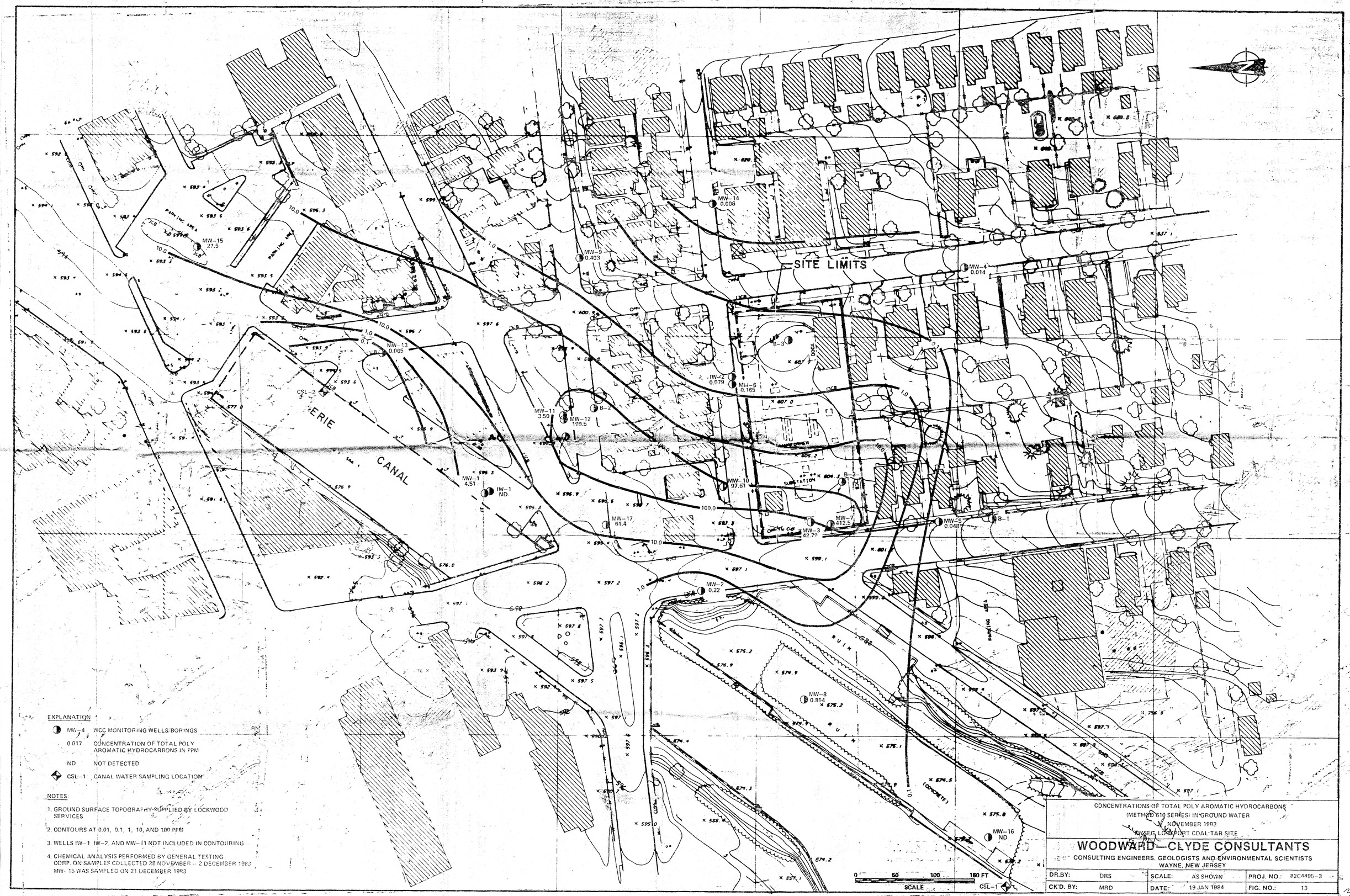
NOTES:

1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. CONTOURS AT 0.01, 0.1, 1, 10, AND 100 PPM
3. WELLS IW-1, IW-2, AND MW-11 NOT INCLUDED IN CONTOURING
4. CHEMICAL ANALYSIS PERFORMED BY GENERAL TESTING CORP. ON SAMPLES COLLECTED 28 NOVEMBER – 2 DECEMBER 1983 MW-15 WAS SAMPLED ON 21 DECEMBER 1983

CONCENTRATIONS OF TOTAL POLY AROMATIC HYDROCARBONS
(METHOD 610 SERIES) IN GROUND WATER
NOVEMBER 1983
NYSEG LOCKPORT COAL-TAR SITE

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY:	DRS	SCALE:	AS SHOWN	PROJ. NO.:	82C4495-3
CK'D. BY:	MRD	DATE:	19 JAN 1984	FIG. NO.:	13



EXPLANATION

- MW-4 — WCC MONITORING WELLS/BORINGS
- 0.017 — CONCENTRATION OF TOTAL POLY AROMATIC HYDROCARBONS IN PPM
- ND — NOT DETECTED
- CSL-1 — CANAL WATER SAMPLING LOCATION

NOTES:

1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. CONTOURS AT 0.01, 0.1, 1, 10, AND 100 PPM
3. WELLS IW-1, IW-2, AND MW-11 NOT INCLUDED IN CONTOURING
4. CHEMICAL ANALYSIS PERFORMED BY GENERAL TESTING CORP. ON SAMPLES COLLECTED 28 NOVEMBER - 2 DECEMBER 1983
   MW- 15 WAS SAMPLED ON 21 DECEMBER 1983

CONCENTRATIONS OF TOTAL POLY AROMATIC HYDROCARBONS (METHOD 610 SERIES) IN GROUND WATER
NOVEMBER 1983
NYSEG, LOCKPORT COAL TAR SITE

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY:	DRS	SCALE:	AS SHOWN	PROJ. NO.:	82C4495-3
CK'D. BY:	MRD	DATE:	19 JAN 1984	FIG. NO.:	13

EXPLANATION

◑	MW–4	WCC MONITORING WELLS/BORINGS
	0.017	CONCENTRATION OF TOTAL VOLATILE AROMATICS IN PPM
	ND	NOT DETECTED
✦	CSL–1	CANAL WATER SAMPLING LOCATION

NOTES:

1. GROUND SURFACE TOPOGRAPHY SUPPLIED BY LOCKWOOD SERVICES
2. CONTOURS AT 0.01, 0.1, 1.0, AND 10 PPM
3. CHEMICAL ANALYSIS PERFORMED BY GENERAL TESTING CORP. ON SAMPLES COLLECTED 28 NOVEMBER – 2 DECEMBER 1983 MW–15 WAS SAMPLED ON 21 DECEMBER 1983
4. WELLS IW–1, IW–2, AND MW–11 NOT INCLUDED IN CONTOURING

CONCENTRATIONS OF TOTAL VOLATILE AROMATICS
(METHOD 602 SERIES) IN GROUND WATER
NOVEMBER 1983
NYSEG LOCKPORT COAL TAR SITE

WOODWARD–CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY:	DRS	SCALE:	AS SHOWN	PROJ. NO.:	82C4495–3
CK'D. BY:	MRD	DATE:	19 JAN 1984	FIG. NO.:	12

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING B-3-1 **SHEET** 1 **OF** 3

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, NEW YORK		ELEVATION AND DATUM: 603.39 FT.	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: J. THEW	DATE STARTED: 11/16/83	DATE FINISHED: 11/17/83
DRILLING EQUIPMENT: TRAILER MOUNTED CME 45 HYDRAULIC ROTARY DRILL RIG		COMPLETION DEPTH: 51.5 FT	ROCK DEPTH: 16.3 FT
SIZE AND TYPE OF BIT: 3 7/8/2 1/2 TRICONE ROLLER BITS	SIZE AND TYPE CORE BARREL: 3 IN DIAMOND IMPREGNATED BIT	NO. SAMPLES: N/A	UNDIST: N/A CORE: 34 FT
CASING: 4 IN HW/3 IN NW FLUSH JOINT	NX DOUBLE TUBE C.B.	WATER LEVEL: N/A	COMPL: N/A 24 HR: N/A
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: 35° FROM VERTICAL N 70 W	
SAMPLER: N/A		INSPECTOR: DAVID MUSCALO	
SAMPLER HAMMER: WEIGHT N/A	DROP N/A		

DESCRIPTION	PENETRATION	DEPTH, FT	SAMPLES: TYPE NO. LOS	RECOV, FT	POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	CRACK: BROKEN	CRACK: SOUND	ROD	CORE TIME MIN/FT	REMARKS
		1									DRILLER TURNED 4 IN. NW CASING TO 5 FT
		2									DRILLER TELESCOPED 3 IN CASING TO 10 FT
		3									NO WASH RETURN
		4									DRILLER TURNED 3 IN. CASING TO 15.4 FT
		5									DRILLED THROUGH OBSTRUCTION AT 5 FT
		6									NO WASH RETURN
		7									DRILLED THROUGH OBSTRUCTION AT 8 FT
		8									
		9									
		10									NO WASH RETURN
		11									
		12									
		13									
		14									NO WASH RETURN
		15									DRILLER TURNED 3 IN. CASING TO 17.6 FT
		16									COAL TAR ODOR AND IRIDESCENT SLICKS ON WATER
TOP OF ROCK 16.3 FT ELEV. 589.27 FT. MSL. Rock highly fractured 16.3 FT to 17.6 FT. Light gray DOLOMITE (Gosport Member) Fractures weathered - contain clay		17									
		18	NX RUN-1 C.B.	4.0		100 %		ROCK	100 %	2.5 MIN/FT.	DRILLS ROUGH AS FRACTURED ROCK
		19									FRACTURES AT 0°, 70° AND 60° FROM HORIZONTAL AXIS
		20									

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING B-3-1 SHEET 2 OF 3

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOG	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS	@ POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: BROKEN	ROCK CORE: CRACK: COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
	21										COLOR OF WASH WATER ALTERNATES FROM MILKY WHITE TO DARK GRAY CORE BLOCK AT 21.6 FT
Light gray DOLOMITE (Gasport Member) Fracture weathered	22	NX RUN-2 C.B.	5.0			100%		POOR	100%	2.5 MIN/FT	SINGLE FRACTURE AT ≈ 55° FROM HORIZONTAL AXIS. NUMEROUS STYLOLITES
	23										
	24										
	25										
	26										
No fractures	27	NX RUN-3 C.B.	5.0			100%		EXCELLENT	100%	2.5 MIN/FT	No fractures numerous STYLOLITES
	28										
	29										
	30										
	31										
elev. 574.39 FT M.S.L. Fractures at 70° weather with some clay – Fractures at 0° and 80° slightly weathered Dark gray shaly DOLOMITE (De Cew Member)	32	NX RUN-4 C.B.	5.0			100%		FAIR TO POOR	80%	2.5 MIN/FT	WASH WATER COLOR CHANGE AT 33 FT FROM MILK WHITE TO MEDIUM GRAY BACK TO MILKY WHITE AT 34 FT THEN GRAY FRACTURES AT 0° AND 70° TO HORIZONTAL AXIS COAL TAR ODOR ON FRACTURE SURFACES
	33										
	34										
	35										
	36										
	37	NX RUN-5 C.B.	5.0			100%		FAIR	100%	2.5 MIN/FT	ONE FRACTURE 80° TO HORIZONTAL AXIS TWO FRACTURES 60° TO HORIZONTAL AXIS COAL TAR ODOR ON FRACTURE SURFACES AND ALONG FRACTURES WHILE CORE WAS [illegible] KNOWN
	38										
	39										
	40										
	41										
Irregular fracture badly weathered 70° FRACTURES weathered	42	NX RUN-6 C.B.	5.0			100%		POOR	95%	2.5 MIN/FT	STRONG COAL TAR ODOR AT START OF RUN – WASH WATER YELLOW-BROWN WITH COAL TAR GOBS
	43										
	44										
	45										

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR. RESIST. BL/6IN.	qu POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK SKETCH	ROCK CORE: CRACK COND	ROCK CORE: RQD	ROCK CORE: CORE TIME /FT	REMARKS
Dark gray shaly DOLOMITE (De Cew Member)		46, 47, 48	NX RUN-7 C.B.	5.0			100%		FAIR	100%	2.5 MIN/FT	IRREGULAR 0° FRACTURES — 3 AT 70° FRACTURES PARALLEL TO BEDDING - ALL FRACTURES SATURATED WITH COAL TAR
elev. 561.39 FT. MSL. Dark gray limey SHALE (Rochester Member) single fracture slightly weathered		49, 50, 51										ONE 55° FRACTURE - CORE HAS STRONG COAL TAR ODOR AND IRIDESCENT SHEEN
BOREHOLE TERMINUS 51.5 FT. elev. 558.79 FT. MSL.		52										

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LOG OF BORING MW-7 **SHEET** 1 **OF** 3

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, NEW YORK		ELEVATION AND DATUM: 600.48 FT	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: J. THEW	DATE STARTED: 11/3/83	DATE FINISHED: 11/3/83
DRILLING EQUIPMENT: TRAILER MOUNTED CME 45 HYDROROTARY DRILL RIG		COMPLETION DEPTH: 55.0FT	ROCK DEPTH: 10.7 FT
SIZE AND TYPE OF BIT: 3 7/8 TRICONE ROLLER BIT	SIZE AND TYPE CORE BARREL: N/A	NO. SAMPLES: DIST 3	UNDIST: NONE CORE: NONE
CASING: 4 IN. HW FLUSH JOINT		WATER LEVEL: FIRST ≈ 9 FT COMPL 9.6 FT 24 HR 1.75 FT	
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 1 3/8 IN I.D. / 2.0 in. O.D. SPLIT BARREL		INSPECTOR: DAVID MUSCALO	
SAMPLER HAMMER: WEIGHT 140 LB	DROP 30 IN.		

DESCRIPTION	SU=2 FT	PENETROMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS/FT	BY POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SHATCH	ROCK CORE: CRACK: COND	ROCK CORE: ROD	ROCK CORE: CORE TIME FT	REMARKS
CRUSHED STONE													
Red-brown f sandy SILT with trace clay (Damp) faint coal tar odor (FILL)			1	S-1	0.5	3 2 2							DRILLER AUGERED TO 10 FT. DRILLER DRILLED 6 IN TEMPORARY CASING TO 11.0 FT
BOULDER			2 3 4 5										
Yellow-brown to black f sandy SILT with coal tar (strong coal tar odor) (Damp) (FILL)			6 7	S-2	1.5	3 2 2							
Red-brown f sandy CLAY with trace to some gravel - trace silt - coal tar odor - (WET) (FILL)			8 9 10	S-3	1.0	3 2 2							SPLIT BARREL REFUSAL AT 10.7 FT DRILLER BEGAN USING 3 7/8 IN ROLLER BIT AT 10.7 FT
TOP OF ROCK 10.7 FT elev. 589.78 FT. M.S.L.			11										DRILL RATE= 10 MIN/FT 10.7 TO 12.5 FT. WASH MILKY WHITE IN COLOR NO ODOR.
Light gray DOLOMITE (Gasport Member)			12 13 14 15 16 17 18 19 20										DRILL RATE= 6 MIN/FT 12.5 TO 17.5 FT. MILKY COLORED WASH

2-IN. I.D. BLACK STEEL PIPER TO 1.79 FT ABOVE GROUND SURFACE

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LOG OF BORING MW-7 SHEET 2 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLS/FT	% POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SKETCH	ROCK CORE: CRACK: COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
Light gray DOLOMITE (Gasport Member)		21 22 23 24 25 26 27										DRILL RATE = 6 MIN/FT 17.5 TO 22.5 FT WASH WATER MILKY COLORED ROCK FRAGMENTS WHITE TO LIGHT GRAY DRILL RATE = 4 MIN/FT 22.6 TO 27.5
elev. 572.98 FT. M.S.L.												
Dark gray shaly DOLOMITE (DeCew Member)	2-IN I.D. BLACK STEEL RISER TO 1.79 FT ABOVE GROUND SURFACE	28 29 30 31 32 33 34 35 36 37 38 39 40										WASH WATER COLOR CHANGE FROM MILKY WHITE TO MEDIUM GRAY AT 27.5 FT ROCK FRAGMENTS DARK AND LIGHT DRILL RATE = 8 MIN/FT 27.5 TO 32.5 WASH COLOR CHANGE TO DARK GRAY AT 33.0 FT DRILL RATE = 6 MIN./FT 32.5 TO 37.5 WASH COLOR DARK GRAY-ROCK FRAGMENTS ALL DARK COLORED
elev. 560.48 FT. M.S.L.												
Dark gray limey DOLOMITE (Rochester Member)	BENTONITE SEAL SAND	41 42 43 44 45										DRILL RATE = 4 MIN/FT 37.5 TO 42.5

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LOG OF BORING MW-7 SHEET 3 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS	⊕ POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SKETCH	ROCK CORE: CRACK: COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
Dark gray limey SHALE (Rochester Member)	2-IN. I.D. SLOTTED SCREEN 44.5-54.5 FT	46 47 48 49 50 51 52 53 54 55										DRILL RATE = 3 MIN/FT 42.5 – 47.5 FT DRILL RATE = 3 MIN/FT 47.5 – 52.5 DRILL RATE = 3 MIN/FT 52.5 TO 55.0 FT
BOREHOLE TERMINUS 55.0 FT ELEV. 545.48 FT. M.S.L.												

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LOG OF BORING B-3-2 **SHEET** 1 **OF** 3

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, NEW YORK		ELEVATION AND DATUM: 595.89 FT.	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: J. THEW	DATE STARTED: 15 NOVEMBER 1983	DATE FINISHED: 16 NOVEMBER 1983
DRILLING EQUIPMENT: TRAILER MOUNTED C.M.E. 45 HYDROROTARY RIG		COMPLETION DEPTH: 50.0 FT	ROCK DEPTH: 10.0FT
SIZE AND TYPE OF BIT: 2 1/2 IN. TRICONE ROLLER BIT 9 AND 4 IN. DIA. IMPREGNATE DIAMOND	SIZE AND TYPE CORE BARREL: 2 IN. DIAMOND EMT. DESIGNATED B.T	NO. SAMPLES: DIST. N/A	LINEAR: N/A CORE: 39.5 FT
CASING: 4 IN HW/3 IN NW FLUSH JOINT	NX DOUBLE TUBE C.B	WATER LEVEL: FIRST N/A	COMPL. N/A 24 HR N/A
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: 35° FROM VERTICAL N70W	
SAMPLER: N/A		INSPECTOR: DAVID MUSCALO	
SAMPLER HAMMER: WEIGHT N/A	DROP N/A		

DESCRIPTION	PENETRATION	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR. RESIST BLOWS/FT	POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK SKETCH	ROCK CORE: CRACK COND	ROCK CORE: RQD	ROCK CORE: CORE TIME /FT	REMARKS
	NONE INSTALLED	1 2 3 4 5 6 7 8 9 10										DRILLER TURNED 5.0FT SECTION OF 4 IN HW CASING TO 5FT DRILLER TELESCOPED 3 IN. NW CASING TO FIVE FT. DRILLER MADE UNSUCCESSFUL ATTEMPT TO OBTAIN SAMPLE AT 5 FT - UNABLE TO DRIVE SPOON DRILLER DRILLED OUT 3 IN CASING WITH 2 1/2 IN. ROLLER BIT DRILLER DRILLED CASING TO TOP OF ROCK AT 10 FT. NW TO 10.4FT ROLLER BITTED TO 10.5 FT - BEGAN ROCK CORING AT 10.5FT FRACTURES 0° and 30° WASH WATER MILKY WHITE IN COLOR
TO OF ROCK 10.0 FT elev. 587.23 FT. M.S.L. Fractured weathered		11	RUN-1 CB	1.2			100%		POOR	0	10 min/ft	DRILL RATE = 10 MIN/FT 10.5 to 11.7 FT
Light gray DOLOMITE (Gasport Member) Fractures slightly weathered		12 13 14 15 16 17	NX RUN-2 CB	5.1			100%		FAIR	98%	2.5 min/FT	MILKY COLORED WASH WATER DRILLER DRILLED CASING TO 11.3 FT. MOST FRACTURES ≈ 55 TO 50° LOWEST 30 TO 35° TO HORIZONTAL AXIS SINGLE FRACTURE AT 55° TO HORIZONTAL AXIS. DOLOMITE FOSSILIFEROUS
Fracture slightly weathered		18 19 20	NX RUN-3 CB	5.0			100%		GOOD	100%	3 min/FT	

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LOG OF BORING B-3-2 SHEET 2 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES TYPE NO. LOG	SAMPLES RECOV. FT	SAMPLES PENETR. RESIST. BLS/IN.	∅ POCKET PENETROMETER TSF	ROCK CORE RECOVERY %	ROCK CORE CRACK SKETCH	ROCK CORE CRACK COND	ROCK CORE RQD	ROCK CORE CORE TIME FT	REMARKS
		21										WASH WATER MILKY WHITE IN COLOR
Light gray Dolomite (Gasport Member) Fractures unweathered Massive dolomite with several shale lenses - mineralized vugs at 31 FT - 32 FT		22 23 24 25 26 27 28 29 30 31	NX RUN-4 C.B.	5.0			100%		GOOD	100%	2.5 MIN/FT	DOLOMITE FOSSILIFEROUS FRACTURES ≥ 55° TO HORIZONTAL AXIS WASH WATER COLOR MILK WHITE - GRAY TO 27.8 FT
			NX RUN-5 C.B.	5.0			100%		POOR TO FAIR	98%	8.0 MIN/FT	SHALE LENS AT 26 TO 26.8 FT FRESHLY PULLED CORE HAS PETROLEUM ODOR PARTIAL LOSS OF DRILL WATER AT 30 FT. FRACTURES IN SHALE ≥ 55°, ONE ≈ 0° TO HORIZONTAL AXIS.
elev. 509.04 FT. M.S.L.												
Dark gray shaly DOLOMITE (De Cew Member)		32 33 34 35 36 37 38 39 40 41	NX RUN-6 C.B.	5.0			100%		FAIR	100%	3.0 MIN/FT	LOSS OF DRILLING FLUID AT 32 FT TO 38 FT FAINT COAL TAR ODOR IN SHALE IRIDESCENT SHEEN ON CORE FRACTURES 10 TO 30° WASH MEDIUM GRAY IN COLOR
elev. 503.85 FT. M.S.L.			NX RUN-7 C.B.	5.0			100%		FAIR TO GOOD	100%	3. MIN/FT	COAL TAR ODOR IN CORE - IRRIDESCENT SHEEN ON CORE WASH WATER HAS IRRIDESCENT SLICKS FRACTURE 20° TO HORIZONTAL AXIS
Irregularly shaped mineralized vugs at 41.5 FT with attendant strong coal tar odor Dark gray limey SHALE (Rochester Member)		42 43 44 45	NX RUN-8 CB	5.0			100%		FAIR POOR	100%	3 MIN/FT	DARK GRAY WASH WATER STRONG COAL TAR ODOR AT FRESH BREAKS IN CORE INCLINATION OF FRAC-

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LOG OF BORING B-3-2 SHEET 3 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV, FT	SAMPLES: PENETR RESIST BLS/6IN.	& POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SKETCH	ROCK CORE: CRACK: COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
		46										TILTED 60° AND 30° TO HORIZONTAL AXIS
		47	NX RUN - 9 CB	3.2			100%		EXCELLENT	100%	3 MIN/FT	COAL TAR ODOR ON CORE AND ALONG BROKEN SURFACES OF CORE
		48										
		49										
BOREHOLE TERMINATED 50.0 FT elev. 552.59 FT M.S.L.		50										UPON COMPLETION OF BORING, DRILLER GROUTED CORE HOLE TO SURFACE

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LOG OF BORING MW-5 **SHEET** 1 **OF** 3

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, NEW YORK		ELEVATION AND DATUM: 604.91 FT.	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: MR. J. THEW	DATE STARTED: 10/25/83	DATE FINISHED: 10/26/83
DRILLING EQUIPMENT: TRAILER MOUNTED C.M.E. 45 HYDROROTARY DRILL RIG		COMPLETION DEPTH: 50.0 FT.	ROCK DEPTH: 18.6 FT
SIZE AND TYPE OF BIT: 3.25 I.D. - 6.25 O.D. HOLLOW STEM AUGER	SIZE AND TYPE CORE BARREL: 3 IN. DIAMOND SET NON-CORING BIT	NO. SAMPLES: DIST 5	UNDIST: NONE CORE: NONE
CASING: 4 IN. I.D. HW FLUSH JOINT	NX DOUBLE TUBE C.B.	WATER LEVEL: FIRST 7.9 FT	COMPL 7.6 FT 24 HR 6.9 FT
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERICAL	
SAMPLER: 2 IN. O.D./1 3/8 IN. I.D. SPLIT BARREL		INSPECTOR: DAVID MUSCALO	
SAMPLER HAMMER: WEIGHT 140 LB	DROP 30 IN.		

DESCRIPTION	S.U. = 0	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	RECOV, FT	PENETR RESIST BLOWS	⊕ POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	CRACK: SKETCH	CRACK: COND	ROD	CORE TIME FT	REMARKS
6 IN. CONCRETE (SIDEWALK)													
ASH FILL													
Red-brown f sandy CLAY with trace organics (Plastic) (moist)			1	S-1	0.9 FT	2 2 1							
			2										
			3										
			4										
Red-brown f sandy CLAY with trace organics (Plastic) (MOIST) (Glacio-lacustrine)			5	S-2	1.1 FT	2 2 3							
			6										
			7										
			8										
			9										DRILLER NOTE: CHANGE IN DRILLING PRESSURE AT 9FT
Red-brown clayey f-m SAND (WET) (Glacio-lacustrine)			10	S-3	1.5FT	2 3 4							
			11										
			12										
			13										
Red-brown f-m sandy f-c GRAVEL with trace to some clay (WET) (TILL)			14										DRILLER NOTE: CHANGE IN DRILLING PRESSURE AT 14 FT
			15	S-4	1.5FT.	9 40 36							
			16										DRILLER SET 4 IN DIA TEMPORARY CASING INTO TOP OF ROCK TO 18.9FT
			17										
			18										Driller DRILLED 3 3/4 IN ⌀ Socket into rock to 21.8 FT
TOP OF ROCK 18.6 FT elev. 586.31 FT. M.S.L.			19										DRILLER GROUTED 2 IN. O.D. BLACK STEEL SCHD. 40 PIPE INTO ROCK SOCKET TO 21.8 FT.
			20										

3-IN. I.D. STEEL RISER PIPE TO 0.5FT BELOW GROUND SURFACE

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LOG OF BORING MW-5 SHEET 2 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR. RESIST. BLOWS/FT.	W. POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SKETCH	ROCK CORE: CRACK: COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
Light-gray DOLOMITE (Gasport Member)		21										DRILLER BEGAN USING A NON-CORING DIAMOND SET BIT
		22										DRILL RATE = 4 MIN/FT. TO 23 FT
		23										WASH MILKY colored – no odor TO 30 FT.
		24										LIGHT GRAY DOLOMITE FRAGMENTS IN WASH
		25										DRILLER REPORTS SEVERAL PERTURBATIONS IN DRILLING RATE
		26										
		27										
		28										
		29										
		30										DRILL RATE = 4 TO 4.5 MIN./FT 29 FT – 33 FT
		31										LIGHT GRAY DOLOMITE FRAGMENTS IN WASH – NO ODOR TO 35 FT
		32										
		33										
elev. 570.91 FT. M.S.L.		34										WASH COLOR CHANGE TO DARK GRAY – DOLOMITE AND SHALE FRAGMENTS IN WASH
Dark gray shaly DOLOMITE (DeCew Member)		35										
		36										
		37										DRILL RATE 3 MIN/FT 33 FT TO 44 FT
		38										FAINT PETROLEUM ODOR IN WASH FRAGMENTS
		39										
		40										
		41										
		42										
elev. 561.91 FT. M.S.L.		43										FAINT PETROLEUM ODOR.
Medium to dark gray limey SHALE (Rochester Member)		44										DRILL RATE = 8 MIN/FT. FROM 43 – 48 FT.
		45										

OPEN ROCK 21.8 – 50.0 FT

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LOG OF BORING MW-5 **SHEET** 3 **OF** 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR. RESIST. BL/6IN.	POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK SKETCH	ROCK CORE: CRACK COND	ROCK CORE: RQD	ROCK CORE: CORE TIME	REMARKS
Medium to Dark gray limey SHALE (Rochester Member)	OPEN ROCK 21.8 - 50.0 FT	46										STRONG COAL TAR ODOR FOR ≈ 15 SEC AT 46 FT.
		47										STRONG COAL TAR ODOR AT 47.5 FT - IRIDESCENT SHEEN IN WASH WATER
		48										
		49										
		50										
BOREHOLE TERMINUS 50.0 FT elev. 554.91 FT. M.S.L.												OBSERVED COAL TAR COATING ON D.L.L RODS WITH ATTENDANT STRONG COAL TAR ODOR

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LOG OF BORING MW-6 **SHEET** 1 **OF** 3

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE - LOCKPORT, NEW YORK		ELEVATION AND DATUM: 604.41 FT.	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: J. THEW	DATE STARTED: 11/1/83	DATE FINISHED: 11/1/83
DRILLING EQUIPMENT: TRAILER MOUNTED C.M.E. 45 HYDROROTARY RIG		COMPLETION DEPTH: 50.0 FT	ROCK DEPTH: 14.8 FT
SIZE AND TYPE OF BIT: 3 7/8 TRICONE ROLLER BIT	SIZE AND TYPE CORE BARREL: 3 IN. DIAMOND SET NON-CORING BIT	NO. SAMPLES: DIST 3	UNDIST: NONE CORE: NONE
CASING: 4 IN. FLUSH JOINT HW	NX DOUBLE TUBE C.B.	WATER LEVEL: FIRST ≈ 10 FT	COMPL 8.4 FT 24 HR 10.5 FT
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 1 3/8 IN ID / 2 IN. OD SPLIT BARREL		INSPECTOR: DAVID MUSCELLO	
SAMPLER HAMMER: WEIGHT 140 LB	DROP 30 IN.		

DESCRIPTION	S.U. = 0 FT	FORMATION	DEPTH, FT	SAMPLES: TYPE NO.	SAMPLES: RECOV. FT	SAMPLES: BLOWS PER 6 INCHES	IN POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SECTION	ROCK CORE: CRACK: COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
ASPHALT OVER BRICK PAVEMENT													
Gray f sandy CLAY with piece of cobble and trace gravel and m-sand (MOIST) (FILL) coal tar odor			1	S-1	1.0	4 3 3							COAL TAR ODOR AND OIL SLICKS OBSERVED AS CASING ADVANCED BY DRILLING
			2										
			3										
			4										
			5										DRILLER DRILLED CASING TO 5 FT
Red-brown silty f SAND with trace clay and trace to some angular rock fragments (DAMP) (TILL)			6	S-2	1.3	5 5 5							
			7										
			8										
			9										
Red-brown, Silty f-m SAND (WET) (Glacio-Fluvial)			10										
			11	S-3	0.5	7 10 11							DRILLER DRILLED CASING TO 10 FT
			12										
			13										Red-brown silt SAND WITH WATER SOME GRAVEL 12.5 - 14.8 FT
			14										
TOP OF ROCK 14.8 FT elev. 589.61 FT. M.S.L. Light gray DOLOMITE (Gasport Member)			15	S-4	0	50/0"							SPLIT BARREL REFUSED AT 14.8 FT - NO RECOVERY - 50/6 IN.
			16										DRILLER DRILLED CASING TO 15.0
			17										DRILLER BEGAN ROCK DRILLING WITH 3 7/8 IN TRICONE ROLLER BIT AT 14.8 FT MUDDY WATER WITH WATER
			18										
			19										
			20										

2 IN. I.D. BLACK STEEL RISER PIPE TO 0.5 FT BELOW GROUND SURFACE

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LOG OF BORING mw-6 SHEET 2 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOG	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS/FT	SAMPLES: ◎ POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: BEDDING	ROCK CORE: CRACK: COND	ROCK CORE: ROD	ROCK CORE: CORE TIME FT	REMARKS
Light gray DOLOMITE (Gasport Member)	0.010 IN SLOTS SET 39.5-49.5 Ft AND BENTONITE SEAL; 2 IN. I.D. BLACK STEEL RISER PIPE TO 0.5 BELOW GROUND SURFACE	21 22 23 24 25 26 27 28 29										WEATHERED ZONE 17-17.4 FT (Brown weath.) DRILL RATE = 8 MIN/FT TO 18 FT 7 MIN/FT 18-20 FT WEATHERED ZONE 19.6-19.4 FT (Red-brown mottled) DRILLER BEGAN USING NON-CORING CORE BARREL AT 20 FT DRILL RATE = 4 min/FT 20-22.8 FT; 2.5 MIN/FT 22.8-25. FT WASH WATER MILKY COLORED DRILL RATE = 4 min/ft 25-30 DRILLER REAMED BOREHOLE TO 7 IN FROM 20-30 FT.
elev. 574.41 FT. M.S.L.		30										WASH WATER COLOR CHANGE AT 30 FT FROM MILKY WHITE TO MEDIUM GRAY
Dark gray sholy DOLOMITE (De Cew Member)		31 32 33 34 5 36										DRILL RATE = 3 MIN/FT 30-33.5 FT DRILLER CONTINUED TO DRILL WITH 3 7/8 IN. ROLLER BIT FROM 33.5 FT TO TERMINAL DEPTH DRILL RATE = 4 MIN/FT 33.5-36.5 36.5-38.0 3 MIN/FT
elev. 567.91 FT. M.S.L.		37										COLOR CHANGE IN WASH FROM MEDIUM GRAY TO DARK GRAY AT 36.5 FT
Dark gray limey SHALE (Rochester Member)		38 20 41 42 43 44 45										STRONG COAL TAR ODOR AT 36.5 FT AND 37.5 FT 38-43 FT DRILL RATE = 2.5 MIN/FT. COAL TAR ODOR IN WASH AT 44.0 FT DRILL RATE 2 MIN/FT 43-48 FT WASH DARK GRAY ROCK FRAGMENT

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LOG OF BORING mw-6 SHEET 3 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS/FT	% POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SKETCH	ROCK CORE: CRACK: CORD	ROCK CORE: ROD	ROCK CORE: CORE TIME FT	REMARKS
Dark gray limey SHALE (Rochester Member)	CEM. SAND 2-in. PD. WELL SCREEN WITH	46 47 48 49 50										STRONG COAL TAR ODOR 49.0 FT OBSERVED COAL TAR COATING INSIDE CASING WHEN CASING WAS PULLED
BOREHOLE TERMINUS 50.0 FT elev. 554.41 FT. M.S.L.												

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LOG OF BORING MW-8 **SHEET** 1 **OF** 2

Field	Entry
PROJECT AND LOCATION	LOCKPORT COAL TAR SITE LOCKPORT, NEW YORK
ELEVATION AND DATUM	574.47 FT.
PROJECT NO.	82C4495
DRILLING AGENCY	NORTH STAR DRILLING CO.
FOREMAN	MR. J. THEW
DATE STARTED	10/31/83
DATE FINISHED	10/31/83
DRILLING EQUIPMENT	TRAILER MOUNTED C.M.E. 45 HYDROROTARY RIG
COMPLETION DEPTH	30.0 FT
ROCK DEPTH	4.3 FT
SIZE AND TYPE OF BIT	3 7/8 IN. TRICONE ROLLER BIT
SIZE AND TYPE CORE BARREL	3 IN. DIAMOND SET NON-CORING BIT; NX DOUBLE TUBE C.B.
NO. SAMPLES	DIST 1; UNDIST NONE; CORE NONE
CASING	4 IN. HW FLUSH JOINT
WATER LEVEL	FIRST N/A; COMPL. 10.75 FT; 24 HR. 10.9 FT
CASING HAMMER	WEIGHT N/A; DROP N/A
BORING ANGLE AND DIRECTION	VERTICAL
SAMPLER	1 3/8 IN. I.D. / 2.0 IN. O.D. SPLIT BARREL
SAMPLER HAMMER	WEIGHT 140 LB; DROP 30 IN
INSPECTOR	DAVID MIRSCHLO

S.U. = 2 FT

Depth, ft	Description	Piezometer	Samples (Type No. Loc / Recov. ft / Penetr. resist. bl/6in.)	Remarks
0	CONCRETE FLOOR SLAB	3-IN ID RISER TO 2 FT (ABOVE) 6.3 FT		DRILLER AUGERED TO 4.5 FT WITH 8 IN. HOLLOW STEM AUGER
0–4.3	Yellow-brown silty f SAND and CINDERS (Moist) (FILL)		S-1 / 0.6 / 3-1-2 (at 1–2 ft)	DRILLER SET 4 IN. [illegible] CASING TO 4.5 FT
4.3–9	TOP OF ROCK 4.3 FT. elev. 570.17 FT M.S.L. Light gray DOLOMITE (Gasport Member)			DRILLER FORMED ROCK SOCKET FROM 4.3 TO 6.3 FT. FAINT COAL TAR ODOR IN MILKY WASH WATER. DRILLER BEGAN USING [illegible] NX C.B. AT 6.3 FT. DRILL RATE [illegible] 12 MIN/FT TO 6.3 FT WITH ROLLER BIT. DRILL RATE 3 MIN/FT TO 8.0 FT WITH C.B. WASH WATER MILK COLORED
9–16.5	elev. 565.47 FT. M.S.L. Dark gray shaly DOLOMITE (DeCew Member)	OPEN ROCK 30.0 TO 6.3 FT		DRILL RATE 3 MIN/FT TO 9 FT. WASH WATER MEDIUM GRAY TO DARK GRAY COLORED FROM 10 FT. DRILL RATE = 5 MIN/FT FROM 10 - 13 FT. 5 MIN/FT FROM 13 - 18 FT.
16.5–20	elev. 557.97 FT. M.S.L. Dark grey limey SHALE (Rochester Member)			OIL SLICKS AND COAL TAR ODOR AT 18 FT.

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LOG OF BORING MW-8 SHEET 2 OF 2

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS	SAMPLES: POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK SKETCH	ROCK CORE: CRACK COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
Dark gray limey SHALE (Rochester Member)	OPEN ROCK 30.0FT - 6.3 FT.	21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45										COAL TAR ODOR AND LARGE OIL SLICK 21.5 DRILL RATE- 6 MIN./FT 18-23 FT DRILL RATE = 6 MIN/FT 23-28 FT DRILL RATE = 6 MIN/FT 28-30 FT
TERMINUS OF BOREHOLE 30.0FT. elev. 544.47 FT M.S.L.												

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LOG OF BORING MW-9 **SHEET** 1 **OF** 3

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE - LOCKPORT, NEW YORK		ELEVATION AND DATUM: 602.12 FT.	PROJECT NO.: 82C449E
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: J. THEW	DATE STARTED: 10/27/83	DATE FINISHED: 10/28/83
DRILLING EQUIPMENT: TRAILER MOUNTED C.M.E 45 HYDROROTARY RIG		COMPLETION DEPTH: 56.0 FT	ROCK DEPTH: 16.8 FT
SIZE AND TYPE OF BIT: 3 7/8 IN TRICONE ROLLER BIT	SIZE AND TYPE CORE BARREL: 2 IN DIAMOND SET NON-CORING BIT	NO. SAMPLES: DIST 4	UNDIST N/A; CORE N/A
CASING: 4 IN HW FLUSH JOINT	NX DOUBLE TUBE C.B.	WATER LEVEL: FIRST N/A	COMPL. 24.3 FT; 24 HR 16.2 FT
CASING HAMMER	WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL
SAMPLER: 1 3/8 IN I.D. / 2.0 IN O.D. SPLIT BARREL			
SAMPLER HAMMER	WEIGHT 140 LB	DROP 30 IN	INSPECTOR: DAVID MUSCALO

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	RECOV. FT	PENETR. RESIST. BL/6 IN	REMARKS
ASPHALT 4 IN; OLD BRICK ROADWAY	3 IN. I.D. STEEL RISER PIPE TO 0.5 FT BELOW GROUND SURFACE	0–1				
Red-brown silty f-m SAND with trace to some gravel (COAL TAR ODOR) - (DAMP) (FILL) OVA reads 10 PPM		1–3	S-1	0.5	5 6 7	
Red-brown gravelly CLAY with piece of cobble (MOIST) (Glacio-lacustrine)		3–6	S-2	0.5	12 50/0 IN	DRILLER TURNED 4 IN. CASING TO 5.0 FT
Red-brown f sandy SILT with trace Clay (Moist) (Glacio-lacustrine)		7–15	S-3	0.9	15 11 12	DRILLER TURNED 4 IN CASING TO 10.0 FT
Red-brown f sandy CLAY with trace to some gravel (Moist to damp) (TILL)		15–16.8	S-4	0.75	20 21 19	DRILLER SET TEMPORARY CASING TO 16.8 FT.
TOP OF ROCK 16.8 FT elev. 585.32 FT. M.S.L. Light gray DOLOMITE (GASPORT Member)	10/27/83	17–20				DRILLER BORED ROCK SOCKET TO 19.0 FT WITH 3 7/8 ROLLER BIT. DRILLER GROUTED 3 IN. RISER PIPE FROM 19 FT TO 0.5 FT BELOW GROUND SURFACE

Column headings also include: SU-50; ON POCKET PENETROMETER TSF; ROCK CORE: RECOVERY %, CRACK (SKETCH, COND), RQD, CORE TIME

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LOG OF BORING MW-9 SHEET 2 OF 3

DESCRIPTION	DEPTH, FT	REMARKS
Light gray DOLOMITE (Gasport Member)	21–26	WASH MILKY COLORED OVA'S <1 ppm DRILL RATE=2 MIN/FT 19-24 FT
elev. 575.62 FT. M.S.L. Dark gray shaly DOLOMITE (DeCew Member)	27–31	WASH FROM MILKY COLORED TO MEDIUM GRAY COLORED DRILL RATE = 2-3 MIN/FT 24-29 FT OVA READS < 5 PPM
elev. 569.62 FT. M.S.L. Dark gray limey SHALE (Rochester Member)	32–45	DRILL RATE= 5 MIN/FT. 29-34 FT. OVA READS < 1 PPM WASH WATER COLOR CHANGE AT 32.5 FT FROM MEDIUM GRAY TO DARK GRAY DRILL RATE = 8 MIN/FT. FROM 34-37 FT 5 MIN./FT 37-39 FT WASH COLOR MEDIUM GRAY OVA READS 7 PPM OIL SLICKS OBSERVED AT 39.0 FT - NO DETECTABLE ODOR (HIGH WINDS) DRILL RATE = 8 MIN/FT 39-44 FT OIL SLICKS OBSERVED AT 44 FT WITH ATTENDENT STRONG COAL TAR ODOR OVA READS 10 PPM

OPEN ROCK 50.0 FT - 19.0 FT

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LOG OF BORING MW-9 SHEET 3 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS/FT	SAMPLES: or POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SKETCH	ROCK CORE: CRACK: COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
Dark gray limey SHALE (Rochester Member)	OPEN ROCK	46 47 48 49 50										DRILL RATE = 8 MIN/FT. 44 FT TO 49 FT 8 MIN/FT 49-50 FT OVA READS 10 PPM CUTTINGS ODOR AND FILM ON DRILL RODS DRILLER REPORTS PARTIAL LOSS OF DRILLING FLUID 42-50 FT.
BOREHOLE TERMINUS 50.0 FT elev. 552.12 FT. M.S.L.												

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LOG OF BORING MW-10 **SHEET** 1 **OF** 3

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, NEW YORK		ELEVATION AND DATUM: 597.97 FT.	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: J. THEW	DATE STARTED: 11/8/83	DATE FINISHED: 11/8/83
DRILLING EQUIPMENT: TRAILER MOUNTED CME. 45 HYDROROTARY RIG		COMPLETION DEPTH: 50.0 FT	ROCK DEPTH: 12.0 FT
SIZE AND TYPE OF BIT: 3 7/8 IN. TRICONE ROLLER BIT	SIZE AND TYPE CORE BARREL: 3 IN. DIAMOND IMPREGNATED BIT	NO. SAMPLES: DIST 3	UNDIST: NONE CORE: 36 FT
CASING: 4 IN. HW FLUSH JOINT	NX DOUBLE TUBE C.B.	WATER LEVEL: FIRST ≈ 10 FT.	COMPL: 8.25 FT 24 HR: 10.1 FT
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 1 3/8 IN I.D / 2.0 IN O.D SPLIT BARREL		INSPECTOR: DAVID MUSCALO	
SAMPLER HAMMER: WEIGHT 140 LB	DROP 30 IN.		

DESCRIPTION	S.U.=0	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	RECOV. FT	PENETR. RESIST BLOWS/FT	@ POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	CRACK: SKETCH	CRACK: COND	RQD	CORE TIME FT	REMARKS
ASPHALT													DRILLER AUGERED TO TOP OF ROCK AT FT 12.0 F
Brown to black f sandy SILT and ORGANICS - trace gravel (MOIST) (FILL)		3 IN BLACK STEEL RISER PIPE TO 0.5 FT BELOW G.S.	1	S-1	1.1	8 5 4							DRILLER TURNED TEMPORARY 4 IN CASING TO 12.1 FT
			2										
			3										
			4										
Gray f sandy CLAY with trace tan sand, gravel and organics - piece of cobble (MOIST) FILL			5										
			6	S-2	1.5	11 3 17							
			7										
			8										
			9										
			10										
Gray f sandy SILT with trace organics and gravel - COAL TAR ODOR (WET) (FILL)			11	S-3	1.5	10 10 16							DRILLER BORED ROCK SOCKET TO 14.0 FT - GROUTED 3 IN RISER PIPE TO 0.5 FT FROM G.S. AS CASING WAS PULLED
			12										
TOP OF ROCK 12.0 FT elev. 585.97 FT. M.S.L.			13										
Light gray DOLOMITE (Gasport Member)			14										
Fossiliferous with stylolitic partings - Fractures slightly weathered		OPEN ROCK	15	NX RUN-1 C.B.	4.5			100%		FAIR	76%	1 min/FT.	MILKY WHITE TO LIGHT GRAY WASH WATER
			16										
			17										
			18										
			19										
			20										

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LOG OF BORING MW-10 SHEET 2 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES TYPE NO. LOC	SAMPLES RECOV. FT	SAMPLES PENETR. RESIST. BLS/IN.	POCKET PENETROMETER TSF	ROCK CORE RECOVERY %	ROCK CORE CRACK SKETCH	ROCK CORE CRACK COND	ROCK CORE RQD	ROCK CORE CORE TIME FT	REMARKS
Light gray DOLOMITE (Gasport Member) Less fossiliferous - few stylolites Core contains irregularly shaped dark mineral probably sphalerite		21 22 23	NX RUN-2 CB	5.0			100%		EXCELLENT	100%	2 MIN/FT	WASH COLOR FROM MILKY WHITE TO LIGHT GRAY AT 22.1 FT TO MILKY WHITE AT 22.7 FT
elev. 573.47 FT. M.S.L. Dark gray shaly DOLOMITE (DeCew Member) Gypsum Filled vugs at 31.9 FT Stylolites in core to 33 FT Fractures slighty weathered to unweathered		24 25 26 27 28	NX RUN-3 CB	4.8			96%		FAIR TO GOOD	93%	2 MIN/FT	WASH WATER LIGHT GRAY AT 25.0 FT COAL TAR ODOR 26.5 FT - COAL TAR ON DRILL RODS - COAL TAR IN WASH WATER RETURNED TO SURFACE
		29 30 31 32 33	NX RUN-4 CB	5.0			100%		GOOD	92%	3 MIN/FT	DRILLING AT 28.6FT WASH MEDIUM GRAY COAL TAR ODOR ON CORE AND ON FRESHLY BROKEN SURFACE
elev. 564.47 FT. M.S.L. Dark gray limey SHALE (Rochester Member)	OPEN ROCK 50.0 - 14.0 FT	34 35 36 37 38	NX RUN-5 CB	5.0			100%		GOOD	98%	3 MIN/FT	WASH MEDIUM GRAY COLORED TO DARK GRAY COAL TAR ODOR AND IRIDESCENT SHEEN ON CORE
		39 40 41 42 43	NX RUN-6 CB	5.0			100%		POOR TO FAIR	98%	3.5 MIN/FT	WASH DARK GRAY COAL TAR ODOR
		44 45										

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LOG OF BORING MW-10 SHEET 3 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR. RESIST. BLOWS	w. POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SKETCH	ROCK CORE: CRACK: COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
Dark gray limey SHALE (Rochester Member)	OPEN ROCK	46	NX RUN-TOB						FAIR			COAL TAR ODOR ON CORE - IRIDESCENT SHEEN ON CORE
		47										
		48										
		49	NX RUN-BOB	1.5			100%		EXCELLENT	100%		STRONG COAL TAR ODOR - IRIDESCENT SHEEN ON CORE
		50										DRILL RODS COATED WITH COAL TAR
BOREHOLE TERMINUS 50.0 FT elev. 547.97 FT. M.S.L.												

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LOG OF BORING MW-11 **SHEET** 1 **OF** 2

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE – LOCKPORT, NEW YORK		ELEVATION AND DATUM: 596.49 FT.	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING	FOREMAN: J. THEW	DATE STARTED: 11/2/83	DATE FINISHED: 11/3/83
DRILLING EQUIPMENT: TRAILER MOUNTED CME 45 HYDROROTARY DRILL RIG		COMPLETION DEPTH: 30 FT.	ROCK DEPTH: 9.5 FT
SIZE AND TYPE OF BIT: 3 7/8 IN. TRICONE ROLLER BIT	SIZE AND TYPE CORE BARREL: 3 IN. DIAMOND SET NON-CORING BIT	NO. SAMPLES: DIST 1	UNDIST: NONE CORE: NONE
CASING: 4 IN. HW FLUSH JOINT	NX DOUBLE TUBE C.B.	WATER LEVEL: FIRST N/A	COMPL: 7.25 24 HR: 7.50 FT
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 1 3/8 IN I.D. / 2 IN. O.D. SPLIT BARREL		INSPECTOR: DAVID MUSCALO	
SAMPLER HAMMER: WEIGHT 140 LB	DROP 30 IN.		

DESCRIPTION	S.U.=O.A.	RESISTIVITY	DEPTH, FT	SAMPLES: TYPE & NO.	SAMPLES: RECOV., FT	SAMPLES: PENETR. RESIST. BLOWS/FT	W. POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACKS: BEDDING	ROCK CORE: CRACKS: COND.	ROCK CORE: RQD	ROCK CORE: CORE TIME, FT	REMARKS
Red-brown, f sandy SILT with pieces of cobble-trace organics (Moist) (FILL)		3-in. I.D. BLACK STEEL RISER TO 0.5 FT BELOW G.S.	1 2 3 4 5 6	S-1	0.5	9 12 6							DRILLER AUGERED TO 2 FT WITH 8 IN O.D. AUGER DRILLER TURNED TEMPORARY 4 IN CASING TO 5 FT DRILLER BEGAN USING A 3⅞ IN TRICONE ROLLER BIT AT 5 FT
TOP OF ROCK 9.4 FT elev. 587.09 FT. M.S.L.			7 8 9 10										DRILLER TURNED CASING TO 9.4 FT DRILLER BORED ROCK SOCKET FROM 9.4 TO 11.4 FT DRILLER GROUTED CASING PIPE TO 0.5 FT BELOW G.S.
Light gray DOLOMITE (Gasport Member)		OPEN ROCK 30.0 FT – 11.4 FT	11 12 13 14 15 16 17 18 19 20										WASH WATER MILKY COLORED DRILLER BEGAN USING NON-CORING CORE BARREL AT 11.4 FT WASH WATER MILKY COLORED DRILL RATE = 2 min/FT 11.4 – 13.5 FT PARTIAL LOSS OF DRILLING WATER AT 18.3 FT. DRILL RATE 3 MIN./FT 13.5 – 18.5 FT

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LOG OF BORING MW-11 SHEET 2 OF 2

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS	@ POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: BED'TCH	ROCK CORE: CRACK: COND	ROCK CORE: ROD	ROCK CORE: CORE TIME FT	REMARKS
Light gray DOLOMITE (Gasport Member)	OPEN ROCK 30.0 – 11.4 FT	21 22 23 24 25 26 27 28 29 30										DRILL RATE = 2.5 MIN/FT 18.5-22.5 FT COLOR CHANGE IN WASH WATER MILKY COLORED PARTIAL LOSS OF DRILLING FLUID AT 24.5 FT DRILL RATE = 3 MIN/FT 23.5 – 28.5 FT WASH WATER MEDIUM GRAY IN COLOR AT 26.5 FT DRILL RATE = 3 MIN/FT. COAL TAR ODOR IN WELL UPON COMPLETION
elev. 569.99 FT. M.S.L. Dark gray shaly DOLOMITE (DeCew Member)												
BOREHOLE TERMINUS 30.0 FT elev. 566.49 FT. M.S.L.												

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LOG OF BORING MW-12 **SHEET** 1 **OF** 3

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, NEW YORK		ELEVATION AND DATUM: 596.35 FT.	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: J. THEW	DATE STARTED: 11/2/83	DATE FINISHED: 11/2/83
DRILLING EQUIPMENT: TRAILER MOUNTED C.M.E. 45 HYDROROTARY DRILL RIG		COMPLETION DEPTH: 53.5 FT	ROCK DEPTH: 9.6 FT.
SIZE AND TYPE OF BIT: 3 7/8 TRICONE ROLLER BIT	SIZE AND TYPE CORE BARREL: NON-CORING BIT 6 IN DIAMOND SET	NO. SAMPLES: DIST. 2	UNDIST.: NONE; CORE: NONE
CASING: 4 IN. HW FLUSH JOINT	NX DOUBLE TUBE C.B.	WATER LEVEL: FIRST N/A	COMPL.: 11.9 FT; 24 HR.: 3.5
CASING HAMMER	WEIGHT: N/A	DROP: N/A	BORING ANGLE AND DIRECTION: VERTICAL
SAMPLER: 1 3/8 in. I.D./2 in. O.D. SPLIT BARREL			
SAMPLER HAMMER	WEIGHT: 140 LB	DROP: 30 IN.	INSPECTOR: DAVID MUSCALO

G.U. = 0

Piezometer: 2 IN. I.D. BLACK STEEL RISER PIPE TO 0.5 FT BELOW GROUND SURFACE

DEPTH, FT	DESCRIPTION	SAMPLES TYPE NO. LOG	RECOV, FT	PENETR. RESIST. BL/6 IN.	REMARKS
0–2	Gray-brown f sandy SILT with trace to some organics (roots, grass and leaves) (Damp to Moist) (FILL and TOP SOIL)	S-1	0.7	3 3 2	DRILLER AUGERED TO 5.0 FT with 8 IN O.D. AUGER
2–5					DRILLER BEGAN DRILLING AT 5 FT WITH 3 7/8 IN TRICONE ROLLER BIT
5–9.6	Gray-brown f sandy SILT with some c gravel and trace f-m gravel, m-c sand and organics (brown) (FILL)	S-2	0.1	30 50/2 IN	SPLIT BARREL REFUSED AT 5.5 FT. DRILLER SET CASING TO 9.9 FT BY TURNING WITH DIAMOND DRILL SHOE 0.3 FT INTO ROCK
9.6	TOP OF ROCK 9.6 FT elev. 586.75 FT. M.S.L.	S-3	0	50/0 IN	SPLIT BARREL REFUSED AT 9.6 FT 50/0 IN.
9.6–20	Light gray DOLOMITE (Gasport Member)				DRILL RATE = 6 MIN/FT FROM 10-13 FT. WASH WATER MILKY WHITE. DRILL RATE = 5 MIN./FT FROM 13-18 FT. MILKY WHITE WASH WATER

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LOG OF BORING MW-12 SHEET 2 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS/FT	ROCK CORE: % POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK SKETCH	ROCK CORE: CRACK COND	ROCK CORE: ROD	ROCK CORE: CORE TIME FT	REMARKS
Light gray DOLOMITE (Gasport Member)	SAND / BENTONITE PEL. / 2-IN. I.D. BLACK STEEL RISER PIPE TO 0.5 FT BELOW GROUND SURFACE / OPENINGS	21 22 23 24 25 26 27										DRILL RATE= 3.5 MIN/FT 18-23 FT WASH WATER MILKY COLORED
elev. 568.85 FT. M.S.L.												COLOR CHANGE IN WASH WATER FROM MILKY WHITE TO MEDIUM GRAY AT 27.5 FT
Dark gray shaly DOLOMITE (Lower Member)		28 29 30 31 32										DRILL RATE=6MIN/FT 23-28 FT
elev. 563.85 FT. M.S.L.												DRILL RATE= 4MIN/FT. 28-33 FT COLOR CHANGE IN WASH WATER FROM MEDIUM GRAY TO DARK GRAY 32.5 FT
Dark gray limey SHALE (Rochester Member)		33 34 35 36 37 38 39 40 41 42 43 44 45										FAINT COAL TAR ODOR IN WASH AT 33.4 FT. DRILL RATE= 2 MIN/FT 33-38FT DRILL RATE= 2 MIN./FT. 38-43FT COAL TAR ODOR IN WASH WATER DRILL RATE= 2 MIN/FT. 43-48 FT

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LOG OF BORING MW-12

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BL/6IN.	Qu POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK SKETCH	ROCK CORE: CRACK COND	ROCK CORE: RQD	ROCK CORE: CORE TIME	REMARKS
Dark gray limey SHALE (Rochester Member)	2 in. ID. SLOTTED WELL SCREEN WITH 0.010 in.	46										COAL TAR ODOR IN WASH
		47										
		48										STRONG COAL TAR ODOR AT 48.5 ft
		49										
		50										STRONG COAL TAR ODOR WITH ATTENDENT OIL SLICKS AND COAL TAR GLOBULES IN WASH WATER
		51										
		52										
	6 in. SAND	53										
BOREHOLE TERMINUS 53.5 FT elev. 542.85 FT. M.S.L.		54										
		55										

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LOG OF BORING MW-13

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, NEW YORK		ELEVATION AND DATUM: 593.73 FT.	PROJECT NO.: 82C 4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: JEFF THEW	DATE STARTED: 10/26/83	DATE FINISHED: 10/27/83
DRILLING EQUIPMENT: TRAILER MOUNTED C.M.E. 45 HYDROROTARY DRILL RIG		COMPLETION DEPTH: 50.0 FT	ROCK DEPTH: 8.4 FT
SIZE AND TYPE OF BIT: 3 7/8 TRICONE ROLLER BIT	SIZE AND TYPE CORE BARREL: 3 W DIAMOND SET NON-CORING BIT	NO. SAMPLES: DIST 2	UNDIST: NONE; CORE: NONE
CASING: 4 IN. HW FLUSH JOINT	NX [illegible]	WATER LEVEL: FIRST N/A	COMPL. 19.6 FT; 24 HR. 17.1 FT
CASING HAMMER	WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL
SAMPLER: 2 IN. O.D. / 1 3/8 IN. I.D. SPLIT BARREL			INSPECTOR: DAVID MUSCALO
SAMPLER HAMMER	WEIGHT 140 LB	DROP 30 IN	

DESCRIPTION	Piezometer	DEPTH, FT	Sample Type No.	Recov., FT	Penetr. Resist. Bl/6 in.	REMARKS
ASPHALT	3-IN. I.D. STEEL RISER TO 0.6 FT BELOW G.S.	0–0.75				9 IN. OF ASPHALT
Brown f-m sandy f-C GRAVEL (damp) (FILL)		2–3.5	S-1	0.7	2 3 3	
Red-brown f-m sandy f-C GRAVEL with piece of cobble (damp) (FILL)		5–6.5	S-2	0.9	[illegible]	
		7–8				DRILLER SET TEMPORARY 4 IN CASING TO 8.6 FT.
TOP OF ROCK 8.4 FT elev. 585.33 FT. M.S.L.		8.4				DRILLER REAMED ROCK SOCKET TO 10.7 FT
	10/26/83	10.7				GROUTED STEEL RISER PIPE ANNULUS TO 0.5 FT BELOW GROUND SURFACE
Light gray DOLOMITE (Gasport Member)	OPEN ROCK 50.0 FT - 10.7 FT	11–20				DRILLER BEGAN NON-RECOVERY CORING AT 8.4 FT
						WASH light grey no DISTINCTIVE ODOR
						DRILL RATE = 2 MIN/FT. 11-18 FT
						OVA READS 2 PPM
						18.2 DRILLS HARDER (DRILLER)

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LOG OF BORING MW-13 SHEET 2 OF 3

DESCRIPTION	DEPTH, FT	REMARKS
Light gray DOLOMITE (Lockport Member)	21–25	DRILL RATE 3 MIN./FT 19-25 FT OVA READS < 2 PPM WASH LIGHT GRAY-NO DISTINCTIVE ODOR DRILLS VERY HARD FROM 25 FT TO FT.
elev. 568.73 FT. M.S.L.		
Dark gray shaly DOLOMITE (DeCew Member)	25–31	OVA READS < PPM DRILL RATE= 5 MIN/FT 24-29 FT OVA READS < 2 PPM WASH MEDIUM GRAY-NO DISTINCTIVE ODOR DRILL RATE = 5 MIN/FT 29-34 FT ALTERNATING HARD AND SOFT ZONES (ATTEMPT TO SET CASING)
elev. 561.73 FT. M.S.L.		
Dark gray limey SHALE (Rochester Member)	31–45	WASH MEDIUM GRAY OVA READS < 2 PPM NO DISTINCTIVE ODOR DRILL RATE 6 MIN/FT 34-39 FT AT 39.0 FT OVA READS < 2 PPM DRILL RATE= 6 min/FT 39-44 FT NO DISTINCTIVE ODOR WASH MEDIUM TO DARK GRAY

OPEN ROCK 50.0 FT - 10.7 FT

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LOG OF BORING MW-13 SHEET 3 OF 3

DESCRIPTION	Formation	DEPTH, FT	SAMPLES	ROCK CORE	REMARKS
Dark gray limey SHALE (Rochester Member)	OPEN ROCK	46 47 48 49 50			DRILL RATE = 6 MIN/FT 44-49 FT OIL SLICKENSIDES WASH AT 48-48.5 FT COAL TAR ODOR 49 FT - COAL TAR FILM ON LOWER 2.0 FT OF DRILL RODS DRILL RATE = 6 MIN/FT 49 50 FT
BOREHOLE TERMINUS 50.0 FT elev. 543.73 FT. M.S.L.					

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LOG OF BORING MW-14 **SHEET** 1 **OF** 3

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE, LOCKPORT, NEW YORK		ELEVATION AND DATUM: 617.12 FT.	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: J. THEW	DATE STARTED: 11/9/83	DATE FINISHED: 11/10/83
DRILLING EQUIPMENT: TRAILER MOUNTED C.M.E. 45 HYDROROTARY DRILL RIG		COMPLETION DEPTH: 70.0 FT	ROCK DEPTH: 31.5 FT
SIZE AND TYPE OF BIT: 2 7/8 IN. TRICONE ROLLER BIT	SIZE AND TYPE CORE BARREL: 3 IN. DIAMOND SET NON-CORING BIT	NO. SAMPLES: DIST 7	UNDIST NONE; CORE NONE
CASING: 4 IN. HW FLUSH JOINT	NX DOUBLE TUBE C.B.	WATER LEVEL: FIRST 11.4 FT	COMPL. 12.9 FT; 24 HR 10.9 FT
CASING HAMMER	WEIGHT N/A; DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 1 3/8 IN I.D. / 2.0 IN O.D. SPLIT BARREL		INSPECTOR: DAVID MUSCALO	
SAMPLER HAMMER	WEIGHT 140 LB; DROP 30 IN.		

Well (piezometer column): 3-IN I.D. BLACK STEEL RISER PIPE TO 0.5 FT BELOW GROUND SURFACE. SU-OFT

DESCRIPTION	DEPTH, FT	SAMPLE TYPE/NO.	RECOV. FT	PENETR. RESIST. BL/6IN	REMARKS
ASPHALT OVER BRICK PAVEMENT	0				
Red-brown f sandy SILT with trace to some gravel (Damp) FILL	1–3	S-1	0.9	4, 5, 7	DRILLER AUGERED TO TOP OF ROCK AT 31.5 FT. CASED WITH 4 IN TEMPORARY CASING TO 31.7 FT. DRILLER BORED ROCK SOCKET TO 33.5
Red-brown f sandy SILT with trace m-c sand and gravel (Damp) Glacio-lacustrine	3–10	S-2	1.5	18, 24, 27	
Red-brown f sandy SILT with trace to some c-m sand and gravel (WET) Glacio-lacustrine	10–14.5	S-3	1.5	17, 26, 49	
Red-brown silty m-c SAND with trace f gravel and f sand (WET) Glacio-lacustrine	14.5–19	S-4		10, 15, 17	
Red-brown f-sandy SILT with rounded and subangular rock fragments (TILL)	19–20				DRILLER REPORTS ROUGHNESS IN DRILLING

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LOG OF BORING MW-14 SHEET 2 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES TYPE NO. LOC	SAMPLES RECOV. FT	SAMPLES PENETR. RESIST. BLOWS	● POCKET PENETROMETER TSF	ROCK CORE RECOVERY %	ROCK CORE CRACK BRETCH	ROCK CORE CRACK COND	ROCK CORE RQD	ROCK CORE CORE TIME FT	REMARKS
Red-brown f sandy SILT with rounded and subangular rock fragments (MOIST) TILL		21	S-5	1.5	21 31 35							
		22										
		23										
		24										DRILLER REPORTS SMOOTH DRILLING FROM 24.0 FT
Red-brown SILT with trace f-m sand (WET) Glacio-lacustrine		25	S-6	1.5	18 25 31							
		26										
		27										
		28										
		29										
Red-brown SILT with trace clay and f-m sand (WET) Glacio-lacustrine		30										
		31	S-7	1.5	9 14 18 17/4in 5/1/08							DRILLER PULLED 4 IN CASING - INSTALLED 28 FT OF RISER PIPE - GROUTED RISER PIPE INTO ROCK SOCKET AND SURROUNDING ANNULUS TO 0.5 FT BELOW G.S.
Top of Rock 31.5 FT elev. 585.62 FT. M.S.L.		32										
Light gray DOLOMITE (Gasport Member)	4" I.D. BLACK STEEL RISER PIPE TO 0.5 FT BELOW G.S.	33										
		34										WASH WATER MILKY WHITE IN COLOR 33.5 TO 38.5 FT. DRILL RATE = 4 MIN/FT
		35										
		36										
		37										
		38										DRILLER BEGAN USING NON-CORING CORE BARREL AT 33.5 FT.
		39										
		40										WASH WATER MILKY WHITE WITH BLUISH TINGE
		41										
		42										DRILL RATE = 4 MIN./FT. 38.5 - 43.5
	OPEN ROCK 70.0 FT - 33.5 FT	43										
		44										
		45										

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LOG OF BORING MW-14 **SHEET** 3 **OF** 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS/FT	@ POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: BEDDING	ROCK CORE: CRACK: COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
Light gray DOLOMITE (Gasport Member)		46										WASH WATER COLOR CHANGE FROM MILKY WHITE TO MEDIUM GRAY
elev. 571.12 FT. M.S.L.		47										DRILL RATE=3.5 MIN/FT 43.5 - 48.5 FT.
Dark gray shaly DOLOMITE (DeCew Member)		48										
		49										WASH WATER MEDIUM GRAY COLORED TO DARK GRAY AT 52.5 FT DRILL RATE: 5 MIN/FT 48.5 - 51.5 FT; 10 MIN/FT 51.5 FT - 53.0 FT
		50										
		51										
		52										
		53										DRILLER BEGAN USING 5 7/8 IN. ROLLER BIT AT 53.0 FT.
elev. 563.62 FT. M.S.L.		54										Gray clay in non-CORING BIT DRILL RATE = 3.5 MIN/FT; 53 - 57 FT
		55										
		56										
Dark gray limey SHALE (Rochester Member)		57										WASH WATER DARK GRAY WITH IRIDESCENT FILM AND PETROLEUM ODOR
		58										
		59										
		60										DRILL RATE = 3.5 MIN/FT 57 to 62 FT
		61										
		62										wash water Dark BROWNISH-GRAY WASH WATER WITH IRIDESCENT OILY FILM AND ~~PETROLEUM ODOR~~ IN WASH WATER
		63										DRILL RATE = 2.0 MIN/FT 62 to 67 FT (DRILLER CHANGED FEED RATE
		64										
		65										DRILL RATE = 2.0 MIN/FT 67 - 70 FT
		66										
		67										
		68										
		69										
		70										

OPEN ROCK 70.0 FT - 33.5 FT

BOREHOLE TERMINUS 70.0 FT
Elev. 547.12 FT.

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LOG OF BORING MW-15 **SHEET** 1 **OF** 3

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, NEW YORK		ELEVATION AND DATUM: 591.31 FT.	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: J. THEW	DATE STARTED: 11/10/83	DATE FINISHED: 11/11/83
DRILLING EQUIPMENT: TRAILER MOUNTED C.M.E. 45 HYDROROTARY DRILL RIG		COMPLETION DEPTH: 50.0 FT	ROCK DEPTH: 5.3 FT
SIZE AND TYPE OF BIT: 3 5/8 IN TRICONE ROLLER BIT	SIZE AND TYPE CORE BARREL: 3 IN DIAMOND SET NON-CORING BIT	NO. SAMPLES: DIST 2	WEATHER: NONE CORE: NONE
CASING: 4 IN. HW FLUSH JOINT	NX DOUBLE TUBE C. B.	WATER LEVEL: FIRST 5 FT	COMPL 9.6 FT 24 HR 14.2 FT
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 1 3/8 IN I.D. / 2.0 IN O.D. SPLIT BARREL		INSPECTOR: DAVID MUSCHLO	
SAMPLER HAMMER: WEIGHT 140 LB	DROP 30 IN.		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE & NO. / LOG	SAMPLES: RECOV, FT	SAMPLES: PENETR RESIST BLOWS/6 IN	POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK INTSCN	ROCK CORE: CRACK CONG	ROCK CORE: RQD	ROCK CORE: CORE RUN FT	REMARKS
ASPHALT											DRILLER AUGERED TO TOP OF ROCK AT 5.3 FT
CONCRETE											
Gray f-c sandy SILT with pieces of cobbles (DRY)(FILL)	1	S-1	0.75	19 24 50 4 IN							
	2										DRILLER SET TEMPORARY 4 IN. CASING TO 5.5 FT
	3										
Red-brown f sandy SILT with trace clay and trace to some subangular rock fragments (WET)(TILL)	4										DRILLER DRILLED ROCK SOCKET FROM 5.3 FT TO 8.2 FT BELOW G.S.
	5										WASH WATER MILKY WHITE COLORED
TOP OF ROCK 5.3 FT elev. 586.01 FT. M.S.L.	6	S-2	0.5	2 1 50/0 IN.							DRILLER GROUTED 3 IN RISER PIPE IN ROCK SOCKET AND RISER PIPE ANNULUS & 4 IN. CASING WAS PULLED
3-IN. BLACK STEEL RISER TO 0.8 FT BELOW G.S.	7										BROWN COLORED WASH WATER AT 7.2 FT (weathered fracture) COAL TAR ODOR
	8										CORE BARREL DRILL RATE = 6 MIN/FT 8.2 TO 11.5
	9										
Light gray DOLOMITE (Gasport Member)	10										MILKY WHITE WASH DRILL RATE = 2 MIN/FT 11.5 - 17.5
	11										
	12										
	13										DRILL RATE = 5 MIN/FT 17.5 TO 18.5
	14										
	15										2 15/16 IN ROLLER BIT
	16										
	17										DRILL RATE = 4 MIN/FT 18.5 TO 20.5 FT
	18										
elev. 573.81 FT. M.S.L.	19										IRIDESCENT WASH SLICKS AND COAL TAR ODOR 17.0 FT TO 25.0 FT.
Dark gray shaly DOLOMITE (DeCew Member)	20										

OPEN ROCK 50.0 FT - 8.2 FT.

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LOG OF BORING MW-15 SHEET 2 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS	POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SKETCH	ROCK CORE: CRACK: COND	ROCK CORE: ROD	ROCK CORE: CORE TIME FT	REMARKS
Dark gray shaly DOLOMITE (DeCew Member)		21										WASH WATER MEDIUM GRAY IN COLOR COAL TAR EJECTED FROM BOREHOLE AT 22 FT
		22										
		23										
		24										
		25										WASH WATER MEDIUM GRAY DRILL RATE = 2 MIN./FT 25 - 32 FT
elev. 565.31 FT. M.S.L.		26										
		27										
		28										WASH WATER FROM MEDIUM TO DARK IN COLOR AT 26 FT
		29										
Dark gray limey SHALE (Rochester Member)		30										
		31										
	OPEN ROCK 50.0 - 8.2 FT	32										COAL TAR ODOR AND IRIDESCENT SHEEN AT 32 FT DRILL RATE = 2 MIN/FT 32 TO 37 FT - 42 WASH WATER DARK GRAY
		33										
		34										
		35										
		36										
		37										
		38										
		39										
		40										DRILL RATE - 2 MIN/FT 42 TO 47 FT WASH DARK GRAY IN COLOR
		41										
		42										
		43										
		44										
		45										

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LOG OF BORING MW-15 SHEET 3 OF 3

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS	w POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SKETCH	ROCK CORE: CRACK: COND	ROCK CORE: ROD	ROCK CORE: CORE TIME FT	REMARKS
Dark gray limey SHALE (Rochester Member)	OPEN ROCK	46 47 48 49 50										DRILL RATE = 2 MIN/FT 47 TO 50 FT COAL TAR ODOR IN WELL AT COMPLETION OF INSTALLATION
BOREHOLE TERMINUS 50.0 FT elev. 541.31 FT. M.S.L.												

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LOG OF BORING MW-16 **SHEET** 1 **OF** 2

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, NEW YORK		ELEVATION AND DATUM: 574.69 FT.	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: J. THEW	DATE STARTED: 11/10/83	DATE FINISHED: 11/10/83
DRILLING EQUIPMENT: TRAILER MOUNTED C.M.E. 95 HYDROROTARY DRILL RIG		COMPLETION DEPTH: 30.0 FT.	ROCK DEPTH: 1.2 FT
SIZE AND TYPE OF BIT: 5 3/8" TRICONE ROLLER BIT	SIZE AND TYPE CORE BARREL: 3 IN. DIAMOND SET NON-CORING B.T	NO. SAMPLES: 1	CASING: NONE
CASING: 4" I.D. HW FLUSH JOINT	NX DOUBLE TUBE C.B.	WATER LEVEL: FIRST N/A	COMPL. 6.1 FT 24 HR 9.8 FT
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 1 3/8 IN. I.D./2.0 IN O.D. SPLIT BARREL		INSPECTOR: DAVID MUSCALO	
SAMPLER HAMMER: WEIGHT 140 LB.	DROP 30 IN.		

DESCRIPTION	S.U. = 2.0 tsf	FORMATION	DEPTH, FT	SAMPLES: TYPE NO.	SAMPLES: BLOWS/FT	SAMPLES: RECOVERY FOOT BLOWS	POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
CONCRETE FLOOR SLAB											DRILLER AUGERED TO 1.0 FT - BEGAN USING 3 7/8 IN ROLLER BIT AT 1.2 FT FORMED ROCK SOCKET FROM 1.2 TO 3.2 FT - GROUTED 5.2 FT OF BLACK IRON PIPE TO 2.0 FT ABOVE G.S. WASH WATER changes color at 6.5 FT FROM MILKY WHITE TO MEDIUM GRAY DRILL RATE = 10 MIN/FT 1.2 TO 3.2 FT
BLACK silty CINDERS (RAMP) FILL			1								
TOP OF ROCK 1.2 FT elev. 573.49 FT. M.S.L.											
light gray DOLOMITE (Gasport Member)		SYM. RED RIVER	2	S-1	0.1 FT	3/2 in 50/0 in					
			3								
			4								
			5								
			6								
elev. 568.19 FT. M.S.L.			7								
DARK gray shaly DOLOMITE (De Cew Member)		OPEN ROCK 1.2 FT - 3.2 FT	8								DRILLER BEGAN USING NON-CORING C.B. AT 3.2 FT WASH brown colored AT 2.3 FT (WEATHERED JOINT?) DRILL RATE 4 MIN/FT TO 8 FT wash water medium gray in color
			9								
			10								
			11								
			12								
			13								DRILL RATE 6 MIN/FT 8.5 to 13.5 F
elev. 560.69 FT. M.S.L.			14								DRILLER BEGAN USING ROLLER BIT 12.5 FT WITH 2 15/16 IN TRICONE ROLLER BIT
Dark gray limey SHALE (Rochester Member)			15								DRILL RATE 2 MIN/FT 13.5 to 17.0 FT WASH COLOR CHANGE FROM MEDIUM GRAY TO DARK BROWN-GRAY AT 14.0 FT OIL SLICKS ON WASH AT 17 FT.
			16								
			17								
			18								
			19								
			20								

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LOG OF BORING MW-16 SHEET 2 OF 2

DESCRIPTION	DEPTH, FT	REMARKS
Dark gray limey SHALE (Rochester Member)	21	DRILL RATE = 2 MIN/FT 17 TO 22 FT.
	22	
	23	
	24	
	25	
	26	DRILL RATE = 2 MIN/FT 22 TO 27 FT. OIL SLICKS ON WASH WATER AT 27.0 FT
	27	
	28	
	29	COAL TAR ODOR IN WELL
BOREHOLE TERMINUS 30.0 FT elev. 544.69 FT. M.S.L.	30	

OPEN ROCK 30.0 AT - 5.2 FT

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LOG OF BORING MW-17 **SHEET** 1 **OF** 2

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE - LOCKPORT, NEW YORK		ELEVATION AND DATUM: 594.36 FT.	PROJECT NO.: 82C4495
DRILLING AGENCY: NORTH STAR DRILLING CO.	FOREMAN: J. THEW	DATE STARTED: 11/7/83	DATE FINISHED: 11/7/83
DRILLING EQUIPMENT: TRAILER MOUNTED C.M.E. 45 HYDRAULIC ROTARY DRILL RIG		COMPLETION DEPTH: 35.0	ROCK DEPTH: 8.0 FT
SIZE AND TYPE OF BIT: 3⅞ TRICONE ROLLER BIT	SIZE AND TYPE CORE BARREL: 3 IN. DIAMOND IMPREGNATED BIT	NO. SAMPLES: 2	CORE: 25 FT
CASING: 4 IN. HW FLUSH JOINT	NX DOUBLE TUBE C.B.	WATER LEVEL: NONE	CORR: 14.5 FT
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 1⅜ IN. I.D. / 2.0 IN O.D. SPLIT BARREL		INSPECTOR: DAVID MUSCALO	
SAMPLER HAMMER: WEIGHT 140 LB	DROP 30 IN.		

DESCRIPTION	S.U.=0	PENETRATION	DEPTH, FT	SAMPLES: TYPE & NO.	SAMPLES: RECOVERY, FT	SAMPLES: BLOWS PER 6 IN.	IN-POCKET PENETROMETER TSF	ROCK CORES: RECOVERY %	ROCK CORES: CRACK INTENSITY	ROCK CORES: RQD	ROCK CORES: RUN	ROCK CORES: CORE TIME	REMARKS
ASPHALT													DRILLER AUGERED TO TOP OF ROCK AT 8.0 FT USING 8 IN O.D. AUGERS
CONCRETE													
Red-brown to gray f sandy SILT with ashes - trace clay - m-c sand (Damp) (FILL)		3-IN. I.D. BLACK STEEL RISER PIPE	1	S-1	1.5	20 23 26							PETROLEUM ODOR ON AUGERS
			2										
			3										
			4										
Gray-brown silty CLAY with trace f-sand and organics - pieces of cobbles (MOIST) (FILL)			5	S-2	1.5	3 10 8							DRILLER FORMED ROCK SOCKET FROM 8.0 - 10.0 FT WITH 3⅞ ROLLER BIT
			6										
			7										
			8										
			9										
			10										
TOP OF ROCK 8.0 FT elev. 586.36 FT. M.S.L.			11	NX RUN-1 C.B.	4.9 FT			90%		GOOD	82%	2 MIN/FT.	
Light gray DOLOMITE (Goasport Member)			12										
Some shale present - Fossiliferous - Stylolitic partings			13										
			14										
			15										
Less fossiliferous from 18 FT			16	NX RUN-2 C.B.	5.0 FT			100%		GOOD		3 MIN/FT	
			17										
			18										
			19										CORE RATE CHANGE FROM 19 - 20 FT 2 TO 2 MIN/FT
			20										

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LOG OF BORING MW-17 SHEET 2 OF 2

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR RESIST BLOWS	SAMPLES: @ POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK SKETCH	ROCK CORE: CRACK COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
Light gray DOLOMITE (Gasport Member) Massive with shaly layers	OPEN ROCK 35.0 FT - 10.0 FT	21	NX RUN-3 C.B.	10.0 FT			100%		GOOD	98%	2 MIN/FT	COAL TAR ODOR AT 20 FT
elev. 569.86 FT. M.S.L.		22										
		23										
		24										WASH WATER CHANGE FROM MILKY WHITE TO MEDIUM GRAY
		25										
Dark gray shaly DOLOMITE (Decew Member) Predominantly shale with lesser quantities of dolomite		26	NX RUN-4 C.B.	5.0 FT			100%		FAIR TO GOOD	100%	3 MIN/FT	COAL TAR ODOR AT 26 FT
		27										
		28										
		29										WASH WATER CHANGE BEGINS AT 29.0 FT
		30										
elev. 563.36 FT. M.S.L.		31	MX RUN-5 C.B.	5.0 FT			100%		FAIR TO GOOD	100%	2 MIN.	STRONG COAL TAR ODOR IN CORE FROM 30 FT
Dark gray limey SHALE (Rochester Member) Light and dark laminated shale with uneven laminae surfaces		32										
		33										
		34										
		35										
BOREHOLE TERMINUS 35.0 FT elev. 559.36 FT. M.S.L.												

APPENDIX B

Test Trench Logs

PROJECT NO. 82C4495 INSPECTOR David Muscato

LOG OF TEST TRENCH NO. TT-1

DATE 10/20/83 - 10/21/83 LOCATION LOCKPORT, N.Y. SURFACE ELEVATION N/A

DESCRIPTION
● = SAMPLE LOCATION
LENGTH, FEET

DEPTH, FEET	SAMPLE NO.	5 10 15 20 25 30 35 40 45 50 55
	S-1	● Brown f sandy SILT with some m-c gravel (moist to wet) (FILL)
2		Red-brown f sandy SILT with bricks (wet) (FILL)
	S-2	● Gray to black f sandy SILT with some gravel - trace organics, cinders, bricks, wood and metal (wet) (FILL) Coal Tar Odor
4		
		Gray to black f sandy SILT and BOULDERS (Wet) (FILL) Coal Tar Odor
6		
8		BOTTOM OF TRENCH 7.0 FT. AT REFUSAL

COMPLETION DEPTH 7.0 FT DEPTH TO WATER 2.5 FT

LOG OF TEST TRENCH NO. TT-2

DATE 10/20/83 LOCATION LOCKPORT, N.Y. SURFACE ELEVATION N/A

DESCRIPTION
● = SAMPLE LOCATION
LENGTH, FEET

DEPTH, FEET	SAMPLES	3 6 9 12 15 18 21 24 27 30 33
		Brown f-sandy SILT with trace clay and gravel (moist) (FILL)
	S-1	● Red-brown f-sandy SILT with trace clay and brick fragments (moist) (FILL)
2		
	S-3	Brown f-sandy SILT with bricks, cinders, metal and wood (Moist) (FILL) ●
4	S-2	● Black Coal Tar / Black coal Tar / Black Coal Tar — Gray f-sandy SILT with cinders and brick (wet) (FILL); Red-brown silty CLAY (Moist) (LACUSTRINE)
6		TOP OF ROCK
8		
10		

COMPLETION DEPTH 4.5 - 6.0 FT DEPTH TO WATER 2.5 FT

PROJECT NO. 82C4495 INSPECTOR DAVID MUSCALO

LOG OF TEST TRENCH NO. TT-3

DATE 10/21/83 LOCATION LOCKPORT, N.Y. SURFACE ELEVATION N/A

DEPTH, FEET | SAMPLE NO. | DESCRIPTION ● = SAMPLE LOCATION LENGTH, FEET

2 4 6 8 10 12 14 16 18 20

0.5 — Gray f sandy SILT and crushed STONE (Moist) (FILL)

1.0

1.5 ● S-1

2.0 — Red-brown f sandy SILT with trace clay, rock and bricks - coal tar odor (Moist) (FILL)

2.5 — TOP OF CONCRETE SLAB 2.5 FT

COMPLETION DEPTH 2.5 DEPTH TO WATER N/A

LOG OF TEST TRENCH NO. TT-4

DATE 10/21/83 LOCATION LOCKPORT, NY. SURFACE ELEVATION N/A

DEPTH, FEET | SAMPLES | DESCRIPTION ● = SAMPLE LOCATION LENGTH, FEET

1 2 3 4 5 6 7 8 9 10 11 12

2 — Gray f sandy SILT with crushed stone, bricks, lead pipe and cinders (Moist) (FILL)

Red-brown f sandy SILT with gray clay lenses and organics (Moist) (FILL) ● S-1

4 — Red-brown f sandy SILT with bricks and rocks (Moist) (FILL)

Gray f sandy SILT and BRICKS with coal tar odor (Moist) (FILL)

6 — Gray f sandy SILT with wood and bricks - strong coal tar odor (Wet) (FILL) ● S-2

TOP OF CONCRETE SLAB

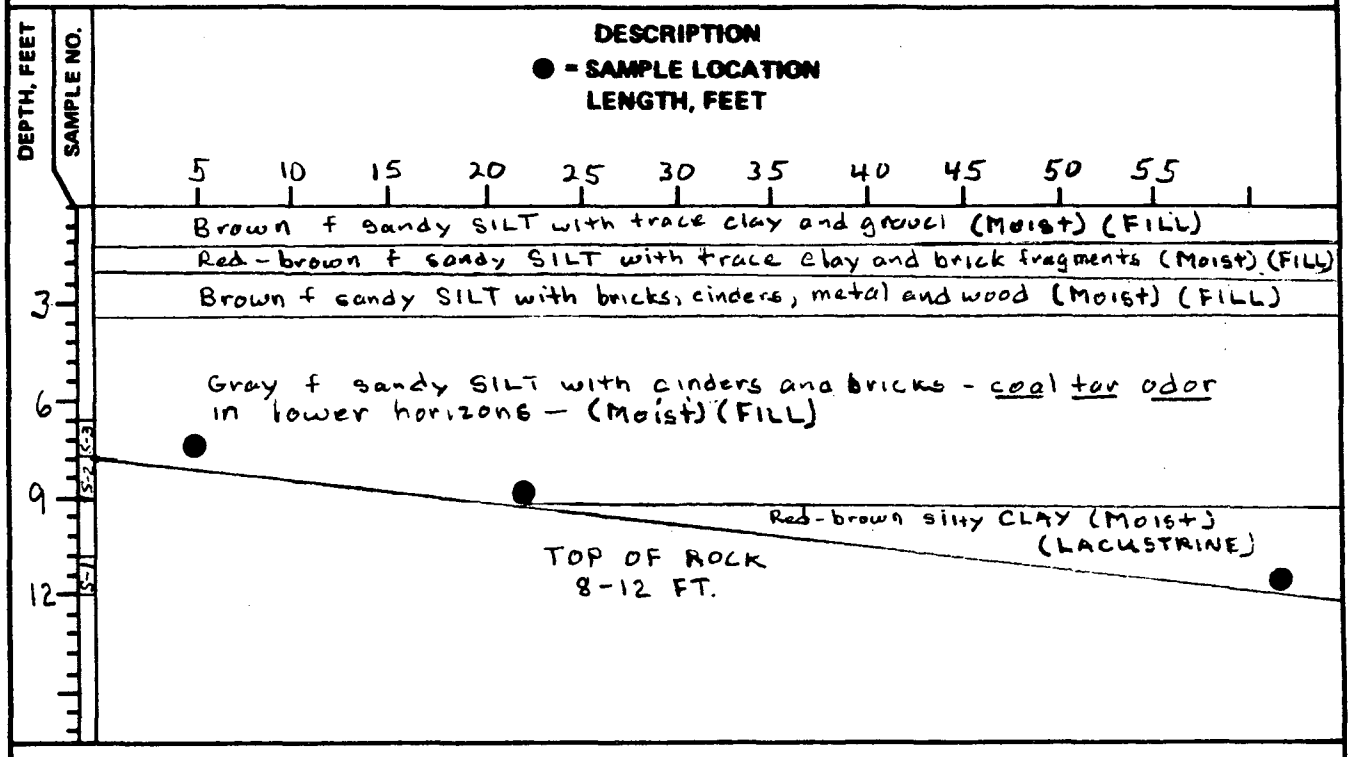
8

COMPLETION DEPTH 7 FT DEPTH TO WATER 6.0 FT

PROJECT NO. 82C4495 INSPECTOR DAVID MUSCATO

LOG OF TEST TRENCH NO. TT-5

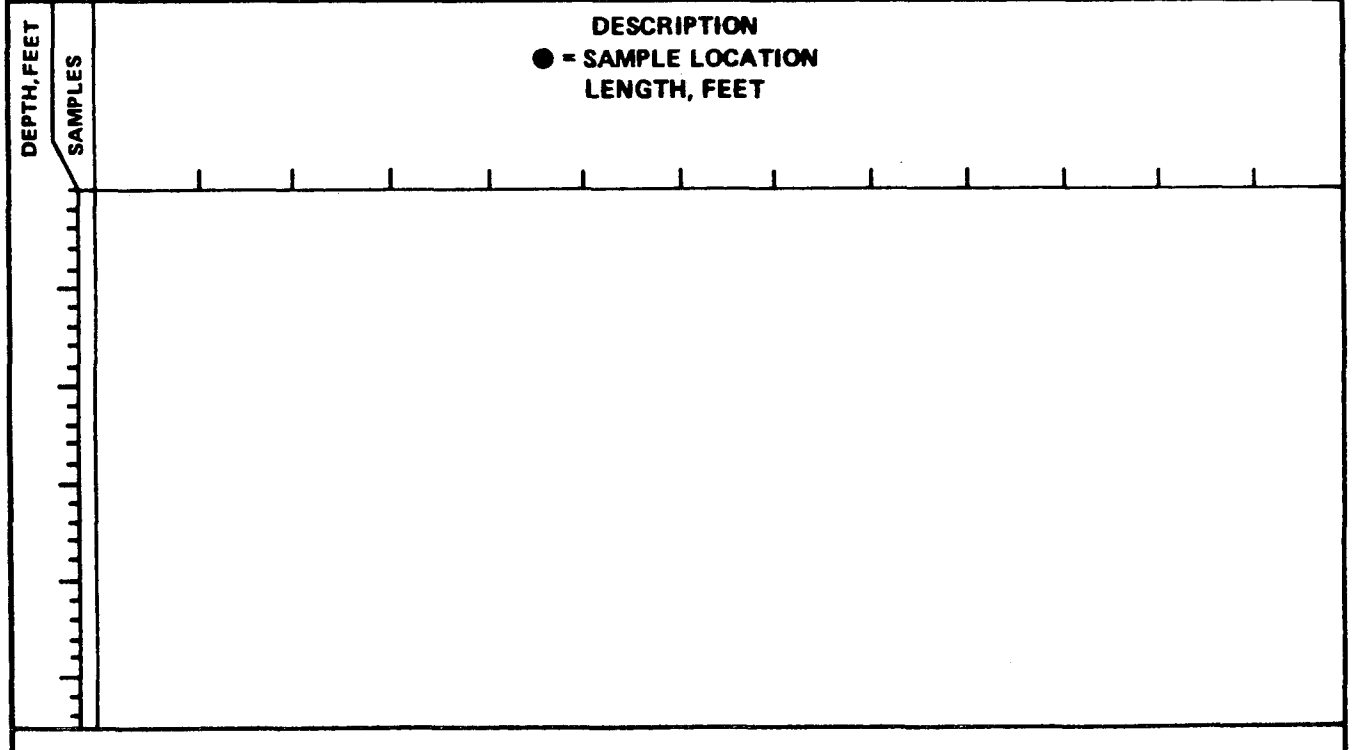
DATE 10/21/83 LOCATION LOCKPORT, N.Y. SURFACE ELEVATION N/A



COMPLETION DEPTH 12 FT DEPTH TO WATER N/A

LOG OF TEST TRENCH NO.

DATE _____ LOCATION _____ SURFACE ELEVATION _____



COMPLETION DEPTH _____ DEPTH TO WATER _____

4

APPENDIX C

Monitor Well Installation Reports

PIEZOMETER INSTALLATION REPORT

Project LOCKPORT COAL TAR SITE INVESTIGATION
Project No. 82C4495 Installed By J. THEW

Piezometer No. MW-17
Location TRANSIT GENESEE ST., LOCKPORT, N.Y.
Date 11/7/83 Time 5:45 PM

Method of Installation DRILLED; COMPLETE BOREHOLE TO 35 FT - GROUTED 3 IN. RISER PIPE FROM 8 TO 10 FT - GROUTED ANNULUS AROUND RISER PIPE TO 0.5 FEET FROM G.S. WHILE PULLING 6 IN. TEMPORARY CASING - INSTALLED WATER BOX 1 IN. BELOW ASPHALT SURFACE

LOG OF BORING AND PIEZOMETER

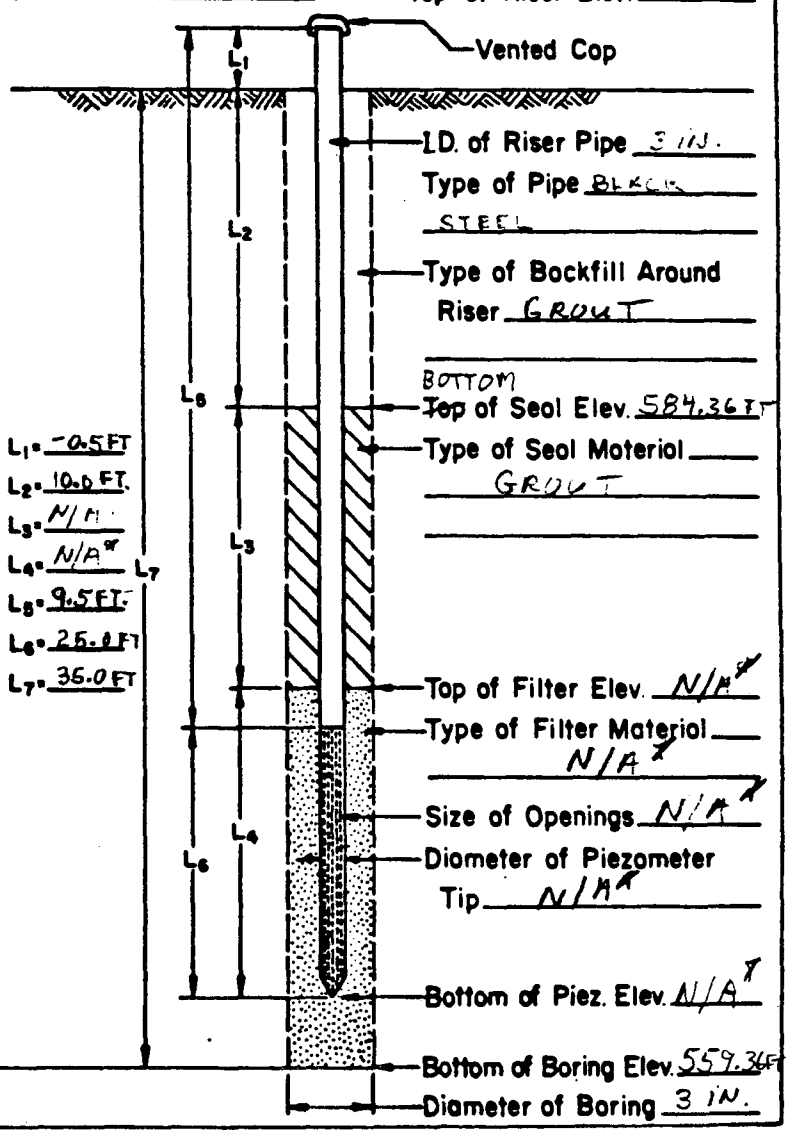
BORING

Depth in ft.	Description	Symbol
0	PAVEMENT	
2	FILL	
4		
6		
8		
10	Light gray DOLOMITE (Gasport Member)	
12		
14		
16		
18		
20		
22		
24		
26	Dark gray shaly DOLOMITE (DeCew Member)	
28		
30		
32	Dark gray limey SHALE (Rochester Member)	
34		
36	BOTTOM of BORING 35.0 FT	

PIEZOMETER

Type of Piezometer OPEN ROCK

Ground Elev. 594.36 FT
Top of Riser Elev. 593.86



- Vented Cap
- I.D. of Riser Pipe 3 IN.
- Type of Pipe BLACK STEEL
- Type of Backfill Around Riser GROUT
- BOTTOM Top of Seal Elev. 584.36 FT
- Type of Seal Materiol GROUT
- Top of Filter Elev. N/A*
- Type of Filter Materiol N/A*
- Size of Openings N/A*
- Diometer of Piezometer Tip N/A*
- Bottom of Piez. Elev. N/A*
- Bottom of Boring Elev. 559.36 FT
- Diameter of Boring 3 IN.

L_1 = -0.5 FT
L_2 = 10.0 FT.
L_3 = N/A*
L_4 = N/A*
L_5 = 9.5 FT.
L_6 = 25.0 FT
L_7 = 35.0 FT

Remorks * NOT APPLICABLE
WATER LEVEL UPON COMPLETION: 14.5 FT BELOW G.S.

Inspected By David Musceli
WOODWARD-CLYDE CONSULTANTS

PIEZOMETER INSTALLATION REPORT

Project LOCKPORT COAL TAR SITE — Piezometer No. MW-5

Project No. B2C4495 — Installed By JEFF TITEWS — Location S. TRANSIT STREET LOCKPORT, NY

Date 10/25/83 — Time 2:30 P.M.

Method of Installation DRILLER SET 4 IN. DIA. TEMPORARY CASING TO 18.9 FT - DRILLER created SOCKET BY DRILLING TO 21.7 FT WITH 3 3/4 IN. TRICONE ROLLER BIT - DRILLER SET 3 IN. STEEL PIPE TO 21.7 FT DRILLER GROUTED STEEL RISER PIPE TO SURFACE - AFTER GROUT SET, DRILLER ADVANCED [illegible] FT AND INSTALLED RISER CAP AND WATER TIGHT FLUSH WITH SURFACE [illegible]

LOG OF BORING AND PIEZOMETER

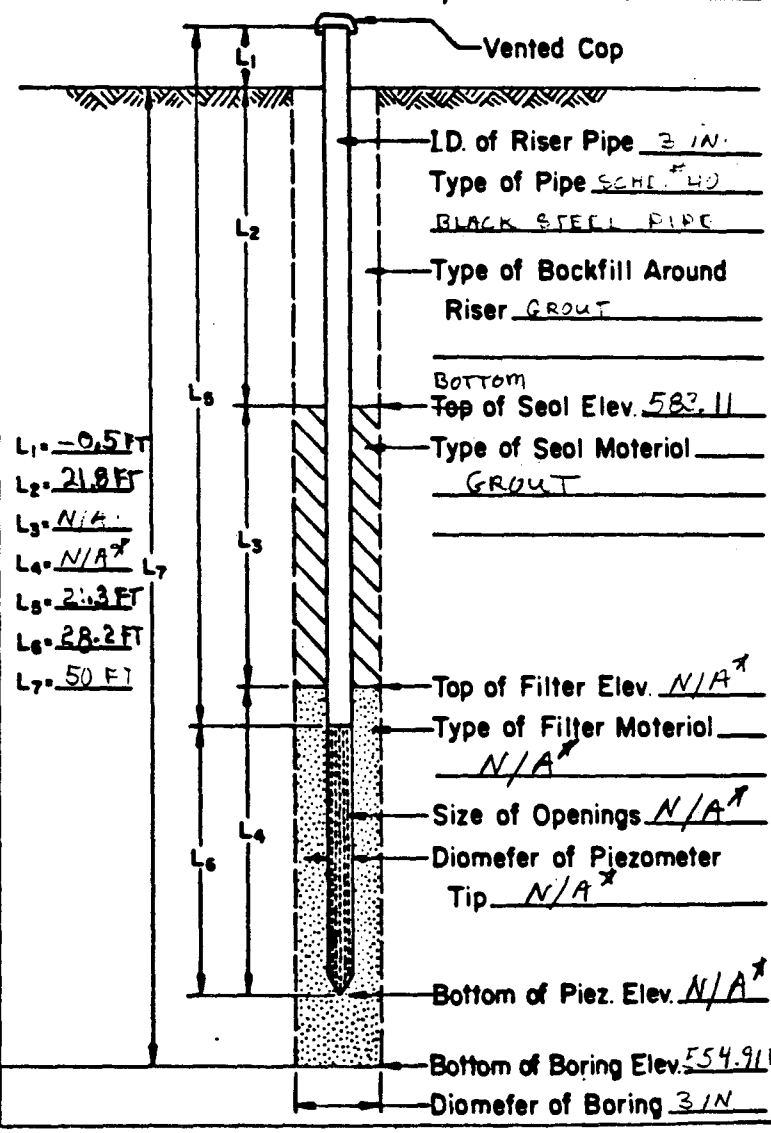
BORING

Depth in ft.	Description	Symbol
0	SIDEWALK AND FILL	
2		
4	Red-brown f sandy CLAY	
6		
8		
10	Red-brown [illegible] f-m SAND	
12		
14		
16	Red-brown f-m sandy f-c GRAVEL	
18		
20	TOP OF ROCK 18.6 FT.	
22	Light gray DOLOMITE	
24	[illegible]	
26		
28		
30		
32		
34	Dark gray, shaly DOLOMITE	
36	(Decew Member)	
38		
40		
42		
44	Medium [illegible] GRAY SHALE	
46	(Rochester Member)	
48		
50	BOTTOM OF BORING 50.0 FT	

PIEZOMETER

Type of Piezometer OPEN ROCK WELL

Ground Elev. 604.91 FT — Top of Riser Elev. 604.41 FT



L1 = 0.5 FT
L2 = 21.8 FT
L3 = N/A*
L4 = N/A*
L5 = 2.3 FT
L6 = 28.2 FT
L7 = 50 FT

- Vented Cap
- I.D. of Riser Pipe 3 IN.
- Type of Pipe SCHED. 40 BLACK STEEL PIPE
- Type of Backfill Around Riser GROUT
- Bottom Top of Seal Elev. 582.11
- Type of Seal Material GROUT
- Top of Filter Elev. N/A*
- Type of Filter Material N/A*
- Size of Openings N/A*
- Diameter of Piezometer Tip N/A*
- Bottom of Piez. Elev. N/A*
- Bottom of Boring Elev. 554.91 FT
- Diameter of Boring 3 IN

Remarks *N/A - NOT APPLICABLE

WATER LEVEL [illegible] ON 11/1/83 7.6 FT BELOW G.S.

Inspected By David Marcello

WOODWARD-CLYDE CONSULTANTS

PIEZOMETER INSTALLATION REPORT

Piezometer No. MW-6

Project LOCKPORT COAL TAR SITE INVESTIGATION Location LA GRANGE ST., LOCKPORT, NY

Project No. 82C4495 Installed By J. THEW Date 11/1/83 Time 6:30 PM

Method of Installation DRILLER: BORED TO 50 FT - PLACED 6 INCHES OF SAND IN BOREHOLE BOTTOM - FILLED ANNULUS AROUND SCREEN AND RISER PIPE TO 2 FT ABOVE SCREEN TOP - PLACED A SIX IN. BENTONITE SEAL ABOVE SAND - GROUTED RISER PIPE TO 0.5 FT. BELOW GROUND SURFACE - INSTALLED WATER BOX 1 IN. BELOW PAVEMENT SURFACE

LOG OF BORING AND PIEZOMETER

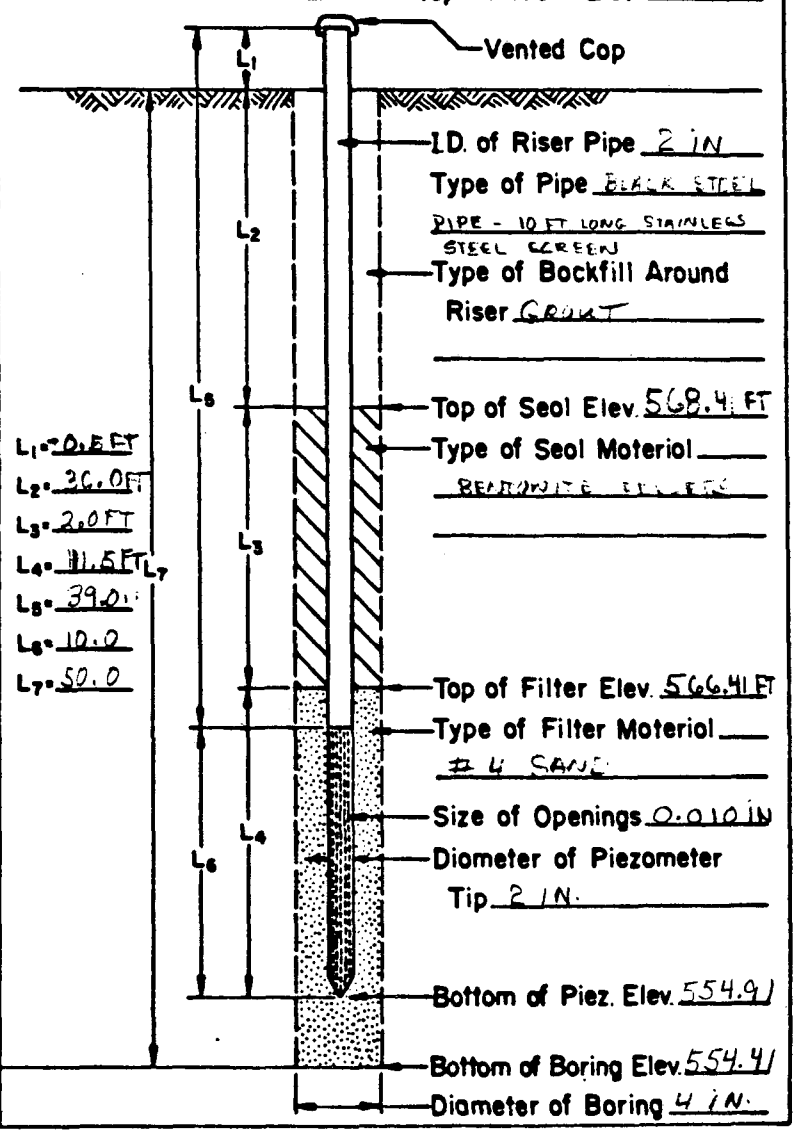
BORING

Depth in ft.	Description	Symbol
0	ASPHALT AND BRICK PAVEMENT	
2	FILL	
4		
6	TILL	
8		
10	Silty SAND	
14		
16	TOP OF ROCK 14 FT Light Gray DOLOMITE (Gasport Member)	
18		
20		
22		
24		
26		
28		
30		
32	Dark gray shaly DOLOMITE (DeCew Member)	
34		
36		
38		
40	Dark gray limey SHALE (Rochester Member)	
42		
44		
46		
48		
50	BOTTOM OF BORING 50.0 FT	

PIEZOMETER

Type of Piezometer 10 FT SCREENED SEALED IN ROCK

Ground Elev. 604.41 FT. Top of Riser Elev. 603.91 FT



L1 = 0.5 FT
L2 = 36.0 FT
L3 = 2.0 FT
L4 = 11.5 FT
L5 = 39.0 FT
L6 = 10.0
L7 = 50.0

Remarks WATER LEVEL UPON COMPLETION: 8.4 FT BELOW G.S.

Inspected By David Muscalo

WOODWARD-CLYDE CONSULTANTS

PIEZOMETER INSTALLATION REPORT

Project LOCKPORT COAL TAR SITE INVESTIGATION
Project No. B2C4495 Installed By J. THEW

Piezometer No. MW-7
Location TRANSIT SUBSTATION, LOCKPORT, N.Y.
Date 11/3/83 Time 11:50 A.M.

Method of Installation DRILLER: BORED TO 55 FT — PLACED 6 IN. SAND IN BOTTOM OF BOREHOLE — INSTALLED 10 FT WELL SCREEN (STAINLESS STEEL) WITH 46.5 FT OF BLACK STEEL RISER PIPE TO 7 FT ABOVE G.S. — INSTALLED SAND PACK AROUND RISER AND SCREEN TO TWO FT ABOVE SCREEN — INSTALLED 2 FT THICK BENTONITE SEAL OVER SAND — GROUTED ANNULUS AROUND RISER TO G.S. — INSTALLED LOCKING CAP

LOG OF BORING AND PIEZOMETER

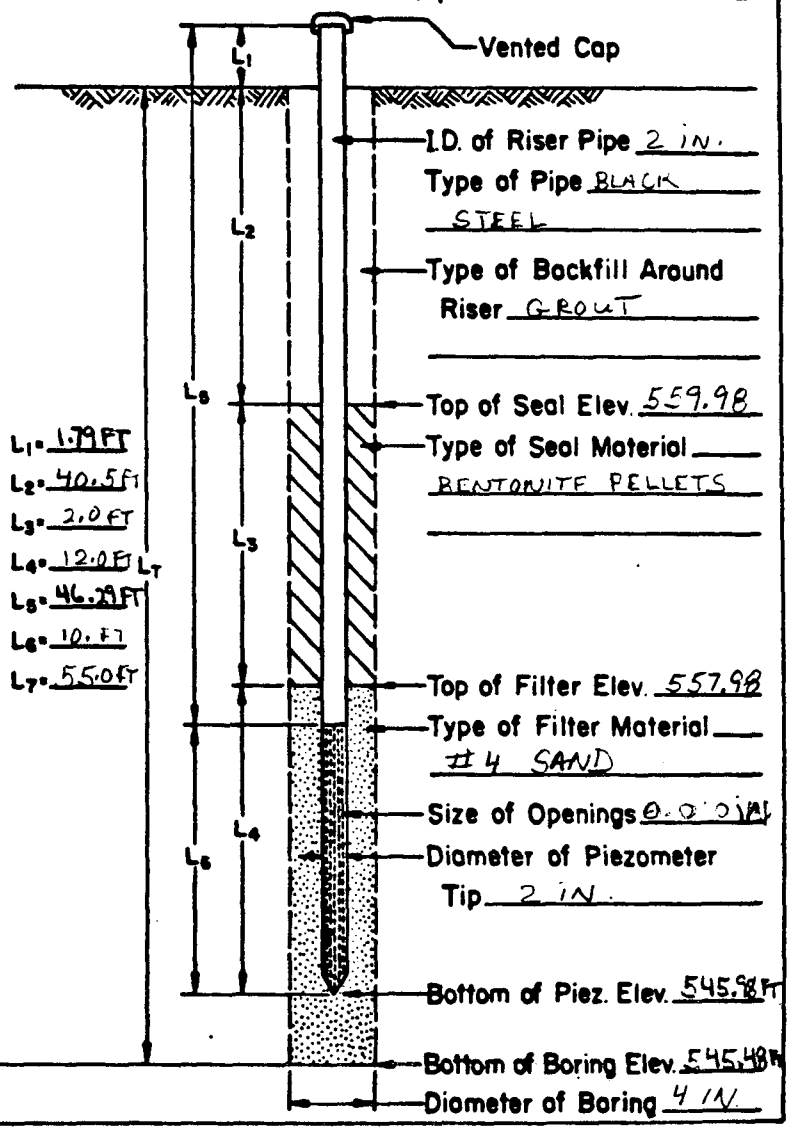
BORING

Depth in ft.	Description	Symbol
0	CRUSHED STONE	
5	FILL	
10	TOP OF ROCK 10.7 FT	
15	Light gray DOLOMITE (Gasport Member)	
20		
25		
30	Dark gray shaly DOLOMITE (Decew Member)	
35		
40		
45	Dark gray limey SHALE (Rochester Member)	
50		
55	BOTTOM OF BORING 55.0 FT.	

PIEZOMETER

Type of Piezometer 10 FT. SCREENED SEALED IN ROCK

Ground Elev. 600.48 FT. Top of Riser Elev. 602.27 FT.



L1 = 1.79 FT
L2 = 40.5 FT
L3 = 2.0 FT
L4 = 12.0 FT
L5 = 46.79 FT
L6 = 10. FT
L7 = 55.0 FT

- Vented Cap
- I.D. of Riser Pipe 2 IN.
- Type of Pipe BLACK STEEL
- Type of Backfill Around Riser GROUT
- Top of Seal Elev. 559.98
- Type of Seal Material BENTONITE PELLETS
- Top of Filter Elev. 557.98
- Type of Filter Material #4 SAND
- Size of Openings 0.010 IN.
- Diameter of Piezometer Tip 2 IN.
- Bottom of Piez. Elev. 545.98 FT
- Bottom of Boring Elev. 545.48 FT
- Diameter of Boring 4 IN.

Remarks WATER LEVEL UPON COMPLETION: 6.9 FT BELOW G.S.

Inspected By David Muscato

WOODWARD-CLYDE CONSULTANTS

APPENDIX A

Boring Logs

PIEZOMETER INSTALLATION REPORT

Piezometer No. MW-8

Project LOCKPORT COAL TAR SITE INVESTIGATION
Location STATE ST. LOCKPORT, N.Y.

Project No. 82C4495 Installed By J. THEW
Date 10/31/83 Time 6:50 PM.

Method of Installation DRILLER DRILLED ROCK SOCKET (3 7/8 IN) FROM 4.3 FT TO 6.3 FT - DRILLER FILLED ROCK SOCKET WITH THICK GROUT - DRILLER SET 3 IN STEEL PIPE TO 6.3 FT WITH 2.0 FT OF STICK-UP. - DRILLER INSTALLED LOCKING CAP WITH LOCK DRILLER PULLED 4 IN. CASING WHILE POURING GROUT - INSTALLED WATER BOX 1 IN. BELOW G.S.

LOG OF BORING AND PIEZOMETER

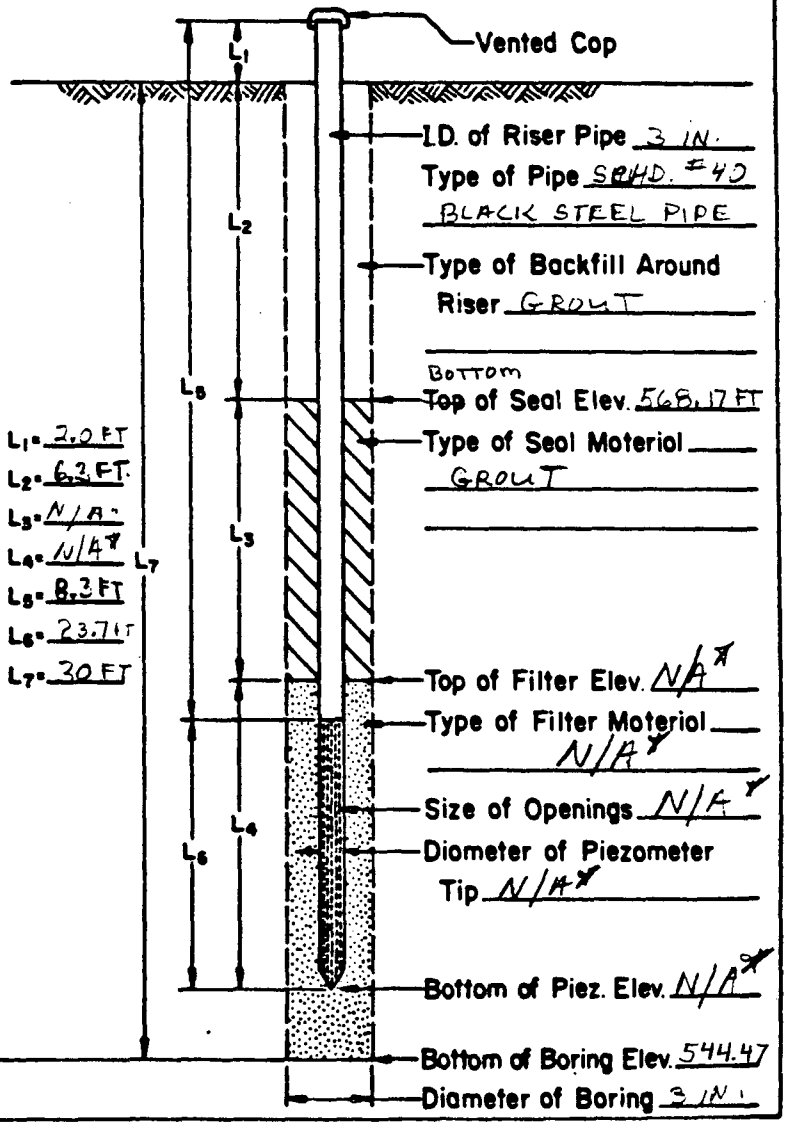
BORING

Depth in ft.	Description	Symbol
0	CONCRETE SLAB	
2	FILL	
4		
6	Light gray DOLOMITE (Gasport Member)	
8		
10	Dark gray shaly DOLOMITE (DeCew Member)	
12		
14		
16		
18	Dark gray limey SHALE (Rochester Member)	
20		
22		
24		
26		
28		
30	BOTTOM OF BORING 30.0 FT	

PIEZOMETER

Type of Piezometer OPEN ROCK WELL

Ground Elev. 574.47 FT Top of Riser Elev. 576.47 FT



L1 = 2.0 FT
L2 = 6.3 FT
L3 = N/A*
L4 = N/A*
L5 = 8.3 FT
L6 = 23.7 FT
L7 = 30 FT

Vented Cap
I.D. of Riser Pipe 3 IN.
Type of Pipe SCHD. #40 BLACK STEEL PIPE
Type of Backfill Around Riser GROUT
Bottom Top of Seal Elev. 568.17 FT
Type of Seal Moteriol GROUT
Top of Filter Elev. N/A*
Type of Filter Moteriol N/A*
Size of Openings N/A*
Diameter of Piezometer Tip N/A*
Bottom of Piez. Elev. N/A*
Bottom of Boring Elev. 544.47
Diameter of Boring 3 IN.

Remarks * NOT APPLICABLE

WATER LEVEL UPON COMPLETION: 12.75 BELOW G.S.

Inspected By David Muscato

WOODWARD-CLYDE CONSULTANTS

PIEZOMETER INSTALLATION REPORT

Piezometer No. MW-9

Project LOCKPORT COAL TAR SITE INVESTIGATION Location 42 GENESEE ST. LOCKPORT, N.Y.

Project No. B3CN495 Installed By J. THEW Date 10/28/83 Time 2:40 PM

Method of Installation DRILLER GROUTED RISER PIPE INTO ROCK SOCKET (16.8-19.0 FT) AND GROUTED ANNULUS OF RISER PIPE TO 0.5 FT BELOW GROUND SURFACE - DRILLER INSTALLED WATER BOX (OVER TOP OF WELL) FLUSH WITH STREET PAVEMENT (1 in. BELOW PAVEMENT)

LOG OF BORING AND PIEZOMETER

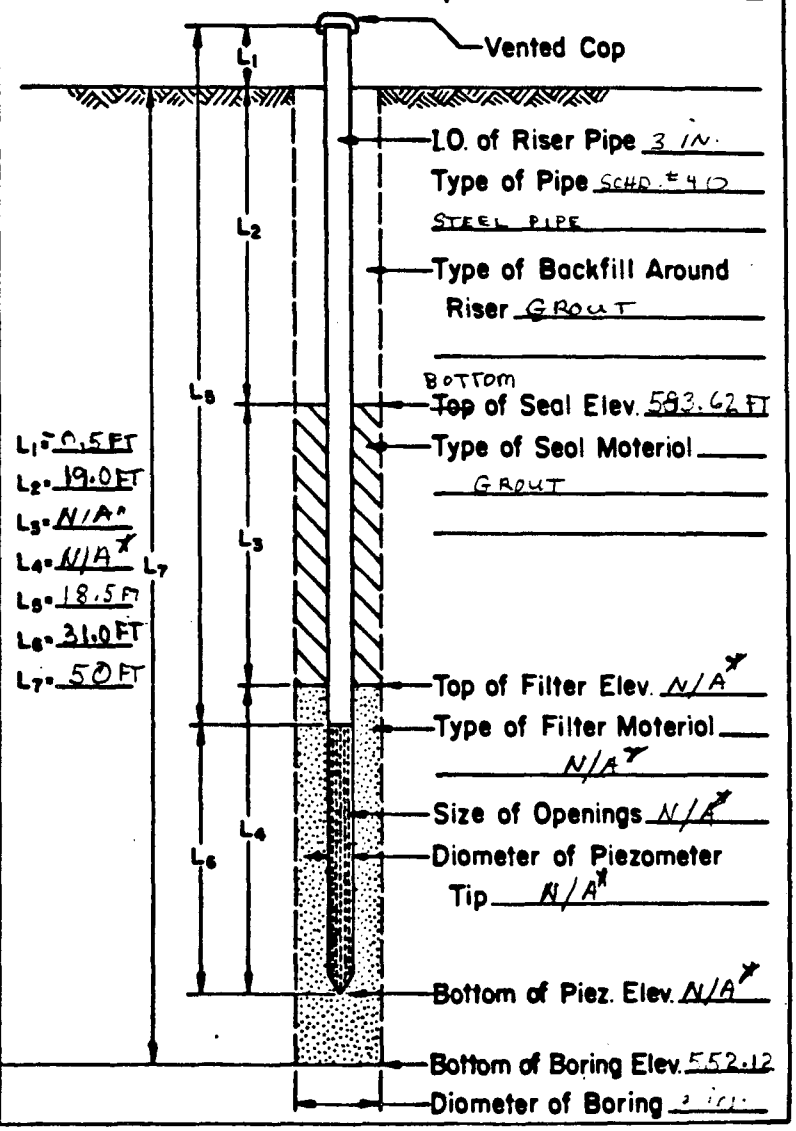
BORING

Depth in ft.	Description	Symbol
0	ASPHALT AND OLD BRICK ROADWAY	
2	FILL	
4	Red-brown CLAYS and SILTS	
6		
8		
10		
12		
14		
16	TILL	
18	TOP OF ROCK 16.8 FT.	
20	Light gray Dolomite (Gasport Member)	
22		
24		
26		
28	Dark gray shaly DOLOMITE (De Cew Member)	
30		
32		
34	Dark gray limey SHALE (Rochester Member)	
36		
38		
40		
42		
44		
46		
48		
50	BOTTOM OF BORING 50.0 FT	

PIEZOMETER

Type of Piezometer OPEN ROCK WELL

Ground Elev. 602.12 FT Top of Riser Elev. 601.62 FT



L1 = 0.5 FT
L2 = 19.0 FT
L3 = N/A*
L4 = N/A*
L5 = 18.5 FT
L6 = 31.0 FT
L7 = 50 FT

Remorks N/A = NOT APPLICABLE

WATER LEVEL UPON COMPLETION: 24.3 FT BELOW G.S.

Inspected By David Vincent

WOODWARD-CLYDE CONSULTANTS

PIEZOMETER INSTALLATION REPORT

Project LOCKPORT COAL TAR SITE INVESTIGATION
Project No. 82C4495 Installed By J. THEW

Piezometer No. MW-10
Location LAGRANGE ST. LOCKPORT, N.Y.
Date 11/8/83 Time 5:30 PM

Method of Installation DRILLER: GROUTED 3 IN BLACK STEEL RISER PIPE FROM ROCK SOCKET (12-14 FT) TO G.S. - AS 4 IN. TEMPORARY CASING WAS PULLED, DRILLED FILLED ANNULUS BETWEEN RISER AND SOIL WITH GROUT - INSTALLED WATER BOX FLUSH WITH ASPHALT SIDEWALK

LOG OF BORING AND PIEZOMETER

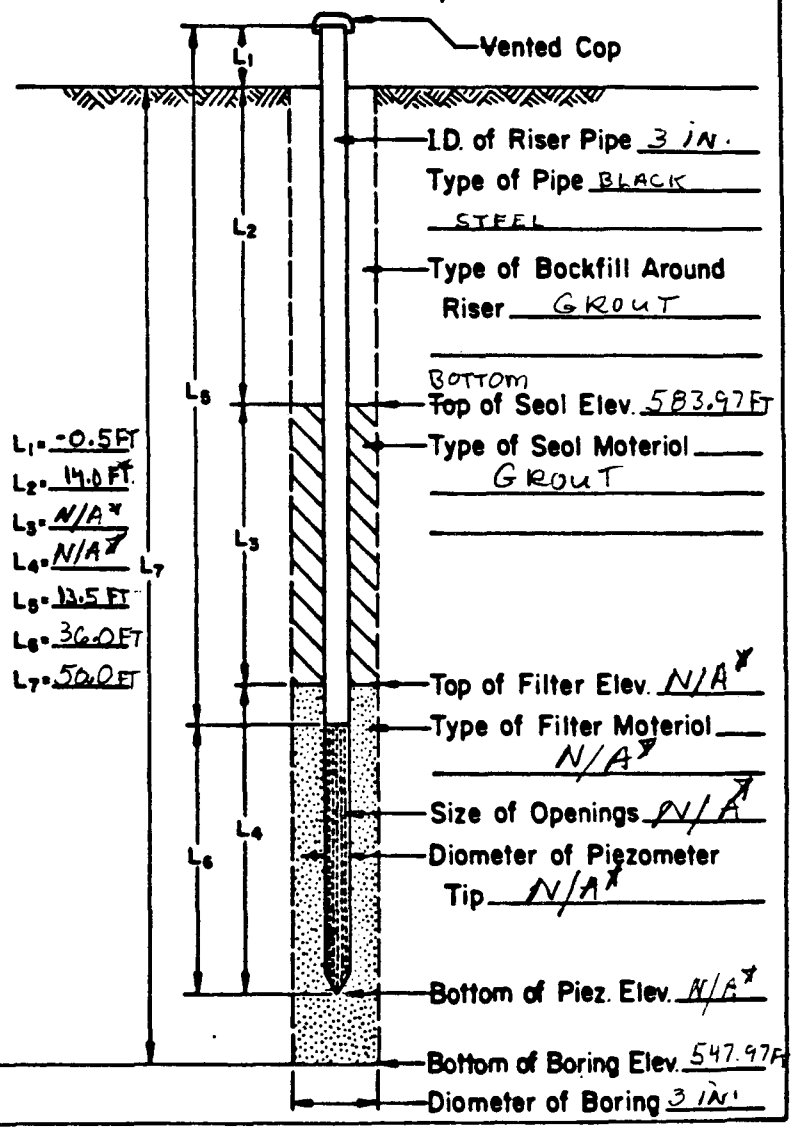
BORING

Depth in ft.	Description	Symbol
	ASPHALT	
2	FILL	
4		
6		
8		
10		
12	TOP OF ROCK 12.0 FT	
14	Light gray DOLOMITE (Gasport Member)	
16		
18		
20		
22		
24		
26	Dark gray shaly DOLOMITE (DeCew Member)	
28		
30		
32		
34		
36	Dark gray limey SHALE (Rochester Member)	
38		
40		
42		
44		
46		
48		
50	BOTTOM OF BORING 50.0 FT	

PIEZOMETER

Type of Piezometer OPEN ROCK WELL

Ground Elev. 597.97 FT. Top of Riser Elev. 597.47 FT



L1 = -0.5 FT
L2 = 14.0 FT
L3 = N/A*
L4 = N/A*
L5 = 13.5 FT
L6 = 36.0 FT
L7 = 50.0 FT

Vented Cop
I.D. of Riser Pipe 3 IN.
Type of Pipe BLACK STEEL
Type of Backfill Around Riser GROUT
Bottom Top of Seal Elev. 583.97 FT
Type of Seal Moteriol GROUT
Top of Filter Elev. N/A*
Type of Filter Moteriol N/A*
Size of Openings N/A*
Diometer of Piezometer Tip N/A*
Bottom of Piez. Elev. N/A*
Bottom of Boring Elev. 547.97 FT
Diometer of Boring 3 IN.

Remarks *N/A = NOT APPLICABLE
WATER LEVEL UPON COMPLETION; 8.25 FT. BELOW G.S.

Inspected By David Muscolo
WOODWARD-CLYDE CONSULTANTS

PIEZOMETER INSTALLATION REPORT

Project LOCKPORT COAL TAR SITE INVESTIGATION
Project No. B2C4495 Installed By J. THEW

Piezometer No. MW-11
Location GENESEE ST. LOCKPORT, N.Y.
Date 11/8/83 Time 9:45 AM

Method of Installation DRILLED BORED TO TOP OF ROCK AT 9.4FT - FORMED ROCK SOCKET TO 11.4 FT - PUMPED GROUT AROUND RISER PIPE AS TEMPORARY CASING WAS PULLED - INSTALLED WATER BOX FLUSH WITH G.S.

LOG OF BORING AND PIEZOMETER

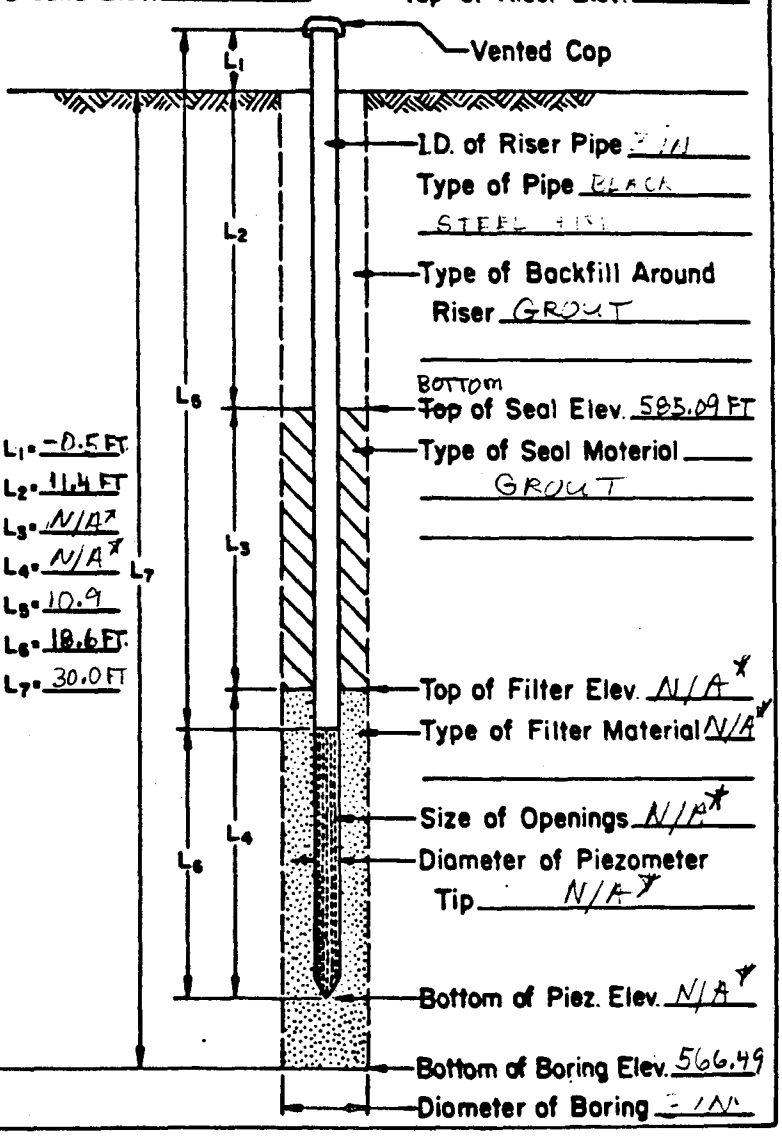
BORING

Depth in ft.	Description	Symbol
0		
2	FILL	
4		
6		
8		
10	TOP OF ROCK 9.4 FT	
12		
14	Light gray DOLOMITE (Gasport Member)	
16		
18		
20		
22		
24		
26	Dark gray shaly DOLOMITE (DeCew Member)	
28		
30	BOTTOM OF BORING 30.0 FT	

PIEZOMETER

Type of Piezometer OPEN ROCK WELL

Ground Elev. 596.49 FT Top of Riser Elev. 595.99 FT



L1 = -0.5 FT
L2 = 11.4 FT
L3 = N/A*
L4 = N/A*
L5 = 10.9
L6 = 18.6 FT
L7 = 30.0 FT

Remorks *N/A NOT APPLICABLE
WATER LEVEL UPON COMPLETION: 7.25 FT BELOW G.S.

Inspected By David Muscolo

WOODWARD - CLYDE CONSULTANTS

PIEZOMETER INSTALLATION REPORT

Piezometer No. MW-12

Project LOCKPORT COAL TAR SITE INVESTIGATION
Location GENESEE ST. LOCKPORT N.Y.

Project No. 82C4495 Installed By J. THEW
Date 11/2/83 Time 3:20 PM.

Method of Installation DRILLER: BORED TO 53.6 FT - PLACED 6 IN. OF #4 SAND TO 53 FT - INSALLED 10 FT SCREEN AND 42.5 FT OF BLACK STEEL RISER PIPE - PLACED SAND AROUND AND OVER SCREEN TO 39 FT - GROUTED BOREHOLE ANNULUS AROUND RISER PIPE TO 0.5 FT BELOW G.S - INSTALLED WATER BOX FLUSH WITH G.S

LOG OF BORING AND PIEZOMETER

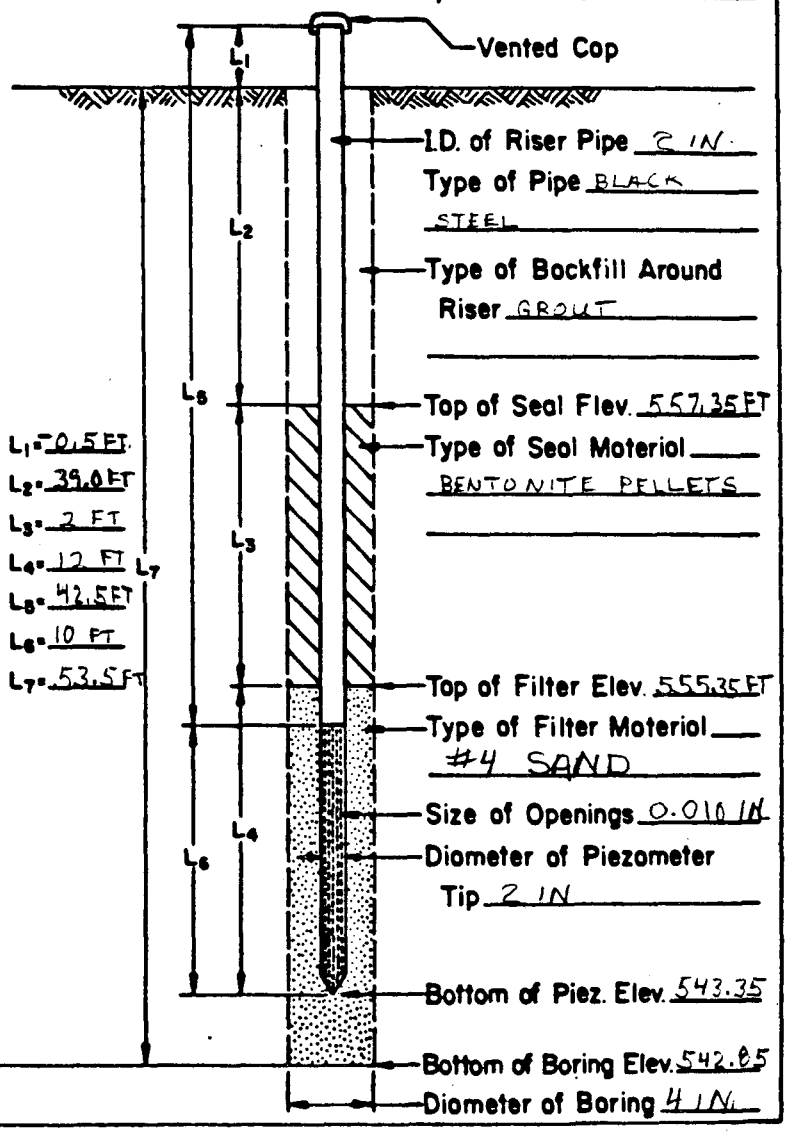
BORING

Depth in ft.	Description	Symbol
0		
5	FILL	
10		
15	Light gray DOLOMITE (Gasport Member)	
20		
25		
30	Dark gray Shaly DOLOMITE	
35		
40	Dark gray limey SHALE (Rochester Member)	
45		
50		
55	BOTTOM OF BORING 53.5 FT	

PIEZOMETER

Type of Piezometer 10 FT SCREENED SEALED IN ROCK

Ground Elev. 596.35 FT Top of Riser Elev. 595.85 FT



L1 = 0.5 FT.
L2 = 39.0 FT
L3 = 2 FT
L4 = 12 FT
L5 = 42.5 FT
L6 = 10 FT
L7 = 53.5 FT

Remarks WATER LEVEL UPON COMPLETION: 11.9 FT BELOW G.S.

Inspected By David Musolo

WOODWARD - CLYDE CONSULTANTS

PIEZOMETER INSTALLATION REPORT

Project LOCKPORT COAL TAR SITE INVESTIGATION
Project No. B2C4495 Installed By J. THEW
Piezometer No. MW-13
Location SAXTON ST LOCKPORT N.Y.
Date 26 OCTOBER Time 2:00 PM

Method of Installation DRILLER SET 4 IN. TEMPORARY CASING TO 6.4 FT - DRILLER DRILLED 3 7/8 IN SOCKET TO 10.6 FT - DRILLER SET 2 IN STEEL RISER PIPE IN SOCKET AND OPEN RISER PIPE IN PLACE TO 0.2 FT FROM GROUND SURFACE AS TEMPORARY CASING WAS REMOVED - DRILLER INSTALLED WATER BOX OVER AND AROUND TOP OF WELL FLUSH WITH PAVEMENT

LOG OF BORING AND PIEZOMETER

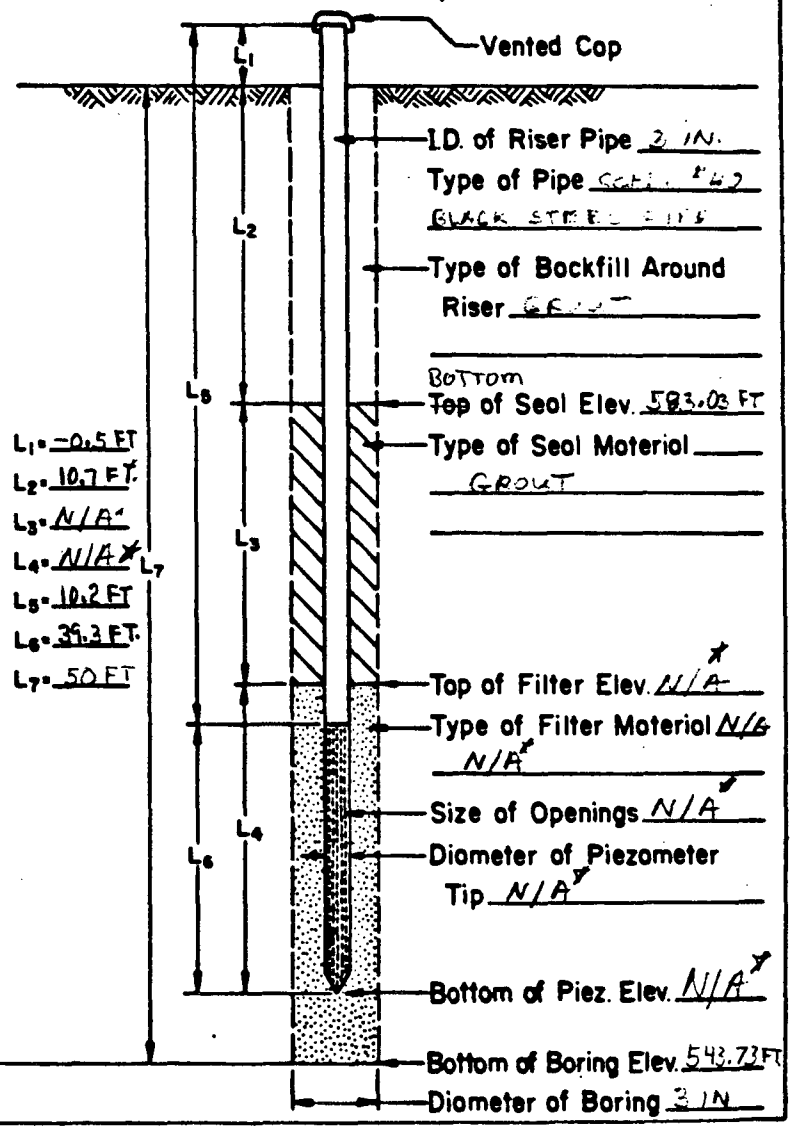
BORING

Depth in ft.	Description	Symbol
0		
2	ASPHALT	
4	GRANULAR FILL	
6		
8		
10	Light gray DOLOMITE (Gasport Member)	
12		
14		
16		
18		
20		
22		
24		
26	Dark grey shaly DOLOMITE (De Cew Member)	
28		
30		
32		
34		
36	Dark grey limey SHALE (Rochester Member)	
38		
40		
42		
44		
46		
48		
50	BOTTOM OF BORING 50.0 FT	

PIEZOMETER

Type of Piezometer OPEN ROCK WELL

Ground Elev. 593.73 FT. Top of Riser Elev. 593.23 FT



L1 = -0.5 FT
L2 = 10.7 FT.
L3 = N/A*
L4 = N/A*
L5 = 10.2 FT
L6 = 39.3 FT.
L7 = 50 FT

Remarks * N/A = NOT APPLICABLE
WATER LEVEL UPON COMPLETION : 19.5 FT BELOW G.S.

Inspected By David Muscala
WOODWARD-CLYDE CONSULTANTS

PIEZOMETER INSTALLATION REPORT

Project LOCKPORT COAL TAR SITE INVESTIGATION
Project No. 826495 Installed By J. THEW

Piezometer No. MW-14
Location STATE RD. LOCKPORT, N.Y.
Date 11/10/83 Time 10:30 AM

Method of Installation DRILLER: AUGERED TO 31.5 - CASED BOREHOLE TO 31.7 FT WITH TEMPORARY 4 IN. CASING - BORED ROCK SOCKET TO 33.5 FT - INSTALLED 33.0 FT OF 3 IN. RISER PIPE - GROUT RISER PIPE TO 0.5 FT BELOW G.S. - INSTALLED WATER BOX 1.0 IN. BELOW TOP OF ASPHALT PAVEMENT

LOG OF BORING AND PIEZOMETER

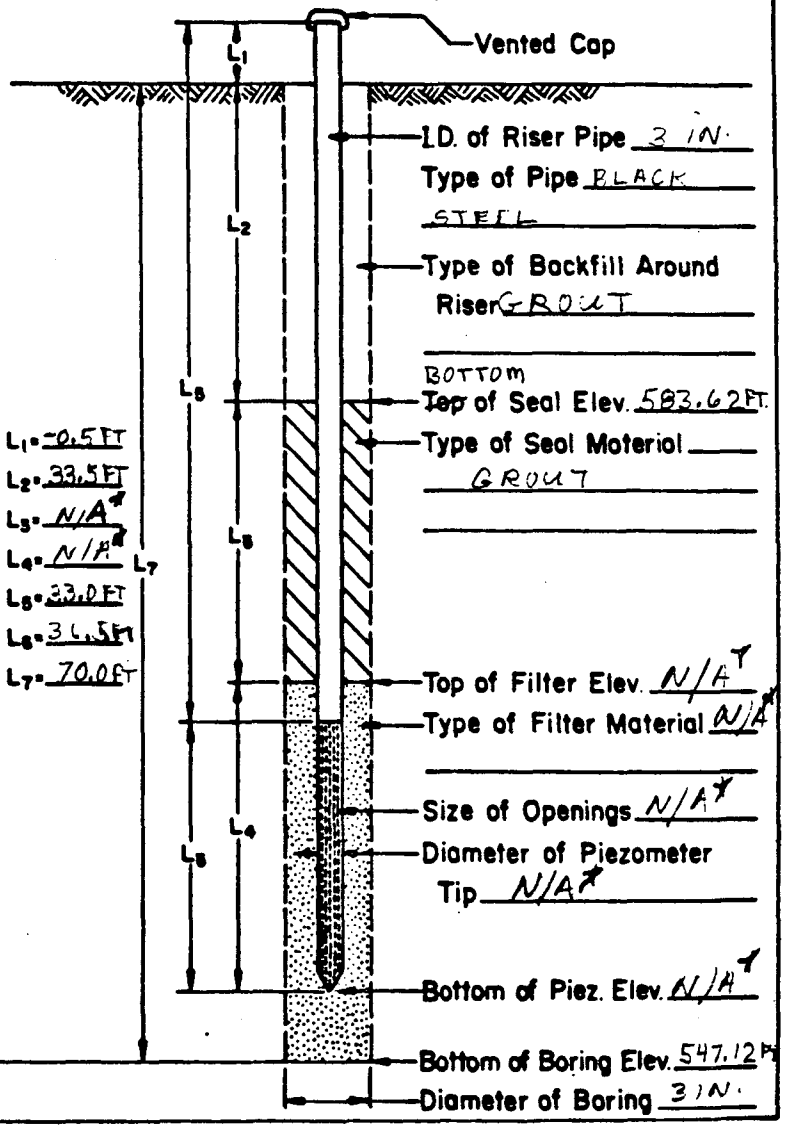
BORING

Depth in ft.	Description	Symbol
0	ASPHALT, BRICK PAVEMENT AND FILL	
5	Red-brown sandy SILT	
10		
15	Red-brown silty SAND	
20	TILL	
25	Red-brown SILT	
30		
35	Light gray DOLOMITE (Gasport Member)	
40		
45	Dark gray shaly DOLOMITE (DeCew Member)	
50		
55		
60	Dark gray limey SHALE (Rochester Member)	
65		
70	BOTTOM OF BORING 70.0 FT	

PIEZOMETER

Type of Piezometer OPEN ROCK WELL

Ground Elev. 617.12 FT. Top of Riser Elev. 616.62 FT



L1 = 0.5 FT
L2 = 33.5 FT
L3 = N/A*
L4 = N/A*
L5 = 33.0 FT
L6 = 34.5 FT
L7 = 70.0 FT

Vented Cap
I.D. of Riser Pipe 3 IN.
Type of Pipe BLACK STEEL
Type of Backfill Around Riser GROUT
Top of Seal Elev. 583.62 FT. (BOTTOM)
Type of Seal Material GROUT
Top of Filter Elev. N/A*
Type of Filter Material N/A*
Size of Openings N/A*
Diameter of Piezometer Tip N/A*
Bottom of Piez. Elev. N/A*
Bottom of Boring Elev. 547.12 FT
Diameter of Boring 3 IN.

Remarks * NOT APPLICABLE
WATER LEVEL UPON COMPLETION: 12.9 FT BELOW G.S.

Inspected By David Mucciolo
WOODWARD-CLYDE CONSULTANTS

PIEZOMETER INSTALLATION REPORT

Piezometer No. MW-15

Project LOCKPORT COAL TAR SITE INVESTIGATION Location MAIN ST. LOCKPORT, NEW YORK

Project No. 82C4495 Installed By J. THEW Date 11/11/83 Time 2:30 PM

Method of Installation DRILLER: BORED 2 FT ROCK SOCKET FROM 5.3 TO 8.2 FT BELOW G.S. - INSTALLED 3 IN. BLACK STEEL RISER PIPE - GROUTED RISER PIPE IN ROCK SOCKET AND RISER ANNULUS - INSTALLED WATER BOX 1 IN. BELOW PAVEMENT SURFACE.

LOG OF BORING AND PIEZOMETER

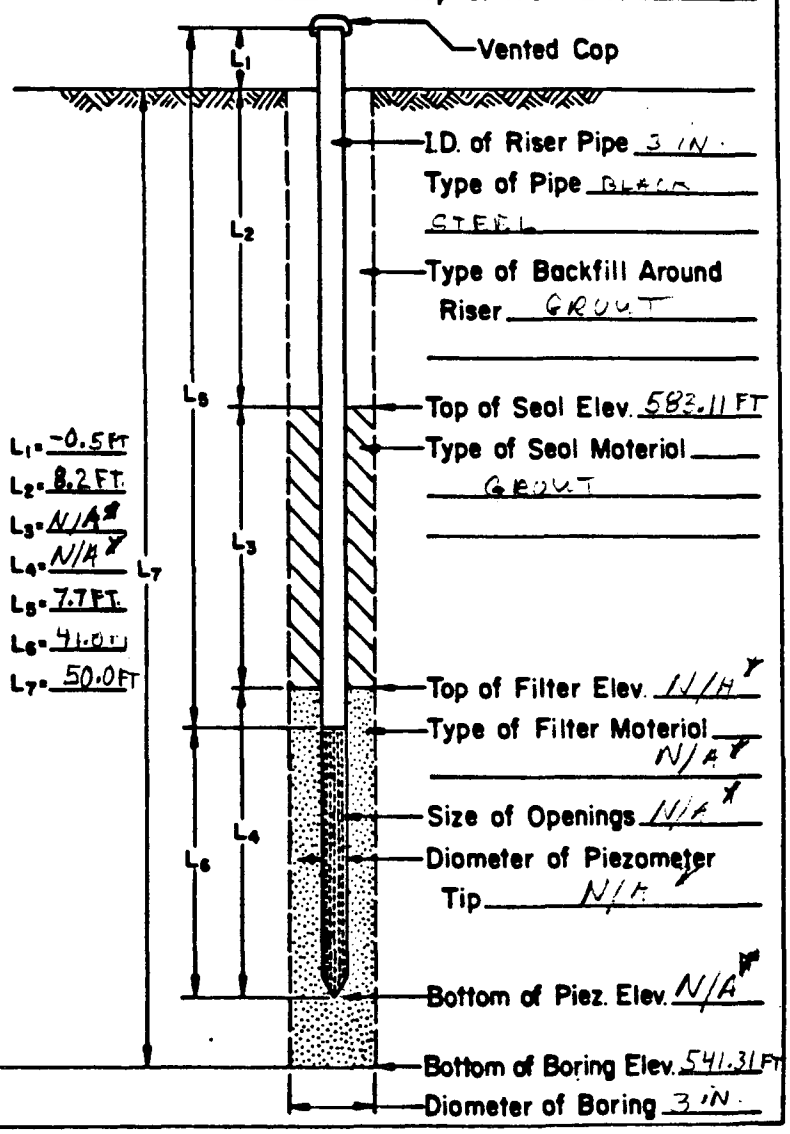
BORING

Depth in ft.	Description	Symbol
0	ASPHALT AND CONCRETE	
2	FILL	
4	Red-brown f. sandy SILT	
6		
8		
10	Light gray DOLOMITE (Gasport Member)	
12		
14		
16		
18		
20	Dark gray shaly DOLOMITE (DeCew Member)	
22		
24		
26		
28		
30		
32		
34	Dark gray limey SHALE (Rochester Member)	
36		
38		
40		
42		
44		
46		
48		
50	BOTTOM OF BORING 50.0 FT	

PIEZOMETER

Type of Piezometer OPEN ROCK WELL

Ground Elev. 591.31 FT Top of Riser Elev. 590.81 FT



L1 = -0.5 FT
L2 = 8.2 FT
L3 = N/A*
L4 = N/A*
L5 = 7.7 FT.
L6 = 41.0 FT
L7 = 50.0 FT

Vented Cap

I.D. of Riser Pipe 3 IN.

Type of Pipe BLACK STEEL

Type of Backfill Around Riser GROUT

Top of Seal Elev. 583.11 FT

Type of Seal Moteriol GROUT

Top of Filter Elev. N/A*

Type of Filter Moteriol N/A*

Size of Openings N/A*

Diometer of Piezometer Tip N/A*

Bottom of Piez. Elev. N/A*

Bottom of Boring Elev. 541.31 FT

Diometer of Boring 3 IN.

Remorks N/A* - NOT APPLICABLE

WATER LEVEL UPON COMPLETION: 9.6 FT. BELOW G.S.

Inspected By David Muscato

WOODWARD-CLYDE CONSULTANTS

PIEZOMETER INSTALLATION REPORT

Piezometer No. MW-16

Project LOCKPORT COAL TAR SITE INVESTIGATION Location STATE RD. LOCKPORT, NEW YORK

Project No. B2C4495 Installed By J. THEW Date 11/10/83 Time [illegible]

Method of Installation DRILLED; FORM ROCK SOCKET TO 3.2 FT - INSTALLED 5.2 FT OF 3 IN. BLACK STEEL PIPE - GROUT PIPE IN ROCK SOCKET AND PIPE ANNULUS TO G.S. - BORED TO 30 FT. - INSTALLED LOCKING CAP ON TOP OF RISER PIPE

LOG OF BORING AND PIEZOMETER

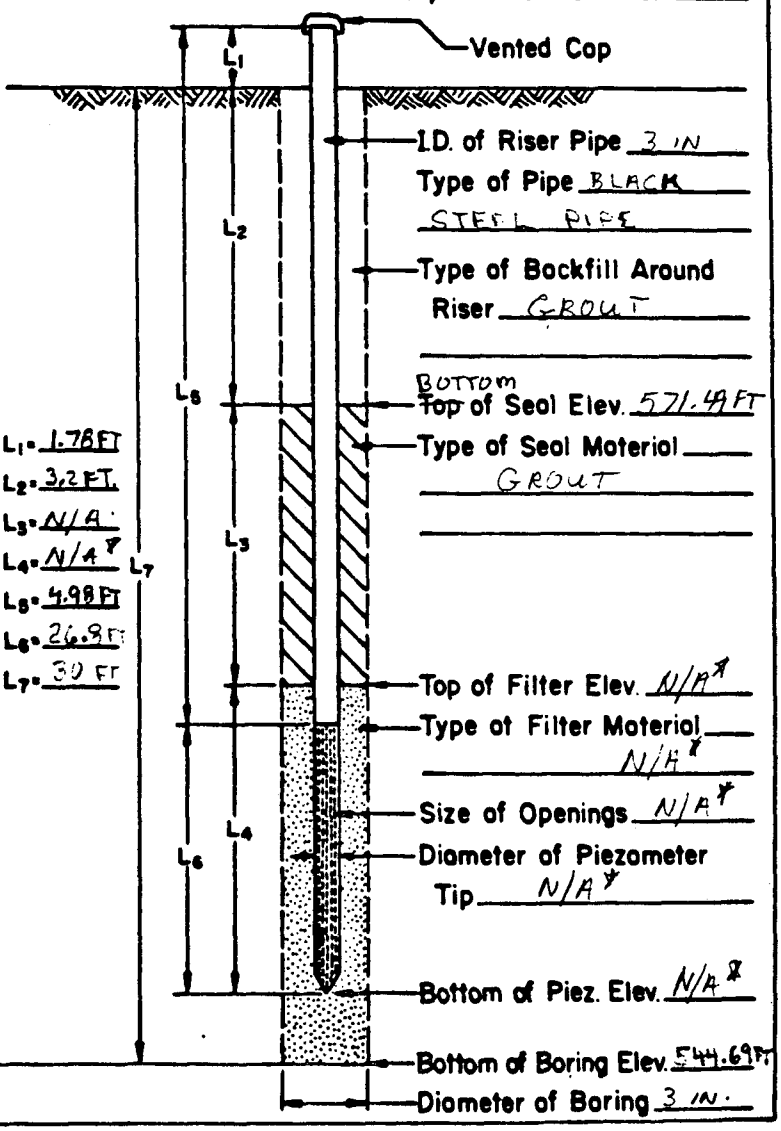
BORING

Depth in ft.	Description	Symbol
0	CONCRETE FLOOR SLAB	
2	TOP OF ROCK 1.2 FT	
4	Light gray DOLOMITE (Gospost Member)	
6		
8	Dark gray shaly DOLOMITE	
10	(De Cew Member)	
12		
14		
16		
18	Dark gray limey SHALE	
20	(Rochester Member)	
22		
24		
26		
28		
30	BOTTOM OF BORING 30.0 FT	

PIEZOMETER

Type of Piezometer OPEN ROCK WELL

Ground Elev. 574.69 FT. Top of Riser Elev. 576.47 FT



L1 = 1.78 FT
L2 = 3.2 FT.
L3 = N/A*
L4 = N/A*
L5 = 4.98 FT
L6 = 26.9 FT
L7 = 30 FT

Remarks * N/A - NOT APPLICABLE

WATER LEVEL UPON COMPLETION: 6.1 FT BELOW G.S.

Inspected By _____

WOODWARD-CLYDE CONSULTANTS

APPENDIX D

Laboratory Analyses

general testing corporation

Water and Wastewater Testing Specialists

710 Exchange Street
Rochester, NY 14608
(716) 454-3760

85 Trinity Place
Hackensack, NJ 07601
(201) 488-5242

LABORATORY REPORT

Job No. 10705 Date December 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
NYS Gas & Electric
Lockport, NY

Date samples (x) received ( ) collected by General Testing 11/29/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	Phenols
Date(s) Collected	11/28/83
Time(s)	10:00 am
MW1	.085
MW2	.081
MW3	1.09
MW4	.014
MW5	.005
MW6	.010
MW7	6.38
MW8	.014
MW9	.005
MW10	9.71
MW11	.057
MW12	.021
MW13	.006
MW14	.007
MW16	.008

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

David H. Berner
Laboratory Director

general testing corporation

Water and Wastewater Testing Specialists

710 Exchange Street
Rochester, NY 14608
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85 Trinity Place
Hackensack, NJ 07601
(201) 488-5242

LABORATORY REPORT

Job No. 10705 Data December 30, 1983

Client

Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference

NYS Gas & Electric
Lockport, NY

Date samples (x) received ( ) collected by General Testing 11/29/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	Phenols
Date(s) Collected	11/28/83
Time(s)	10:00 am
MW17	.151
IW1	.017
IW2	.020

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
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David L. Berner
Laboratory Director

general testing corporation

Water and Wastewater Testing Specialists

710 Exchange Street
Rochester, NY 14608
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85 Trinity Place
Hackensack, NJ 07601
(201) 488-5242

LABORATORY REPORT

Job No. 10705 Date December 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Date samples (X) received ( ) collected by General Testing

Sample(s) Reference
Volatile Aromatics
602 Series
NYS Gas & Electric
Lockport, NY
11/29/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	Trip Blank	MW1	MW2	MW3
Date(s) Time(s)				
Benzene	<0.001	0.170	0.520	4.18
Toluene	<0.001	0.230	0.220	3.78
Ethyl Benzene	<0.001	0.260	0.190	1.96
p-Xylene	<0.001	0.041	0.230	0.42
m-Xylene	<0.001	0.081	0.110	1.06
o-Xylene	<0.001	0.062	0.280	0.74
Styrene	<0.001	0.005	<0.001	0.56
n-Propylbenzene	<0.001	0.014	0.083	<0.1
p-Dichlorobenzene	<0.002	<1	<1	<1
m-Dichlorobenzene	<0.002	<1	<1	<1
o-Dichlorobenzene	<0.002	<1	<1	<1

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

*Elute Together

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David A. Benner
Laboratory Director

general testing corporation

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LABORATORY REPORT

Job No. 10705 **Date** December 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Volatile Aromatics
602 Series
NYS Gas & Electric
Lockport, NY

Date samples (x) received ( ) collected by General Testing 11/29/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW4	MW5	MW6	MW7
Date(s) Collected	11/28/83	11/28/83	11/28/83	11/28/83
Time(s)	10:00 am	10:00 am	10:00 am	10:00 am
Benzene	0.003	0.005	0.008	3.56
Toluene	<0.001	0.001	0.029	3.44
Ethyl Benzene	<0.001	0.004	0.013	0.99
p-Xylene	<0.001	0.002	0.006	0.26
m-Xylene	<0.001	<0.001	0.017	0.67
o-Xylene	<0.001	0.002	0.011	0.46
Styrene	<0.001	<0.001	<0.001	0.90
n-Propylbenzene	<0.001	<0.001	0.002	0.048
p-Dichlorobenzene	<0.005	<0.02	<0.02	<1
m-Dichlorobenzene	<0.005	<0.02	<0.02	<1
o-Dichlorobenzene	<0.005	<0.02	<0.02	<1

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

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David L. Berner
Laboratory Director

general testing corporation

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LABORATORY REPORT

Job No. 10705 **Date** December 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Volatile Aromatics
602 Series
NYS Gas & Electric
Lockport, NY

Date samples (x) received ( ) collected by General Testing 11/29/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW8	MW9	MW10	MW11
Date(s) Collected	11/28/83	11/28/83	11/28/83	11/28/83
Time(s)	10:00 am	10:00 am	10:00 am	10:00 am
Benzene	0.052	0.011	6.36	1.06
Toluene	0.005	0.007	4.98	1.46
Ethyl Benzene	0.044	0.003	1.01	0.61
p-Xylene	0.012	0.005	0.68	1.06
m-Xylene	0.009	<0.001	1.63	1.22
o-Xylene	0.014	0.003	1.16	1.47
Styrene	0.001	<0.001	0.42	<0.01
n-Propylbenzene	0.007	<0.001	0.04	0.06
p-Dichlorobenzene	<0.1	<0.002	<1	<1
m-Dichlorobenzene	<0.1	<0.002	<1	<1
o-Dichlorobenzene	<0.1	<0.002	<1	<1

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

*Elute Together

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(<) indicates lowest detectable concentration with procedure used

David H. Benner
Laboratory Director

general testing corporation

Water and Wastewater Testing Specialists

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(201) 488-5242

LABORATORY REPORT

Job No. 10705 Date December 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Volatile Aromatics
602 Series
NY State Gas & Electric
Lockport, NY

Date samples (X) received ( ) collected by General Testing 11/29/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW12	MW13	MW14	MW16
Date(s) Collected	11/28/83	11/28/83	11/28/83	11/28/83
Time(s)	10:00 am	10:00 am	10:00 am	10:00 am
Benzene	0.33	<0.001	0.001	0.002
Toluene	0.61	<0.001	0.007	0.003
Ethyl Benzene	1.34	<0.001	<0.001	0.026
p-Xylene	0.10	<0.001	<0.001	0.007
m-Xylene	0.35	<0.001	<0.001	0.007
o-Xylene	0.54	<0.001	<0.001	0.015
Styrene	<0.1	<0.001	<0.001	<0.001
n-Propylbenzene	0.09	<0.001	<0.001	<0.001
p-Dichlorobenzene	<1	<0.01	<0.01	<0.1
m-Dichlorobenzene	<1	<0.01	<0.01	<0.1
o-Dichlorobenzene	<1	<0.01	<0.01	<0.1

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

*Elute Together

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

David L. Benn
Laboratory Director

general testing corporation

Water and Wastewater Testing Specialists

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Rochester, NY 14608
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86 Trinity Place
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LABORATORY REPORT

Job No. 10705 Date December 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Volatile Aromatics
602 Series
NYS Gas & Electric
Lockport, NY

Date samples (X) received ( ) collected by General Testing 11/29/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW17	IW1	IW2
Date(s) Collected	11/28/83	11/28/83	11/28/83
Time(s)	10:00 am	10:00 am	10:00 am
Benzene	2.3	<0.001	<0.001
Toluene	11.4	0.005	0.001
Ethyl Benzene	4.8	0.004	<0.001
p-Xylene	5.7	0.005	<0.001
m-Xylene	15.1	0.010	0.001
o-Xylene	10.9	0.008	<0.001
Styrene	<1	<0.001	<0.001
n-Propylbenzene	3.9	0.002	<0.001
p-Dichlorobenzene	<10	<0.01	<0.002
m-Dichlorobenzene	<10	<0.01	<0.002
o-Dichlorobenzene	<10	<0.01	<0.002

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

*Elute Together

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

David L. Benner
Laboratory Director

general testing corporation

Water and Wastewater Testing Specialists

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LABORATORY REPORT

Job No. 10705 **Date** December 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Volatile Aromatics
602 Series
NYS Gas & Electric
Lockport, NY

Date samples (X) received ( ) collected by General Testing 11/29/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW6 QC	MW8 QC	MW12 QC
Date(s) Collected	11/28/83	11/28/83	11/28/83
Time(s)	10:00 am	10:00 am	10:00 am
Benzene	0.010	0.093	0.21
Toluene	0.046	0.006	0.45
Ethyl Benzene	0.022	0.039	1.06
p-Xylene	0.010	0.011	0.27
m-Xylene	0.029	0.008	0.59
o-Xylene	0.017	0.013	0.44
Styrene	0.001	0.001	<0.01
n-Propylbenzene	0.003	0.007	0.09
p-Dichlorobenzene	<0.02	<0.1	<1
m-Dichlorobenzene	<0.02	<0.1	<1
o-Dichlorobenzene	<0.02	<0.1	<1

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

*Elute Together

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

David L. Bemer
Laboratory Director

general testing corporation

Water and Wastewater Testing Specialists

710 Exchange Street
Rochester, NY 14608
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85 Trinity Place
Hackensack, NJ 07601
(201) 488-5242

LABORATORY REPORT

Job No. 10705 Date December 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Volatile Aromatics
602 Series
NYS Gas & Electric
Lockport, NY
11/29/83

Date samples (X) received ( ) collected by General Testing

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	Amount Added	Net Recovery	% Recovery
Date(s) Time(s)			
Benzene	0.035	0.027	75%
Toluene	0.032	0.031	97%
Ethyl Benzene	0.035	0.030	86%
p-Xylene	0.036	0.033	92%
m-Xylene	0.035	0.031	89%
o-Xylene	0.035	0.031	89%
Styrene	0.045	0.044	98%
n-Propylbenzene	0.040	0.040	100%

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

*Elute Together

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

David L. Benner
Laboratory Director

general testing corporation

Water and Wastewater Testing Specialists

710 Exchange Street
Rochester, NY 14608
(716) 454-3760

85 Trinity Place
Hackensack, NJ 07601
(201) 488-5242

LABORATORY REPORT

Job No. 10705 Date December 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Poly Aromatic Hydrocarbons
EPA 610 Series

NYS Gas & Electric
Lockport, NY

Date samples (x) received ( ) collected by General Testing
11/29/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW1	MW2	MW3	MW4
Date(s) Collected	11/28/83	11/28/83	11/28/83	11/28/83
Time(s)	10:00 am	10:00 am	10:00 am	10:00 am
Napthalene	3.0	0.011	22	<0.005
Acenapthylene	0.088	0.013	3.2	<0.005
Acenapthene	0.14	0.017	1.9	<0.005
Fluorene	0.095	0.022	2.7	<0.005
Phenanthrene *	0.20	0.054	16.2	0.003
Anthracene *				
Fluoranthene	0.23	0.032	1.5	0.002
Pyrene	0.33	0.026	1.7	0.003
Benzo(a)Anthracene	<0.02	0.012	0.88	<0.005
Chrysene	0.43	0.011	0.77	0.006
Benzo(b)Fluoranthene *	<0.02	0.008	0.52	<0.005
Benzo(k)Fluoranthene *				
Benzo(a)Pyrene	<0.02	0.014	0.86	<0.005
Dibenzo(a,h)Anthracene *	<0.02	<0.004	0.27	<0.005
Indeno(1,2,3-cd)Pyrene *				
Benzo(g,h,i)Perylene	<0.02	<0.004	0.24	<0.005

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

* Elute Together

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LABORATORY REPORT

Job No. 10705 Date December 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Poly Aromatic Hydrocarbons
EPA 610 Series

NYS Gas & Electric
Lockport, NY
11/29/83

Date samples (x) received ( ) collected by General Testing

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW5	MW6	MW7	MW8
Date(s) Collected	11/28/83	11/28/83	11/28/83	11/28/83
Time(s)	10:00 am	10:00 am	10:00 am	10:00 am
Napthalene	0.012	0.034	97	0.12
Acenapthylene	0.012	0.003	49	0.049
Acenapthene	<0.005	0.003	22	0.12
Fluorene	0.005	<0.005	38	0.13
Phenanthrene *	0.007	0.011	190	0.25
Anthracene *				
Fluoranthene	0.003	0.037	31	0.050
Pyrene	0.003	0.041	33	0.051
Benzo(a)Anthracene	<0.005	<0.005	11	0.022
Chrysene	0.006	0.036	8.0	0.016
Benzo(b)Fluoranthene *	<0.005	<0.005	7.5	0.011
Benzo(k)Fluoranthene *				
Benzo(a)Pyrene	<0.005	<0.005	11	0.025
Dibenzo(a,h)Anthracene *	<0.005	<0.005	3.5	0.004
Indeno(1,2,3-cd)Pyrene *				
Benzo(g,h,i)Perylene	<0.005	<0.005	2.9	0.002

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LABORATORY REPORT

Job No. 10705 Date December 30, 1983

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Mr. Dave Muscalo
Woodward Clyde
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Wayne, NJ 07470

Sample(s) Reference
Poly Aromatic Hydrocarbons
EPA 610 Series

NYS Gas & Electric
Lockport, NY
11/29/83

Date samples (x) received ( ) collected by General Testing

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW9	MW10	MW11	MW12
Date(s) Collected	11/29/83	11/29/83	11/29/83	11/29/83
Time(s)	10:00 am	10:00 am	10:00 am	10:00 am
Napthalene	0.077	54	0.42	37
Acenapthylene	0.016	2.2	<0.04	1.8
Acenapthene	0.072	1.7	0.30	37
Fluorene	0.068	1.6	0.40	7.1
Phenanthrene *	0.12	34	0.92	97
Anthracene *				
Fluoranthene	0.014	1.1	0.34	4.4
Pyrene	0.017	1.2	0.40	5.5
Benzo(a)Anthracene	<0.005	0.58	0.25	2.5
Chrysene	0.011	0.37	0.27	1.8
Benzo(b)Fluoranthene *	<0.005	0.31	0.089	1.5
Benzo(k)Fluoranthene *				
Benzo(a)Pyrene	0.008	0.55	0.13	2.6
Dibenzo(a,h)Anthracene *	<0.005	<0.1	<0.005	0.66
Indeno(1,2,3-cd)Pyrene *				
Benzo(g,h,i)Perylene	<0.005	<0.1	<0.005	0.59

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

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LABORATORY REPORT

Job No. 10705 Date December 30, 1983

Client
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201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Poly Aromatic Hydrocarbons
EPA 610 Series

NYS Gas & Electric
Lockport, NY

Date samples (x) received ( ) collected by General Testing
11/29/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otharwise)

Sample Description	MW13	MW14	MW16	MW17
Date(s) Collected	11/29/83	11/29/83	11/29/83	11/29/83
Time(s)	10:00 am	10:00 am	10:00 am	10:00 am
Napthalene	0.002	<0.005	<0.005	47
Acenapthylene	0.021	<0.005	<0.005	2.4
Acenapthene	0.007	<0.005	<0.005	4.7
Fluorene	0.017	<0.005	<0.005	2.6
Phenanthrene *	0.002	<0.005	<0.005	3.4
Anthracene *				
Fluoranthene	0.007	0.003	<0.005	0.46
Pyrene	0.009	0.003	<0.005	0.37
Benzo(a)Anthracene	<0.005	<0.005	<0.005	0.18
Chrysene	<0.01	<0.01	<0.01	0.16
Benzo(b)Fluoranthene *	<0.005	<0.005	<0.005	0.12
Benzo(k)Fluoranthene *				
Benzo(a)Pyrene	<0.005	<0.005	<0.005	<0.1
Dibenzo(a,h)Anthracene *	<0.005	<0.005	<0.005	<0.1
Indeno(1,2,3-cd)Pyrene *				
Benzo(g,h,i)Perylene	<0.005	<0.005	<0.005	<0.1

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(<) indicates lowest detectable concentration with procedure used

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LABORATORY REPORT

Job No. 10705 Date December 30, 1983

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Sample(s) Reference
Poly Aromatic Hydrocarbons
EPA 610 Series

NYS Gas & Electric
Lockport, NY

Date samples (x) received ( ) collected by General Testing
11/29/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	IW1	IW2		MW6 QC
Date(s) Collected	11/28/83	11/28/83		11/28/83
Time(s)	10:00 am	10:00 am		10:00 am
Napthalene	<0.05	0.002		0.032
Acenapthylene	<0.05	<0.004		<0.008
Acenapthene	<0.05	0.008		<0.008
Fluorene	<0.05	0.007		<0.008
Phenanthrene *	<0.05	0.007		0.007
Anthracene *				
Fluoranthene	<0.05	0.016		0.042
Pyrene	<0.05	0.019		0.028
Benzo(a)Anthracene	<0.05	<0.004		<0.008
Chrysene	<0.05	0.016		<0.008
Benzo(b)Fluoranthene *	<0.05	0.004		<0.008
Benzo(k)Fluoranthene *				
Benzo(a)Pyrene	<0.05	<0.004		<0.008
Dibenzo(a,h)Anthracene *	<0.05	<0.004		<0.008
Indeno(1,2,3-cd)Pyrene *				
Benzo(g,h,i)Perylene	<0.05	<0.004		<0.008

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LABORATORY REPORT

Job No. 10705 Date December 30, 1983

Client
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Wayne, NJ 07470

Sample(s) Reference
Poly Aromatic Hydrocarbons
EPA 610 Series

NYS Gas & Electric
Lockport, NY
11/29/83

Date samples (x) received ( ) collected by General Testing

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	Spiked Amount Added	610 Recovery Net Recovery	% Recovery
Date & Time(s)			
Napthalene	0.16	0.15	94%
Acenapthylene	0.17	0.20	118%
Acenapthene	0.015	0.015	100%
Fluorene	0.015	0.015	100%
Phenanthrene *	0.20	0.24	119%
Anthracene *			
Fluoranthene	0.015	0.016	104%
Pyrene	0.025	0.022	88%
Benzo(a)Anthracene	0.026	0.024	93%
Chrysene	-	-	-
Benzo(b)Fluoranthene *	0.050	0.033	66%
Benzo(k)Fluoranthene *			
Benzo(a)Pyrene	0.024	0.019	78%
Dibenzo(a,h)Anthracene *			
Indeno(1,2,3-cd)Pyrene *			
Benzo(g,h,i)Perylene	0.052	0.055	106%

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LABORATORY REPORT

Job No. 10705 Date December 30, 1983

Client
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Sample(s) Reference
Poly Aromatic Hydrocarbons
EPA 610 Series
NYS Gas & Electric
Lockport, NY
11/29/83

Date samples (x) received ( ) collected by General Testing

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW2 Spiked Recovery		
	Amount Added	Net Recovery	% Recovery
Time(s)			
Napthalene	0.022	0.023	104%
Acenapthylene	0.019	0.021	110%
Acenapthene	0.021	0.023	109%
Fluorene	0.005	0.008	160%
Phenanthrene *	0.008	0.008	100%
Anthracene *			
Fluoranthene	0.010	0.013	130%
Pyrene	0.010	0.011	110%
Benzo(a)Anthracene	-	-	-
Chrysene	-	-	-
Benzo(b)Fluoranthene *	0.011	0.012	109%
Benzo(k)Fluoranthene *			
Benzo(a)Pyrene	-	-	-
Dibenzo(a,h)Anthracene *			
Indeno(1,2,3-cd)Pyrene *			
Benzo(g,h,i)Perylene	-	-	-

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LABORATORY REPORT

Job No. 10652 Date December 22, 1983

Client

Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference

NYS Gas & Electric - Lockport

Date samples (X) received ( ) collected by General Testing 11/22/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	CSL-1	CSL-2	CSL-3
Date(s) Collected	-	-	-
Time(s)	-	-	-
Phenols	<.005	<.005	<.005
602 SERIES - VOLATILE AROMATICS			
Benzene	<0.001	<0.001	<0.001
Toluene	<0.001	<0.001	<0.001
Ethyl Benzene	<0.001	<0.001	<0.001
p-Xylene	<0.001	<0.001	<0.001
m-Xylene	<0.001	<0.001	<0.001
o-Xylene	<0.001	<0.001	<0.001
Styrene	<0.001	<0.001	<0.001
n-Propylbenzene	<0.001	<0.001	<0.001
p-Dichlorobenzene	<0.002	<0.002	<0.002
m-Dichlorobenzene	<0.002	<0.002	<0.002
o-Dichlorobenzene	<0.002	<0.002	<0.002

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LABORATORY REPORT

Job No. 10652 **Date** December 22, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Volatile Aromatics
602 Series
NYS Gas & Electric - Lockport

Date samples (X) received ( ) collected **by General Testing** 11/22/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	CLS-1 Spiked Recovery Amount Added	Net Recovery	% Recovery
Date(s)			
Time(s)			
Benzene	0.014	0.014	100%
Toluene	0.013	0.014	108%
Ethyl Benzene	0.014	0.016	114%
p-Xylene	0.014	0.016	114%
m-Xylene	0.014	0.016	114%
o-Xylene	0.014	0.016	114%
Styrene	0.018	0.020	111%
n-Propylbenzene	0.016	0.018	112%
p-Dichlorobenzene	0.022	0.024	109%
m-Dichlorobenzene	0.025	0.028	112%
O-Dichlorobenzene	0.022	0.024	109%

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

*Elute Together

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LABORATORY REPORT

Job No. 10652 Date December 22, 1983

Client
Mr. Dave Muscalo
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Wayne, NJ 07470

Sample(s) Reference
Volatile Aromatics
602 Series
NYS Gas & Electric - Lockport

Date samples (x) received ( ) collected by General Testing 11/22/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	USEPA QC Standard (WS879 - Conc. #1) Amount Recovered	True Value	% Recovery
Date(s) Time(s)	ug/l	ug/l	
Benzene	27.9	28.8	97%
Toluene	5.8	4.5	129%
Ethyl Benzene	11.4	11.1	103%
p-Xylene	17.1	18.8	91%
m-Xylene	47.2	40.4	117%
o-Xylene	11.6	11.6	100%
Styrene			
n-Propylbenzene			

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

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LABORATORY REPORT

Job No. 10652 Date December 22, 1983

Client
Mr. Dave Muscalo
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Sample(s) Reference
NYS Gas & Electric - Lockport
Poly Aromatic Hydrocarbons
EPA 610 Series

Date samples (X) received ( ) collected by General Testing 11/22/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	CSL-1	CSL-2	CSL-3
Date(s) Collected	-	-	-
Time(s)	-	-	-
Napthalene	<0.002	<0.002	<0.002
Acenapthylene	<0.002	<0.002	<0.002
Acenapthene	<0.002	<0.002	<0.002
Fluorene	<0.002	<0.002	<0.002
Phenanthrene *	0.002	0.004	<0.002
Anthracene *			
Fluoranthene	0.002	0.005	<0.002
Pyrene	0.003	0.006	0.003
Benzo(a)Anthracene	<0.005	<0.005	<0.005
Chrysene	<0.005	<0.005	<0.005
Benzo(b)Fluoranthene *	<0.005	0.007	<0.005
Benzo(k)Fluoranthene *			
Benzo(a)Pyrene	<0.005	0.008	<0.005
Dibenzo(a,h)Anthracene *	<0.005	<0.005	<0.005
Indeno(1,2,3-cd)Pyrene *			
Benzo(g,h,i)Perylene	<0.005	<0.005	<0.005

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LABORATORY REPORT

Job No. 10652 Date December 22, 1983

Client

Mr. Dave Muscalo
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201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference

NYS Gas & Electric - Lockport
Poly Aromatic Hydrocarbons
EPA 610 Series

Date samples (x) received ( ) collected by General Testing 11/22/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	Spiked 610 Recovery Amount Added	Net Recovery	% Recovery
Date(s) Time(s)			
Napthalene	0.16	0.15	94%
Acenapthylene	0.17	0.20	118%
Acenapthene	0.015	0.015	100%
Fluorene	0.015	0.015	100%
Phenanthrene *	0.20	0.24	119%
Anthracene *			
Fluoranthene	0.015	0.016	104%
Pyrene	0.025	0.022	88%
Benzo(a)Anthracene	0.026	0.024	93%
Chrysene	-	-	-
Benzo(b)Fluoranthene *	0.040	0.033	84%
Benzo(k)Fluoranthene *			
Benzo(a)Pyrene	0.024	0.019	78%
Dibenzo(a,h)Anthracene *	-	-	-
Indeno(1,2,3-cd)Pyrene *			
Benzo(g,h,i)Perylene	0.052	0.055	106%

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LABORATORY REPORT

Job No. 10604 Date November 30, 1983

Client

Mr. Dave Muscalo
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201 Willowbrook Boulevard
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Sample(s) Reference

Volatile Aromatics
602 Series
NYS Gas & Electric - Lockport

Date samples (x) received ( ) collected by General Testing 11/11/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	CSL-3 Spiked Recovery		
	Amount Added	Net Recovery	% Recovery
Date(s)			
Time(s)			
Benzene	0.035	0.032	91%
Toluene	0.032	0.029	91%
Ethyl Benzene	0.035	0.031	89%
p-Xylene	0.035	0.032	91%
m-Xylene	0.035	0.031	89%
o-Xylene	0.035	0.032	91%
Styrene	0.045	0.040	89%
n-Propylbenzene	0.040	0.036	90%
p-Dichlorobenzene	0.056	0.049	88%
m-Dichlorobenzene	0.063	0.056	89%
o-Dichlorobenzene	0.054	0.048	89%

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

*Elute Together

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LABORATORY REPORT

Job No. 10604 Date November 30, 1983

Client
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Wayne, NJ 07470

Sample(s) Reference
NYS Gas & Electric - Lockport

Date samples (X) received ( ) collected by General Testing 11/11/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	CSL-1	CSL-2	CSL-3
Date(s) Collected	11/11/83	11/11/83	11/11/83
Time(s)	8:20 am	9:45 am	8:40 am
Napthalene	<0.005	<0.005	<0.005
Acenapthylene	<0.005	<0.005	<0.005
Acenapthene	<0.005	<0.005	<0.005
Fluorene	0.010	<0.005	<0.005
Phenanthrene *	0.017	0.018	0.006
Anthracene *			
Fluoranthene	0.006	0.009	<0.005
Pyrene	0.011	0.006	<0.005
Benzo(a)Anthracene *	0.013	0.015	<0.005
Chrysene *			<0.005
Benzo(b)Fluoranthene *	0.005	<0.005	<0.005
Benzo(k)Fluoranthene *			
Benzo(a)Pyrene	0.010	<0.005	<0.005
Dibenzo(a,h)Anthracene *	<0.005	<0.005	<0.005
Indeno(1,2,3-cd)Pyrene *			
Benzo(g,h,i)Perylene	<0.005	<0.005	<0.005

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LABORATORY REPORT

Job No. 10604 Date November 30, 1983

Client

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Wayne, NJ 07470

Sample(s) Reference

NYS Gas & Electric - Lockport

Date samples (x) received ( ) collected by General Testing 11/11/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	Amount Added	Net Recovery	% Recovery
Date(s)			
Time(s)			
Napthalene	0.015	0.010	67%
Acenapthylene	0	<0.005	-
Acenapthene	0.015	0.014	93%
Fluorene	0.015	0.014	93%
Phenanthrene *	0.015	0.018	120%
Anthracene *			
Fluoranthene	0.015	0.016	107%
Pyrene	0	<0.005	-
Benzo(a)Anthracene	0.013	0.010	77%
Chrysene	0	<0.005	-
Benzo(b)Fluoranthene *	0	<0.005	-
Benzo(k)Fluoranthene *			
Benzo(a)Pyrene	0.012	0.009	75%
Dibenzo(a,h)Anthracene *	0	<0.005	-
Indeno(1,2,3-cd)Pyrene *			
Benzo(g,h,i)Perylene	0.103	0.104	101%

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

* Elute together

Dave L Berner
Laboratory Director

general testing corporation

Water and Wastewater Testing Specialists

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(201) 488-5242

LABORATORY REPORT

Job No. 10604 Date November 30, 1983

Client

Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference

NYS Gas & Electric - Lockport

Date samples (X) received ( ) collected by General Testing 11/11/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	CSL-1	CSL-2	CSL-3
Date(s) Collected	11/11/83	11/11/83	11/11/83
Time(s)	8:20 am	9:45 am	8:40 am
Phenol	<.005	<.005	<.005
602 SERIES - VOLATILE AROMATICS			
Benzene	<0.001	<0.001	<0.001
Toluene	<0.001	<0.001	<0.001
Ethyl Benzene	<0.001	<0.001	<0.001
p-Xylene	<0.001	<0.001	<0.001
m-Xylene	<0.001	<0.001	<0.001
o-Xylene	<0.001	<0.001	<0.001
Styrene	<0.001	<0.001	<0.001
n-Propylbenzene	<0.001	<0.001	<0.001
p-Dichlorobenzene	<0.002	<0.002	<0.002
m-Dichlorobenzene	<0.002	<0.002	<0.002
o-Dichlorobenzene	<0.002	<0.002	<0.002

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

David L. Brown
Laboratory Director

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LABORATORY REPORT

Job No. 10569 Date November 30, 1983

Client

Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference

NYS Gas & Electric - Lockport
Job #82C4495

Date samples (x) received ( ) collected **by General Testing** 11/7/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW-8	MW-9	MW-13
Date(s) Collected	11/7/83	11/7/83	11/7/83
Time(s)	2:00 pm	10:50 am	12:20 pm
Phenol	.010	.047	<.005
602 SERIES - VOLATILE AROMATICS			
Benzene	0.180	0.005	0.004
Toluene	0.015	0.003	0.004
Ethyl Benzene	0.260	0.011	0.009
p-Xylene	0.024	0.006	0.012
m-Xylene	0.018	0.010	0.027
o-Xylene	0.040	0.010	0.019
Styrene	0.001	0.002	<0.001
n-Propylbenzene	0.023	0.002	<0.001
p-Dichlorobenzene	<0.005*	<0.005*	<0.005*
m-Dichlorobenzene	<0.005*	<0.005*	<0.005*
o-Dichlorobenzene	<0.005*	<0.005*	<0.005*

* <1 ppm

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

David L Bruce
Laboratory Director

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LABORATORY REPORT

Job No. 10569 Date November 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Volatile Aromatics
602 Series
NYS Gas & Electric - Lockport
Job #82C4495
11/7/83

Date samples (x) received ( ) collected by General Testing

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW-13 Spiked Recovery Amount Added	Net Recovery	% Recovery
Date(s) Time(s)			
Benzene	0.035	0.032	91%
Toluene	0.032	0.032	100%
Ethyl Benzene	-	-	-
p-Xylene	0.036	0.037	103%
m-Xylene	0.035	0.038	109%
o-Xylene	-	-	-
Styrene	0.045	0.049	109%
n-Propylbenzene	0.040	0.040	100%

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

*Elute Together

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

David H. Bruner
Laboratory Director

general testing corporation

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LABORATORY REPORT

Job No. 10569 **Date** November 30, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Poly Aromatic Hydrocarbons
NYS Gas & Electric - Lockport
Job #82C4495

Date samples (x) received ( ) collected **by General Testing** 11/7/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	MW-8	MW-9	MW-13
Date(s) Collected	11/7/83	11/7/83	11/7/83
Time(s)	2:00 pm	10:50 am	12:20 pm
Napthalene	0.85	0.075	<0.005
Acenapthylene	0.15	0.087	0.013
Acenapthene	1.28	0.045	0.006
Fluorene	2.03	0.10	0.028
Phenanthrene * / Anthracene *	2.08	0.19	0.020
Fluoranthene	0.61	0.034	0.005
Pyrene	2.81	0.064	0.006
Benzo(a)Anthracene	0.16	0.043	<0.005
Chrysene	0.13	0.039	<0.005
Benzo(b)Fluoranthene * / Benzo(k)Fluoranthene *	0.092	0.050	<0.005
Benzo(a)Pyrene	0.15	0.051	<0.005
Dibenzo(a,h)Anthracene * / Indeno(1,2,3-cd)Pyrene *	0.053	0.020	<0.005
Benzo(g,h,i)Perylene	0.039	<0.005	<0.005

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

* Elute together

David H. Berner
Laboratory Director

general testing corporation

Water and Wastewater Testing Specialists

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LABORATORY REPORT

Job No. 10488 Date November 18, 1983

Client

Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Date samples (X) received ( ) collected by General Testing

Sample(s) Reference

Tar Site - Soil Samples
Lockport Coal
Job #82C4495
Poly Aromatic Hydrocarbons
EPA 610 Series
10/21/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	T-2 S-1 1-2 Ft.	T-~~2~~5 S-~~1~~3 4-5 Ft.	T-2 S-2 5 Ft.	AB-4 G2 S-1 1.5-4 Ft.	AB-6 S-1 12-15 Ft.
Date(s) Collected	10/20/83	10/21/83	10/20/83	10/19/83	10/19/83
Time(s)	-	-	-	-	-
	ug/g	ug/g	ug/g	ug/g	ug/g
Napthalene	4.1	3.8	29,000	1900	49
Acenapthylene	1.8	3.6	4500	960	0.6
Acenapthene	2.5	3.8	3000	250	6.5
Fluorene	3.4	4.5	4500	1300	5.7
Phenanthrene * Anthracene *	23	3.5	13,700	4600	14
Fluoranthene	25	118	5300	690	18
Pyrene	24	948	4500	1000	18
Benzo(a)Anthracene	22	40	2000	330	12
Chrysene	16	33	1300	340	88
Benzo(b)Fluoranthene * Benzo(k)Fluoranthene *	24	44	1600	210	11
Benzo(a)Pyrene	27	52	1500	360	12
Dibenzo(a,h)Anthracene * Indeno(1,2,3-cd)Pyrene *	26	24	490	80	5.8
Benzo(g,h,i)Perylene	10	15	300	69	7.6

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

* Elute together

David L. Bence
Laboratory Director

general testing corporation

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LABORATORY REPORT

Job No. 10488 Date November 18, 1983

Client

Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference

Tar Site - Soil Samples
Lockport Coal
Job #82C4495

Date samples (x) received ( ) collected by General Testing 10/21/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	T-2 S-1 1-2 Ft.	T-3 S-3 4-5 Ft.	T-12 S-2 5 Ft.	AB-4 G2 S-1 1.5-4 Ft.	AB-6 S-1 12-15 Ft.
Date(s) Collected	10/20/83	10/21/83	10/20/83	10/19/83	10/19/83
Time(s)	-	-	-	-	-
Phenol	.73	3.69	2440	1.06	.42

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
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Laboratory Director

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LABORATORY REPORT

Job No. 10488 Date November 18, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference
Tar Site - Soil Samples
Lockport Coal
Job #82C4495
Volatile Aromatics - 602 Series

Date samples (X) received ( ) collected by General Testing 10/21/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	T-2 S-1 1-2 Ft.	T-25 S-13 4-5 Ft.	T-2 S-2 5 Ft.	AB-4 G2 S-1 1.5-4 Ft.	AB-6 S-1 12-15 Ft.
Date(s) Collected	10/20/83	10/21/83	10/20/83	10/19/83	10/19/83
Time(s)	-	-	-	-	-
	ug/g	ug/g	ug/g	ug/g	ug/g
Benzene	0.041	0.008	128	6.6	0.09
Toluene	0.049	0.006	155	26.0	0.05
Ethyl Benzene	0.006	0.007	10.4	53.1	0.91
p-Xylene *	0.097	0.002	25.5	1.5	1.61
m-Xylene *		0.008	79.4	60.4	
o-Xylene	0.023	0.004	46.0	11.3	1.05
Styrene	0.022	0.029	104	14.8	2.19
n-Propylbenzene	0.006	0.003	4.9	4.8	2.09
p-Dichlorobenzene	<0.05	<0.05	<50	<10	<1
m-Dichlorobenzene	<0.05	<0.05	<50	<10	<1
o-Dichlorobenzene	<0.05	<0.05	<50	<10	<1

* Elute Together

Analytical procedures in accordance with the Federal Register Method 602, 12/79.

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

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Laboratory Director

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LABORATORY REPORT

Job No. 10487 Date November 11, 1983

Client

Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference

NYS Electric & Gas
Job #82C4495

Date samples (X) received ( ) collected by General Testing 10/20/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	CSL-1	CSL-2	CSL-3
Date(s) Collected	10/20/83	10/20/83	10/20/83
Time(s)	3:00 pm	3:30 pm	5:30 pm
Phenol	.005	.157	.010
602 SERIES - VOLATILE AROMATICS			
Benzene	<0.001	<0.001	<0.001
Toluene	<0.001	<0.001	<0.001
Ethyl Benzene	<0.001	<0.001	<0.001
p-Xylene	<0.001	<0.001	<0.001
m-Xylene	<0.001	<0.001	<0.001
o-Xylene	<0.001	<0.001	<0.001
Styrene	<0.001	<0.001	<0.001
n-Propylbenzene	<0.001	<0.001	<0.001
p-Dichlorobenzene	<0.002	<0.002	<0.002
m-Dichlorobenzene	<0.002	<0.002	<0.002
o-Dichlorobenzene	<0.002	<0.002	<0.002

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

David H. Benner
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LABORATORY REPORT

Job No. 10487 Data November 11, 1983

Client

Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Sample(s) Reference

NYS Electric & Gas
Job #82C4495
Poly Aromatic Hydrocarbons-610 Series

Date samples (X) received ( ) collected by General Testing 10/20/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	CSL-1	CSL-2	CSL-3
Date(s) Collected	10/20/83	10/20/83	10/20/83
Time(s)	3:00 pm	3:30 pm	5:30 pm
Napthalene	<0.005	<0.005	<0.005
Acenapthylene	<0.005	<0.005	<0.005
Acenapthene	<0.005	<0.005	<0.005
Fluorene	<0.005	<0.005	<0.005
Phenanthrene * / Anthracene *	<0.005	<0.005	<0.005
Fluoranthene	<0.005	<0.005	<0.005
Pyrene	<0.005	<0.005	<0.005
Benzo(a)Anthracene	<0.005	<0.005	<0.005
Chrysene	<0.005	<0.005	<0.005
Benzo(b)Fluoranthene * / Benzo(k)Fluoranthene *	<0.005	<0.005	<0.005
Benzo(a)Pyrene	<0.005	<0.005	<0.005
Dibenzo(a,h)Anthracene * / Indeno(1,2,3-cd)Pyrene *	<0.005	<0.005	<0.005
Benzo(g,h,i)Perylene	<0.005	<0.005	<0.005

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

* Elute together

David H. Berner
Laboratory Director

general testing corporation

Water and Wastewater Testing Specialists

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LABORATORY REPORT

Job No. 10487 **Date** November 11, 1983

Client
Mr. Dave Muscalo
Woodward Clyde
201 Willowbrook Boulevard
Wayne, NJ 07470

Date samples (X) received ( ) collected by General Testing

Sample(s) Reference
NYS Electric & Gas
Job #82C4495

Poly Aromatic Hydrocarbons
610 Series
10/20/83

P.O. # _____

ANALYTICAL RESULTS

(mg/l unless stated otherwise)

Sample Description	Spiked Amount Added	Water Recovery Net Recovery	% Recovery
Date(s) Collected	-	-	-
Time(s)	-	-	-
Napthalene	0.039	0.030	78%
Acenapthylene	0.043	0.0034	80%
Acenapthene	0.0035	0.0031	89%
Fluorene	0.0035	0.0039	111%
Phenanthrene *	0.054	0.050	93%
Anthracene *			
Fluoranthene	0.0035	0.0040	114%
Pyrene	0.0063	0.0055	88%
Benzo(a)Anthracene	0.0065	0.0054	83%
Chrysene	-	-	-
Benzo(b)Fluoranthene *	0.010	0.0099	99%
Benzo(k)Fluoranthene *			
Benzo(a)Pyrene	0.0059	0.0038	65%
Dibenzo(a,h)Anthracene *	-	-	-
Indeno(1,2,3-cd)Pyrene *			
Benzo(g,h,i)Perylene	0.013	0.010	78%

Analytical procedures in accordance with Standard Methods for the Examination of Water and Wastewater, 14th Edition and Methods for Chemical Analysis of Water and Wastes, EPA.
(<) indicates lowest detectable concentration with procedure used

* Elute together

David L Bennett
Laboratory Director

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING AB-1 **SHEET** 1 **OF** 1

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, NY		ELEVATION AND DATUM: N/A	PROJECT NO.: 82C4495.CC
DRILLING AGENCY: N.Y.S.E.G.	FOREMAN: J. LYONS	DATE STARTED: 10/19/83	DATE FINISHED: 10/19/83
DRILLING EQUIPMENT: AUGER RIG		COMPLETION DEPTH: 9.5 FT	ROCK DEPTH: 9.5 FT
SIZE AND TYPE OF BIT: 20 IN. AUGER BIT	SIZE AND TYPE CORE BARREL: N/A	NO. SAMPLES: DIST 1	UNDIST N/A CORE N/A
CASING: N/A		WATER LEVEL: FIRST ≈ 8 FT	COMPL ? FT 24 HR N/A
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: N/A			
SAMPLER HAMMER: WEIGHT N/A	DROP N/A	INSPECTOR: DAVID MUSCA	

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES TYPE NO. LOC	SAMPLES RECOV. FT	SAMPLES PENETR RESIST BLS/FT.	@ POCKET PENETROMETER TSF	ROCK CORE RECOVERY %	ROCK CORE CRACK SKETCH	ROCK CORE CRACK COND'D	ROCK CORE ROD	ROCK CORE CORE TIME FT	REMARKS
Gray-brown silt and bricks, concrete and asphalt (moist) (Demolition FILL)		1 2 3 4 5 6										coal tar pockets beginning at ?ft
coal tar saturated Demolition FILL (moist to wet)		7 8	S-1									Sample of coal tar saturated soil strong coal tar odor
Coal tar saturated brown silt FILL (wet)		9										coal tar contamination to rock
TOP OF ROCK 9.5 FT		10										

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING AB-2 **SHEET** 1 **OF** 1

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, N.Y.		ELEVATION AND DATUM: N/A	PROJECT NO.: 82C4054.G2
DRILLING AGENCY: N.Y.S.F.G.	FOREMAN: J. LYONS	DATE STARTED: 10/19/83	DATE FINISHED: 10/19/83
DRILLING EQUIPMENT: AUGER RIG		COMPLETION DEPTH: 6.0 FT	ROCK DEPTH: UNKNOWN
SIZE AND TYPE OF BIT: 20 IN. AUGER BIT	SIZE AND TYPE CORE BARREL: N/A	NO. SAMPLES: DIST N/A	UNDIST N/A CORE N/A
CASING: N/A		WATER LEVEL: FIRST NONE	COMPL NONE 24 HR N/A
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: N/A		INSPECTOR: DAVID WINKLER	
SAMPLER HAMMER: WEIGHT N/A	DROP N/A		

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV, FT	SAMPLES: PENETR RESIST BLOWS/FT	POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: SKETCH	ROCK CORE: CRACK: COND	ROCK CORE: ROD	ROCK CORE: CORE TIME FT	REMARKS
Red-brown and gray brown Silty CLAY and clayey SILT with demolition fill (Bricks, concrete and asphalt and metal)		1 2 3 4 5 6										OPERATOR UNABLE TO ADVANCE HOLE BEYOND 6 FT DUE TO ROCK
BOTTOM OF AUGER HOLE 6 FT		7 8 9 10										

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING AB-3 **SHEET** 1 **OF** 1

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, N.Y.		ELEVATION AND DATUM: N/A	PROJECT NO.: 82C4495 G2
DRILLING AGENCY: N.Y.S.E.G.	FOREMAN: J. LYONS	DATE STARTED: 10/19/83	DATE FINISHED: 10/19/83
DRILLING EQUIPMENT: AUGER RIG		COMPLETION DEPTH: 9.0 FT	ROCK DEPTH: 9.0 FT
SIZE AND TYPE OF BIT: 20 IN. AUGER BIT	SIZE AND TYPE CORE BARREL: N/A	NO. SAMPLES: DIST 1	UNDIST N/A CORE N/A
CASING		WATER LEVEL: FIRST 3.5	COMPL [illegible] 24 HR N/A
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: N/A			
SAMPLER HAMMER: WEIGHT N/A	DROP N/A	INSPECTOR: DAVID MUSCATO	

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: BLOWS/FT	SAMPLES: PENETR RESIST BLOWS/FT	POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: BEDDING	ROCK CORE: CRACK: JOINT	ROCK CORE: RQD	ROCK CORE: CORE TIME PT	REMARKS
Red-brown to gray brown demolition fill (bricks, asphalt metal and wood) (moist)		1 2 3 4 5 6 7 8										
Demolition fill with coal tar (wet)		9	S-1									COAL TAR @ 6 IN ABOVE ROCK
TOP OF ROCK 9 FT		10										

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING AB-4 SHEET 1 OF 1

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, N.Y.		ELEVATION AND DATUM: N/A	PROJECT NO.: 82C4495 G2
DRILLING AGENCY: N.Y.S.E.G.	FOREMAN: J. LYONS	DATE STARTED: 10/19/83	DATE FINISHED: 10/19/83
DRILLING EQUIPMENT: AUGER RIG		COMPLETION DEPTH: 4.0 FT	ROCK DEPTH: UNKNOWN
SIZE AND TYPE OF BIT: 10 IN. AUGER BIT	SIZE AND TYPE CORE BARREL: N/A	NO. SAMPLES: DIST	WEIGHT: CORE
CASING		WATER LEVEL: FIRST 1.5	COMPL. 1.5 24 HR. N/A
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: N/A		INSPECTOR: DAVID MUSCALO	
SAMPLER HAMMER: WEIGHT N/A	DROP N/A		

DESCRIPTION	POSSESSION	DEPTH, FT	SAMPLES: TYPE NO. L&D	SAMPLES: RECOVERY, FT	SAMPLES: PENETR. RESIST. BLOWS/FT	SAMPLES: POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: DEGREE	ROCK CORE: CRACK: ORIENTATION	ROCK CORE: RQD	ROCK CORE: CORE TIME, FT	REMARKS
Gray coarse gravel with trace silt (moist)		1										
Gray coarse gravel with trace silt and coal tar (wet)		2	S-1									coal tar oder very strong - coating on all gravel fragments
		3										
		4										
		5										driller unable to advance borehole beyond 4ft due to large boulders.

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING AB-5 **SHEET** 1 **OF** 1

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, N.Y.		ELEVATION AND DATUM: N/A	PROJECT NO.: 82C4495 GE
DRILLING AGENCY: N.Y.S.E.G.	FOREMAN: J. LYONS	DATE STARTED: 10/19/83	DATE FINISHED: 10/19/83
DRILLING EQUIPMENT: AUGER RIG		COMPLETION DEPTH: 6.0 FT	ROCK DEPTH: UNKNOWN
SIZE AND TYPE OF BIT: 20 IN. AUGER BIT	SIZE AND TYPE CORE BARREL: N/A	NO. SAMPLES: DIST N/A	UNDIST N/A CORE N/A
CASING		WATER LEVEL: FIRST NONE	COMPL NONE 24 HR N/A
CASING HAMMER: WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: N/A		INSPECTOR: DAVID [illegible]	
SAMPLER HAMMER: WEIGHT N/A	DROP N/A		

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE / NO. LOC / RECOV. FT / PENETR RESIST BLOWS/FT	@ POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	CRACK: SKETCH	CRACK: COND	RQD	CORE TIME FT	REMARKS
Red-brown clayey silt with some gravel (damp) (Demolition fill)		1 2 3								
Red-brown clayey silt with bricks and asphalt (Demolition Fill)		4 5								
BOTTOM OF BOREHOLE 6 FT		6								AUGER REFUSAL AT 6 FT.

WOODWARD-CLYDE CONSULTANTS

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LOG OF BORING AB-6 **SHEET** 1 **OF** 1

PROJECT AND LOCATION: LOCKPORT COAL TAR SITE LOCKPORT, N.Y.		ELEVATION AND DATUM: N/A	PROJECT NO.: 82C4495 G2
DRILLING AGENCY: N.Y. S.E.G.	FOREMAN: J. LYONS	DATE STARTED: 10/19/83	DATE FINISHED: 10/19/83
DRILLING EQUIPMENT: AUGER RIG		COMPLETION DEPTH: 15 FT	ROCK DEPTH: UNKNOWN
SIZE AND TYPE OF BIT: 20 IN. AUGER BIT	SIZE AND TYPE CORE BARREL: N/A	NO. SAMPLES: DIST 1	UNDIST N/A CORE N/A
CASING		WATER LEVEL: FIRST 3.0 FT	COMPL - FT 24 HR N/A
CASING HAMMER WEIGHT N/A	DROP N/A	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER N/A		INSPECTOR: DAVID MAGEE	
SAMPLER HAMMER WEIGHT N/A	DROP N/A		

DESCRIPTION	PIEZOMETER	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: RECOV. FT	SAMPLES: PENETR. RESIST BLOWS/FT	ROCK CORE: % POCKET PENETROMETER TSF	ROCK CORE: RECOVERY %	ROCK CORE: CRACK: BKTCH	ROCK CORE: CRACK: COND	ROCK CORE: RQD	ROCK CORE: CORE TIME FT	REMARKS
BLACK CINDERS and crushed stone												
Yellow-white ashes with bricks, bottles, wood and asphalt (moist) (Demolition Fill)		1 2 3 4 5 6 7 8 9 10 11 12										
Yellow-white ashes and demolition fill (wet)												
Gray ashes and demolition fill with coal tar (wet)		13 14 15	S1									
BOTTOM OF BOREHOLE 15 FT												LIMIT OF AUGER REACH - SOIL BACKFILLED TO SURFACE