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VELSICOL CHEMICAL CORPORATION ----- 26

QUALITY CONTROL/ QUALITY ASSURANCE TESTING

Containment Wall Construction

St. Louis, Michigan

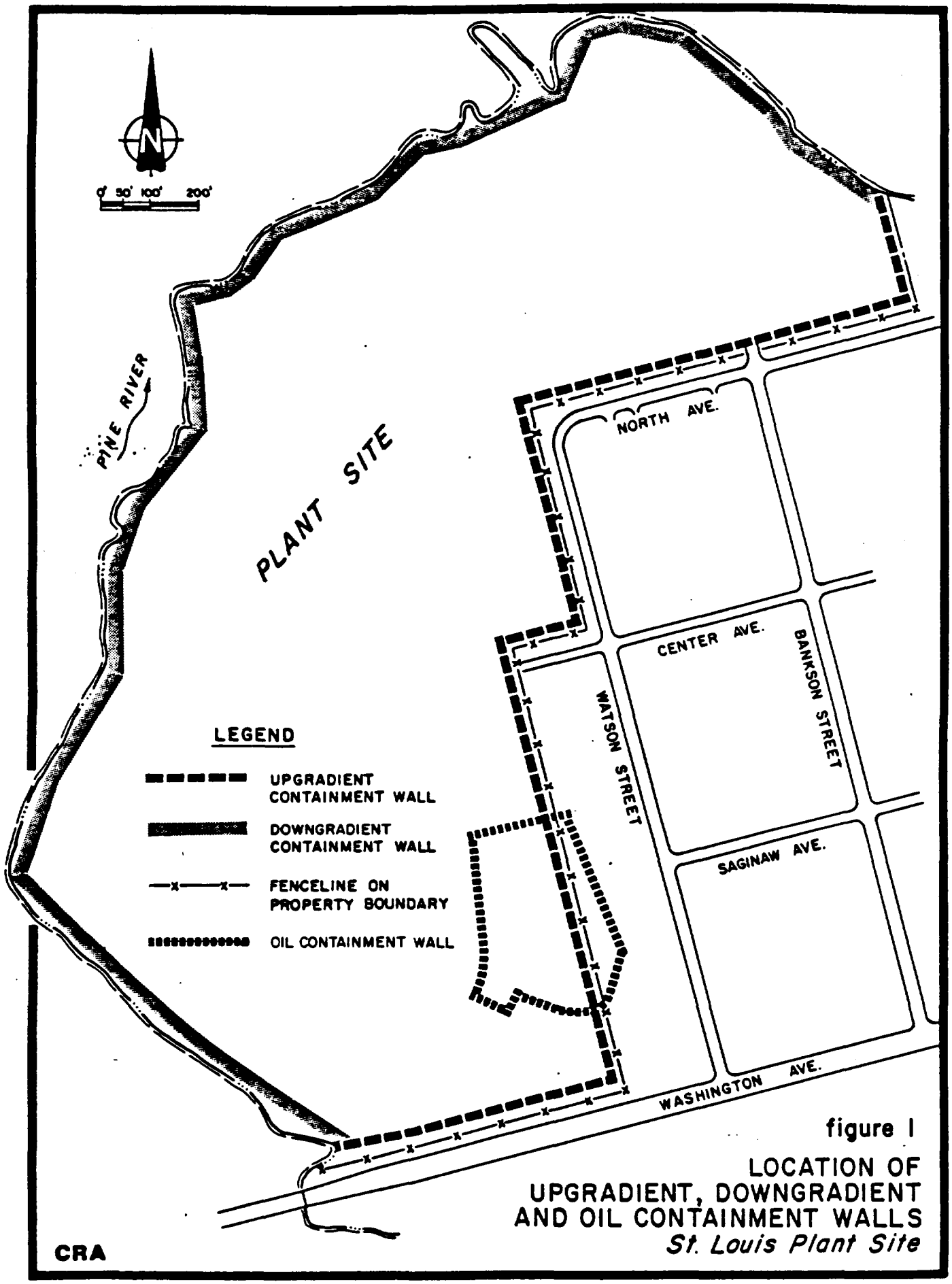

figure 1

LOCATION OF UPGRADIENT, DOWNGRADIENT AND OIL CONTAINMENT WALLS

St. Louis Plant Site

1218-26-22/03/84

During construction, Velsicol was required to maintain a strict field testing program to assure the completed containment walls met stipulated specifications. This report describes the installation of the containment walls and presents the implemented quality control/quality assurance program and derived field testing data.

2.0 QUALITY ASSURANCE AND CONTROL PROGRAM

2.1 SCOPE

The specifications dealing with quality control/quality assurance (QA/QC) testing for containment wall construction are outlined in Sections 6, 7, and 8 of the Technical Appendix to the Consent Judgement, and in Section Ps.7 of the Construction Contract Specifications approved by MDNR for the project. These specifications are presented in Appendix A. Certain of the requirements were completed prior to wall construction and documentation has been presented in two reports entitled:

1) "Upgradient Containment Wall - Chemical Analyses of Soil Samples - St. Louis, Michigan", Conestoga-Rovers & Associates Limited, July, 1982.

2) "Permeability and Durability Testing of Soil/Bentonite Backfill Mix - St. Louis, Michigan", Conestoga-Rovers & Associates Limited, January 1983.

Both reports were submitted to and approved by EPA and MDNR prior to commencement of containment wall construction.

The QA/QC program implemented during construction can be subdivided into three major divisions which are:

i) Construction parameters

ii) Composition parameters

iii) Permeability testing

Each of the divisions are discussed in the following sections.

2.2 CONSTRUCTION PARAMETERS

This portion of QA/QC program including required frequency of testing was as follows:

i) Marsh Funnel Viscosity Testing

a) Bentonite Slurry - 4 tests/8 hours in slurry pond or at mixer
- 4 tests/8 hours in trench

ii) Unit Weight Testing

a) Slurry - 1 test/hour in trench

b) Backfill - 1 test/hour

iii) Slump Cone

a) Backfill - 1 test/25 cubic yards of backfill mix

In addition, the sand content of slurry samples was determined whenever the unit weight of slurry increased significantly.

2.3 COMPOSITION PARAMETERS

This portion of the QA/QC program including frequency of testing was as follows:

i) Filtrate Loss

a) Slurry - 2 tests/8 hours from trench

ii) Methylene Blue Test

a) Backfill - 4 tests/8 hours on backfill mix

iii) Gradation

a) Backfill - 4 tests/8 hours

In addition, the pH of the slurry was monitored during slurry wall construction.

2.4 ON-SITE LABORATORY

Velsicol installed and maintained an on-site laboratory in order to conduct the QA/QC

program described in Sections 2.2 and 2.3. The laboratory was situated in the decontamination zone south of the Health and Hygiene trailer at the northeast corner of the site. Figure 2 illustrates the location of the laboratory. Following completion of containment wall construction, the laboratory was decontaminated and removed from site.

2.5 PERMEABILITY TESTING

Shelby tube samples were collected from the installed containment wall and subjected to triaxial permeability testing in accordance with ASTM D-2850. Testing was performed on samples collected from the wall 7 to 10 days after wall installation. Sampling stations were located along the alignment of the completed wall at intervals of 500 feet.

2.6 QUALITY CONTROL PROGRAMS BY CONTRACTOR AND MDNR

The slurry wall contractor conducted his own QA/QC program for the initial period of wall installation. Contractor QA/QC data collected for the period June 10 to June 24 is included as

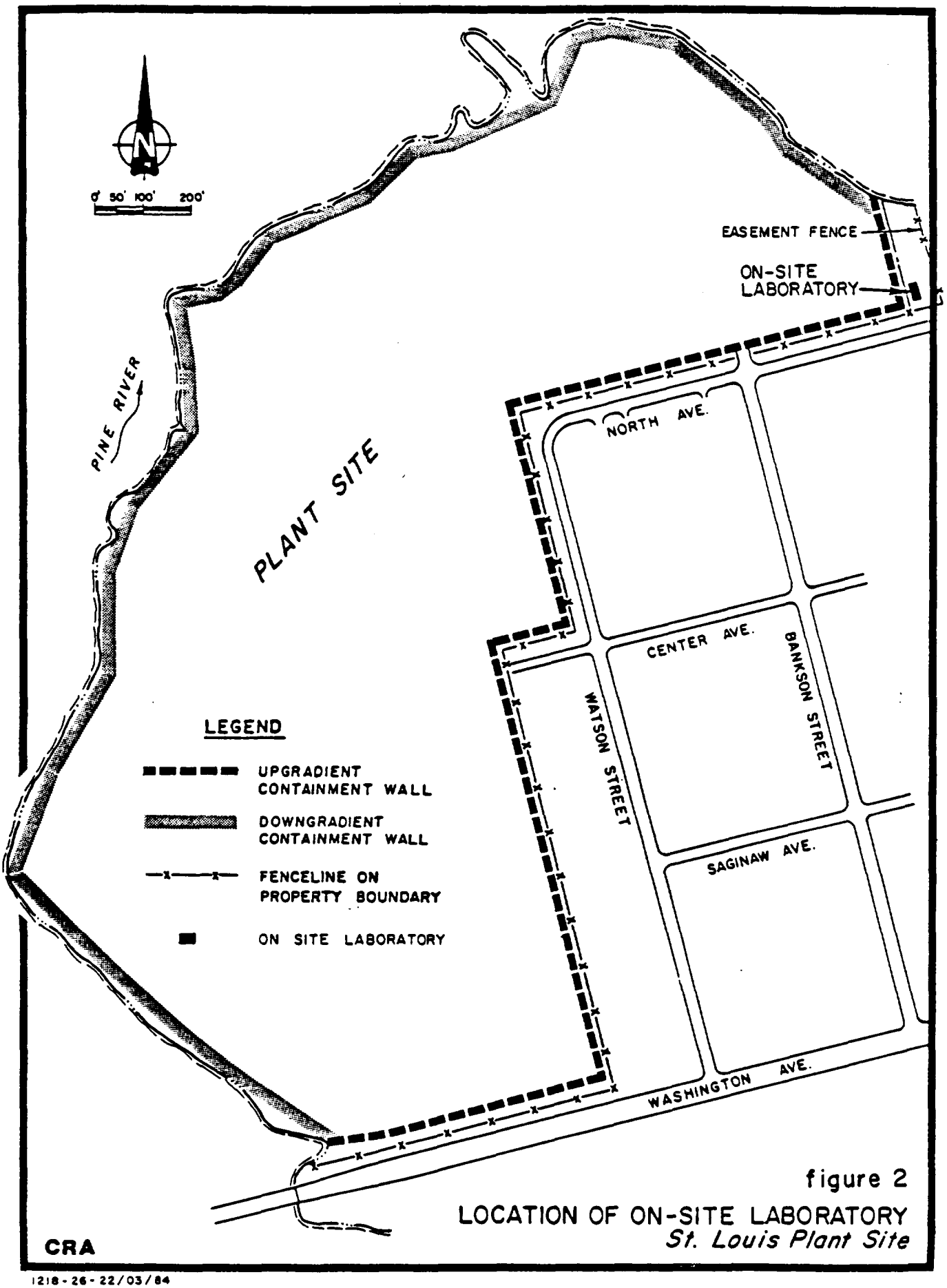

figure 2

LOCATION OF ON-SITE LABORATORY
St. Louis Plant Site

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Appendix B. Subsequent to June 24 the contractor deleted his QA/QC program and accepted QA/QC data generated by Velsicol.

The MDNR also performed quality control testing at intermittent periods throughout construction. Samples for composition testing were collected, but not analyzed, as the MDNR failed to mobilize a field laboratory for this project.

3.0 CONTAINMENT WALL INSTALLATION

3.1 CLAY WORKING PLATFORM

A clay working platform was specified to overlie the perimeter containment wall. Details of the working platform are illustrated in Figures 3 and 4. Clay used to construct the platform was to be compacted to a minimum density of 98% Modified Proctor at a moisture content of -1% to +3% of optimum. A nuclear magnetic densometer was used to confirm densities of the constructed platform. Installation of the containment wall did not begin until the platform had reached the specified degree of compaction. A total of 113 tests were performed. Results for the quality control testing of the working platform are contained in Appendix C. Figure 5 depicts the testing locations. Most stations were sampled more than one time at varying elevations within the working platform.

Clay runoff control berms were also constructed along the perimeter of the plant site and were subject to compaction testing. The berms were constructed using clay from the project borrow pit compacted in 12-inch lifts to a minimum density of 90% Standard Proctor. Testing data for the perimeter berms are also contained in Appendix C.

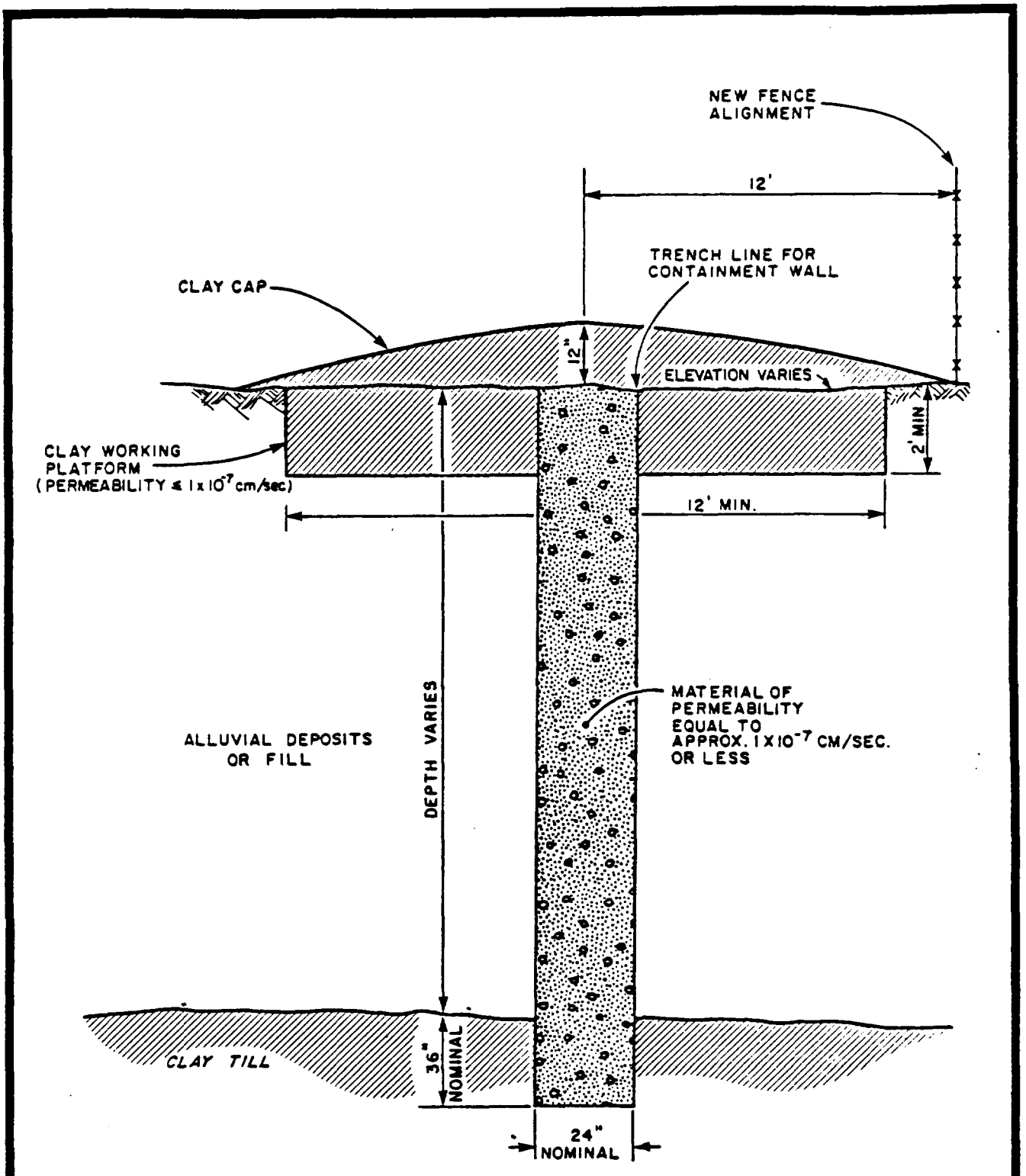

figure 3

TYPICAL CROSS SECTION OF UPGRADIENT CONTAINMENT WALL

St. Louis Plant Site

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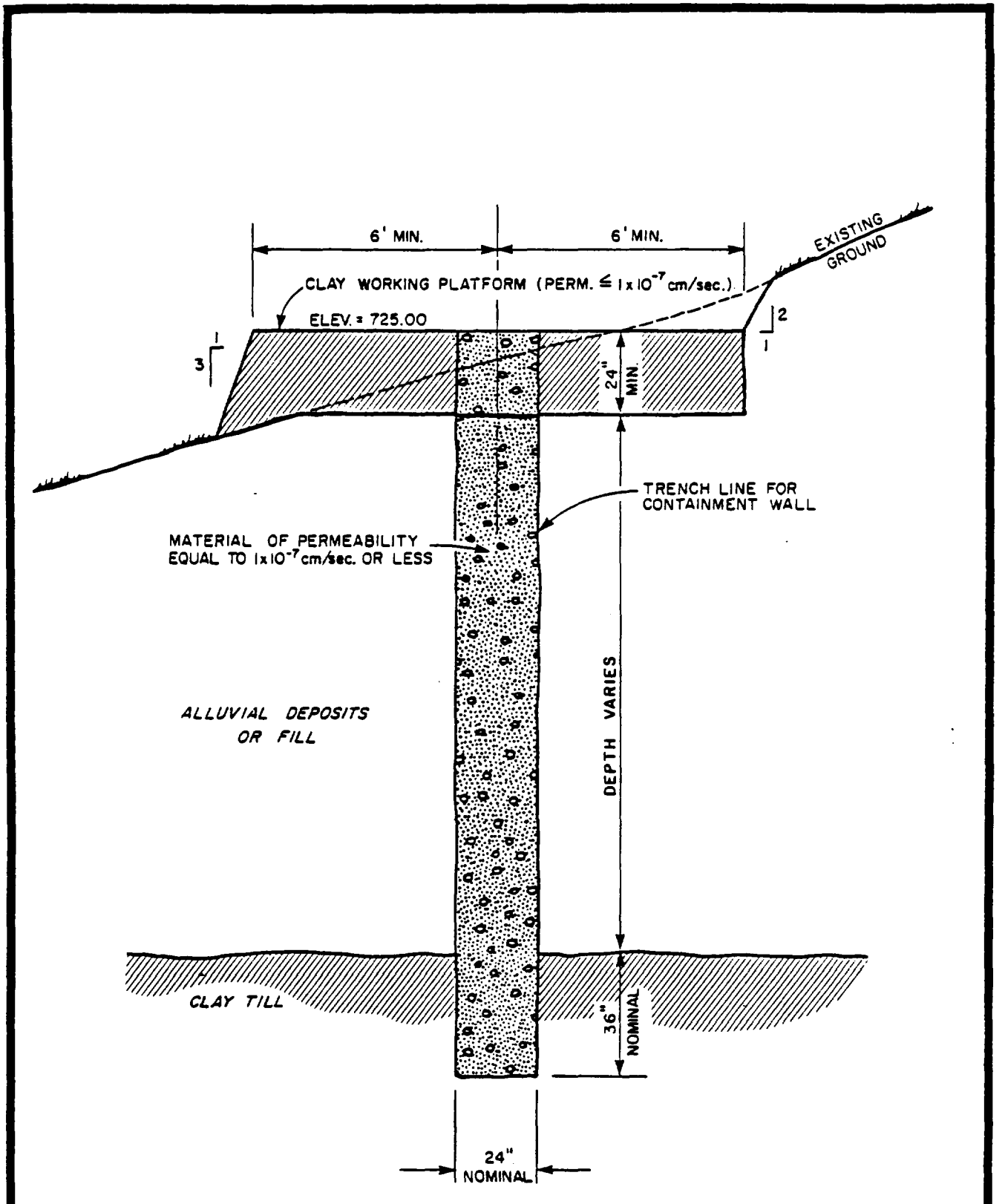

figure 4

TYPICAL CROSS SECTION OF DOWNGRADIENT CONTAINMENT WALL

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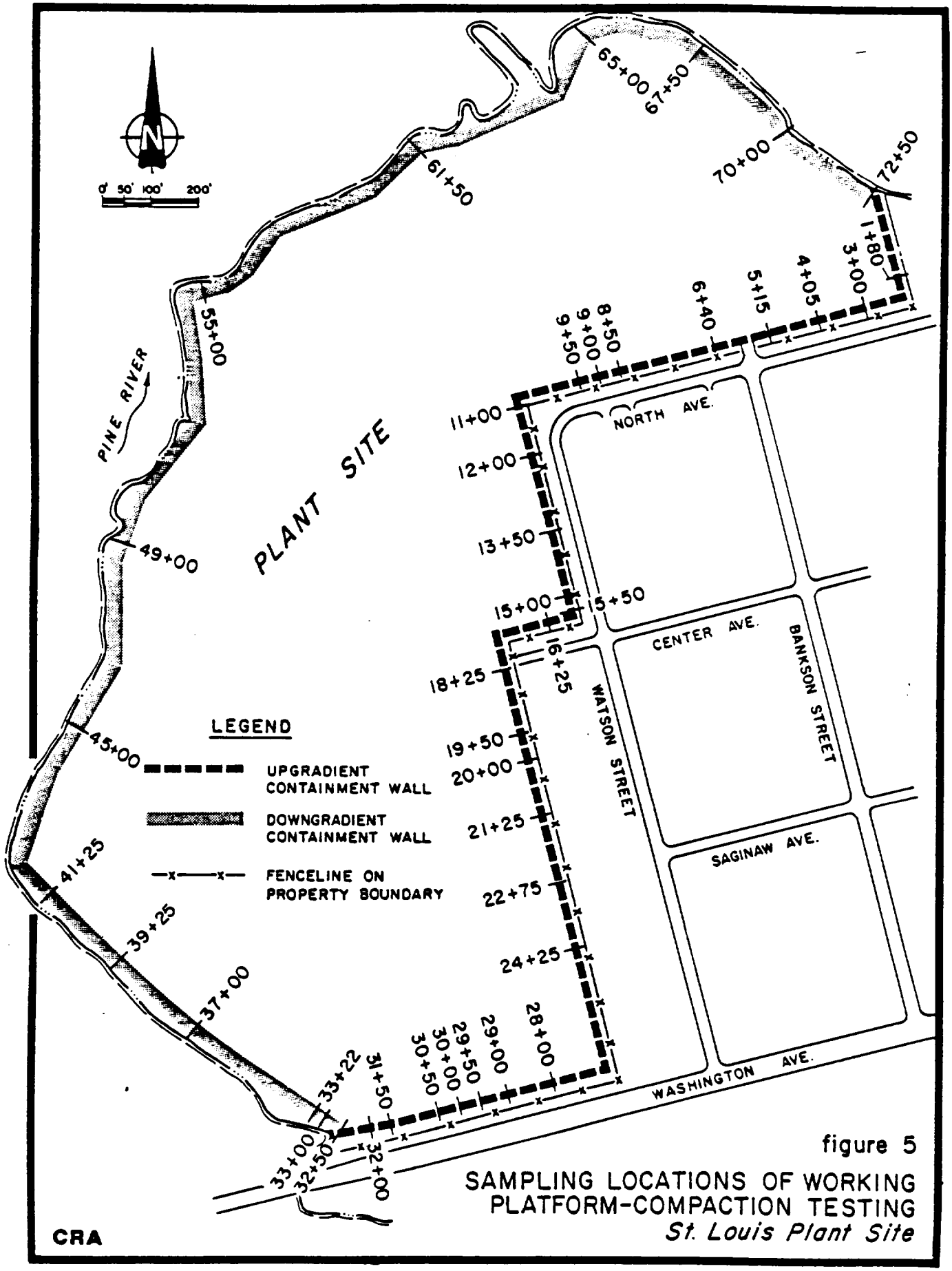

figure 5

SAMPLING LOCATIONS OF WORKING PLATFORM-COMPACTION TESTING

St. Louis Plant Site

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3.2 CONTAINMENT WALL ALIGNMENT AND DIMENSIONS

All containment walls were constructed to a nominal 24-inch width. The site perimeter wall was specified to be keyed a nominal depth of 36 inches into the underlying clay till. Final depths of the perimeter wall ranged from 8.5 feet to 27 feet, with an average depth of approximately 15 feet. Verification of key and total wall depth was conducted jointly by CRA and MDNR staff at 20 to 25 foot intervals along the alignment of the wall. Appendix D presents the field log documenting the key and wall depths.

3.3 BENTONITE SLURRY COMPONENTS

3.3.1 Bentonite

The bentonite used on the project was Slurry Gel #125 manufactured by International Minerals and Chemical Corporation. All shipments of bentonite were documented with written Certifications of Compliance. Copies of these certificates are presented in Appendix E.

In addition, CRA collected four representative samples of bentonite for analysis

by Michigan Testing Engineers of Detroit, Michigan. Samples were tested using API Standard API-RB-13A. All samples were found to comply with the stipulated specifications. Test reports for the four samples are contained in Appendix F.

3.3.2 Water

Water used in the mixing of the bentonite slurry was required to meet the following specification:

a) a pH $\geq$ 7.0
b) Calcium concentration < 500 ppm
c) oil, organics, acids, alkali, soluble salts or other deleterous substance concentration <50 ppm each

Water for slurry mixing was obtained from the City of St. Louis potable water system, from a hydrant located at the intersection of Watson St. and Center St. Limited testing of the water was conducted by Environmental Laboratory Specialists Ltd., Owosso, Michigan, and met project

specifications. Analytical data are contained in Appendix G.

3.4 SLURRY MIXING

The Contract Specifications stipulated the use of a continuous venturi type mixer that would mix dry bentonite and water and then pump the mixed slurry to holding ponds for final hydration of the bentonite. The containment wall contractor, prior to initiating wall construction, proposed to use a lightening or cyclone mixer and pump mixed slurry directly to the containment wall trench, thus eliminating the use of hydration ponds. CRA approved the mixing modification on May 23, 1983 contingent upon the availability of an adequate water supply and the acceptable performance of the mixer during the installment of the temporary containment wall which would be constructed first. The cyclone mixer performed satisfactorily during initial wall construction and was approved for use for all site containment wall construction.

3.5 SLURRY TESTING

The slurry was tested both at the mixer and following delivery to the trench. Parameters monitored were apparent viscosity, unit weight, sand content, filtrate loss, and pH.

Prior to installation of the containment wall, initial tests were run in the field on prepared slurry samples. Test results indicated that it would be extremely difficult to meet the original contract specifications of an apparent viscosity of 40 seconds Marsh, a unit weight of greater than 67 pounds per cubic foot (pcf), a filtrate loss of less than 15 cc in 30 minutes, and still maintain a workable slurry. CRA, following consultation with MDNR, approved the contractor's request for a modification to the specification for the following parameter values.

i) Apparent viscosity: 40 to 45 seconds Marsh
ii) Unit Weight: greater than 64 pcf
iii) Filtrate loss: less than 25 cc in 30 minutes

The approval for the specification change was contingent upon field observations indicating that the specifications as revised produced a good workable slurry.

The contractor also requested that the specified sand content (not greater than 15 percent) for the slurry be increased. This request was not approved by CRA.

Quality control test data for all slurry construction is contained in Appendix H.

3.6 BACKFILL CONSTRUCTION

Pre-construction testing along the alignment of the site perimeter containment wall had indicated that some areas of site soils were unsuitable for use as wall backfill. Material for backfill for these areas would be obtained from the Project borrow pit. During installation, imported backfill was used exclusively in all of the downgradient portion of the containment wall and between stations 9+10 and 10+70 for the upgradient portion of the containment wall. Imported fill was mixed with native soils to produce a more satisfactory backfill between stations 0+00 and 9+10 on the upgradient wall portion. Figure 6 illustrates the portions of the site perimeter containment wall constructed with imported backfill.

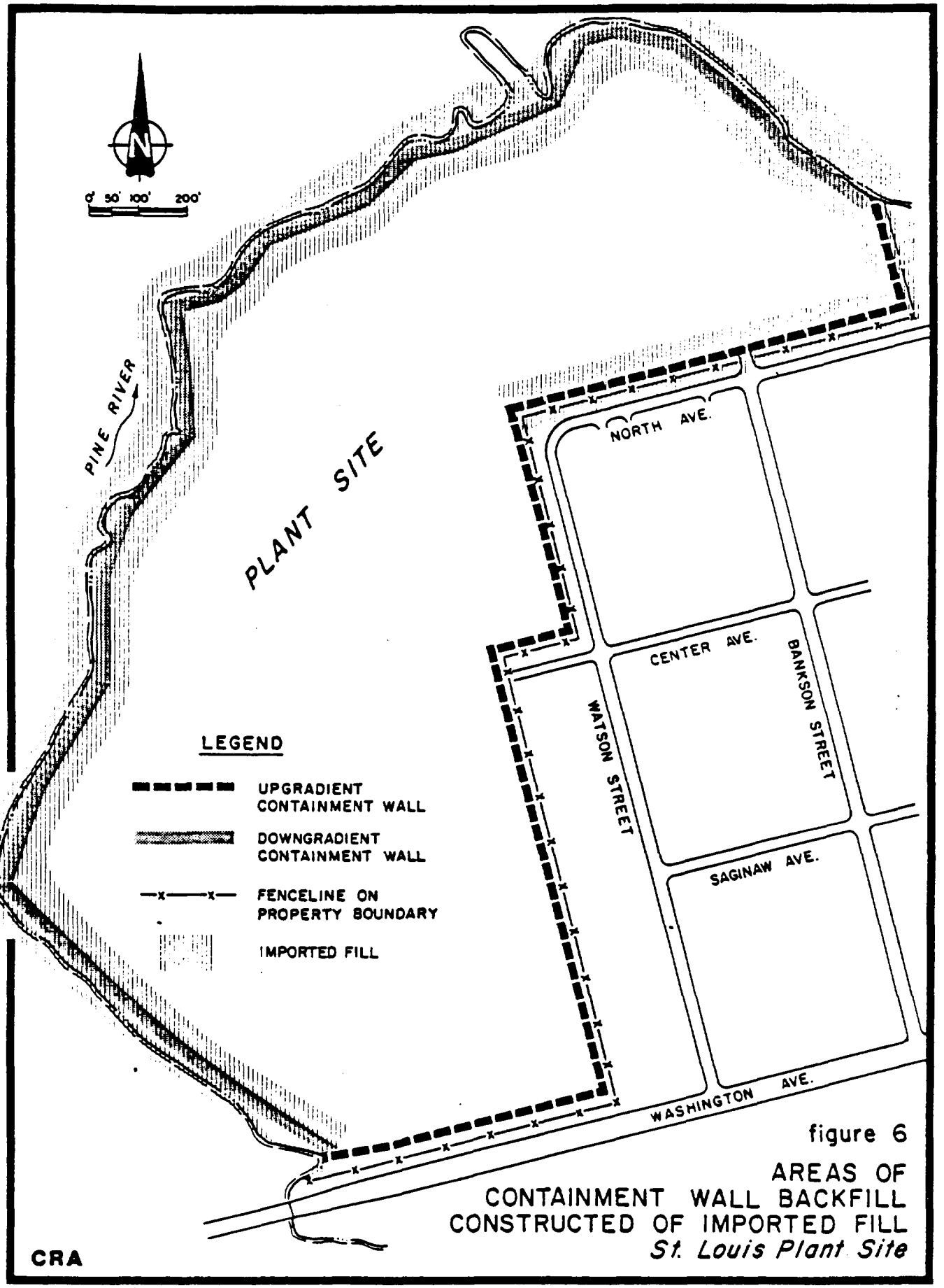

figure 6

AREAS OF CONTAINMENT WALL BACKFILL CONSTRUCTED OF IMPORTED FILL

St. Louis Plant Site

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Mixing of the backfill was accomplished with a tracked dozer following sluicing of the backfill material with slurry pumped from the mixer. Periodically, dry bentonite was added to the backfill by front-end loader, either to reduce slump or to ensure the backfill bentonite content met the specified three per cent dry weight requirement. The practice of adding dry bentonite was eliminated in mid-July as part of additional dust reduction and control measures implemented by the contractor.

3.7 BACKFILL TESTING

Testing was performed on samples of mixed backfill prior to placement into the trench. Testing parameters included unit weight, slump, gradation, and bentonite content.

Specified parameter limits were as follows:

Unit weight:	no less than 15 pcf greater than unit weight of slurry
Slump:	2 inches to 6 inches
Gradation:	greater than 25 percent fines (ie. greater than 25 percent passing #200 sieve)
Bentonite Content:	3 percent by dry weight

Determination of unit weight was conducted using a mud balance. Slump was determined by the slump cone method in accordance with ASTM C 143-78.

Gradation testing was originally specified to be performed on a 200 gram sample in the following manner:

i) dessicate sample

ii) weigh sample

iii) pass through #200 sieve

iv) redessicate sample

v) reweigh sample

Prior to commencement of construction, field testing indicated that the specified protocol was time consuming to the point that it would be difficult to complete the required frequency of testing in an efficient manner. The method also produced relatively large variances in duplicate tests. After consultation with the MDNR, CRA revised the testing protocol to a wash-sieve analysis whereby the sample was dried, weighed, washed with clean water through a #200 sieve and then redried and reweighed.

Bentonite content was to be determined using the Methylene Blue test referenced as API-RP-13B, 1978. During preconstruction quality control testing, CRA determined that the Methylene Blue test gave apparent bentonite contents of 3.5 to 6 percent by dry weight for premixed site soil/bentonite mixtures actually containing approximately 3 percent bentonite by dry weight. This discrepancy was due to the cation exchange capability of natural clays present in the native site soils. On this basis, quality control testing was performed in order to maintain the bentonite content as determined by the Methylene Blue test in the range of 3.5 to 6 percent by wet weight. Wet weight determination was performed as the results were conservative and would underestimate the bentonite content.

Quality control data for all backfill construction are contained in Appendix I.

3.8 CONTAINMENT WALL CAP

The clay for the containment wall cap was imported from the project borrow pit and compacted to a minimum density of 90% Modified Proctor. Capping of the containment wall was done in conjunction

with the grading and capping of the remainder of the site.

3.9 PERMEABILITY TESTING

Triaxial permeability testing, in accordance with ASTM D-2850, was performed on samples extracted from the installed containment walls. Samples were collected in 2-foot long Shelby tubes at intervals of 500 linear feet along the alignment of the containment wall 7 to 10 days after each section of wall had been completed. Figure 7 details the sample locations. Two samples were collected from the oil contamination area temporary containment wall and 14 and 10 samples from the upgradient and downgradient portion of the site perimeter containment wall, respectively. Test data are detailed in Appendix J.

The sample collected at Station 5+00 (UGW-106) yielded a permeability of 1.2×10^{-7} cm/sec, marginally greater than the specified permeability of 1.0×10^{-7} cm/sec. An examination of the sample indicated the presence of a thin sand lense within it. Additional samples were collected immediately to each side of the original sample, and permeability testing indicated compliance with specifications.

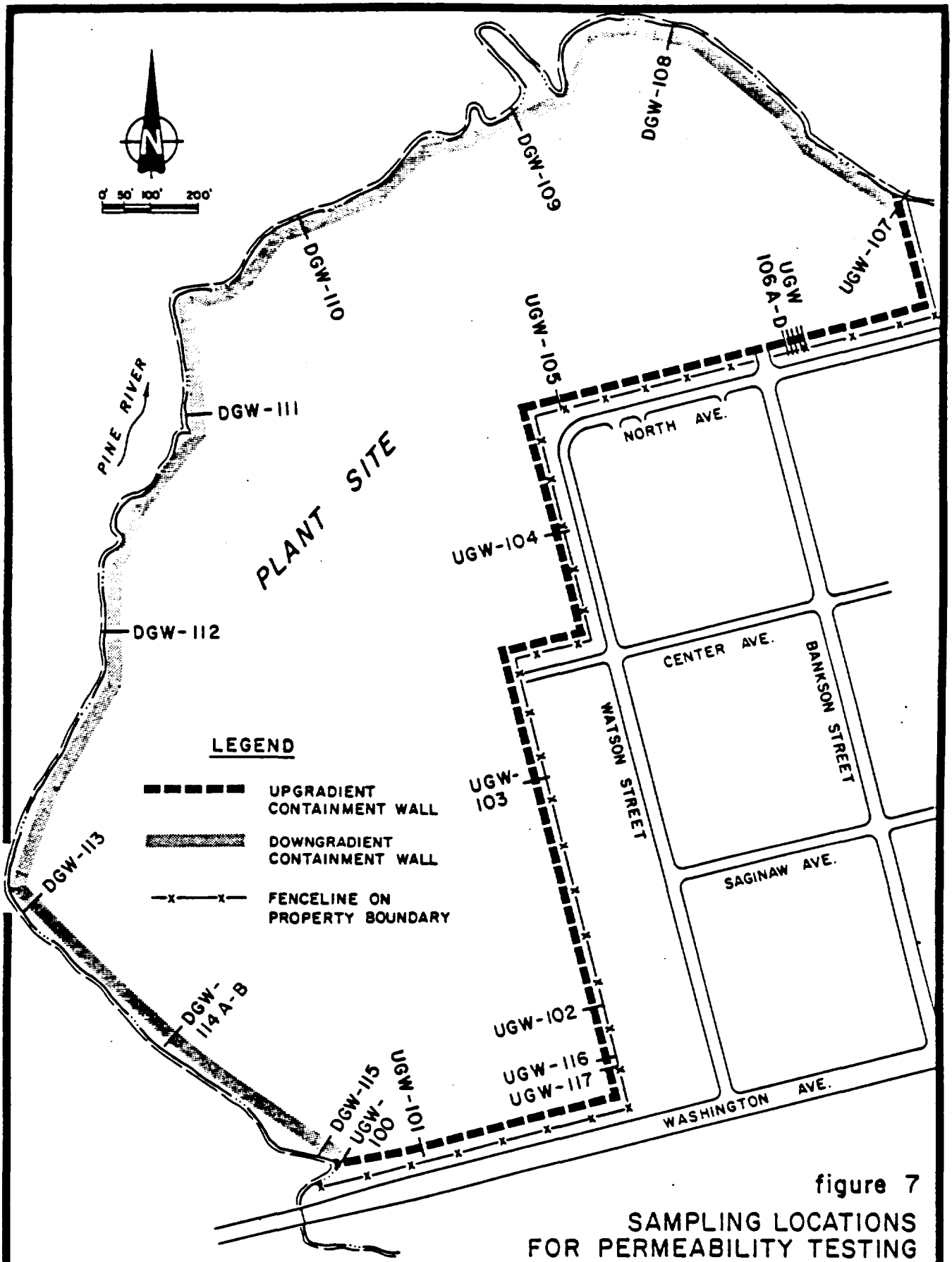

figure 7

SAMPLING LOCATIONS FOR PERMEABILITY TESTING

St. Louis Plant Site

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Resampling was also conducted at Station 37+46 (DGW-114) where examination of the sample revealed virgin soil present in the tip of the Shelby tube. Two additional samples were collected, at Stations 37+46 and 37+48. Examination of the Shelby tube samples did not confirm the presence of a soil lense.

3.10 REPAIR TO SECTION OF UPGRADIENT WALL

During the construction of the upgradient portion of the site perimeter containment wall, a failure of the trench wall occurred betweeen Stations 26+40 to 25+80. Figure 8 depicts the location of the trench wall failure. The failure of the slurry to support the trench walls is attributed to a temporary low level of slurry within the trench and excessive activity by construction equipment within the immediate vicinity.

This portion of the site perimeter containment wall was retrenched on August 31, 1983 and retested. Two samples were collected at Stations 26+20 and 26+00. Testing indicated permeabilities of less than 1×10^{-7} cm/sec and the wall was considered completed at this time.

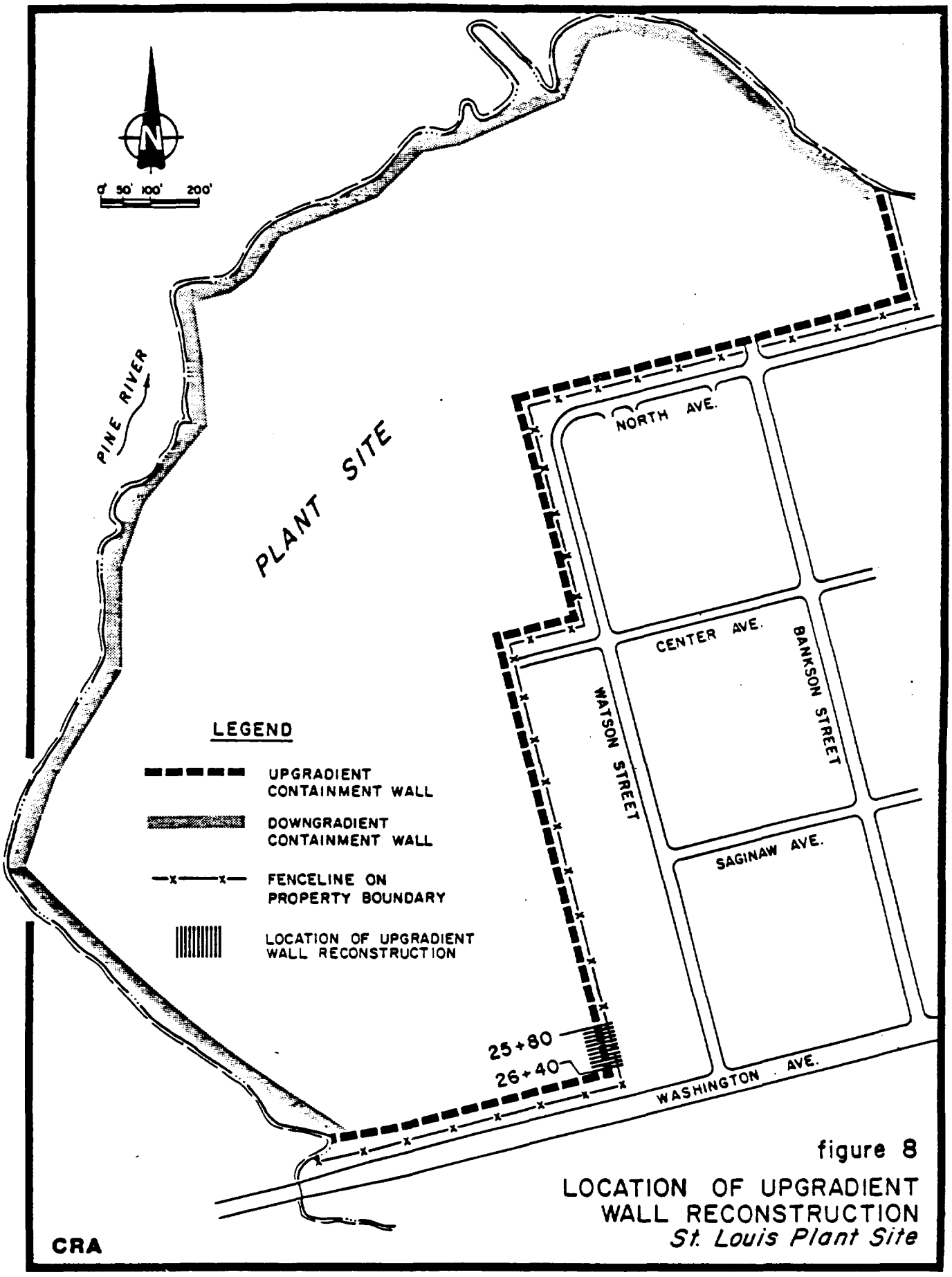

figure 8

LOCATION OF UPGRADIENT WALL RECONSTRUCTION
St. Louis Plant Site

1218-26-22/03/84

4.0 CONCLUSIONS

It is concluded that:

(i) In accordance with the provision of the Consent Judgement, Velsicol completed construction of a soil/bentonite containment wall around the perimeter of its former St. Louis, Michigan, plant site.

(ii) A quality control/quality assurance program was conducted throughout the containment wall construction to assure compliance with specifications. In general, quality control/quality assurance was performed as stipulated by the Consent Judgement. In certain instances, minor variations to protocol or specified testing limits were implemented with MDNR approval to accommodate specific site conditions.

(iii) Data produced by the quality control/quality assurance program confirm that the containment walls were constructed to the physical and performance specifications stipulated by the Consent Judgement and the Construction Specifications.

All of Which is Respectfully Submitted

CONESTOGA-ROVERS & ASSOCIATES LIMITED

Richard G. Shepherd, P. Eng.

Don Robinson

APPENDIX A

SECTIONS 6,7,8 AND EXHIBIT D OF CONSENT JUDGMENT;

SECTION Ps.7 FROM CONTRACT SPECIFICATIONS

CONTAINMENT WALLS

6. Velsicol shall submit, for review and subject to approval by EPA and Michigan, plans, specifications and methods and techniques of emplacement for continuous containment walls along the entire boundary of the main Plant Site to control the infiltration of groundwater through, and abate the further migration of contaminants from, the main Plant Site. The containment walls shall be constructed within Velsicol property lines of the main Plant Site, as shown in attached Figures 1 and 2. Upon approval Velsicol shall construct and install said containment walls in accordance with such plans, specifications and methods and techniques of emplacement. Such plans and specifications shall include but not be limited to the provisions detailed in Exhibit D, Containment Wall Specifications. The containment walls shall be constructed to a minimum thickness of twenty-one (21) inches (nominal 24 inches) of suitable bentonite soil mixture, or equivalent, achieving a permeability of 1×10^{-7} cm/sec, or less, and shall be keyed a minimum of thirty (30) inches (nominal 36 inches) into the underlying till layer. If sand lenses having a minimum thickness of 4 inches are found along the containment wall route, the wall shall be keyed to a minimum of thirty (30) inches (nominal 36 inches) into the underlying till layer beneath such sand lenses. Soils excavated along the containment wall route shall be visually examined by the supervising Engineer in consultation with representatives of EPA or Michigan and, if determined to be unsuitable for slurry wall construction, shall be removed for disposal upon the plant site within the containment walls.

7. The plans and specifications which Velsicol is required to develop pursuant to Paragraph 6, above, shall include provisions for pre-construction borings and core samplings (or backhoe excavation and sampling), chemical testing along the line of the upgradient wall, and construction quality control and field testing methods. Such activities shall be designed to locate sand lenses, to locate contaminated soils on the line of the upgradient wall, and to assure proper design and construction of the containment walls. Chemical testing of soil for HBB, PBB, total DDT and Tris shall be conducted along the line of the upgradient wall at one hundred and fifty (150) foot intervals at depths below one (1) foot, using the protocols defined in Exhibit C, Analytical Protocols for HBB, DDT, PBB and Tris. The top of the till and consistency of the till to a depth of thirty-six (36) inches shall be defined by bore hole testing with visual definition and logging of the spoon sampling (or backhoe excavation with visual definition and logging of the open excavation) at 150 foot centers along the line of containment wall construction.

Velsicol shall excavate that soil lying between the containment wall and adjacent roadways owned by the City of St. Louis (Watson Street, Center Avenue, Washington Avenue and North Avenue) to a one (1) foot depth and shall dispose of such soils upon the plant site within the containment walls. Soil below such one (1) foot depth lying between the containment wall and adjacent roadways owned by the City of St. Louis, shown on Figure E-1 to Exhibit E, Storm Sewer System, which is assumed to contain significant levels of chemical contamination (as determined by EPA, Michigan and Velsicol following chemical testing along the line of the upgradient containment wall), shall be excavated and disposed of by Velsicol upon the plant site within the containment walls. The maximum depth of excavation shall be to the top of the water table.

In the area where private property abutts the main Plant Site, Velsicol shall, if granted permission by the owner of such property, excavate that soil lying within the drainage area of the storm sewer on the private property on Watson Street, and that soil lying within the limit of fifty (50) feet outside the Plant Site on the private property adjacent to the northeast corner of the main Plant Site, as shown on Figure E-2, Exhibit E, Storm Sewer System, to a depth of one (1) foot and shall dispose of such soil upon the plant site within the containment walls. Soil below such one (1) foot depth lying between the containment wall and both the limit of drainage of the storm sewer and the limit of fifty (50) feet outside the main Plant Site, as shown on Figure E-2 to Exhibit E, Storm Sewer System, which is assumed to contain significant levels of chemical contamination (as described by EPA, Michigan and Velsicol following chemical testing along the line of the upgradient containment wall) shall be excavated by Velsicol, if it is granted permission by the Owner of such property, and disposed of by Velsicol, within the containment walls. The maximum depth of excavation shall be to the top of the water table.

All such excavated areas shall be backfilled with imported fill, and where appropriate, with topsoil, and shall be seeded or sodded.

8. The following testing procedures shall be utilized to determine the adequacy of the containment wall material with respect to durability and permeability both during and subsequent to installation, and to ensure that proper mixture ratios, blending and injection rates are maintained during containment wall installation:

   a) <u>Durability Testing</u>

      The testing procedure to deterimine the durability of the containment wall material to maintain a permeability of

1×10^{-7} cm/sec, or less, as well as predict the expected in situ life of the containment wall shall be as follows:

1) Prepare four permeameter specimens: two by mixing the selected grade of bentonite at the design mix ratio with native material obtained from borings taken along the line of the containment wall, and two by mixing the selected grade of bentonite with the imported fill.

2) Prepare permeameter specimens of 1) by dehydrating with water for 13 days.

3) Prepare duplicate permeameter specimen of 1) without prehydration with water as per 2).

4) Under the falling head permeability test, set up in accorance with ASTM D 2434, add groundwater from the main Plant Site to the permeameter specimens of 1), 2), and 3) and monitor the permeability for 90 days. Analysis of the data shall be carried out as outlined in the reference text "Laboratory Soils Testing", Department of Army Engineering Manual EM-1110-2-1906.

5) Native material from the route of the containment wall, where native material is to be used in containment wall construction, shall be obtained from two bore hole locations jointly agreed to by Velsicol and EPA/Michigan. Imported fill material from the imported fill site location for use in containment wall construction shall be obtained from two bore hole locations jointly agreed to by Velsicol and EPA/Michigan. At each location at the main Plant Site, continuous split spoon samples shall be taken from the surface to a point three feet below the top of the clay till. At each location at the imported fill site continuous split spoon samples shall be taken through the depth of the soil deposit to be used. The material contained with each continuous sample shall be thoroughly blended prior to the addition of bentonite.

6) Plant site groundwater shall be collected from existing on-site wells. The groundwater to be used in this testing procedure shall be approved by EPA/Michigan prior to initiation of the test.

b. Permeability Testing

The testing procedure to determine the permeability of the design mix for the containment wall backfill shall be as follows:

1) From four locations agreed to by Velsicol and EPA/Michigan, along the route of the containment wall continuous samples of native material shall be obtained. In addition, imported fill samples shall be obtained from four locations at the imported fill site. The soil samples shall be continuous from the ground surface to a point three (3) feet below the top of the clay till at the main Plant Site, and from the surface through the depth of the soil deposit to be used at the imported fill site.

2) Each continuous sample shall be thoroughly blended prior to addition of bentonite. A grain size analysis shall be performed on each blended sample in accordance with ASTM D 422-63 as reapproved in 1972.

3) Bentonite shall be blended with each sample at the specified design ratio.

4) One triaxial consolidation test, set up in accordance with ASTM D 2580 with samples saturated, shall be performed on a portion of each sample to determine permeability. Calculations of test results shall be carried out as outlined in the reference text "Laboratory Soils Testing", Department of Army Engineering Manual EM-1110-2-1906.

c. Construction Testing

1) From each 500 lineal feet of installed containment wall, a triaxial consolidation test to determine permeability, set up in accordance with ASTM D 2850 with samples saturated, shall be performed. Well corings for testing purposes shall be collected within seven to ten days of backfill placement. Calculations of test results shall be as specified in subparagraph 8.b.4, above.

2) Slump cone tests, carried out in accordance with API-RP-13B, shall be performed during construction at the rate of one test for each twenty-five (25) cubic yards of backfill mix.

3) Gradation tests for determination of plastic fines contents (passing the #200 sieve) shall be performed at the rate of four (4) tests per eight (8) hour shift.

4) A Methylene Blue Test, carried out in accordance with API-RP-13B, shall be performed four (4) times each eight (8) hour shift on backfill mixture samples selected at the same time as the gradation test.

5) Slurry samples which shall be pumped from the bottom of the trench, and backfill samples from mix being added to the trench, shall be tested for unit weight, in accordance with API-RP-13B, at least once each hour of the working shift.

d. Post Construction Testing

Following installation, falling head laboratory testing, set up in accordance with ASTM D 2434, on a single collected sample of the installed containment wall shall be done every three (3) months for thirty-six (36) months to evaluate maintenance of a permeability of 1×10^{-7} cm/sec., or less. Analysis of the data shall be carried out as specified in subparagraph 8.a.4, above.

EXHIBIT B

Containment Wall Specifications

The plans and specifications for construction of continuous containment walls, submitted by Velsicol for approval, shall include, but not be limited to, the following specifications:

1. The trenching equipment shall be continuously controlled and monitored to assure plumbness of the containment wall in the vertical plane.
2. The volume of slurry material will be great enough to maintain a trench level a minimum depth of three (3) feet above the groundwater level.
3. A level clay soil working platform shall be constructed at least 6 feet wide about the centerline of the containment wall for stable support, mobility of equipment, stability of the containment wall, to assure plumbness of the containment wall in the vertical plane, and as a means of keying the cover to the containment wall. The working cap will not be less than two (2) feet in thickness.
4. The slurry mix shall have viscosity of not less than 40 sec. Marsh.
5. Prior to placement of the backfill material the trench shall be profiled by passing the digging tool horizontally and vertically over the full depth and length of the excavated bottom of the trench. Sediment that accumulates in the bottom of the trench shall be removed with excavating equipment or with an air lift pump.
6. During construction, at each 25 feet of trench installation, representatives from Velsicol and EPA/Michigan shall witness the native material excavated from the base of

the containment wall trench and shall each sign a log certifying that the wall has been founded in the underlying clayey till.

7. The slurry shall consist of a stable colloidal suspension of pulverized "premium grade natural" bentonite. Velsicol shall provide a written certification specifying the quality of the "premium grade natural" for each shipment of bentonite received.

8. The unit weight of the slurry, as sampled near the bottom of the trench, shall be at least 15 pcf lighter than the backfill.

9. Slurry mixture operations shall be performed when ambient temperatures are greater than 35 degrees F.

10. Whenever temperatures are anticipated to be 35 degrees F, or less, suitable approved cover shall be placed over the containment wall trench to prevent freezing.

11. The backfill material shall be placed in the trench at a point where the backfill rises to the ground surface. Free dropping backfill through the slurry mix shall not be permitted.

12. The backfill consistency at the time of placement shall be maintained at a slump of 2 inches to 6 inches.

13. Backfill material shall be granular material containing greater than 24% plastic fines (25% passing the #200 sieve). Bentonite content shall be no more than 3% by dry weight.

14. Contaminated natural soils shall be used where possible in the backfill material.

Ps.7 SOIL/BENTONITE CONTAINMENT WALL CONSTRUCTION

Ps.7.01 GENERAL

The work shall consist of constructing an impervious continuous soil/bentonite containment wall along the upgradient and downgradient perimeter of the Plant Site, and constructing a separate wall around the area of oil contaminated soil in the southeast portion of the site. As part of the upgradient and downgradient wall construction the Contractor shall; construct a level clay working platform centred along the line of the containment walls; construct a temporary clay control berm between the upgradient wall line and the boundary fenceline and between the downgradient wall line and the Pine River; and furnish all plant, labor, equipment, material and quality control testing to effectively complete all the soil/bentonite containment walls.

Ps.7.02 MATERIAL

All material used on this Contract must be approved by the Engineer prior to use.

a) Bentonite

The bentonite used for this Contract shall be Slurry Gel #125 by International Minerals and Chemical Corporation and shall be a naturally powdered, pure, premium grade Wyoming type, sodium cation-base bentonite consisting mainly of the clay mineral sodium montmorillonite and displaying high swelling characteristics. All bentonite used shall meet the standards outlined in the current API specifications 13A "Oil Well Drilling Fluid Materials". Each shipment of bentonite when received on-site, shall be furnished with written Certification of Compliance in quadruplicate and a copy of the test reports from the bentonite manufacturer verifying that the bentonite is a premium grade natural bentonite meeting the requirement of API specifications 13A. Copies of the certification and the test reports shall be submitted to the Engineer for his review and subsequent submittal to the EPA/MNDR upon receiving each shipment of bentonite. No bentonite shall be used until the Contractor has received approval from the Engineer that the bentonite is of premium quality. Bentonite not meeting specifications shall be promptly removed from the site of work and replaced with bentonite conforming to specifications.

The use of chemically pretreated bentonite will not be allowed on any portion of this Contract.

b) Water

The Contractor shall be responsible for securing a suitable source of water for bentonite slurry mixing. The water shall be fresh and clean and must meet the standards specified below:

i) A pH $\geq$ 7.0
ii) Calcium < 500 ppm
iii) Oil, organics, acids, alkali, soluble salts, or other deleterious substances < 50 ppm each

The Contractor shall submit test results to the Engineer prior to commencing any slurry mixing, verifying that the water quality meets the stated specifications.

c) Slurry Control Agents

The use of thinners, dispersants and flocculants may be used by the Contractor to attain and control standard properties of the slurry, particularly the apparent viscosity, gel strength, and filtration characteristics provided the final properties of the soil/bentonite wall are not altered. The Contractor shall inform and receive approval from the Engineer of any additives to be used.

Peptizing or bulking agents will not be permitted for mixing with slurry.

d) Imported Clay

Clay used for construction of the working platform shall be clean clay soil obtained from the approved borrow pit located as shown on the Contract Drawings with a plastic fines concentration such that a permeability of 1×10^{-7} cm/sec can be obtained. Clay shall be removed from the borrow pit only at locations as directed by the Engineer.

e) Native Soil

Native soils excavated from the upgradient containment wall trench and the perimeter containment wall trench around the oil contaminated soils, shall be used in the containment wall backfill.

f) Imported Fill

Imported backfill material shall be used; in areas along the upgradient wall which are judged to be unsuitable; along the north/south dividing wall at the oil contaminated soil excavation; and along the entire downgradient containment wall. Material used for backfill mix in these areas shall be sandy clay material imported from the approved Project borrow pit. Backfill material must contain greater than 25% plastic fines (25% soil particles passing a U.S. Standard No. 200 Sieve).

g) Backfill

All backfill material whether imported or native material shall be thoroughly mixed with the bentonite prior to backfilling the trench. Any backfill material larger than three (3) inches will not be accepted. In the area of oil contaminated soil excavation, any native soils containing free petroleum based contaminants will be rejected for that containment wall backfill.

Ps.7.03 EQUIPMENT

The Contractor shall carry out all trench excavations using any suitable earthmoving equipment such as backhoes, draglines, clamshells, or any combination thereof provided the equipment can perform the required work as specified. The equipment shall be capable of excavating the 24 inch wide trench in one pass to the depths specified on the Contract Drawings.

Equipment used for mixing the backfill shall be a suitable type of earthmoving or grading equipment such as a bulldozer, blade grader or blender that is capable of thoroughly mixing the backfill material into a homogeneous consistency.

Ps.7.04 MIXING OF SLURRY

a) Equipment

The Contractor shall provide a continuous venturi type mixer capable of producing a colloidal suspension of bentonite in water for preparation of all slurry. The slurry mixing plant shall include a mechanically agitated sump, pumps, valves, hoses, supply lines, small tools and all other plant and materials required to adequately supply slurry to the trench.

The Contractor shall construct adequate containment areas for the storage and hydration of mixed slurry. After mixing, slurry shall be pumped to the holding ponds for final hydration of the bentonite. The ponds shall be sized to provide an adequate supply of slurry for 3 to 4 days of construction in case of equipment failure or in case of a substantial loss of slurry in the trench should a highly pervious strata be encountered. The ponds shall be located in an area approved by the Engineer. The Contractor shall restrict his plant activities within this designated area, unless given approval by the Engineer to expand or move his plant to other areas of the Plant Site.

Slurry within the hydration ponds shall have Marsh funnel tests performed on it, as a minimum, three (3) times daily. Additional tests shall be performed on the slurry after a rainfall to maintain the proper physical properties.

At the completion of the Contract the Contractor shall dispose of excess slurry in an area approved by the Engineer and cover the spoiled slurry with clean imported clay. The slurry holding pond areas shall be regraded and covered with clean imported clay fill.

b) Mixing

The bentonite slurry for supporting the sides of the trench and for mixing with the backfill material shall consist of a suitable suspension of a quality natural bentonite and clean water

thoroughly mixed and agitated to avoid formation of lumps. Mixing shall be continued until the bentonite particles are fully hydrated and the slurry appears to be at the proper consistency. At no time shall the slurry be mixed in the trench.

Mixing operations shall not be carried out when ambient temperatures are below 35 degrees F. Should the Contractor anticipate temperatures below 35 degrees F, he must take precautionary measures to protect slurry in the containment areas and in the trench from freezing using suitable approved cover.

After mixing, the slurry shall be pumped into the slurry containment areas to allow the bentonite to expand fully. The Contractor shall provide a means of agitating and recirculating the slurry in the containment areas in order to maintain a homogeneous slurry mixture. The slurry shall be pumped from the containment area to the excavated trench when required.

The Contractor shall ensure that the slurry level in the trench is kept at a minimum three (3) feet above the groundwater level. Should a sudden drop in the slurry level occur or a sudden rise in the groundwater occur, the Contractor must immediately make the appropriate adjustment to the slurry level in the trench.

The Contractor shall keep personnel on call weekends and holidays to ensure that the slurry level in the trench remains at least three (3) feet above the groundwater level.

c) Slurry Properties

Flow properties and control limits of the slurry as specified herein shall be determined according to procedures outlined in the API Recommended Practise 13B, "Standard Procedures for Testing Drilling Fluids" or unless otherwise specified herein.

When pumped from the slurry containment areas to the trench, the slurry must have the following properties:

i) Apparent viscosity of 40 seconds Marsh
ii) Density $\geq$ 67 pcf
iii) pH $\geq$ 7.0
iv) Filtration Loss = 15 cc in 30 minutes @ 100 psi

Continual testing of the slurry in the trench shall be carried out throughout the slurry construction in order that the following slurry properties are maintained within the trench:

i) An apparent viscosity of 40 seconds Marsh
ii) Slurry density less than 15 pcf that of backfill material
iii) 7.0 $\leq$ pH <12.0
iv) Sand content $\leq$ 15%

Should the slurry fall below the stated limits at any time during construction of the upgradient containment wall, the Contractor shall immediately recirculate, remove of adjust the slurry such that it complies with the above specifications.

Ps.7.05 WORKING PLATFORM

Construction of both the upgradient and downgradient wall shall at all times be carried out from a level clay working platform. The working platform shall be twelve feet wide centered along the center line of the containment walls and shall be a minimum of two (2) feet thick. The downgradient working platform shall be constructed as close to the river as good construction practices allow.

Material excavated for the upgradient working platform shall be disposed on the Plant Site in an area designated by the Engineer. Material excavated for the downgradient working platform may be used as fill material for preparation of the working platform base prior to placing the clay platform. Any excess material shall be diposed on-site. Any areas of base fill, prior to placing the downgradient clay working platform shall be compacted to 90% Standard Proctor Density.

Clay from the approved borrow pit shall be transported, placed and compacted in six inch lifts to 98% maximum Modified Proctor Density at a moisture content of $\pm$ 1% of the clay's optimum moisture content.

Ps.7.06 CONSTRUCT CLAY CONTROL BERM

A clay control berm shall be constructed, as shown on the Contract Drawings, along the Plant Site property during the upgradient wall construction, and along the Pine River as part of the working platform during tne downgradient wall construction, to prevent run-off of any slurry material or rainwater onto adjacent properties or into the Pine River. Extreme care shall be taken to preserve and maintain the berms throughout the duration of the Contract. The Contractor shall take appropriate measures for erosion control along the berm side slope adjacent to the Pine River.

The berm shall be constructed using clay from the approved project borrow pits to the line and grades approved by the Engineer and shall be compacted in 12 inch lifts to 90% maximum Standard Proctor Density. The top of the berm shall be kept a minimum of 24 inches above existing grades.

At the completion of the containment wall construction the Contractor shall remove the control berm by grading to the proposed final base contours.

Ps.7.07 ON-SITE HAUL ROADS

On-site haul roads are presently located on the Plant Site as shown on the Contract Drawings. Maintenance of these haul roads and construction of any new haul roads shall be the responsibility of the Contractor. The cost of such haul road construction or maintenance shall be included in the appropriate bid prices for Phase I and Phase II construction work.

On-site haul roads shall be maintained in a condition satisfactory to the Engineer.

Ps.7.08 ALIGNMENT AND DIMENSIONS

Excavation of the containment wall around the oil contaminated soil and the upgradient and downgradient containment wall trench shall be to the lines and grades shown on the Contract Drawings. The trench shall be 24 inches wide and shall be to a depth such that the wall is keyed into the underlying clay till layer 36 inches. The containment wall around the oil contaminated soil excavation area shall be keyed into the underlying clay till layer 24 inches. Any excess excavation of the slurry trench for the convenience of the Contractor or for any other purpose shall be at his expense unless otherwise directed in writing by the Engineer. All areas of overexcavation shall be backfilled with material approved by the Engineer, at the Contractors expense.

The Contractor shall be responsible for continually monitoring the trench excavation to ensure the plumbness of the trench walls.

At points of direction change having a radius less than 30 feet or at 90° corners, the Contractor shall ensure continuity of the wall by excavating beyond the centerline of the wall a minimum of ten (10) feet. This additional excavation shall be included in the bid price for all wall constructions. Extreme care shall be taken by the Contractor to excavate all material at these direction changes ensuring that no windows of unexcavated material remain within the backfilled containment wall.

Throughout the course of the trench excavation, the Contractor shall profile the trench by passing the digging tool horizontally and vertically over the full depth and length of the excavated trench prior to placing backfill in the trench. Sediment that collects in the bottom of the trench shall be removed with excavating equipment or with an air lift pump.

During the entire upgradient and downgradient containment wall installation, representatives from Velsicol and from the EPA/MDNR shall be present to witness the native material excavated from the trench at 25 feet intervals in order to certify that the containment wall has been founded in clay. The Contractor shall at all times accommodate and assist as necessary the aforementioned representatives.

It is anticipated that material excavated during the upgradient wall installation, between stations 2 + 20 and 5 + 95; and between stations 9 + 75 and 11 + 50; will be unsuitable for use as backfill due to rubble buried along the line of the wall. The Contractor shall dispose of this excavated material in an area on the Plant Site designated by the Engineer and cover the disposed material with 12" of clean fill. All material excavated from the downgradient wall will be spoiled on-site. Any excavated native material from the perimeter wall around the oil contaminated soil, containing free petroleum liquids, shall be spoiled on-site and clean backfill substituted.

Backfill for all these areas shall be imported from the approved Borrow pit from locations as directed by the Engineer. The Contractor shall ensure that the imported backfill is thoroughy mixed with the bentonite slurry to design mix prior to backfilling the trench. Borelogs taken along the line of the upgradient containment wall, the downgradient containment wall and within the area of oil contaminated soils, indicating the depth to clay till and the nature of soils to be excavated during wall construction are provided within Appendix B, C and D respectively.

Ps.7.09 TESTING

Throughout the construction of the containment walls the Contractor shall be responsible for performing quality control testing to monitor the quality of all construction materials and to ensure the maintenance of slurry and backfill mixing properties. In addition, the Engineer shall perform quality control testing to ensure Contractor compliance with specification. As a minimum the Engineer shall be responsible for performing the following quality control tests:

i) Slump Cone Test
   - one test performed for every twenty-five (25) cubic yards of backfill mix

ii) Gradation test
   - four tests performed on backfill mix per eight (8) hour shift

iii) Methylene Blue Test
   - four test performed on backfill mix per eight (8) hour shift

iv) Unit Weight
   - Performed on slurry samples pumped from bottom of trench and on backfill mix being added to trench at least once each hour of working shift

v) Marsh Funnel Test
   - four tests performed on slurry in trench per eight (8) hour shift
   - four tests performed on slurry in holding ponds per eight (8) hour shift. Increase to one test per hour during and for one day after rainfall

vi) Filtrate Loss Test
   - two tests performed on slurry sample every eight (8) hour shift

vii) Triaxial Permeability Test
- performed on cores taken from each 500 lineal feet of installed wall 7 to 10 days after containment wall is completed, prior to installing clay cap over wall

The Contractor shall provide assistance as required by the Engineer in the collection and testing of samples.

In the event, deficiencies are noted in either slurry or backfill characteristics, the Contractor shall immediately rectify the deficiency to the satisfaction of the Engineer.

Ps.7.10 EMERGENCY PROCEDURES ALONG EXCAVATION

In the highly unlikely event that barrels, canisters or chemical gases or vapors are uncovered during the containment wall constructions the following procedures shall be followed:

i) Vessels

In the event that barrels or canisters are encountered during excavation all work shall immmediately cease and all workmen be removed from the work area. Velsicol officials shall be immediately notified and they shall identify vessel contents, handling procedures and storage and disposal techniques prior to re-commencing work.

ii) Excessive Chemical Gases or Vapors Generated from Excavated Face

In the event of excessive gases or vapors along the trench excavation, the following actions will be taken:

a) Remove all workers from the area.

b) Monitor contaminant concentrations to determine the type of respiratory protective device that will be required before workers re-enter the area.

iii) Major Leak of a Toxic Gas

In the highly unlikely event of a major leak of toxic gas, such as might occur if a compressed gas cylinder were encountered and ruptured during excavation, all on-site personnel will be evacuated to a safe distance and the "Emergency Contingency and Response Plan", as specified in Section Ps.4.11, shall be implemented.

Ps.7.11 MIXING AND PLACEMENT OF BACKFILL

Mixing of the backfill shall take place adjacent to the slurry trench excavation using equipment that will guarantee thorough mixing of the excavated material and the bentonite slurry. Mixing equipment shall not run closer than 15 feet to the edge of the trench. The slurry used for backfill mixing shall be taken from the trench, not the hydration ponds.

Should addition of dry bentonite be required to achieve a 3% by dry weight soil/bentonite backfill the additional bentonite shall be evenly distributed over the soil backfill prior to blending with slurry. The dry bentonite shall be well mixed with the soil backfill using mechanical mixers or harrows.

Backfill material shall have a bentonite content of 3% by dry unit weight and when placed in the trench shall have a slump of two (2) inches to six (6) inches. Slump shall be determined using the method outlined in the slump cone testing Specification ASTM C 143-66. Sluicing of backfill mix with water to produce the desired slump will not be permitted.

Backfilling of the excavated trench shall not commence until the Engineer has satisfied himself that the trench and backfill material meet the specifications and not until the excavation of the trench is at least 100 feet ahead of the backfilling. When the backfilling operation commences, the toe of the backfill slope in the trench shall be no more than 250 feet and no less than 100 feet away from the toe of the trench excavation.

Backfill material shall be placed in the trench, no sooner than 24 hours after excavation begins, at its natural angle of repose, at a point where the backfill rises to the top of the working platform. As the trench is backfilled the slurry should be displaced along the trench. No free dropping of backfill material into the trench shall be permitted.

The Contractor shall be responsible for maintaining and protecting the containment wall in place from damage caused by differential hydraulic pressures, equipment travel and all other possible damaging influences.

Ps.7.12 CONTAINMENT WALL CAP

Upon completion of the upgradient and downgradient soil/bentonite containment wall and all subsequent quality control testing the Contractor shall construct a clay cap over the wall to prevent groundwater from filling the trench, to prevent drying and cracking of the soil/bentonite wall and to allow the travel of vehicles and equipment over the wall without damage to the walls. Clay for the cap shall be obtained from the approved source and shall be placed in 12 inch lifts compacted to a minimum density of 90% modified Standard Proctor. Capping shall not commence for at least 1 week after backfilling the trench.

The Contractor shall construct an access structure over the completed upgradient containment wall at the south and north access gates to allow the travel of loaded trucks and heavy equipment over the wall. These access structures shall be maintained in place for the duration of all construction work at the Plant Site and shall be left in place until such a time as the Contractor is instructed by the Engineer to remove them. Approval by the Engineer of the type of access structure proposed shall be obtained by the Contractor prior to construction.

APPENDIX B

CONTRACTOR QUALITY CONTROL DATA

GEO·CON INC

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SLURRY TRENCH QUALITY CONTROL

DATE 10.93 JOB NAME 11/61-161 JOB NUMBER 93-178

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	STA DEPTH KEY
10+70	6.0	~4	12+70 | 7.9 | 4.0
10+90	7.6	3.4	
11+10	7.2	5.2	2446 feet² of trench
11+30	8.3	4.6	
11+50	10.0	6.2	
11+53	9.25	~7.25	SW Corner
11+70	11.4	~9.4	
11+90	11.9	7.9	
12+10	13.0	10.3	
12+30	12.6	8.2	
12+50	9.1	4.7	

STATION	~~% BENT PRE-MIX WC~~	BACKFILL STATION	SLUMP	WC	%PASSING = 200	COMMENTS
	4.5%	7+50	3"	17	27	
	5%	9+00	4"	18	25	

SLURRY									COMMENTS
TRENCH					PLANT				
STATION	TIME	DEPTH	Y	PLANT	Y	FILTRATE	VISC	TIME	
	8:30	0	66	38 visc	64	27cc	38	4.00	slump at top of trench
	9:00	10	84	52 visc					water will be added at
	1:30	10	70	72 visc					start of trench

It quickly mixed & became thicker & heavier, 10 cy of slightly thin slurry was sent to the trench in the afternoon

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SLURRY TRENCH QUALITY CONTROL

DATE 4-13 83 JOB NAME Velsicol JOB NUMBER 83-178

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	
0	7.2	~6	See extra work report
20	10.5	~8	
40	10.5	~8	
			total 594 ft²

	To bent	BACKFILL				
STATION	PRE MIX ~~WC~~	STATION	SLUMP	WC	%PASSING #200	COMMENTS
12+00	41.5		2"	15	27	

SLURRY									
TRENCH				Visc	PLANT				COMMENTS
STATION	TIME	DEPTH	Y	~~PLANT~~	Y	FILTRATE	VISC	TIME	
12+00	9:30	0	67	40					

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GEO·CON INC

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URRY TRENCH
QUALITY CONTROL

DATE 2-10 93 JOB NAME Political JOB NUMBER 93-178

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	
—	—	—	See extra work report

BACKFILL						COMMENTS
STATION	PRE MIX WC	STATION	SLUMP	WC	%PASSING ≠ 200	

SLURRY									COMMENTS
TRENCH				VISC	PLANT				
STATION	TIME	DEPTH	Y	PLANT	Y	FILTRATE	VISC	TIME	
	11.00	0	69	46					

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SLURRY TRENCH
QUALITY CONTROL

DATE 2-16-93 JOB NAME Colonial JOB NUMBER 93-174

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	
80	12.9	10.5	see extra work report
100	13.4	9.2	
120	14.4	8.0	
150	13.1	11	
170	14.2	10.6	
			1230 ft²

BACKFILL						
STATION	PRE MIX WC	STATION	SLUMP	WC	%PASSING ≠ 200	COMMENTS

SLURRY									
TRENCH				PLANT					COMMENTS
STATION	TIME	DEPTH	Y	PLANT	Y	FILTRATE	VISC	TIME	

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URRY TRENCH
QUALITY CONTROL

DATE , , JOB NAME Urrisich 1 JOB NUMBER 93-178

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	
1+90	15 7		
2+10	15 2	13,0	
2+30	18 3	16.3	
2+37	17 9	15 9	
2+57	15 0	13 0	
2+77	13 2	11 5	
2+97	16.3	13.7	
3+17	15 5	13.5	
3+37	11.5	9.0	
			2500 ft²

	% bent BACKFILL					
STATION	PRE MIX WC	STATION	SLUMP	WC	%PASSING = 200	COMMENTS
	-5%		3"	16	23	

SLURRY									
TRENCH					PLANT				COMMENTS
STATION	TIME	DEPTH	Y	PLANT	Y	FILTRATE	VISC	TIME	
	9.00	0	65	44 visc.	64	23	36	10:00	

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SLURRY TRENCH QUALITY CONTROL

DATE 6-17-93 JOB NAME Wilsicol JOB NUMBER 93-178

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	
3+57	11.2	7.8	
3+77	10.8	~8.8	
4+00	10.3	7.7	
4+20	13.1	11.0	
4+40	13.2	10.5	
4+60	11.2	9.1	
4+80	12.2	9.0	
5+00	12.9	7.6	
5+20	12.1	9.6	
5+40	12.0	9.8	
			2360 Ft²

BACKFILL						
STATION	~~PRE-MIX WC~~ % bent	STATION	SLUMP	WC	%PASSING #200	COMMENTS
	5%		5¾	19	25	

SLURRY									
TRENCH				VISC	PLANT				COMMENTS
STATION	TIME	DEPTH	Y	PLANT	Y	FILTRATE	VISC	TIME	
	8:30	0		36					Slurry was found to be very thin in the morning. Slurry at the top of the
	9:30	0	67	40			~100	11.00	
	1:00	0		52					
	3:00	0		47					

trench was drained off and thick (2316/bbl) slurry was added to the trench so that by evening the trench was safe for the weekend. Geo-Con personnel are, of course, on call at all times.

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SLURRY TRENCH QUALITY CONTROL

DATE 6-20-85 JOB NAME Walnut JOB NUMBER 85-175

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	
0120	17.7	4.5	
0140	14.1	12.1	
0160	14.7	10.7	
0180	12.4	7.9	
1400	10.9	8.9	
			1400 ft²

Joint BACKFILL						
STATION	~~PRE MIX~~ WC	STATION	SLUMP	WC	%PASSING #200	COMMENTS
	5% bent		4	19	27	

SLURRY									
TRENCH				PLANT					COMMENTS
STATION	TIME	DEPTH	Y	PLANT	Y	FILTRATE	VISC	TIME	
	9.00	0	66		64	23	47	9.30	
	1.30	6	80						

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URRY TRENCH
UALITY CONTROL

DATE 6-21 83 JOB NAME Nelson JOB NUMBER 83178

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	
1720	9.5	7.5	
1740	10.3	7.9	Completed oil containment wall
			396 ft²

BACKFILL						COMMENTS
STATION	PRE MIX WC	STATION	SLUMP	WC	%PASSING = 200	

SLURRY									COMMENTS
TRENCH				WISC.	PLANT				
STATION	TIME	DEPTH	Y	~~PLANT~~	Y	FILTRATE	VISC	TIME	
	10 30	0	85	55					
	3.30	0	75	52					

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URRY TRENCH
QUALITY CONTROL

DATE 12·93 JOB NAME Volsted JOB NUMBER 53·75

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	
33+32	0		Begin construction of upgradient wall
33+12	21		
32+92	21	17.5	
			1050 ft²

BACKFILL						
STATION	~~PRE MIX~~ % soil ~~WC~~	STATION	SLUMP	WC	%PASSING = 200	COMMENTS
	45	32+32		19	26	Backfill tested prior to addition of clay bentonite

SLURRY									
TRENCH				VISC / PLANT					COMMENTS
STATION	TIME	DEPTH	Y	PLANT	Y	FILTRATE	VISC	TIME	
		0	65	47	64		45	11.00	
		0	68	45	64	22 cc.	42	3.00	

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SLURRY TRENCH QUALITY CONTROL

DATE [illegible] JOB NAME [illegible] JOB NUMBER [illegible]

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	
32+72	20.8	17.1	
32+52	20.8	18.7	
32+32	21.7	18.4	
32+12	20.8	15.4	
			1682 ft²

BACKFILL						COMMENTS
STATION	PRE MIX WC	STATION	SLUMP	WC	%PASSING #200	
						NC backfill placed

SLURRY									COMMENTS
TRENCH				VISC / PLANT					
STATION	TIME	DEPTH	Y	PLANT	Y	FILTRATE	VISC	TIME	
33+32	2.00	0	66	47T	64	22	45	1:30	
31+92	2.30	0	67	40					

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SLURRY TRENCH
QUALITY CONTROL

DATE 6-24-83 JOB NAME Alsical JOB NUMBER 83-175

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	
31+92	17.0	12.2	Excavation below key as directed by
31+72	16.5	13.1	MDNR & CRA
31+52	15.4	10.3	
31+32	14.4	9.7	
31+12	16.7	13.5	
30+92	16.4	11.5	
30+72	15.3	9.0	
0+52	13.6	10.5	
30+32	16.0	~13	
30+10	14.0	9.6	
29+90	12.8	10.2	(Cont'd by D.M)

STA	DEPTH	KEY
29+70	14.2	12.2
29+50	14.8	11.7

3974 ft²

	% Bent BACKFILL					
STATION	PRE MIX wc	STATION	SLUMP	WC	%PASSING #200	COMMENTS
33+32	5.5		3"	18	31	This batch has been tested in
32+82	4.5		4"	19	~~#~~ 29	6-22-83 prior to adding dry
						bentonite

SLURRY									
TRENCH				Misc / PLANT					COMMENTS
STATION	TIME	DEPTH	Y	PLANT	Y	FILTRATE	VISC	TIME	
32+50	11:00	0	67	47					
31+92	11:00	15	72	48					

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APPENDIX C

WORKING PLATFORM COMPACTION AND GRADATION TESTING DATA

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF MOISTURE DENSITY RELATIONSHIP OF SOIL

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

TE: JUNE 13, 1983

OUR REPORT NO.: 408-30029-21 PAGE 6 of 7

TEST DATA

Visual Classification: GRAY, SANDY CLAY, LITTLE FINE GRAVEL, LITTLE SILT, MOIST

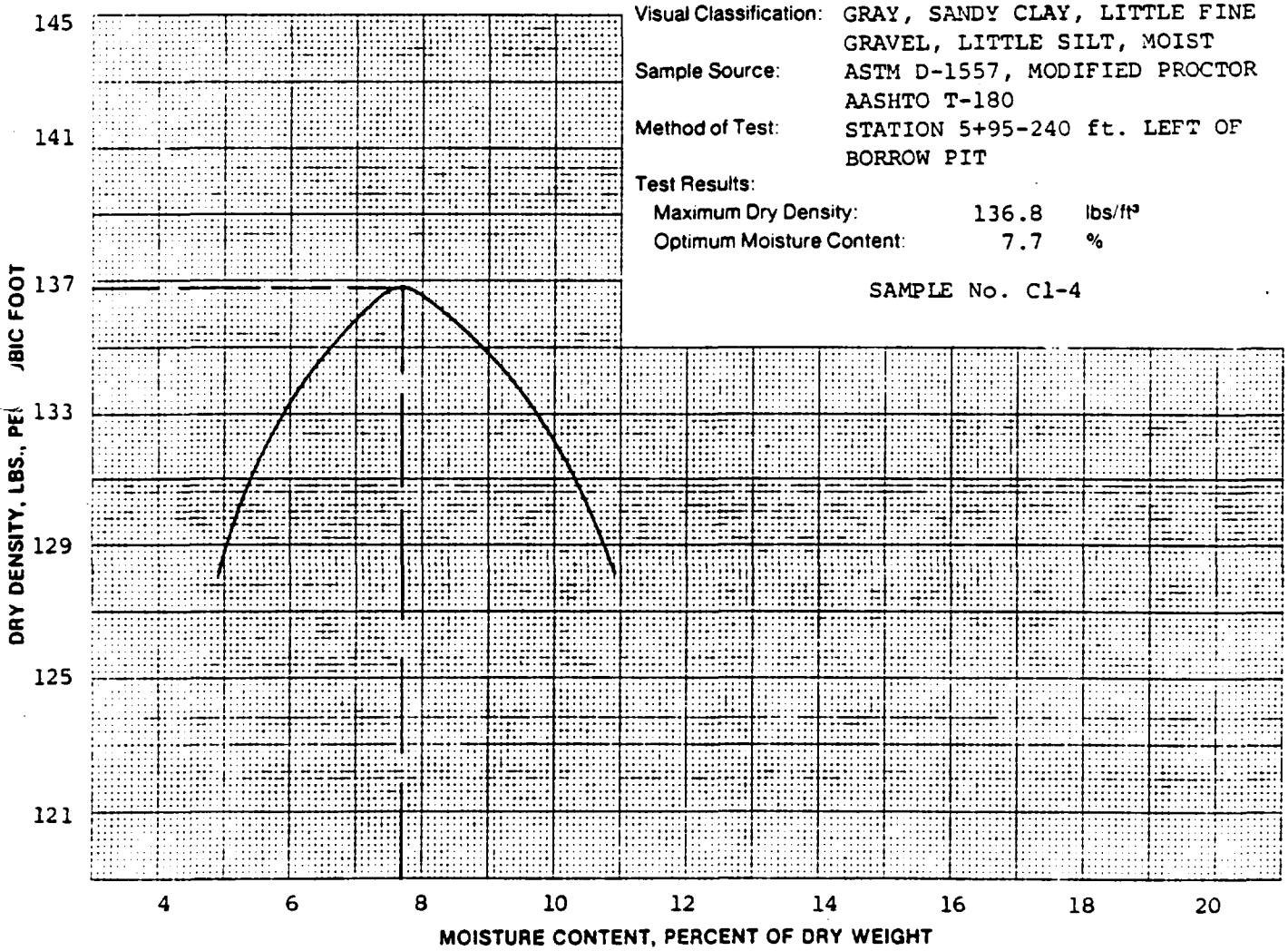
Sample Source: ASTM D-1557, MODIFIED PROCTOR AASHTO T-180

Method of Test: STATION 5+95-240 ft. LEFT OF BORROW PIT

Test Results:

Maximum Dry Density:	136.8	lbs/ft³
Optimum Moisture Content:	7.7	%

SAMPLE No. C1-4



Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JUNE 13, 1983 OUR REPORT NO: 408-30029-21 PAGE 7 of 7

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	6-13-83	-1	C1-4	136.8	11.0%	131.5	96.1	B-1
2	6-13-83	-3	C1-4	136.8	11.8%	133.2	97.4	B-1
3	6-13-83	-9	C1-4	136.8	12.4%	130.7	95.6	B-1

TEST LOCATION: WORKING PLATFORM

1	Station 29+50
2	Station 31+50
3	Station 33+00

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JUNE 14, 1983

OUR REPORT NO: 408-30029-22 PAGE 2 of 3

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	6-14-83	-1	C1-4	136.8	9.7%	135.5	99.0	AC-1
2	6-14-83	-3	C1-4	136.8	8.5%	135.0	98.7	AC-1
3	6-14-83	-9	C1-4	136.8	11.3%	135.2	98.9	AC-1
4	6-14-83	-0.5	C1-4	136.8	9.7%	134.5	98.3	A-1
5	6-14-83	-0.5	C1-4	136.8	9.8%	135.7	99.2	A-1
6	6-14-83	-2.5	C1-4	136.8	8.4%	137.0	100+	A-1

TEST LOCATION: WORKING PLATFORM

1	Retest of test #1 of 6-13-83 (REPORT No. 408-30029-21)
2	Retest of test #2 of 6-13-83 (REPORT No. 408-30029-21)
3	Retest of test #3 of 6-13-83 (REPORT No. 408-30029-21)
4	Station 29+00
5	Station 30+50
6	Station 32+00

REMARKS:

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5 SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUS, MICHIGAN
PHASE I & II-PROJECT No. 1185

TE: JUNE 14, 1983 OUR REPORT NO: 408-30029-22

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
7	6-14-83	-8.5	C1-4	136.8	7.8%	136.5	99.8	A-1
8	6-14-83	GRADE	C1-4	136.8	7.2%	135.2	98.9	A-1
9	6-14-83	GRADE	C1-4	136.8	9.9%	134.2	98.1	A-1
10	6-14-83	-2.0	C1-4	136.8	7.8%	135.0	98.7	A-1
11	6-14-83	-8.0	C1-4	136.8	8.4%	135.7	99.2	A-1
12	6-14-83	-7.0	C1-4	136.8	8.9%	134.5	98.3	A-1

ST LOCATION: WORKING PLATFORM

7	Station 33+00
8	Station 29+00
9	Station 30+00
10	Station 31+50
11	Station 33+00
12	Station 32+50

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUS, MICHIGAN
PHASE I & II-PROJECT No. 1185

ATE: JUNE 14, 1983

OUR REPORT NO.: 408-30029-23

TEST DATA:

TEST NO.	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
7	6-14-83	-8.5	C1-4	136.8	7.8%	136.5	99.8	A-1
8	6-14-83	GRADE	C1-4	136.8	7.2%	135.2	98.9	A-1
9	6-14-83	GRADE	C1-4	136.8	9.9%	134.2	98.1	A-1
10	6-14-83	-2.0	C1-4	136.8	7.8%	135.0	98.7	A-1
11	6-14-83	-8.0	C1-4	136.8	8.4%	135.7	99.2	A-1
12	6-14-83	-7.0	C1-4	136.8	8.9%	134.5	98.3	A-1

TEST LOCATION: WORKING PLATFORM

7	Station 33+00
8	Station 29+00
9	Station 30+00
10	Station 31+50
11	Station 33+00
12	Station 32+50

REMARKS:

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

ATE: JUNE 15, 1983

OUR REPORT NO.: 408-30029-23

TEST DATA:

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	N PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	6-15-83	-6.5	C1-4	136.8	7.0%	137.5	100+	A-1
2	6-15-83	-2.0	C1-4	136.8	7.3%	137.0	100+	A-1
3	6-15-83	-5.0	C1-4	136.8	8.6%	134.5	98.3	A-1
4	6-15-83	-7.0	C1-4	136.8	7.7%	136.5	99.8	A-1
5	6-15-83	-6.0	C1-4	136.8	9.4%	135.7	99.2	A-1
6	6-15-83	-4.5	C1-4	136.8	9.7%	134.5	98.3	A-1

TEST LOCATION: WORKING PLATFORM

1	Station 32+50
2	Station 32+00
3	Station 32+50
4	Station 33+00
5	Station 33+00
6	Station 32+50

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JUNE 16, 1983

OUR REPORT NO.: 408-30029-24

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	6-16-83	-5.5	C1-4	136.8	7.4%	135.5	99.0	A-1
2	6-16-83	-4.0	C1-4	136.8	8.1%	135.0	98.7	A-1
3	6-16-83	-3.5	C1-4	136.8	7.7%	135.2	98.9	A-1
4	6-16-83	-5.0	C1-4	136.8	7.2%	135.7	99.2	A-1
5	6-16-83	-3.0	C1-4	136.8	8.4%	136.5	99.8	A-1
6	6-16-83	-4.5	C1-4	136.8	8.9%	134.5	98.3	A-1

TEST LOCATION: WORKING PLATFORM

1	Station 33+00
2	Station 32+50
3	Station 32+50
4	Station 33+00
5	Station 32+50
6	Station 33+00

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHIGNTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

ATE: JUNE 20, 1983 OUR REPORT NO.: 408-30029-28

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	6-20-83	-2.5	C1-4	136.8	8.0%	134.5	98.3	A-1
2	6-20-83	-1.5	C1-4	136.8	7.5%	135.0	98.7	A-1
3	6-20-83	-1.0	C1-4	136.8	8.2%	134.2	98.1	A-1
4	6-20-83	-2.0	C1-4	136.8	7.8%	135.7	99.2	A-1

EST LOCATION: WORKING PLATFORM

1	Station 33+00
2	Station 32+50
3	Station 32+50
4	Station 33+00

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JUNE 21, 1983

OUR REPORT NO.: 408-30029-29 PAGE 2 of 4

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	6-21-83	-1.5	C1-4	136.8	9.9%	134.2	98.1	A-1
2	6-21-83	-0.5	C1-4	136.8	9.0%	135.7	99.2	A-1
3	6-21-83	-1.0	C1-4	136.8	8.8%	136.5	99.8	A-1
4	6-21-83	GRADE	C1-4	136.8	9.5%	134.2	98.1	A-1
5	6-21-83	-0.5	C1-4	136.8	9.3%	135.0	98.7	A-1
6	6-21-83	GRADE	C1-4	136.8	8.5%	135.5	99.0	A-1

TEST LOCATION: WORKING PLATFORM

1	Station 33+00
2	Station 32+50
3	Station 33+00
4	Station 32+50
5	Station 33+00
6	Station 33+00

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

2605 North Grand River Avenue • Lansing, MI 48906 • Phone: 517/321-1324

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JUNE 21, 1983 OUR REPORT NO.: 408-30029-29

TEST DATA: ABOVE GRADE

TEST NO	DATE	DEPTH / ELEV	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
7	6-21-83	+1	Cl-4	136.8	8.3%	114.0	83.3	B-1
8	6-21-83	+2	Cl-4	136.8	11.3%	115.5	84.4	B-1
9	6-21-83	+1	Cl-4	136.8	9.0%	122.0	89.2	B-1
10	6-21-83	+1	Cl-4	136.8	9.9%	128.2	93.8	AC-1
11	6-21-83	+2	Cl-4	136.8	10.5%	130.7	95.9	AC-1
12	6-21-83	+1	Cl-4	136.8	9.9%	123.7	90.5	AC-1

TEST LOCATION: WORKING PLATFORM BERM

7	Station 30+50
8	Station 30+50
9	Station 33+22
10	Retest of Test #7
11	Retest of Test #8
12	Retest of Test #9

REMARKS:

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JUNE 29, 1983

OUR REPORT NO.: 408-30029-35

TEST DATA:

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	6-29-83	GRADE	C1-4	136.8	7.1%	136.7	100	A1
2	6-29-83	GRADE	C1-4	136.8	9.4%	135.8	99.2	A1
3	6-29-83	GRADE	C1-4	136.8	6.3%	136.0	99.4	A1
4	6-29-83	GRADE	C1-4	136.8	8.8%	128.0	93.6	B1
5	6-29-83	GRADE	C1-4	136.8	9.2%	130.5	95.4	B1
6	6-29-83	GRADE	C1-4	136.8	7.2%	135.3	98.9	A1

TEST LOCATION: WORKING PLATFORM

1	Station 12+00
2	Station 13+50
3	Station 15+00
4	Station 16+25
5	Station 18+25
6	Station 19+50

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JUNE 29, 1983

OUR REPORT NO.: 408-30029-35 PAGE 3 of 3

TEST DATA:

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
7	6-29-83	GRADE	C1-4	136.8	7.1%	134.5	98.3	A1
8	6-29-83	GRADE	C1-4	136.8	7.1%	136.0	99.4	A1

TEST LOCATION: WORKING PLATFORM

7	Station 9+50
8	Station 8+50

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 5, 1983 OUR REPORT NO. 408-30029-38

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	7-5-83	-1.3'	C1-4	136.8	8.0%	135.8	99.2	A-1
2	7-5-83	-0.7'	C1-4	136.8	7.7%	134.5	98.3	A-1
3	7-5-83	-1.3'	C1-4	136.8	7.5%	136.0	99.4	A-1
4	7-5-83	-1.3'	C1-4	136.8	9.6%	134.2	98.1	A-1
5	7-5-83	-0.7'	C1-4	136.8	8.8%	136.0	99.4	A-1
6	7-5-83	-1.3'	C1-4	136.8	7.1%	136.2	99.6	A-1

TEST LOCATION: WORKING PLATFORM

1	Station 9+00
2	Station 9+00
3	Station 11+00
4	Station 13+50
5	Station 13+50
6	Station 15+50

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 5, 1983

OUR REPORT NO: 408-30029-38

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
7	7-5-83	-1.3'	Cl-4	136.8	9.8%	134.5	98.3	A-1
8	7-5-83	-0.7'	Cl-4	136.8	9.2%	135.8	99.2	A-1
9	7-5-83	GRADE	Cl-4	136.8	7.9%	136.2	99.6	AC-1
10	7-5-83	-1.3'	Cl-4	136.8	8.4%	134.0	98.0	A-1
11	7-5-83	GRADE	Cl-4	136.8	8.9%	133.3	96.1	BC-1

TEST LOCATION: WORKING PLATFORM

7	Station 18+25
8	Station 18+25
9	Station 18+25 (Retest of Test No. 5 of 6-29-83)
10	Station 20+00
11	Station 16+25 (Retest of Test No. 4 of 6-29-83)

REMARKS:

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 6, 1983

OUR REPORT NO.: 408-30029-39 PAGE 2 of 3

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	7-6-83	-1.3'	C1-4	136.8	7.5%	132.5	94.6	B-1
2	7-6-83	GRADE	C1-4	136.8	7.7%	135.5	99.0	A-1
3	7-6-83	-0.7'	C1-4	136.8	9.5%	134.7	96.3	B-1
4	7-6-83	-1.3'	C1-4	136.8	7.8%	132.2	94.4	B-1
5	7-6-83	-0.7'	C1-4	136.8	7.1%	135.0	98.7	A-1
6	7-6-83	GRADE	C1-4	136.8	6.9%	138.0	100+	A-1

TEST LOCATION: WORKING PLATFORM

1	Station 6+40
2	Station 6+40
3	Station 6+40
4	Station 4+05
5	Station 4+05
6	Station 4+05

REMARKS:

NOTES: DENSITIES SHOWN Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 6, 1983 OUR REPORT NO.: 408-30029-39 PAGE 3 of 3

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
7	7-6-83	-1.3'	C1-4	136.8	6.7%	134.5	98.3	A-1
8	7-6-83	GRADE	C1-4	136.8	7.3%	137.3	100+	A-1
9	7-6-83	-0.7'	C1-4	136.8	6.5%	136.2	99.6	A-1
10	7-6-83	GRADE	C1-4	136.8	7.0%	137.0	100+	AC-1
11	7-6-83	-0.7'	C1-4	136.8	6.8%	137.5	100+	AC-1
12	7-6-83	-1.3'	C1-4	136.8	6.7%	136.0	99.4	AC-1

TEST LOCATION: WORKING PLATFORM

7	Station 5+15
8	Station 5+15
9	Station 5+15
10	Retest of Test No. 3
11	Retest of Test No. 4
12	Retest of Test No. 1

REMARKS:

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D MOISTURE IN EXCESS OF SPECIFICATIONS
E MOISTURE BELOW SPECIFICATIONS

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 8, 1983 OUR REPORT NO: 408-30029-41

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	7-8-83	-1.3'	C1-4	136.8	6.7%	134.5	98.3	A-1
2	7-8-83	GRADE	C1-4	136.8	6.8%	137.0	100+	A-1
3	7-8-83	-0.7'	C1-4	136.8	7.2%	136.0	99.4	A-1
4	7-8-83	-1.3'	C1-4	136.8	7.9%	133.5	97.6	B-1
5	7-8-83	GRADE	C1-4	136.8	7.2%	138.0	100+	A-1
6	7-8-83	-0.7'	C1-4	136.8	7.5%	136.2	99.6	A-1

TEST LOCATION: WORKING PLATFORM

1	Station 24+25
2	Station 24+25
3	Station 24+25
4	Station 22+75
5	Station 22+75
6	Station 22+75

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 8, 1983

OUR REPORT NO.: 408-30029-41

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
7	7-8-83	-1.3'	C1-4	136.8	8.2%	131.8	96.3	B-1
8	7-8-83	-0.7'	C1-4	136.8	8.3%	134.7	98.5	A-1
9	7-8-83	GRADE	C1-4	136.8	7.4%	135.5	99.0	A-1
10	7-8-83	-1'	G2-5	115.0	4.3%	109.3	95.0	A-1
11	7-8-83	-1'	G2-5	115.0	3.4%	109.3	95.0	A-1
12	7-8-83	GRADE	G2-5	115.0	3.4%	109.8	95.4	A-1

TEST LOCATION:

7	Working Platform: Station 21+25
8	Working Platform: Station 21+25
9	Working Platform: Station 21+25
10	Internal Collection System Laterals: 150-ft. West of MHS-14
11	Internal Collection System Laterals: 250-ft. West of MHS-14
12	Internal Collection System Laterals: 370-ft. West of MHS-14

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 11, 1983 OUR REPORT NO.: 408-30029-42

TEST DATA:

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	7-11-83	-1.3'	Cl-4	136.8	8.1%	135.0	98.7	AC-1
2	7-11-83	-1.3'	Cl-4	136.8	7.9%	135.8	99.2	AC-1

TEST LOCATION:

1	Retest of Test No. 4, taken 7-8-83 (Report No. 408-30029-41)
1	Retest of Test No. 7, taken 7-8-83 (Report No. 408-30029-41)

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF MOISTURE DENSITY RELATIONSHIP OF SOIL

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 11, 1983

OUR REPORT NO.: 408-30029-42 PAGE 9 of 9

TEST DATA

Visual Classification: Gray Sandy Clay, with little Silt and Fine Gravel

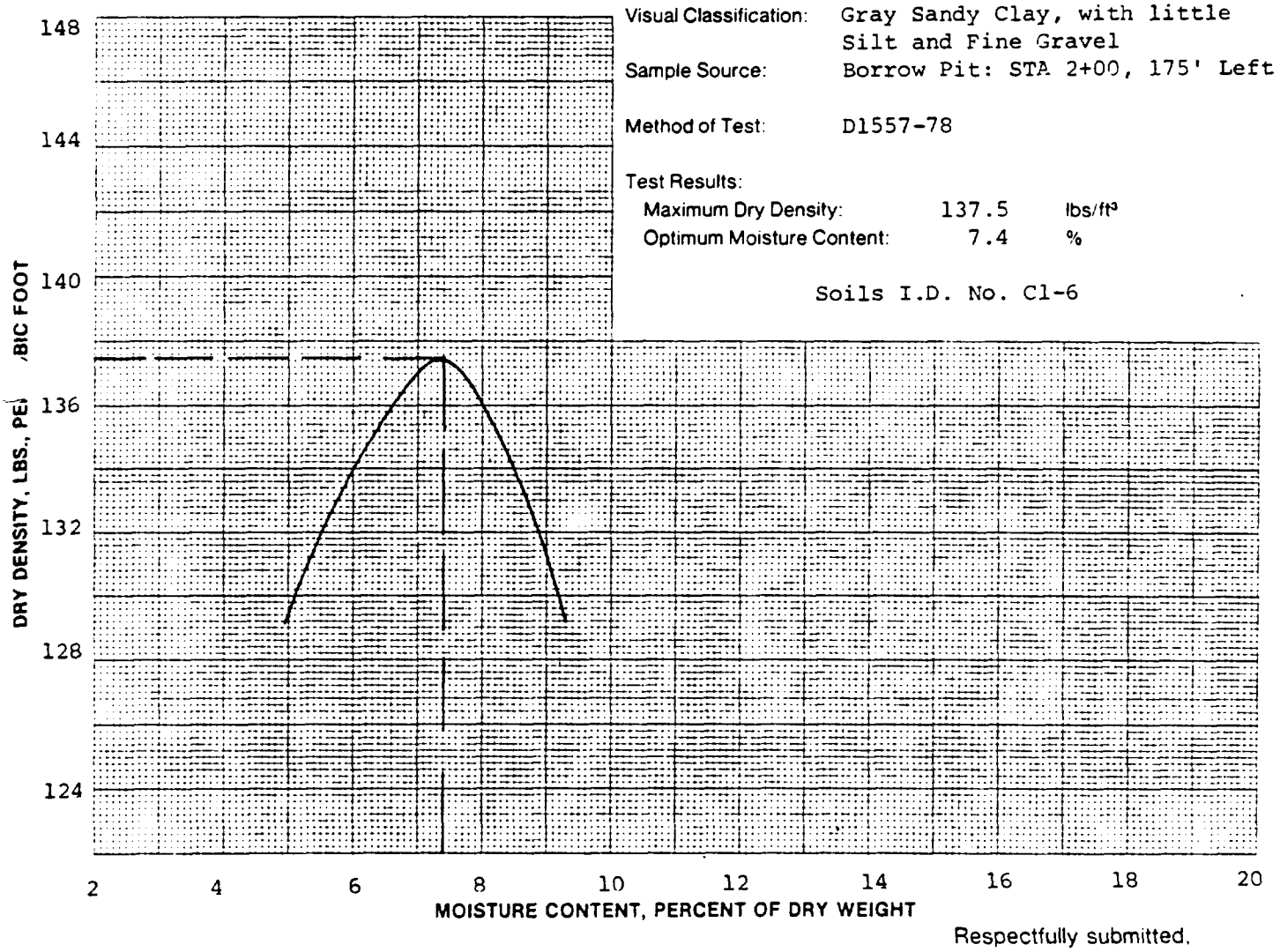
Sample Source: Borrow Pit: STA 2+00, 175' Left

Method of Test: D1557-78

Test Results:

Maximum Dry Density:	137.5	lbs/ft³
Optimum Moisture Content:	7.4	%

Soils I.D. No. C1-6



Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 25, 1983 OUR REPORT NO.: 408-30029-52

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	7-25-83	-1.3'	C1-6	137.5	9.8%	134.7	98.0	A-1
2	7-25-83	GRADE	C1-6	137.5	7.6%	134.7	98.0	A-1
3	7-25-83	-1.3'	C1-6	137.5	9.3%	135.3	98.4	A-1
4	7-25-83	GRADE	C1-6	137.5	7.6%	137.0	99.6	A-1
5	7-25-83	-0.7'	C1-6	137.5	8.0%	136.5	99.3	A-1
6	7-25-83	GRADE	C1-6	137.5	6.6%	135.8	98.7	A-1

TEST LOCATION: WORKING PLATFORM

1	Station 1+80
2	Station 1+80
3	Station 72+50
4	Station 72+50
5	Station 72+50
6	Station 70+00

REMARKS:

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 25, 1983 OUR REPORT NO.: 408-30029-52

TEST DATA: BELOW GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
7	7-25-83	GRADE	C1-6	137.5	6.3%	138.0	100+	A-1
8	7-25-83	-0.7'	C1-6	137.5	6.9%	137.5	100.0	A-1
9	7-25-83	-1.3'	C1-6	137.5	6.6%	135.5	98.5	A-1
10	7-25-83	GRADE	C1-6	137.5	6.9%	138.2	100+	A-1
11	7-25-83	GRADE	C1-6	137.5	7.2%	137.0	99.6	A-1
12	7-25-83	-0.7'	C1-6	137.5	7.5%	136.2	99.1	A-1

TEST LOCATION: WORKING PLATFORM

7	Station 70+00
8	Station 70+00
9	Station 67+50
10	Station 67+50
11	Station 65+00
12	Station 65+00

REMARKS:

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 25, 1983

OUR REPORT NO.: 408-30029-52

TEST DATA: ABOVE GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
13	7-25-83	BELOW GRADE -1.3	Cl-6	137.5	9.1%	134.7	98.0	A-1
14	7-25-83	+1'	Cl-6	137.5	7.2%	130.0	94.5	A-1
15	7-25-83	+2'	Cl-6	137.5	6.9%	131.5	95.6	A-1
16	7-25-83	+2'	Cl-6	137.5	6.8%	132.7	96.5	A-1
17	7-25-83	+1'	Cl-6	137.5	7.5%	128.0	93.1	A-1
18	7-25-83	+1'	Cl-6	137.5	8.4%	125.0	90.9	A-1

TEST LOCATION:

13	Working Platform : Station 65+00
14	Working Platform Berm: Station 65+00
15	Working Platform Berm: Station 65+00
16	Working platform Berm: Station 70+00
17	Working platform Berm: Station 70+00
18	Working platform Berm: Station 3+00

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL
701 W. WASHINGTON
ST. LOUIS, MI 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II-PROJECT No. 1185

DATE: JULY 25, 1983

OUR REPORT NO. 408-30029-52 PAGE 5 of 5

TEST DATA: ABOVE GRADE

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
19	7-25-83	+2'	C1-6	137.5	8.0%	127.3	92.5	A-1

TEST LOCATION:

19	Working Platfrom Berm: Station 3+00

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL CHEMICAL CORPORATION
701 W. WASHINGTON STREET
ST. LOUIS, MICHIGAN 48880

PROJECT: SECUREMENT OF ST. LOUIS PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II, PROJECT NO. 1185

DATE: August 6, 1983

OUR REPORT NO.: 408-30029-62

TEST DATA:

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	8/6/83	-0.3'	C1-6	137.5	7.3	138.25	100+	A-1
2	8/6/83	-1.0'	C1-6	137.5	6.6	136.0	98.9	A-1

TEST LOCATION: WORKING PLATFORM

1	Station 61+50
2	Station 61+50

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

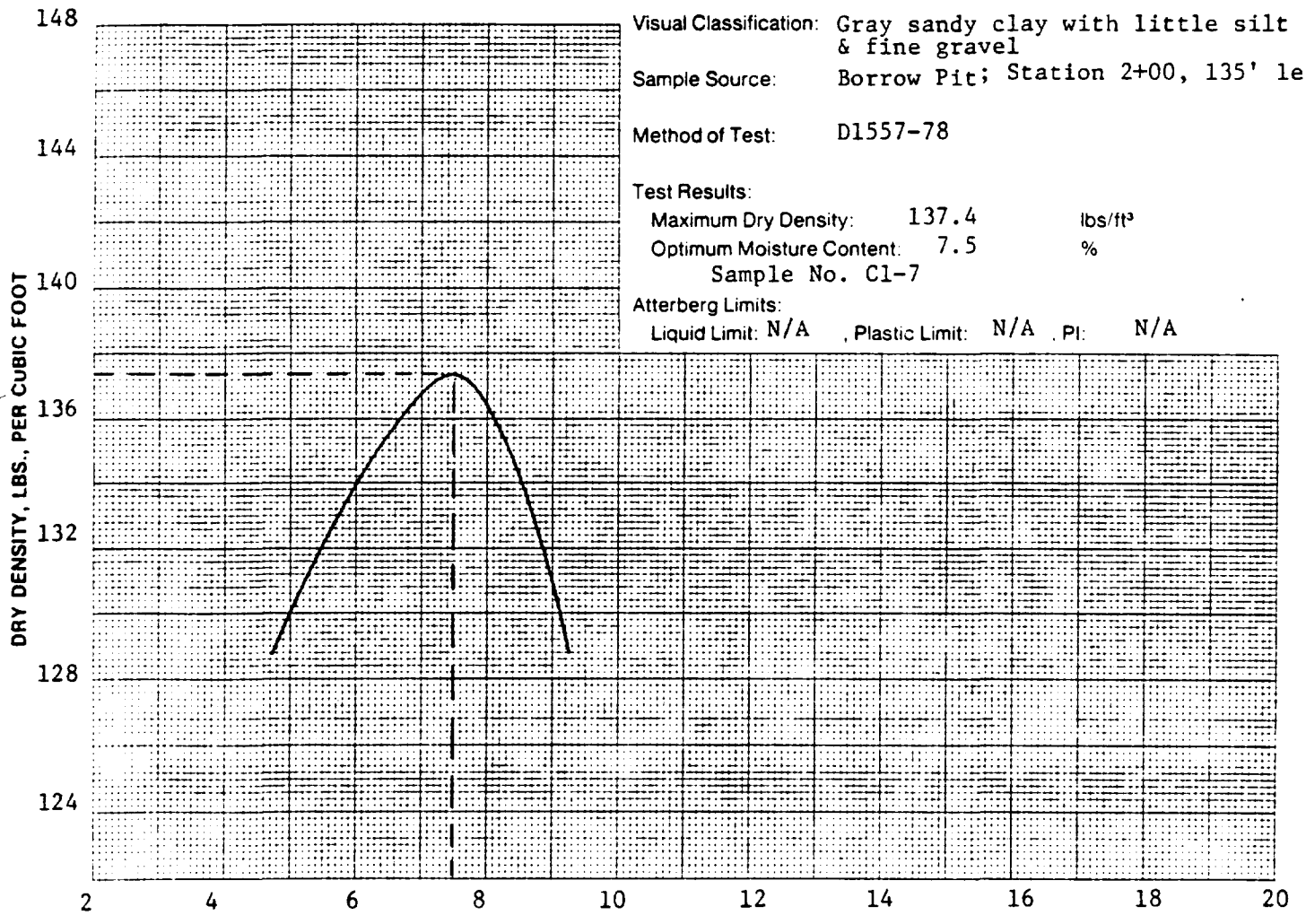
REPORT OF MOISTURE DENSITY RELATIONSHIP OF SOIL

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL CHEMICAL CORPORATION
701 W. WASHINGTON STREET
ST. LOUIS, MICHIGAN 48880

PROJECT: SECUREMENT OF PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II, PROJECT NO. 1185

DATE: August 8, 1983 OUR REPORT NO.: 408-30029-64

TEST DATA



Visual Classification: Gray sandy clay with little silt & fine gravel

Sample Source: Borrow Pit; Station 2+00, 135' left

Method of Test: D1557-78

Test Results:
Maximum Dry Density: 137.4 lbs/ft³
Optimum Moisture Content: 7.5 %
Sample No. C1-7

Atterberg Limits:
Liquid Limit: N/A , Plastic Limit: N/A , PI: N/A

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL CHEMICAL CORPORATION
701 W. WASHINGTON STREET
ST. LOUIS, MICHIGAN 48880

PROJECT: SECUREMENT OF ST. LOUIS PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II, PROJECT NO. 1185

DATE: August 11, 1983 OUR REPORT NO.: 408-30029-67

TEST DATA:

TEST NO	DATE	ELEV. / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	8/11/83	GRADE	C1-7	137.4	7.1	137.8	100+	A-1
2	8/11/83	-0.7'	C1-7	137.4	6.7	136.3	99.2	A-1
3	8/11/83	-1.3'	C107	137.4	7.5	137.0	99.7	A-1

TEST LOCATION: WORKING PLATFORM

1	Station 55+00
2	Station 55+00
3	Station 55+00

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL CHEMICAL CORPORATION
701 W. WASHINGTON STREET
ST. LOUIS, MICHIGAN 48880

PROJECT: SECUREMENT OF ST. LOUIS PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II, PROJECT NO. 1185

DATE: August 15, 1983

OUR REPORT NO.: 408-30029-69

TEST DATA:

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	8/15/83	GRADE	C1-7	137.4	7.2	138.5	100+	A-1
2	8/15/83	-1'	C1-7	137.4	6.9	138.0	100+	A-1
3	8/15/83	GRADE	C1-7	137.4	8.4	139.8	100+	A-1
4	8/15/83	-1'	C1-7	137.4	8.3	135.3	98.5	A-1

TEST LOCATION: WORKING PLATFORM

1	Station 49+00
2	Station 49+00
3	Station 45+00
4	Station 45+00

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF MOISTURE DENSITY RELATIONSHIP OF SOIL

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD.
C/O VELSICOL CHEMICAL CORPORATION
701 W. WASHINGTON STREET
ST. LOUIS, MICHIGAN 48880

PROJECT: SECUREMENT OF ST. LOUIS PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II, PROJECT NO. 1185

DATE: August 16, 1983

OUR REPORT NO.: 408-30029-70

TEST DATA

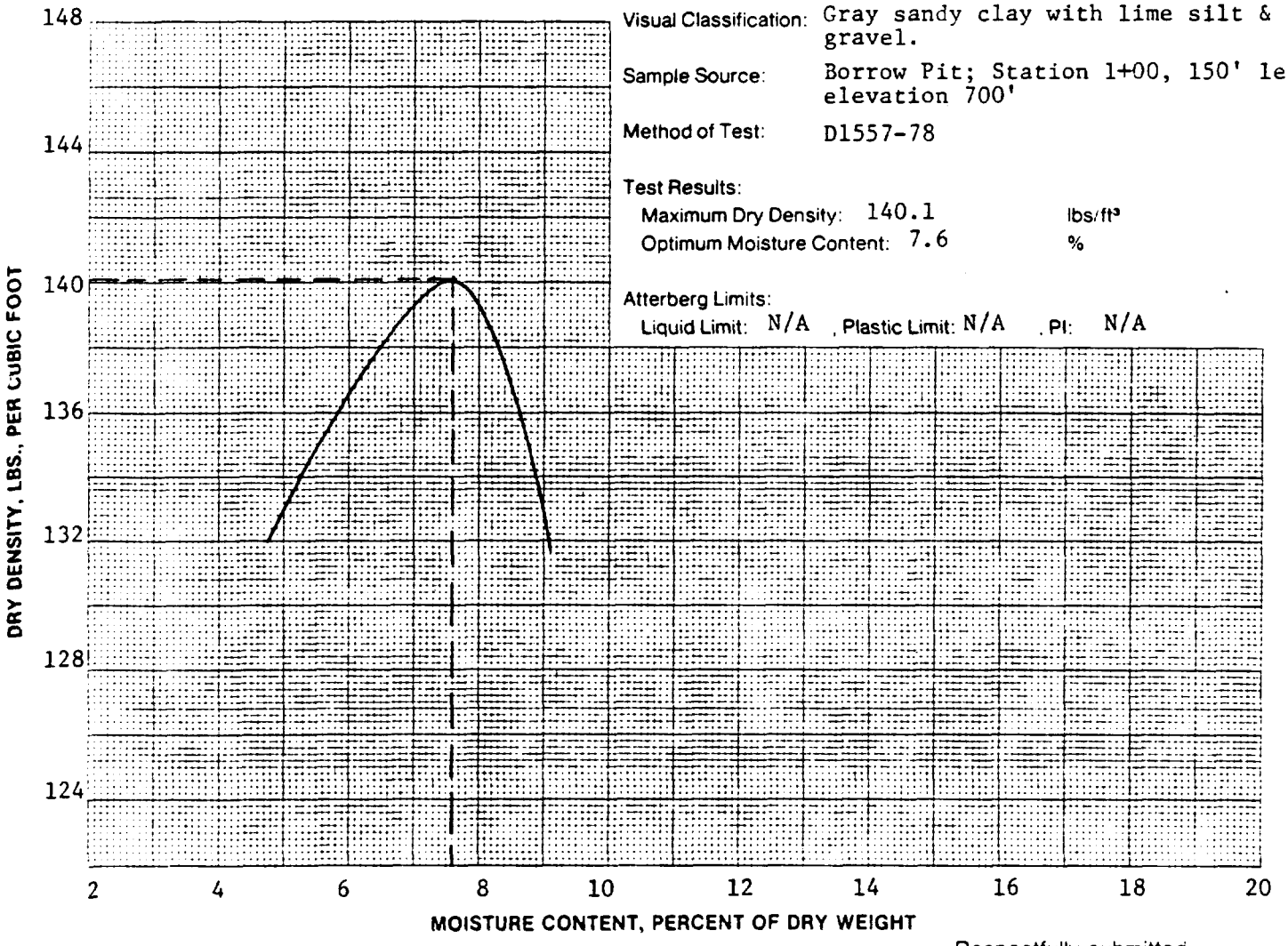
Visual Classification: Gray sandy clay with lime silt & gravel.

Sample Source: Borrow Pit; Station 1+00, 150' left elevation 700'

Method of Test: D1557-78

Test Results:
Maximum Dry Density: 140.1 lbs/ft³
Optimum Moisture Content: 7.6 %

Atterberg Limits:
Liquid Limit: N/A , Plastic Limit: N/A , PI: N/A



Respectfully submitted,
Professional Service Industries, Inc.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

REPORT OF FIELD COMPACTION TESTS

TESTED FOR: CONESTOGA-ROVERS & ASSOC., LTD
C/O VELSICOL CHEMICAL CORPORATION
701 W. WASHINGTON STREET
ST. LOUIS, MICHIGAN 48880

PROJECT: SECUREMENT OF ST. LOUIS PLANT SITE
ST. LOUIS, MICHIGAN
PHASE I & II, PROJECT NO. 1185

DATE: August 24, 1983 OUR REPORT NO: 408-30029-77

TEST DATA:

TEST NO	DATE	ELEV / DEPTH	SOIL ID NUMBER	MAXIMUM LAB DRY DENSITY	WATER CONTENT	IN PLACE DRY DENSITY	PER CENT COMPACTION	COMMENT *
1	8/24/83	GRADE	C1-8	140.1	6.6	142.0	100+	A-1
2	8/24/83	-1'	C1-8	140.1	7.8	140.5	100+	A-1
3	8/24/83	GRADE	C1-8	140.1	7.9	138.5	98.9	A-1
4	8/24/83	-1'	C1-8	140.1	10.8	137.3	98.0	AD-1
5	8/24/83	GRADE	C1-8	140.1	7.2	139.8	99.8	A-1
6	8/24/83	-1'	C1-8	140.1	8.0	138.0	98.5	A-1

TEST LOCATION: WORKING PLATFORM

1	STATION 41+25
2	STATION 41+25
3	STATION 39+25
4	STATION 39+25
5	STATION 37+00
6	STATION 37+00

REMARKS:

NOTES: DENSITIES SHOWN: Lbs. per cubic foot

WATER CONTENT: Per Cent of dry weight

PERCENT COMPACTION: Based on maximum dry density obtained on sample indicated by soil ID number.

* 1. FILL MATERIAL
2. BACKFILL
3. BASE COURSE
4. SUBBASE
5. SOIL CEMENT
6. OTHER

A. TEST RESULTS COMPLY WITH SPECIFICATIONS
B. RECOMPACTION REQUIRED
C. TEST IS AFTER RECOMPACTION
D. MOISTURE IN EXCESS OF SPECIFICATIONS
E. MOISTURE BELOW SPECIFICATIONS

Respectfully submitted,
Professional Service Industries, Inc.

APPENDIX D

KEY AND TOTAL DEPTH

VERIFICATION LOG

1217 UGW (36)

June 22, 83. 1

LOC	BS	HI	IFS	FS	ELEV
Bm @	Top of concrete		ST 0+70 o/s 4.00 L		730.71
	6.15	(736.86)	(36.9)		
ST 33+32			ST 1+70 o/s 6.48 (4)		
S			0' (Deep)		732.1
T.o.C.					
B.o.T.			0 (Deep)		
ST 33+12			(1)		
S			4.45		732.41
T.o.C.			23.3		713.56
~~B.o.T.~~			~~24.9~~		
~~B.o.T.~~			~~25.3~~		
B.o.T.			26.3		
ST 32+92					
~~S. T.o.C.~~			22.5		714.36
T.o.C. S			4.4		732.16
B.o.T.			25.5		

(1) FOR PAYMENT, ADD 4' TO DEPTH FOR WT ON TAPE

1217 UGW (37)

June 22, 83 2

LOC	BS	HI	IFS	FS	ELEV
ST 32+72					
S			4.47		732.39
T.o.C.			21.55		715.31
B.o.T.			See 230683		

ADDITIONAL NOTES FROM DIARY

	DEPTH (BOT)	
33+32	0	732.1
33+28	16	716.1
33+22	18	714.1

(MEASURED IN FIELD WITH TAPE)

1217 UGW
June 23, 83 Page 1 (30)

LOC	BS	HI	IFS	FS	ELEV
Bm @ Top of Concrete			ST 0+70 @		400ft
					730.71
	6.04	736.75			
				36.8	
ST 32+72					
BoT			25.1		711.65
ST 32+52					
S			4.34		732.41
ToC			23.0		713.65
~~BoT~~					
BM @ Top of Concrete			ST 0+70 @		400ft
					730.71
	4.88	735.59			
ST 32+52				→ B.M.	~~712.19~~
~~BoT~~			~~23.4~~		~~25.4~~
BoT			25.2		710.39
ST 32+32				→ B.M.	
S			3.41		
ToC			21.87		713.72
BoT			25.1		710.19

1217 UGW
June 23, 83 Page 2 (29)

LOC	BS	HI	IFS	FS	ELEV
ST 32+12					
S			3.30		733.45
ToC			15.75		718.00
~~BoT~~			~~21.01~~		
BOT			24.12		712.63
ST ~~31+92~~					
~~S~~			~~3.15~~		
~~ToC~~			~~12.95~~		
~~BoT~~					
Bm @ Top of Concrete			ST 0+70 @		400ft
					730.71
	4.92	736.63			
ST 31+72					
S			3.45		733.18
~~ToE~~			~~12.95~~		
~~BoT~~ ToC			15.70		720.93
BoT			24.83		

1217 NGW (40)
June 24, 83

LOC	BS	HI	IFS	FS	ELEV
BM @ Top of Concrete	4.48	735.19		ST 0+70 ds 400 ft	730.71
ST 31+92		→		D.M.	
BOT			21.50		713.69
ST 31+72					
S			3.25		731.94
TOC			16.31		718.88
BOT			19.70		715.49
				D.M.	
ST 31+52					
S			3.51		731.68
TOC			13.58		721.61
BOT			18.89	D.M.	[illegible]
ST 31+32					
S			3.82		731.37
TOC			13.50		721.69
BOT			18.25	D.M.	716.94
ST 31+12					
S			4.16		731.03
TOC			17.73		717.46
BOT			20.91	D.M.	714.28

1217 UGW (41)
062483

LOC	BS	HI	IFS	FS	ELEV
Bm @ T. of C.	5.12	ST	735.83	0+70 ds 400 ft	730.71
ST 30+92					
S			4.82		731.01
TOC			16.34		719.49
BOT			21.24	D.M.	714.59
ST 30+72					
S			4.82		731.01
TOC			13.89		721.94
BOT			20.10	D.M.	715.73
STA 30+52					
S			4.40		731.43
TOC			14.24		720.89
BOT			17.98	D.M.	717.15
ST 30+38			~~4.46~~		
S			4.46		731.37
TOC			11.66		724.17
BOT			20.1	D.M.	715.73

1217 N.W.
062485

(42)

LOC	BS	HI	IFS	FS	ELEV
			(35.8)		
ST 30+30					
S			3.61		
~~ToC~~					
BoT			19.56		
ST ~~30+105~~ 30+10					
			3.78		732.05
[illegible]			13.36		722.47
[illegible]			17.80	D.M.	718.03
~~ST 29+90~~					
~~[illegible] Top [illegible] [illegible]~~					
BM	Peg @ 400	ST 738.08	0+70	℄	734.08
			(38.1)		
ST 29+90					
S			[illegible].02		732.[illegible]
ToC			16.25		721.63
BoT			18.86	D.M.	719.[illegible]

1217 N.W.
062483

(43)

Page 4

Loc	BS	HI	IFS	FS	Elev.
STA ~~29+90~~ 29+70					
S			6.55		731.5
ToC			17.70		
BoT			20.7		
ST ~~29+70~~ 29+50					
S			6.8		
ToC			16.75		
BoT			21.08		
ST ~~29+50~~ 29+30					
S			~~6.60~~ ~~17.7~~ 6.68		
ToC			17.7		
BOT			20.86 D.M.		

U.G.W. (AA)

June 27, 1983 Page 1

Loc	BS	HI	IFS	FS	Elev
UM @ STA 0+70					~~738.08~~ 734.08 (KE 270683)
	4.27	~~733.81~~ 739.35			
			(38.4)		
STA 27+10					
S			6.65		~~727.16~~
TOC			16.80		~~717.01~~
BOT			19.90	D.M.	~~713.11~~
STA 27+90					
S			6.31		732.1 ~~727.10~~
TOC			14.48		~~717.62~~
BOT			20.64	D.M.	~~713.47~~
STA 28+70					
S			6.62		731.8 ~~727.19~~
TOC			16.08		~~717.73~~
BOT			19.93	D.M.	~~713.83~~
STA 28+50					
S			6.06		~~727.75~~
TOC			16.22		~~717.59~~
BOT			19.22	D.M.	~~714.59~~

June 27, 1983 Page 2

Loc	BS	HI	IFS	FS	Elev
STA 28+30					
S			6.10		732.3 ~~726.11~~
TOC			16.26		~~716.55~~
BOT			19.42	A.M.	~~714.39~~
STA 28+10					
S			5.40		733.0 ~~727.49~~
TOC			16.66		~~716.15~~
BOT			19.70	A.M.	~~713.11~~
Bench check @ STA 0+90 ℄ OK					
~~STA 27+70~~					
~~S~~					
~~TOC~~					
~~BOT~~					
~~4.29~~					
~~STA 27+90~~					
S			5.29		~~728.52~~
TOC			15.92		~~717.89~~
~~BOT~~ BOT			19.22		
TOC (End)			14.96		718.85
BOT			19.55		914.26
BOT (End)			19.72		

(46)

06 27 83 Page 3

(38.1)

ST 27+50			733.1
S		5.29	
Toc		15.92	
Bot		19.55	
ST 27+20			
S			
Toc		14.96	
Bot		19.72	

(47)

PS 11.0

07 06 83 Page 1

MHS 14 to Sump 420'

Loc	BS	HI	IFS	FS	Elev
BM	1.51	732.98			731.47
100 T. Pipe			1.83		721.15
TOP			11.94		721.04
125 T.P			11.64		721.34
150 T.P			11.44		721.54
175 T.P			11.26		721.76
200 T.P			11.11		721.87
			11.06		721.92
BM		731.96			731.47
225 T.P			9.82		722.14
250 T.P			9.63		722.33

Pipe = 0.41' O.D.

D = Top of Pipe

1217
July 8, 83

(52)
4

LOC	BS	HI	IFS	FS	ELEV
415			10.76		
420			10.72		
425			10.66		
430			10.62		
435			10.56		
440			10.53		
445			10.48		
450			10.44		
455			10.39		
460			10.34		
465			10.30		
470			10.25		
475			10.20		
480			10.16		
485			10.11		
490			10.06		
495			10.02		

UGW Slurry Wall 1217 (53)
July 11, 83

LOC	BS	HI	IFS	FS	ELEV
~~BM @ 0+70~~					~~731.08~~
~~STK @ ST 4+02 ...~~					
	~~5.47~~				
	~~6.17~~	~~740.04~~			~~733.87~~
BM @ ST 0+70 ℄					
	5.92	740.00	(40.0)		734.08
STA 27+50					
S			7.60		732.40
TOC			17.42		722.58
BOT			21.38	D.M.	718.62
STA 27+38			(Note 12' section)		
S			7.12		732.88
TOC			17.12		722.88
BOT			20.38	A.M.	719.62
STA 27+18					
S			7.19		732.81
TOC			15.32		724.68
BOT			19.66	A.M.	[illegible]
STA 26+93					
S			7.10		732.90
TOC			14.14		725.86
BOT			18.22	A.M.	721.78

U.G.W. (54)
July 11, 1983 — 2

[illegible]	BS	H.I	IFS	FS	ELEV
		740.00	(40.0)		
STA	26+78				
			[illegible]		73[illegible]6
[illegible]			17.65		[illegible]2.32
[illegible]		A.M.	22.00		
ST 26+60					
S			8.0		
ToC					
BoT			22.5		
ST 26+~~80~~ 40					
S			4.35		32.7
ToC			17.30		22.7
BoT		A.M.	23.30		16.7
⊄					
CROSS	@ ST	26+60	Top 10'x10'		
			Bottom 2'x2' @		
			~~Same~~ elevation		778.5

New Slurry Wall (55)
July 12, 83 — Page 1

Loc	BS	HI	IFS	FS	ELEV
BM [illegible]	5.92	740.00			734.08
ST 26+20					
S			8.05		
ToC			17.80		
BoT	[illegible]		24.80		
ST 26+00					
S			7.92		
ToC			17.70		
BoT	DS		23.45		
ST 25+75					
S			8.15		
ToC			15.70		
BoT	DS		19.2		
St 25+50					
S			8.14		
ToC			16.05		
BoT	DS.		[illegible]		

(56)

UGW

	[illegible] 3[illegible]	[illegible] [illegible].00	[illegible]	/	
St. 25+25					
S			[illegible]		
TOC			[illegible]		
BOT		[illegible]	20.75		
[illegible]					
S			[illegible]		
TOC			15.[illegible]		
BOT		[illegible]	[illegible]		
[illegible] 24+75					
S			[illegible]		
[illegible]			[illegible]		
[illegible]		[illegible]	20.[illegible]		
[illegible]					

UGW Slurry Wall (57)
July 13, 1983 Page 1

LOC	BS	HI	IFS	FS	ELEV
BM@ 0+20 ℄					
	5.80				734.08
		739.88	(39.?)		
St 24+50					
S			8.36		
T.C			16.70		
Bot	[illegible]		21.10		
St. 24+25					
S			[illegible]		
TOC			17.75		
Bot	DS		[illegible]		
St. [illegible]+00					
S			8.70		
TOC			16.54		
Bot	DS		21.52		
[illegible]					
			8.34		
			15.54		
[illegible]	DS		19.30		

UGW
July 13, 83

(58)
Page 2

	3°.33	(39.?)		
		8.45		31.4
		18.55		721.33
14 07 83				

UGW Slurry Wall
July 14, 83

(59)
Page 1

LOC	BS	HI	IFS	FS	ELEV
STK @ 400 O/S 100 LT					733.87
	2.67	736.54		(36.5)	
ST 22+75					
~~BOT~~			~~18.95~~		~~718.59~~
B.T		TMC	19.35		717.19
ST 22+50			5.34 ETB		
S			~~5.34~~		
T.C		TMC	17.87		
B.T			20.87		
S/A ~~22+25~~ 22+26 ETB			~~5.06~~		
S			~~15.08~~ 5.06		
TOC		TMC	~~14.27~~ 15.28		
BOT			19.22		
ST ~~22+20~~ 22+22 ETB					31.38
S			5.16		
TOC			~~18.87~~ 14.17		
BOT		TMC	18.82		

UGW
July 14, 83

2 (60)

LOC	B.S	HI	IFS	FS	ELEV
~~St 22+00~~					
Stk @ 400 03 100 FT					733.87
	4.08	737.95	(38.?)		
St 22+03 ETB ~~22+00~~					
S			6.52		731.43
ToC			16.24		
BoT		TMC	~~19.25~~ 20.88		
St 21+79 ETB ~~21+75~~					
S			6.75		731.2
ToC			15.15		
BoT		TMC	19.53		
Sta 21+55 ETB ~~21+50~~			~~6.93~~		
S			~~14.91~~	6.93	731.02
TOC			14.91		
BOT		TMC	16.22		
Sta 21+31 ETB ~~21+25~~					
S			7.2		730.75
TOC			16.95		
BOT	~~TMC~~		~~[illegible]~~		

UGW
July 14, 83

3 (61)

LOC	BS	HI	IFS	FS	ELEV
STK @ 400 95' 100 FT					
	~~4.03~~ 4.08	737.95	(38.0)		
Sta 21+31 ETB ~~21+25~~					
BOT	TMC		20.44		
Sta 21+08 ETB ~~21+00~~					
S			7.24		730.71
TOC			18.18		
BOT	TMC		22.10		
Sta 20+84 ETB ~~20+75~~					
S			6.88		731.07
TOC			16.16		
BOT	TMC		19.86		
Sta 20+60 ETB ~~20+50~~					
S			6.96		730.99
TOC			12.03		
BOT	TMC		16.15		
Sta 20+36 ETB ~~20+25~~					
S			6.92		731.03
TOC			13.43		
BOT	TMC		16.46		

U.C.W. (62)

July 14, 83 4

	20113 RTB			
Sta ~~20+00~~	3.80	~~6.83~~		
S		~~5.78~~ 6.83		31.12
TOC		12.78		
BOT	TMC	16.77		
	19+89 RTB			
Sta ~~19+75~~				
S		6.85		31.1
TOC		16.40		
BOT	TMC	21.36		
	19+65 RTB			
Sta ~~19+50~~				
S		7.0		30.95
TOC	TMC	15.0		
BOT		19.1		
	19+42 RTB			
Sta ~~19+25~~		~~6.85~~		
S		6.25		31.75
TOC		15.64		22.31
BOT		15/07/83		

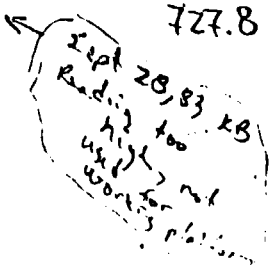
UCWS (63)

July 15, 83 1

Loc	BS	HI	IFS	FS	ELEV
STK @ 400 ob 100 LT					733.87
	2.17	736.04			
		19+18 RTB			
ST ~~19+00~~					
S			5.7		30.34
TOC			15.0		
BT			18.6		
		19+42 RTB			
ST ~~19+25~~					
~~B.T~~			~~15.60~~		~~720.41~~
B.T	D.M.		17.90		718.14
		18+94 RTB			
ST ~~17+00~~		~~18+75~~			
S			5.56		
TOC			12.80		
BOT	D.M.		16.62		
		18+70 RTB			
STA		~~18+50~~			
S			6.68		729.36
TOC			13.50		
BOT	D.M.		19.30		

Loc	BS	HI	IFS	FS	Elev
		736.04			
STA	~~18+25~~ 18+42 ETB		~~7.22~~ 7.22		
			14.25		
		D.M.	18.78		
STA	~~18+00~~ 18+23 ETB				
S			7.18		728.86
TOC			14.80		
		D.M.			
STA	~~17+75~~ 17+99 ETB				
S			7.62		728.42
TOC			15.18		
BOT		D.M.	19.12		
STA	~~17+50~~ 17+75 ETB				
			8.20		
			14.75		
		D.M.	19.30		
STA	~~17+25~~ 17+52 ETB				
S			9.20		726.8
TOC			15.92		
BT		D.M.	20.35		

Loc	BS	HI	IFS	FS	Elev
		736.04			
STA	~~17+00~~ 17+28 ETB			28' from corner	
S			8.20		727.8
TOC			16.40		
~~BT~~			~~18.22~~		
BT		D.M.	19.74		



Fence Post @ Corner of Watson & Center
3.11 728.00

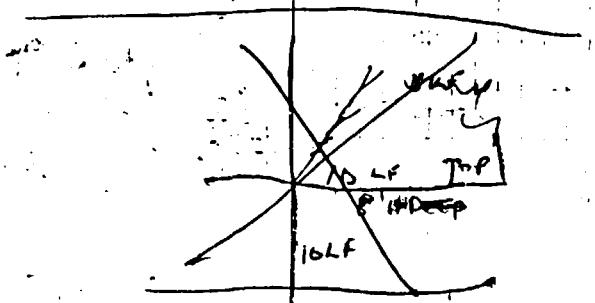
731.11

Center of 'X' 7+20

S

~~T.C~~

S.T 17.40 713.71



July 15, 1983

Loc	BS	HI	IFS	FS	ELEV
		731.11			
STA 17+00					
S			5.86		725.25
TOC			11.42		719.69
B.T		D.M.	15.58		715.53
STA	16+75				
S			6.48		724.71
T.C			11.96		719.15
B.T		D.M.	15.40		715.71
~~STA 16+50~~					

1217 View Levy Wall (17)

July 18, 83

Loc	BS	HI	IFS	FS	ELEV
Fence Post @ Corner of Watson & Center					
	2.66				728.00
		730.76			
ST	16+50				
S				5.15	
T.C				12.55	
B.T				15.9 LL	
ST	16+30				
S				5.95	724.81
T.C				11.0	
B.T				14.4 LL	
ST	16+70				
S				6.0	724.76
T.C				10.73	
B.T				15.10 LL	
ST	15+90				
S				5.35	
T.C				11.15	
B.T				14.40 LL	

July 15, 1983 (66) 2

LOC	BS	HI	IFS	FS	Elev
		~~731.44~~	730.76		
STA 15+70					
S			5.37		
TOC			9.22		
BOT			14.99		
~~Sta~~	~~+0~~				

1212 UGW Slurry Wall (67)
July 19, 83

LOC	BS	HI	IFS	FS	ELEV
~~ST 15+60~~					
S					
ToC					
~~BoT~~					
Fence Post @ Corner of Watson & Center					728.00
	3.64	731.64			
ST 12+20					
S			6.30		725.34
ST 15+60 (corner of Center & Watson)					
S			6.50		725.14
ToC					
BoT			15.60		
ST ~~15+40~~ 15+39 RTB					
S			6.30		
ToC			11.45		
BoT		DS	14.65		

12+4 (T)
July 19, 83 2

Loc	BS	HI	IFS	FS	ELEV
15+18 RTB					
					725.36
		16.30			
14+77 RTB					
					724.86
	DS	17.15			
14+76 RTB					
					723.62
	DS	16.80			
14+55 RTB					
					723.62
		17.22			
14+34 RTB					
					723.89
		17.15			

12+4 (T)
July 19, 83 3

Loc	BS	HI	IFS	FS	ELEV
14+13 RTB					
S			7.40		724.24
T.C			13.48		
B.T		DS	17.12		
14+00 RTB					
S					
TOC					
BOT					

1214 UGW SLURRY WALL (84)
July 20, '83
1

LOC	BS	HI	IFS	FS	ELEV
BM @ [illegible] POST — WATSON + CENTER					
	3.48	731.48			728.00
ST 13+92 RTB ~~14+00~~					
S			7.80		723.68
TOC					
BOT		DS	17.64		
ST 13+71 RTB ~~13+80~~					
S			7.3		724.18
TOC			14.6		
BOT		DS	17.74		
13+50 RTB					
					724.03
		DS	[illegible]		
13+29 RTB					
					724.33
			[illegible]		
		DS	17.25		

1217 UGW SLURRY WALL (85)
July 20, '83 Page 2

LOC	BS	HI	IFS	FS	Elev
St 13+08 RTB ~~13+20~~					
S			6.92 RTB ~~6.90~~		
TOC			13.02		
Bot		DS	16.52		
St 12+87 RTB ~~13+00~~					
S			6.62		
TOC			14.10		
Bot		DS	17.15		
St 12+66 RTB ~~12+80~~					
S			6.56		
TOC			12.46		
Bot		DS	16.58		
St 12+45 RTB ~~12+60~~					
			6.48		
S			13.76		
TOC		DS	17.02		
ST 12+24 RTB ~~12+40~~					
S			5.96		
TOC			14.00		
Bot		DS	17.15		

12:1 UGW July 21, 83 (86) 1

Loc	BS	HI	IFS	FS	ELEV
	~~3.15~~	Post @ Watson & Centre			
	3.15	731.15			728.00
SP	12 ~~11+20~~ 12+03 RTB				
S			5.8		725.35
ToC			13.3		717.85
B.T		D.M.	17.42		713.73
STA	11+82 RTB ~~12+00~~				
			5.50		
			13.26		
		D.M.	17.32		
~~STA~~ 11+80					
Post @ Corner of Watson & North					
	3.72	735.72			732.00
STA	11+61 RTB ~~11+80~~				
S			8.40		727.32
ToC			14.88		720.84
B.T		D.M.	19.42		716.30

12:10 UGW July 21, 83 (87) 2

Loc	BS	HI	IFS	FS	ELEV
STA ~~11+60~~ 11+40 RTB					
S			8.26		722.46
TOC			17.08		718.64
BOT		D.M.	20.42		715.30
STA 11+19 ~~11+40~~ RTB					
S			8.20		
TOC			14.89		
BOT		D.M.	20.56		
STA 10+98 RTB ~~11+20~~					
S			8.16		
TOC			20.06		
BOT		D.M.	23.11		
STA 10+77.5			(~~11+00~~)	~~22.5 ft~~ RTB ~~[illegible]~~ stationing	
S			8.08		
~~BoT~~ ToC			21.86		
BoT		D.M.	21.87		
~~Corner of North & Watson~~					
~~10+70~~					
~~S~~					
~~ToC~~					
~~BoT~~					

UGW SLURRY WALL
July 22, 83

(88)

Loc	BS	HI	FS	TS	Elev
[illegible] Corner of			North & Watson		
	2.71	734.71 ~~730.71~~			732.00 ~~728.00~~
Corner of		North	& Watson		
ST [illegible]					
S			7.10		723.61
TOC			1830		712.41
BOT		D.M.	24.30		706.41
STA 10+50					
S			7.24		723.47
TOC			18.57		712.14
BOT		D.M	23.70		
STA 10+25					
S			7.18		
TOC			18.22		
BOT		D.M.	26.80		
STA 10+00					
S			6.90		
TOC			18.90		
BOT		D.M.	22.87		

UGW
July 22, 83 2

(89)

Loc	BS	HI	FS	TS	Elev
STA 9+75					
S			6.85		
TOC			19.40		
BOT		D.M.	22.90		
STA 9+50					
S			6.55		
TOC			17.55		
BOT		D.N.	21.02		
STA 9+25					
S			6.60		
TOC			18.72		
BOT		D.M.	22.82		
Post @ Corner of North & Watson	3.28	735.28			732.00
STA 9+00					
S			7.50		727.78
TOC			19.96		715.32
BOT		D.M.	23.08		712.20
STA 8+75					
S			7.58		727.70
TOC			18.72		716.56
BOT			22.31		712.97

UGW Utility
July 22, 1983

Loc	BS	HI	IFS	FS	Elev.
		735.28			
STA 8+50					
S			7.12		
TOC			19.18		
BOT		D.M.	22.45		
STA 8+25					
S					
TOC					
BOT					

1217 UGW
July 25, 83

Loc	BS	HI	IFS	FS	ELEV
Reconstruction Existing BM					
1+25		735.72			731.47
STA 8+25					
S			7.40		728.32
TOC			18.320		717.40
BOT		D.M.	21.60		714.12
STA 8+00					
S			7.35		
TOC			18.30		
BOT		D.M.	21.50		
STA 7+75					
S			7.22		
TOC			18.24		
BOT		D.M.	21.70		
STA 7+50			(Note: Using tape)		
S			6.95		
TOC			18.70		
BOT		D.M.	21.85		

(11)

Loc	BS	HI	ITS	TS	Elev
		75+12			
	7+25				
			7.10		
			18.20		
T		D.M.	22.30		
	7+00				
			6.90		
			19.00		
		D.M.	23.40		
		75			
			7.72		
			19.82		
		D.M.	21.10		
STA	6+50				
			7.54		
TOC			17.85		
BOT		D.M.	20.15		
STA	6+25				
			7.72		
TOC			19.00		
BOT		D.M.	22.30		

(11)

LOC	BS	HI	ITS	TS	Elev
			3		
STA	6+00				
S			8.12		
TOC			18.35		
BOT		D.M.	22.40		
STA	5+75				
S			7.90		
TOC			19.50		
BOT		D.M.	22.80		

LOC	BS	HI	IFS	FS	ELEV
BM					
[illegible] STA #1		734.35			
		HI: 34.35			
STA	STA				
S			5.8		
T.C					
B.T	TMC		21.3		
STA	5+25				
S			6.2		
T.C			16.5		
B.T	TMC		19.9		
STA [illegible] #1					
[illegible]	3.63	734.35			
[illegible]	[illegible]		[illegible]	[illegible]	
	2.27	[illegible]	[illegible]	731.47	
[illegible]		HI (34.35)		[illegible]	
STA	5+00				
S			6.2		
T.C			12.7		
B.T	TMC		21.9		

LOC	BS	HI	IFS	FS	ELEV
		734.35	(34.35)		
STA	4+75				
S			5.7		728.65
T.C			~~T.C~~ 15.5		~~724.75~~
[illegible] #1					730.62
	3.63				
[illegible] #2					
[illegible]		734.31			
			(34.31)		
~~STA~~	~~5+00~~				
STA	4+75				
B.T	TMC		21.0		713.31
STA	4+50				
BS			G5		
T.C			17.6		
B.T	TMC		22.0		
STA	4+25				
S			5.30		
T.C			19.55		
B.T	TMC		22.30		

21 MCW
26/07/83

3

Sta 4+00
S 5.00
TOC
BOT TMC

Sta 3+75
S 3.90
TOC 20.15
TMC 24.00

Sta 3+50
S 6.58
TOC 21.60
BOT TMC 24.65

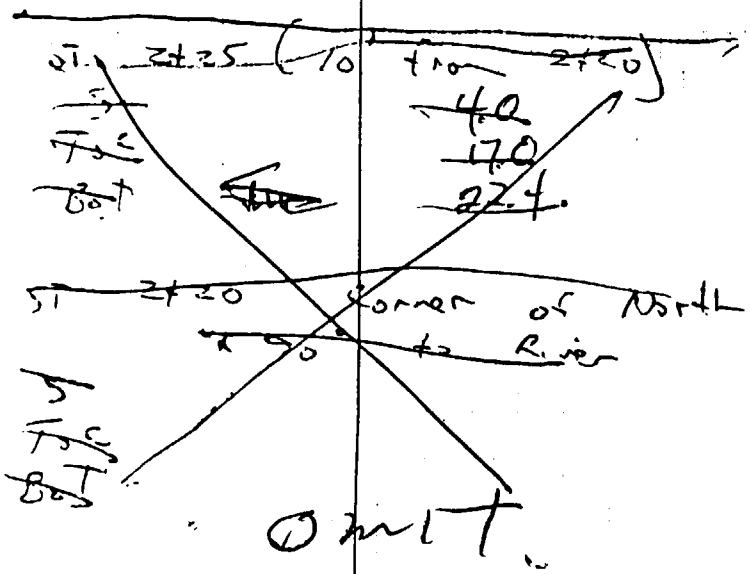
Sta 3+25
S 5.32
TOC 22.9
BOT TMC 25.95

Sta 3+00
5.31
21.7
TMC 25.2

26/07/83 4

Sta 2+75
S 5.50
TOC 21.00
BOT TMC 24.20

Sta 2+50
S ~~5.6~~ 5.68
TOC ~~21.50~~ 21.50
BOT TMC ~~25.10~~ 25.10



Wells — K. Brickell, C. Call — July 27, 83 — (14)

Loc	BS	HI	IFS	FS	ELEV
STA					739.52
	2.8	742.32			
Well Pt @ Disposal Cell					
Top of Pipe			- 1.25		743.57
Water Level			~~13.2~~ 11.95		730.37
Well Pt @ approx ST 200 o/s 300 RT					
Top of Pipe			2.35		739.97
Water Level			12.5		729.82

1217 NCW — July 27, 83 — (10)

Loc	BS	HI	IFS	FS	ELEV
Fence Post @ Wash House					
X	2.55	732.55			730.00
ST ~~2100~~ ~~2120~~					
S			~~4.0~~		
ToC			~~17.0~~		
BoT Tmc			~~21.5~~		
ST ~~2100~~ 1490					
S			4.8		
ToC			19.4		
BoT Tmc			22.5		
ST ~~1165~~ 1166					
S			4.9		
ToC			15.95		
BoT Tmc			19.80		
ST 1164					
S			5+20		
ToC			18.8		
BoT Tmc			21.9		

12 17
July 27, 83

LOC	BS	HI	IFS	FS	ELEV
Sta 2+75					
S			~~4.80~~		
TOC			~~19.4~~ 4.80		
BOT			~~19.4~~		
			12.5		
Sta 1+50					
S			4.90		
TOC			15.85		
BOT			19.80		
		HI = 732.55			
STA 1+90					
S			5.7		
TOC			18.7		
BOT	Time		22.2		710.32

July 27, 83 Page 2
HI = 732.19

ST 2+30 (10 from 2+20)

S	3.75
TOC	14.6
BOT Time	21.1

ST 2+20

S	4.0
TOC	17.0
BOT Time	22.4

1212 UGW SLURRY WALL 1
August 1, 83

LOC	BS	HI	IFS	FS	ELEV
Fence Post	@ Wash House				
	0.80				730.00
⊼		730.80	30.[illegible]		
STA	1+50	(check)			
BoT			21.3		
STA	1+25				
S			5.5		
ToC			16.3		
BoT		DS	14.9		
Sta	1+00				
S			4.2		
TOC			16.7		
Bot		DS	20.0		
St	0+75				
S			4.2		
TOC			15.5		
Bot		DS	19.2		

1212 UGW SLURRY WALL (105)
August 1, 83 2

LOC	BS	HI	IFS	FS	Elev
St. 0+50					
S			5.0		
TOC			17.1		
Bot.		DS	21.6		

12.17 UGW SLURRY WALL
August 2, 83

LOC	BS	HI	IFS	FS	ELEV
BM @ Post @ Wash House					
⏄	1.28	731.28			730.00
			(31.28)		
STA 0+25					
S			5.9		
TOC			15.8		
BOT		D.M.	20.9		
STA 0+15					
BOT		D.M.	22.0		
STA 0+00 (72+50 DGW)					
S			5.7		25.6
TOC			16.6		14.7
BOT		D.M.	21.7		9.6
BM @ Post					
	1.53	731.53			730.00

12.17 Downgradient Wall
02 08 83
Page 2 (107)

LOC	BS	HI	IFS	FS	ELEV
		731.53		(31.53)	
STA 72+25					
S			6.2		725.3
TOC			17.6		713.9
BOT		D.M.	21.5		710.0
STA 72+00					
S			6.0		725.5
TOC			14.1		716.6
BOT		D.M.	20.2		711.3
STA 71+75					
S			6.3		
TOC			17.3		
BOT		D.M.	22.5		
STA 71+50					
S			6.7		
TOC			18.8		
BOT		D.M.	19.7		
STA 71+25					
S			6.4		
TOC			17.5		
BOT		D.M.	21.5		

DOW Velsicol
Aug 2, 1983

(108)

LOC	BS	HI	IFS	FS	ELEV
		731.53	175	75	
STA 71+00					
S			7.0		
TOC			16.1		
BOT		D.M.	23.7		
STA 70+75					
S			7.0		
TOC			15.9		
BOT		//			

(109)

— 1217 DOW WALL
August 3, 83 Page 1

LOC	BS	HI	IFS	FS	ELEV
BM	Post @ Washhouse				
					730.00
T	1.08	(731.08)		(31.08)	
STA 70+75					
B.T		26.8			
STA 70+50					
S		6.0			
T.C		16.25			
B.T		26.7	//		
STA 70+25					
S		5.65			
TOC		14.00			
BOT		28.1	//		
BM	Post @ Washhouse				
					730.00
T	0.00	(730.00)			

(used type for day)

1217 DGW Slurry Wall
August 3, 83 (110)

Loc	BS	HI	IRS	FS	Elev
		730.00		30.00	
70+00					
S			4.25		
TOC			24.6		
BOT					
69+75					
			4.65		
S	69+50		4.1		
TOC			25		
BOT			27.0		

1217 DGW (111)
Aug 1st 4, 83

Loc	BS	HI	IRS	FS	Elev
Lo					
BM @ Decontamination Facility					731.47
π 1.53		733.00			
P					
Stake @ well ST 125 o/s 250				3.58	729.42
π 30.9		728.52			
				28.52	
ST 69+25					
S			3.7		
TOC					
BOT			28.5		
ST 69+00					
S			3.4		
TOC			24.8		
BOT			27.7		
ST 68+75					
S			3.4		
TOC			24.8		
BOT			27.6		

(112)

2

HI = 728.52

ST 6+50

S .45

TOC 28.7

BOT 19.9

ST 5+25

S 3.45

TOC 23.5

BOT 30.4

ST 4+00

S 3.8

TOC 23.2

BOT 26.15

BM ST A Q Rivet ∧ ST approx 3.00 ds 5.00

3.65 724.87

(113)

3

HI = 728.52

ST 6+25

S 3.3

TOC 24.3

BOT 28.05

1217 DGW (114)
August 5, 83 Page 1

Loc	BS	HI	IFS	FS	ELEV
BM	Top of Stk @ River 300 of 500				
	3.83				224.87
*		228.70	(28.70)		
STA 67+50					
S			3.55		
ToC			24.25		
BoT			~~[illegible]~~ 27.20 ff		
STA 67+25					
S			3.5		
TOC			24.15		
BOT			27.7 ff		

1217 DGW (115)
August 5, 83 Page 2

Loc	BS	HI	IFS	FS	ELEV
	~~3.83~~				
STA 67+00					
S			3.3		
TOC			24.3		
BOT			27.3 ff		
Sta 66+75					
S	3.4				
TOC	21.4				
BOT	24.3 ff				
STA 66+50					
S			3.3		
TOC			19.3		
BOT			22.7 ff		
STA 66+25					
S	~~3.2~~		3.2		
TOC	~~20.2~~		20.2		
BOT			23.6 ff		

1217 DGW (116)
Aug 5, 83 3

STA	66+00		
S		3.6	
TOC		21.4	
BOT		24.8	
STA	65+75		
S		3.4	
TOC		20.0	
BOT		25	

1217 DGW (117)
August 8, 83 1

Loc	BS	HI	IFS	FS	ELEV
Bm	T.P of P.I.		BD 600	o/s 600	721.89
T	8.35	730.24			
			30.24		
ST 65+50					
S				4.90	
TOC				20.05	
BOT		DS		25.20	
St 65+25					
S				5.1	
TOC				20.05	
Bot		DS		23.75	
St. 65+00					
S				5.75	
TOC				20.05	
Bot		DS		25.15	
St. 64+75.					
S				5.15	
TOC				20.95	
Bot		DS		23.65	

1217 DGW
August 8, 83

2 (118)

LOC	BS	HI	IFS	FS	ELEV
		30.24			

1217 DGW SLURRY WALL (119)
August 9, 83

Page 1

LOC	BS	HI	IFS	FS	ELEV
BM Top of Pile ℄ B 600 o/s 600					721.89
⊼	6.23	(728.12)			
St 63+50					
S					
ToC					
BoT					
		TMC	2.3		
			2		
			17.3		

1217 DOW
Aug 9, 83

(120)
2

21.3

2.3
13.[illegible]

17.0

1.5

Tmc

00

2.0
13.2
Tmc 726.1
714.9
701.[illegible]

725.7
713.4
17.1 710.4

Dow
Aug. 9, 83

(121)
3

725.1
3.0 KTB 23/8/83
713.8
Tmc 17.6 710.5

Sl 6400
2.0 726.1
11.4 716.7
Tmc 15.4 712.7

Sl 6400
3.5 724.6
715.2
Tmc 711.1

723.1
712.0
Tmc 19.1 709.0

(122)

DGD (123)

August 10, '93 Page 1

LOC	BS	HI	IFS	FS	ELEV
BM					
at Pile	BB 605 ds 600				
		729.39			721.89
BB	5?	8.00			
					728.79
	1.1	729.89			
Sta 60+~~25~~ 50					
S			3.7		726.2
TOC			15.2		714.7
BOT		TAR	18.3		711.6
Sta 60+25					
S			4.3		725.6
TOC			16.5		713.4
BOT		TAR	26.0		708.9
Sta 60+00					
S			4.2		725.7
TOC			13.7		716.2
BOT			19.4		710.5

DCW
August 10, 83 2 (124)

				725.6
				715.6
				710.0
				725.7
				713.0
				709.2
				725.6c
				710.4
				707.9
St 59+60				
S	1	4.2		725.7
T.C		18.0		711.9
B.T		21.0		708.9
BM	ST 800	0/S 600		728.79
⊼ 0.4	729.19			

DCW
August 10, 83 Page 3 (125)

Sta 58+75		
S	3.8	725.4
TOC	15.4	713.8
BOT Tmc	19.0	710.2
Sta 58+50		
S	3.5	725.7
TOC	14.1	715.1
BOT Tmc	18.3	710.9
Sta 58+25		
S	4.4	724.8
TOC	12.4	716.8
BOT Tmc	16.1	713.1
Sta 58+00		
S	3.4	725.8
TOC	15.1	714.1
BOT Tmc	18.3	710.9
Sta 57+75		
S	3.7	726.5
TOC	16.8	712.4
BOT Tmc	20.7	708.5

DGW (126)

August 10, 83 Page 4

sta 7+50

		3.2	726.0
		14.3	714.9
	TMc	17.8	711.1

Velsicol DGW
8-15-83

Loc	BS	HI	+FS	FS	ELEV
Bm	top of well		Pt		728.70
↑	0.35		(729.17)		
ST	57+25				
S			3.88		725.29
T.C			16.47		712.67
B.T	D.M		21.18		707.96
			21.15	(RNP rock)	707.99
STA	57+00				
S			3.18		725.96
TOC			15.87		713.27
BOT	D.M		20.94		708.20
STA	56+75				
S			5.95		725.19
TOC			16.10		713.04
BOT	D.M.		17.22		709.92
STA	56+50				
S			3.24		725.90
TOC			17.05		709.09
BOT	D.M.		20.62		705.52

Velsicol DGW
8-15-83

(2)

Loc	BS	HI	IFS	FS	ELEV
~~BM~~		~~BM~~		HI = 729.14	
STA 58+25					
S			3.45		725.61
TOC			18.00		711.14
BOT		DM	21.38		707.76
STA 56+00					
S			3.49		725.65
TOC			16.92		712.52
BOT		DM	20.41		708.08
STA 55+75					
S		0	3.40		725.74
TOC			16.70		712.44
BOT		DM	21.94		707.20
BM NW CORNER OF BRACKETS PANEL					730.66
T	1.20	731.86			
T.P.			1.55		727.31
T	1.03	728.34			

DGW
8-15-83

(3)

Loc	BS	HI	IFS	FS	ELEV
		728.34			
STA 55+50					
S			3.49		724.85
TOC			17.47		710.87
BOT		DM	22.47		705.87
~~STA 55+25~~					
~~S~~					
~~TOC~~					
~~BOT~~					

1217 DGW Slurry (4)
August 16, 83

Loc	BS	HI	IFS	FS	Elev
BM	NW	CORNER OF			
	SANITARY	HOLDING	TANK		730.66
TP	0.62	731.28			
ST 55+25					
S			(Not shot by DNR		
TOC					
BOT			25.98 ← shot by TMC		705.30
Sta 55+00					
S			6.1		
TOC			18.6		712.68
BOT		TMC	23.3		
Sta 54+75					
S			6.5		
TOC			20.8		
BOT		TMC	25.3		

1217 DGW (5)
August 16, 83

Sta 54+50			
S		7.1	724.18
TOC		18.9	
BOT	TMC	24.0	
Sta 54+25			
S		5.6	
TOC		19.9	
BOT	TMC	24.9	705.38
Sta 54+00			
S		6.1	
TOC		20.4	718.88
BOT	TMC	23.7	
Sta 53+75			
S		6.1	
TOC		19.3	
BOT	TMC	23.5	

1217 DGW (6)
Aug 16, 83
3

LOC	BS	AI	IFS	FS	ELEV
BM		731.28			
TP				4.48	726.80
BM	2.46	729.26			
SS 53+50					
S			3.91		725.36
TOC			16.94		712.32
BOT		Tile	22.35		706.91
S 53+25					
S			3.71		725.55
TOC			15.91		713.35
BOT		Tile	19.82		709.44
53+00	S	4.49			
S					
TOC					
BOT					
52+75					
S	4.5				

1217 DGW (7)
Aug 16, 83
4

LOC	BS	AI	IFS	FS	ELEV
5m NW corner of leachate holding tank					730.66
BM	1.08	731.74			
Surface Shots					
52+50			7.0		724.74
			7.1		724.64
52+00			7.2		724.54
			7.1		724.64
			7.0		724.74
			6.7		725.04
51+00			6.7		725.04
			6.6		725.14
			6.7		725.04
			6.6		725.14
50+00			6.7		725.04
			7.1		724.64
			6.7		725.04
			6.6		725.14
49+00			6.4		725.34
			6.6		[illegible]
			6.3		725.44
48+25			6.0		725.74

12+7 DGW (6)
August 16, 83

Readings on Tape

Station	ToC	BoT	DNR
52+75	11.0	14.0	[illegible]
52+50	10.9	18.3	[illegible]
52+25	13.5	16.6	[illegible]

12+7 DGW (9)
August 17, 83

Readings on Tape

Station	ToC	BoT	DNR
52+25	12.6	14.0	[illegible]
52+00	13.0	16.2	[illegible]
51+75	13.6	16.6	[illegible]
51+50	11.6	16.0	[illegible]
51+25	11.9	18.8	[illegible]
51+00	12.3	15.6	[illegible]
50+75			

MH5	+	20.00	0.39%
MH3		21.17	0.39%
MH2		21.56	0.39%
MH1		22.93	0.41%
S...		23.50	

50+175			
49+50	11.3	16.0	
49+25			
49+00	11.8		
48+75	12.1	15.8	
48+50		16.5	
48+25			
48+00	14.1	17.1	
47+75	13.0		
47+50	13.6		
47+25			

(22)

Sta	BS	HI	FS	FS	Elev
			8.61		25.0
	37+25				25.3
	37+50				25.5
					24.9
					24.8
6	36+25				24.9
6	36+50		8.31		24.6
	36+75				24.7
			11.20		25.8
		732.97		9.23	727.9

(23)

37+75

	7.18	25.5
		25.5
		25.5
		25.6
	6.90	26.0
		25.9
	7.29	25.7
	7.65	25.3
	7.69	25.3
	7.87	25.1
	7.82	25.2
	7.70	25.3
	9.72	723.25
2.57	730.82	
		25.3
		25.2
	5.9	25.3
	5.45	25.4
	5.10	25.4
	5.21	25.6
	5.55	25.3
		25.2

(29)

25
731.65

725.26

DGW
Aug 22, 83

(28)

5.15

		BC	AST	
		[illegible]	17.0	D.M.
[illegible]	*	12.2	15.8	D.M.
46+[illegible]		12.5	16.5	D.M.
[illegible]		12.0	16.5	D.M.
[illegible]		13.0	18.4	D.M.
[illegible]+00		12.4	17.4	D.M.
[illegible]		10.8	16.0	D.M.
[illegible]50**		12.0	15.0	
45+25		9.6	14.2	D.M.
[illegible]00		12.4	15.8	D.M.
44+75		13.0	16.0	D.M.

*Note: @ 47+00 to 45+75
Key [illegible] 4.5' due [illegible]
chemical desiccation [illegible]
of clays.
[illegible] stepped first 10' of [illegible]
[illegible] then w/ 4' key then
[illegible] 15' w/ 3' key [illegible]

[illegible]
[illegible]

[illegible]	S	T[illegible]	R[illegible]	
44+50	5.[illegible]	13.5	[illegible]	DM
44+25	[illegible]	11.2	14.4	DM.
44+00	[illegible]	12.7	17.2	D.M.
43+75	[illegible]	11.6	15.0	D.M.
43+50	[illegible]	11.4	14.0	DM
43+25	5.75	11.2	14.0	DM.
43+00	5.82	11.6	15.1	D.M.
42+75	5.70	11.8	15.3	D.M
42+50	5.57	13.0	16.0	D.M
42+25	5.55	12.9	16.3	D.M.

Note: Trench widened at 44+50 to 45+25 due to 15' surficial crack. Area widened 2-3' to a depth 5' [illegible]

1218 Downgradient Slurry Wall 1
Aug 25 83

Readings on Tape

STATION	T.O.C.	B.O.T.	
42+00	13.5	16.5	//
41+75	12.2	15.2	//
41+50	12.3	15.3	//
41+25	12.8	16.0	//
41+00	13.1	16.9	//
40+75	13.0	16.0	//
40+50	12.3	15.5	//
40+25	12.9	16.2	//
40+00	13.0	17.2	//
39+75	12.6	15.7	//
39+50	12.1	16.1	//

[illegible]

1218 Downgradient Slurry Wall 1
August 26, 83

Readings on Tape

STATION	T.O.C.		B.O.T.	
39+25	14.7	12.4	17.6	05
39+00	12.2	15.2	15.3	05
38+75	11.9	14.4	15.3	05
38+50	11.9	14.9	15.9	05
38+25	9.1	13.1	12.3	06
38+00	10.8	13.8	14.2	05
37+75	9.8	12.8	13.3	05
37+50	10.0	13.0	14.6	05
37+25	9.8	12.9	13.3	05
37+00	9.3	[illegible]	14.0	05
36+75	11.0	14.2	14.5	05

(46)

1212 Aug. 29, '83 [illegible] Sherry W.

Readings on Tape

		TOC	BOC	
36+50	13	10.0	13.0	[illegible]
36+25	11.8	8.8	12.8	[illegible]
36+00	[illegible]	10.[illegible]	15.0	[illegible]
35+75	[illegible]	12.5	15.2	[illegible]
35+50	[illegible]	11.1	15.0	[illegible]
35+25	[illegible]	2.7	14.3	[illegible]
35+00	[illegible]	4.7	12.9	[illegible]

(47)

Velsicol DGW
Aug 30, 1983

Readings On Tape

STA	TOC		BOT
34+75	10.2	[illegible]	13.9 D.M.
34+50	10.3	[illegible]	14.1 D.M.
34+25	10.5	13.5	14.0 D.M.
34+00	12.9	[illegible]	16.0 D.M.
33+74 (33+12 UGW)	—		17.4 D.M.

(46)

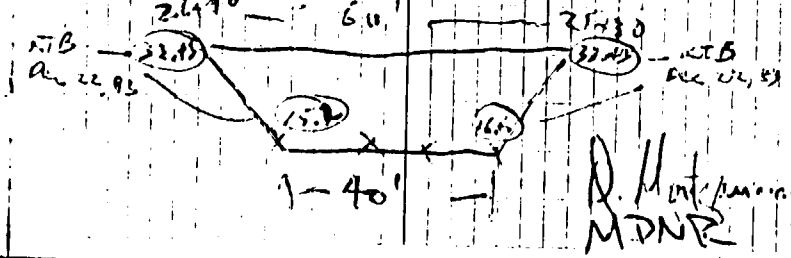
(49)

Reconnaissance Upgradient Storm Wall
August 31, 83

Loc	BS	HI	IFS	FS	ELEV
BM. Rebar in Concrete Ftg @ Washington & Watson					735.29
TP	4.52	739.81			
Surface alongside Track					
ST 2640 to 2400				6.38	733.43

Readings on Tape

	BOT (Flow)	Reading
ST 2640	216.4	19
2620	215.2	18.9
ST 2600	216.6	18.7
ST 2580		17.9
ST 2575	220.8	



R. Montgomery
MDNR

APPENDIX E

CERTIFICATIONS OF COMPLIANCE FOR BENTONITE

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico Chemical Corp. St. Louis, MT

Date Loaded 6-27-83 Date Tested 6-27-83

Car Number Truck Order Number C6065-9

API: 9.0 Viscosity 600 66 300 55 pH ___ Filt. ___

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload C6065-9 Mercer (Jones Aviation 3-50) shipped on 27 June 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico Chemical Corp. St. Louis, MI

Date Loaded 6-~~28~~ 27-83 Date Tested

Car Number Truck Order Number C6065-8

% Hzl 8.4 Viscosity 600 54 300 42 pH 8.4 Filt. 14.6

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload C6065-8 Mercer (Jones Aviation 10-40) shipped on 27 June 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

LABORATOR REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico Chemical Corp. St. Louis, MT

Date Loaded 6-23-83 Date Tested 6-23-83

Car Number Truck (MERCER C.T.R 100-101) Order Number C6065-7

H2O 8.3 Viscosity 600 57 300 44 pH 9.1 Filt. 15.0

CANONIE CONSTRUCTION

Job #83-6G

C6065-7

IMC certifies that truckload Mercer (J&R Trucking 100-101)

shipped on 24 June 1983 is premium-grade bentonite

meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

CANONIE CONSTRUCTION

Job #83-6G

C6065-7

IMC certifies that truckload Mercer (J&R Trucking 100-101) shipped on 24 June 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

CANONIE CONSTRUCTION

Job #83-6G

C6065-7

IMC certifies that truckload Mercer (J&R Trucking 100-101) shipped on 24 June 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico Chemical Corp. St. Louis, MT

Date Loaded 6-20-83 Date Tested 6-20-83

Car Number Truck Cargo Express Order Number C6065-6

H2O 8.0 Viscosity 600 69 300 57 pH 8.9 Filt. 12.0

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload C6065-6 MERCER (Cargo Express 51141-51141A) shipped on 21 June 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload C6065-5 MERCER (Tiger Transport 154-854) shipped on 21 June 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

LABORATORY REPORT

INTERNATIONAL MINERALS & CHEMICAL CORPORATION
COLONY, WYOMING

Shipments to

PLANT Rockwood

Date Loaded 6-21-83 Date Tested 6-20-83

Car Number TwR (2) TIGER 154-854 Order Number C6065 5

% H_2O 8.1

1MM. Viscosity 600 69 300 55 Clay _____ Methylene Blue _____ ML

22.5 grams

Sieve Analysis

Plus 20 Mesh	_____
Plus 50 Mesh	_____
Plus 100 Mesh	_____
Plus 200 Mesh	_____
Pan	_____
Total	_____

9

Filt. 13

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico Chemical Corp., St. Louis, MT

Date Loaded 6-20-83 Date Tested 6-14-83

Car Number Truck Order Number C6065-4

20 9.6 Viscosity 600 58 300 45 pH 9.0 Filt. 11.2

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload C6065-4 Mercer(~~8888~~Jones Aviation 10-40) shipped on 20 June 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico, St. Louis MI

Date Loaded 6-14-83 Date Tested 6-14-83

Car Number Trk #3 (618-6184) Order Number C6065-614

% H20 9.1 Viscosity 600 16.5 300 8.7 pH 9.0 Filt. 16.4

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload C6065-14 ~~Mercer (J&J Leasing 618-615A)~~ shipped on 15 June 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

3-11 SHIFT
6-14-83

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico, St Louis MI

Date Loaded 6-14-83 Date Tested 6-14-83

Car Number TK #1 Mercer Order Number C6065-#13

% H20 9.1 Viscosity 600 70 300 56 pH 9 Filt. 10.8

CANONIE CONSTRUCTION

Job #83-6G

24800-24850

IMC certifies that truckload C6065-13 Mercer (Case Heavy Haulers) shipped on 14 June 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

LABORATOR REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico Chemical Corp., St. Louis MI

Date Loaded 5-17-83 Date Tested 5-17-83

Car Number Truck Order Number C 5117-1

% H2O 9.6 Viscosity 600 58 300 43 pH 9.4 Filt. 12.0 ml

CANONIE CONSTRUCTION

Job #83-6G

2615-340563

IMC certifies that truckload Mercer (Tri-State Motor Transit) shipped on 17 May 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload Mercer (Momsen) 2580-965 Transportation shipped on 20 May 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A Schipke Jr

Dwight Schipke

Tech 5/23/83 JC.

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsicol Chemical Corp, St. Louis MI Sunagel-125

Date Loaded 5-20-83 Date Tested 5-20-83

Car Number Mercer Truck Order Number C5117-2

% H2O 7.8 Viscosity 600 68 300 52 pH 9.0 Filt. 10.8ml

THIS SHIPPING ORDER must be legibly in Carbon, in Ink, in Indelible Pencil, or signed by the Agent.

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Shipping Order.

CARRIER: Mercer Transportation AT: Bentonite Spur, Colony, Wyo.

FROM

IMC INTERNATIONAL MINERALS & CHEMICAL CORPORATION

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff, if this is a motor carrier shipment.

Shipper hereby certifies that he is familiar with all terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

DATE SHIPPED	CUSTOMER ORDER NUMBER	FREIGHT RATE	IMC ORDER NO.
20 May 83	8897	C	C5117-2

CONSIGNED TO:
Velsicco Chemical [redacted] Corp.
701 W. Washington (WHY[redacted]46)
[redacted] Job #83-6G
St. Louis, Michigan [redacted]

SOLD TO:
FOR HELP IN CHEMICAL EMERGENCIES INVOLVING SPILL, LEAK, FIRE OR EXPOSURE CALL CHEMTREC TOLL-FREE 800-424-9300 DAY OR NIGHT

ROUTE: Mercer Transportation (Momsen) CAR NUMBER 2580-965

The Fibre Boxes used for this shipment conform to the specifications set forth in the box makers certificate thereon and all other requirements of Rule 41 of the Uniform Freight Classification.

*If the shipment moves between two ports by a Carrier by water, the Law requires that the bill of lading state whether it is "carriers or shippers weight."

Shippers imprint in Lieu of Stamp; not a part of Bill of Lading approved by the Interstate Commerce Commission.

Subject to Section 7 of Conditions of Applicable bill of lading. If this shipment is to be delivered to the consignee without recourse on the Consignor, the Consignor shall sign the following statement.
The Carrier shall not make delivery of this Shipment without Payment of freight and all other lawful charges.

Signature of Consignor, INTERNATIONAL MINERALS & CHEMICAL CORPORATION

This shipment is correctly described. The correct weight is _____ lbs.

Subject to verification by governing weighing and inspection bureau according to agreement

No.
INTERNATIONAL MINERALS & CHEMICAL CORP. Shipper

The agreed, declared, or released value of the property is hereby specifically stated by the shipper to be not exceeding 50¢ per pound per article or 135¢ per pound for each distribution package or any higher value permitted by RRO MC-972, whichever value results in the lowest transportation charges on the date of shipment. (Applicable only when consignment is subject to released valuation rates as provided, and approved by the Interstate Commerce Commission).

If Charges are to be Prepaid, write or stamp here "To Be Prepaid"
COLLECT

NO. OF PACKAGES	TYPE PACKAGE	HM	BILL OF LADING DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*WEIGHT (Subject To Correction)
448	100 lb		GROUND CLAY NOI plain 96892 200-SPECIAL 3295232 SLURRY GEL 125	44,800 lb
16	wood		42x42 double face pallets 4x7 high	800 lb
			SCL send freight bill to: Canonie Construction Box 509 PLASTIC WRAPPED South Haven, MI 49090	
			driver phone Mike Rehkof at 517-681-5902 or 5903 prior to arrival	
			2/4/	
			MARKED SHELL CAPACITY DOME WT. PER GAL. LOADED T°F GAL. LOADED	GROSS (LBS) TARE (LBS) NET (LBS)

This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportation and the Environmental Protection Agency.

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsicol Chemical Corp, St. Louis, MI

Date Loaded 5-23-83 Date Tested 5-23-83

Car Number Truck #1 Order Number C 5117-3

% H2O 9.3 Viscosity 600 56 300 45 pH 9.2 Filt. 13.2

aged: 48 37

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload Mercer (Thunderbird 1269-1269A) shipped on 23 May 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A Schipke

Dwight Schipke

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico Chemical Corp., St. Louis MI

Date Loaded 5-23-83 Date Tested 5-23-83

Car Number Truck #2 Order Number C5117-4

#20 8.7 Viscosity 600 52 300 41 pH 9.2 Filt. 13.2

aged: 45 34

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload **Mercer (Marck Express 21027-21027A)** shipped on **24 May 1983** is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Nelsco Chemical Corp., St. Louis MO

Date Loaded 5-24-83 Date Tested 5-24-83

Car Number Truck #1 Order Number C5117-5

% H2O 7.2 Viscosity 600 56 300 45 pH 9.1 Filt. 13.2

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload Mercer (Jones Aviation 10-40) shipped on 24 May 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico Chemical Corp., St. Louis MI

Date Loaded 5-25-83 Date Tested 5-24-83

Car Number Truck Order Number C5117-6

API 7.7 Viscosity 600 57 300 43 pH 9.1 Filt. 13.0

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload 5089-5089A Mercer (Transcontinental Express) shipped on 25 May 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico Chemical Corp., St Louis MI Slurry Gel 125

Date Loaded 5-26-83 Date Tested 5-25-83

Car Number Truck #1 Order Number 05117-7

% H2O 7.7 Viscosity 600 53 300 40 pH [illegible] Filt. [illegible]

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload Mercer (J&J Leasing 618-618A) shipped on 26 May 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsicol Chemical Corp. St. Louis MI Surry Col 125

Date Loaded 5-27-83 Date Tested 5-25-83

Car Number Truck # 125-21143 Order Number C5117-8

% H2O 7.7 Viscosity 600 53 300 40 pH 9.1 Filt. 14.2

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload C5117-8 Mercer (Ringle Express 125-21143) shipped on 27 May 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload C5117-8 Mercer (Ringle Express 125-21142) shipped on 27 May 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico Chemical Corp. St. Louis, MI Slurry Gel 125

Date Loaded 6-10-83 Date Tested 5-25-83

Car Number Truck Order Number C6065-1

% H20 7.7 Viscosity 600 55 300 44 pH 8.9 Filt. 12.9

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload C6065-1 Mercer (Jones Aviation 10-40) shipped on 10 June 1983 is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL COR
Colony, Wyoming

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

PLANT Velsico Chemical Company St. Louis Mo. - Slurry Gel - 125

Date Loaded 6-13-83 Date Tested 6-13-83

Car Number Truck Apple Lines 1168 Order Number C 6056-2

% H20 9.6 Viscosity 600 50 300 40 pH 9.2 Filt. 13.4

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload ~~Apple Lines 1168~~ C6056-2 shipped on ~~13 June 1983 9~~ is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

LABORATORY REPORT

INTERNATIONAL MIN. & CHEM. CORP.

COLONY, WYOMING

Shipment to

AT Velsico Chemical Company St. Louis Mo. - Slurry Gel 125

Loaded 6-13-83 Date Tested 6-13-83

Car Number Adv. Trk Order Number C6065-3

H2O 9.5 Viscosity 600 51 300 41 pH 9.1 Filt. 13.6

CANONIE CONSTRUCTION

Job #83-6G

IMC certifies that truckload ~~C6065-3 Mercer (Case Heavy Haulers)~~ shipped on ~~14 June 1983~~ is premium-grade bentonite meeting API specifications 13A.

Dwight A. Schipke

Dwight Schipke
Plant Superintendent
INTERNATIONAL MINERALS & CHEMICAL CORP.
Colony, Wyoming

APPENDIX F

BENTONITE TESTING DATA

Professional Service Industries, Inc.
Michigan Testing Engineers Division

May 31, 1983

Conestoga-Rovers & Associates, Ltd.
701 West Washington
St. Louis, Michigan 48880

Attn: Mr. Don Robinson

RE: Bentonite Testing
File No.: 401-30051-1

Gentlemen:

As requested, we have tested the submitted bentonite sample for conformance with current API specifications for Oil-Well Drilling Fluid Materials, API Spec 13A. The sample was submitted on May 25, 1983 and labeled Sample #B-519-1. The sample represents a composite sample of Slurry Gel 125 shipped to St. Louis for use in the containment wall currently under construction. Test results are attached to this letter.

As the testing indicates, the submitted sample meets the required specifications.

If there are any questions, please do not hesitate to call.

Very truly yours,

MICHIGAN TESTING ENGINEERS DIVISION

Randall K. DeRuiter, P.E.
Branch Manager

RKD/aga

	Submitted Sample	API Specifications
A. Suspension Properties		
- Viscometer Dial Reading at 600 RPM	50.0	30, minimum
- Viscometer Dial Reading at 300 RPM	29.0	--
- Plastic Viscosity, Centipoises	21.0	--
- Yield Point, lb/100 Ft^2	8.0	3 X Plastic Viscosity Maximum
- Filtrate, cm^3	14.1	15.0 cm^3, Maximum
- Cake Thickness, Ins.	0.125	--
B. Wet Screen Analysis		
Residue on U.S. Sieve No. 200, %	1.9	4.0% Maximum
C. Moisture Content		
Moisture, as shipped from point of Manufacture	9.8	10.0% Maximum

Sample Number: B-519-1

Sample Identification: Slurry Gel #125

Date Tested: May 25, 1983

Tested For: Conestoga-Rovers & Associates, Ltd.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

D9

June 9, 1983

Conestoga-Rovers & Associates, Ltd.
701 West Washington
St. Louis, Michigan 48880

Attn: Mr. Don Robinson

RE: Bentonite Testing
File No.: 401-30051-2

Gentlemen:

As requested, we have tested the submitted bentonite sample for conformance with current API specifications for Oil-Well Drilling Fluid Materials, API Spec 13A. The samples were submitted on June 3, 1983 and labeled Samples B 523-1 and B 525-1. The samples represent a composite of Slurry Gel 125 shipped to St. Louis for use in the containment wall currently under construction. Test results are attached to this letter.

As the testing indicates, the submitted samples meet the required specifications. Your attention is drawn to the relatively high filtrate levels.

If there are any questions, please do not hesitate to call.

Very truly yours,

MICHIGAN TESTING ENGINEERS DIVISION

Randall K. DeRuiter, P.E.
Branch Manager

RKD/aga

	Submitted Sample	API Specifications
A. Suspension Properties		
- Viscometer Dial Reading at 600 RPMS	44	30, minimum
- Viscometer Dial Reading at 300 RPMS	25	--
- Plastic Viscosity, Lentipoises	19.0	--
- Yield Point, lb/100 Ft^2	6	3 X Plastic Viscosity Maximum
- Filtrate, cm^3	15.0	15.0 cm^3, Maximum
- Cake Thickness, Ins.	0.090	--
B. Wet Screen Analysis		
Residue on U.S. Sieve No. 200, %	2.8	4.0% Maximum
C. Moisture Content		
Moisture, as shipped from point of Manufacture	9.1	10.0% Maximum

Sample Number: B-523-1

Sample Identification: Bentonite

Date Tested: 6-09-83

Tested For: Conestoga-Rovers & Associates, Ltd.

	Submitted Sample	API Specifications
A. Suspension Properties		
- Viscometer Dial Reading at 600 RPMS	48	30, minimum
- Viscometer Dial Reading at 300 RPMS	29	--
- Plastic Viscosity, Lentipoises	20.0	--
- Yield Point, lb/100 Ft^2	10	3 X Plastic Viscosity Maximum
- Filtrate, cm^3	14.9	15.0 cm^3, Maximum
- Cake Thickness, Ins.	0.110	--
B. Wet Screen Analysis		
Residue on U.S. Sieve No. 200, %	2.6	4.0% Maximum
C. Moisture Content		
Moisture, as shipped from point of Manufacture	9.6	10.0% Maximum

Sample Number: B-525-1

Sample Identification: Bentonite

Date Tested: 6-09-83

Tested For: Conestoga-Rovers & Associates, Ltd.

Professional Service Industries, Inc.
Michigan Testing Engineers Division

July 26, 1983

Conestoga-Rovers & Associates, Ltd.
701 West Washington
St. Louis, Michigan 48880

Attention: Mr. Don Robinson

RE: Bentonite Testing
File No.: 401-30051-4

Gentlemen:

As requested, we have tested the submitted bentonite sample for conformance with current API specifications for Oil-Well Drilling Fluid Materials, API Spec 13A. The sample was designated as Black Hills Bentonite. The sample recovered from the field on July 22, 1983. Test results are attached to this letter.

If there are any questions, please do not hesitate to call.

Very truly yours,

MICHIGAN TESTING ENGINEERS DIVISION

Randall K. DeRuiter, P.E.
Branch Manager

RKD/dgd

	Submitted Sample	API Specifications
A. Suspension Properties		
- Viscometer Dial Reading at 600 RPMS	35	30 Minimum
- Viscometer Dial Reading at 300 RPMS	24	--
- Plastic Viscosity, Centipoises	11	--
- Yield Point, lb/100 Ft^2	13	3 x Plastic Viscosity Maximum
- Filtrate, cm^3	14.5	15.0 cm^3, Maximum
- Cake Thickness, Ins.	0.125	--
B. Wet Screen Analysis		
Residue on U.S. Sieve No. 200, %	2.2%	4.0% Maximum
C. Moisture Content		
Moisture, as shipped from point of manufacture	8.0	10.0% Maximum

Sample Identification: Black Hills Bentonite

Date Tested: July 25, 1983

Date Sampled: July 22, 1983

Tested For: Conestoga-Rovers & Associates, Ltd.

APPENDIX G

MIXING WATER ANALYTICAL DATA

Canonie Construction

(1185)

Canonie Construction Co.
P.O. Box 509
South Haven, Michigan 49090
Phone 616-637-1171
Telex 72-9435

June 8, 1983

Conestoga-Rovers & Associates
701 W. Washington
St. Louis, Michigan 48880

ATTENTION: Mr. Don Robinson

Re: Water Analysis
Phases I and II
Velsicol Chemical Corporation
St. Louis, Michigan
Canonie Job No. 83-6G

Gentlemen:

Attached, please find a report from Environmental Laboratory Specialists, Ltd., on the water to be used in our slurry operation.

If you have any questions, please contact me at your convenience.

Very truly yours,

Miles Rehkopf
Project Superintendent

MR:tm

cc: [redacted]
J. Virgo
N. Stone
Central File
Job File

EPI IT NUMBER

Environmental Laboratory Specialists, Ltd.

224 N. BALL STREET – OWOSSO, MI. 48867 – (517) 725-7778

Samples Submitted By: Canonie Construction Company
Post Office Box 303
St. Louis, Michigan 48880

Copy To:
Date Rec'd: May 27, 1983
Date Reported: May 31, 1983

WATER & WASTEWATER REPORT OF ANALYSIS

SAMPLE DESCRIPTION	2884				
	Results in mg/l unless stated otherwise				
Aluminum					
Barium					
BOD (5-Day)					
Cadmium					
Chlorides					
Chlorine (Residual)					
Chromium (Total)					
Chromium (Hexavalent)					
COD					
Copper					
Cyanide					
Dissolved Oxygen					
Fluoride					
Iron					
Lead					
Manganese					
Mercury					
Nickel					
Nitrogen (Kjeldahl)					
Nitrogen (Ammonia)					
Nitrogen (Organic)					
Nitrate					
Nitrite					
Oil & Grease	< 0.1 MG/L				
Phosphate (Ortho)					
Phosphate (Total)					
pH	8.55				
Phenol					
Phosphorous (as P)					
Solids (Total)					
Solids (Dissolved)	305 MG/L				
Solids (Settleable)					
Solids (Suspended)					
Solids (Volatile)					
Sulfate (as SO_4)					
Sulfide					
Turbidity					
Zinc					
Calcium	27.0 MG/L				

ments:

By:

Analysis in accordance with procedures outlined in Standard Methods For the Examination of Water and Wastewater (14th Edition) 1975 and EPA Manual of Methods for the Chemical

APPENDIX H

SLURRY QUALITY CONTROL TESTING DATA

APPENDIX H

SLURRY QUALITY CONTROL TESTING DATA

SAMPLING DATE	PARAMETER pH	APPARENT VISCOSITY (Sec. - Marsh) MIXER	APPARENT VISCOSITY (Sec. - Marsh) TRENCH	UNIT WEIGHT (lbs/ft^3)	SAND CONTENT (%)	FILTRATE LOSS (mls)	FILTER CAKE THICKNESS (mm)
6/6/83	8.89	64	44	64.5	12	19	--
	8.46	44	44.3	70		19.5	--
		42	57	70			
			48	71.5			
			41	65.5			
6/7/83	8.21	40	52	68.5	1.5	18	4
	8.57	40	48	69.5		17	3.5
			48	68			
			52	68			
			65	65			
				66.5			
6/8/83	--	52	57	72		--[1]	--
	--		81	65		--	--
			60	77			
6/9/83	8.47		52	68		--[1]	--
	9.02		74	66		--	--
			54	70			
			55	84			
			<60	68			
6/10/83	7.67	48	38	66.5	26	--[1]	--
	8.72		54	87	24	--	--
			44	84			
			59	89			
			70	75			
6/13/83	7.97		40	67	5	17.5	2
	7.81		38.5	66	15	18	2
			42	68			
			44	74			
6/14/83	8.72		45	64	1.5	18	2
			46	64			
6/15/83	8.50		48	64	2	15	3.5
	9.06						

APPENDIX H - (cont'd)

SLURRY QUALITY CONTROL TESTING DATA

SAMPLING DATE	PARAMETER pH	APPARENT VISCOSITY (Sec. - Marsh) MIXER	APPARENT VISCOSITY (Sec. - Marsh) TRENCH	UNIT WEIGHT (lbs/ft^3)	SAND CONTENT (%)	FILTRATE LOSS (mls)	FILTER CAKE THICKNESS (mm)
6/16/83			44	67	0.75	--[1]	--
			43	64	1.5		
			40	64			
6/17/83			34	64		--[1]	--
			32	65			
6/20/83	8.92	180	50	64		25	2
	8.96	47	48	66		23	3.5
			48	80			
6/21/83	8.75		46.5	65	2	24	3
	9.03		55	85	38	--[1]	--
			55	75	10		
			54	72	11		
			52	75	20		
6/22/83	7.83	42	40	67	3	18	5
	8.39	47	45	68	2.25	19	3
		47	46	68	4		
		45	45	68			
				66			
				68			
6/23/83	8.26	40	48.5	69	1	18	3
	8.26	40	45.5	67		--	--
		40	40	68			
		51	41	67			
			42	65			
				67			
				66			
6/24/83	8.49	46	53	64	7	16	3
	8.00	40	47.5	67.5	5	18	3
			48.5	68	7		
			50	68			
			49	71			
				70			
				69			

APPENDIX H - (cont'd)

SLURRY QUALITY CONTROL TESTING DATA

SAMPLING DATE	PARAMETER pH	APPARENT VISCOSITY (Sec. - Marsh) MIXER	APPARENT VISCOSITY (Sec. - Marsh) TRENCH	UNIT WEIGHT (lbs/ft^3)	SAND CONTENT (%)	FILTRATE LOSS (mls)	FILTER CAKE THICKNESS (mm)
6/27/83	7.91		53	73	8.5	20	3
			46	70	7		
			50	69			
7/11/83	7.79	42	60	76	10	15	3
	8.83	44	44	64	2.5	22	2
	8.96		46	68	11	20	2
			43	74	0.75		
				68			
7/12/83	8.10	45	50	72	8	16	2.5
	8.57		50	71	0.75	17	3
			50	64	8		
			49	70			
			52	74			
7/13/83	7.79	40	52	76	14	13	2
		60	54	72			
			40	65			
			54	65			
				65			
7/14/83	7.70	44	54	65	12	17	2
	8.72	43	51	75	10	16.5	2
			51	74			
			51	69			
			44	64			
				67			
7/15/83	8.73		56	64.5		16.5	2.5
	8.06		56	64		14	3
			54	64			
			51	80			
				80			
				68			

APPENDIX H - (cont'd)

SLURRY QUALITY CONTROL TESTING DATA

SAMPLING DATE	PARAMETER pH	APPARENT VISCOSITY (Sec. - Marsh) MIXER	APPARENT VISCOSITY (Sec. - Marsh) TRENCH	UNIT WEIGHT (lbs/ft^3)	SAND CONTENT (%)	FILTRATE LOSS (mls)	FILTER CAKE THICKNESS (mm)
7/18/83	7.94		60	82	3.5	17	2.5
	8.07		45	65		15.5	2
			55	65			
			57	82			
				95			
7/19/83	7.56	68	66	85	23	14	3
	7.84		61	81	20	14	3
			60	81	24		
			63	82			
				85			
				84			
				82			
7/20/83	--[4]		73	82	21	--[3]	--
	--		45	68	3	17	2.5
			62	68	3.5		
			45	85	24		
				68	4.5		
7/21/83	--[4]	46	41	66	2.5	17	2.5
			44	67	2.3		
			46	71	16		
			67	74	2.5		
				67			
				76			
7/22/83	--	43	50	76.5	14	14	2.5
	--		56	67	4	15.5	3
			47	72	10		
			43	79	16		
				76			
				74			
7/25/83	--[4]	41	45	82	5	17.5	3
	--		45	69		19	2.5
			44	102			
			49	66.5			
			39	72			

APPENDIX H - (cont'd)

SLURRY QUALITY CONTROL TESTING DATA

SAMPLING DATE	PARAMETER pH	APPARENT VISCOSITY (Sec. - Marsh) MIXER	TRENCH	UNIT WEIGHT (lbs/ft^3)	SAND CONTENT (%)	FILTRATE LOSS (mls)	FILTER CAKE THICKNESS (mm)
7/26/83	--[4]	48	44	65		18	3
	--		51	65		18	3
			51	92			
			48	69			
			54	90			
			51	69			
			55	86			
				67.5			
7/27/83	--[4]	50	60	87		15	3
	--		60	86		15	3
			60	103			
			55	70			
			38	64.5			
			60	95			
8/1/83	--[4]	42	43	70	40	15.5	3
			64	96	18		
			38	64.5			
			44	80			
				84			
8/2/83	--[4]	46	54	81	13	15.5	3
	--		54	65		15	2.5
			50	75			
			54	80			
			53	66.5			
				74			
8/31/83 (Re-excavation)	--[4]		46	72		17.5	3

APPENDIX H - (cont'd)

SLURRY QUALITY CONTROL TESTING DATA

SAMPLING DATE	PARAMETER pH	APPARENT VISCOSITY (Sec. - Marsh) MIXER	APPARENT VISCOSITY (Sec. - Marsh) TRENCH	UNIT WEIGHT (lbs/ft^3)	SAND CONTENT (%)	FILTRATE LOSS (mls)	FILTER CAKE THICKNESS (mm)
8/3/83	--[4]	40	60	67	9	24	2.5
	--		34	70		50	8
			38	64			
			42	72			
			43	84			
			50	65			
			44	76			
			48	67			
				66			
8/4/83	--[4]		41	64		16	3
	--		63	64.5		24	3.5
			60	64.5			
			38	70			
			38	64			
			41	64			
				64			
8/5/83	--[4]	38	37	64		21	4
			41	73			
			50	77			
			39	65			
			43	65			
			80	66			
				64			
8/8/83	--[4]	43	50	63.5		19	3
	--		51	62.5		19.5	4
			50	64			
			46	64.5			
			40	64.5			
				67			
				71			

APPENDIX H - (cont'd)

SLURRY QUALITY CONTROL TESTING DATA

SAMPLING DATE	PARAMETER pH	APPARENT VISCOSITY (Sec. - Marsh) MIXER	TRENCH	UNIT WEIGHT (lbs/ft^3)	SAND CONTENT (%)	FILTRATE LOSS (mls)	FILTER CAKE THICKNESS (mm)
8/9/83	--[4]	43	39	64		22	3
	--		44.5	62.5		21	2.5
			38	66			
			40	64			
				65.5			
				66.5			
				66.6			
				70			
8/10/83	--[4]	41	41	75		29	4.5
	--		41	74		24.5	2
			42	67			
			39	74			
			35	80			
				63.5			
				64			
				64			
8/15/83	--[4]		37	63	6	23	4
	--		41	63.5	10	21	4
	--		44	68	10	71	8
			48	74	22		
			46	74			
			72	80			
8/16/83	--[4]	48	47	66		19.5	3.5
	--		46	65.5		20	3.5
				65.5			
			60	64			
			40	64			
				62.5			
8/17/83	--[4]	35	40	64		21.5	3
	--		41	66		27	4
			45	69			
				74			

APPENDIX H - (cont'd)

SLURRY QUALITY CONTROL TESTING DATA

SAMPLING DATE	PARAMETER					FILTRATE LOSS (mls)	FILTER CAKE THICKNESS (mm)
	pH	APPARENT VISCOSITY (Sec. - Marsh) MIXER	APPARENT VISCOSITY (Sec. - Marsh) TRENCH	UNIT WEIGHT (lbs/ft^3)	SAND CONTENT (%)		
8/30/83	--		44	70		15	3
			46	66			

NOTE: 1. CO_2 pressure not held constant - repairs under way
3. Insufficient quantity of sample
4. pH meter was broken
5. large stone present in sample

APPENDIX H - (cont'd)

SLURRY QUALITY CONTROL TESTING DATA

SAMPLING DATE	PARAMETER pH	APPARENT VISCOSITY (Sec. - Marsh) MIXER	APPARENT VISCOSITY (Sec. - Marsh) TRENCH	UNIT WEIGHT (lbs/ft^3)	SAND CONTENT (%)	FILTRATE LOSS (mls)	FILTER CAKE THICKNESS (mm)
8/22/83	--	38	36	63	11	33	4
	--		36	68		16	2.5
	--		36	74.5		18	3
			41	64.5			
			43	70			
			47	68			
			47	71.5			
8/23/83	--		41	65	16	15	2.5
	--		50	64		17	3
			47	70			
			56	68			
			65	78			
				65			
8/24/83	--	53	47	64	10	15	3
			70	63		18	3
			63	63.5			
			48	67			
				77			
				67.5			
				76			
8/25/83	--		54	74.5	10	21	4
	--		46	76	12	17	4
			49	76	10		
			44	72	8		
				68			
8/26/83	--		38	66	9	16	2.5
	--		44	70	13	18	2.5
			43	73	20		
			40	69			
			50	76.5			
				82			
8/29/83	--		44	68		15.5	2.5
	--		41	68		15.5	2.5
			43	70			

APPENDIX I

BACKFILL QUALITY CONTROL DATA

APPENDIX I

BACKFILL QUALITY CONTROL DATA

SAMPLING DATE	BACKFILL VOLUME (C.Y.)	UNIT WEIGHT (lbs./ft^3)	SLUMP (inches)	GRADATION (% <200 Sieve)	APPARENT BENTONITE CONTENT (% Wet Wt)
6/7/83	164.7	90	5.5	8	<3
		123	6	8	<3
		120	7		
		126	4		
6/8/83	52.5	114	1	31*	<3
		120	1	--	<3
		132	6		
		126	6		
			6		
			4		
6/9/83	197.3	118	2	--	<3
		126	2	--	<3
		123	2		<3
			2		
			3		
			3		
			3		
6/10/83	185.7	135	2	39	<3
		130	3	41	
		120	4		
		120	6		
		132	4		
			3		
6/13/83	48.1		2		
			2		
6/15/83	107.6			31.8	
				31.6	

APPENDIX I - (cont'd)

BACKFILL QUALITY CONTROL DATA

SAMPLING DATE	BACKFILL VOLUME (C.Y.)	UNIT WEIGHT (lbs./ft^3)	SLUMP (inches)	GRADATION (% <200 Sieve)	APPARENT BENTONITE CONTENT (% Wet Wt)
6/16/83	70.2	132	2	39.4	
		123	2		
		123	3		
6/17/83	130.3			41.6	
6/20/83	183.9	120	6	36	<3
		120	6	33.7	<3
		146	6	34.4	3.2
		132	5	36	3.4
			4		
			4		
6/21/83	224.2	114	2	35.9	4
		126	2		3.8
		126	4		3
		120	4		3
		126	3		
6/22/83	183.4			2 --	2 (3.4)
				--	(4)
6/24/83	149.9	120	3	45.7	5.1
		120	4	47.8	5.7
		120	3	59.4	4.8
		120	4	64.5	
			4		
			3.5		
			4		
			3.5		
			4		

APPENDIX I - (cont'd)

BACKFILL QUALITY CONTROL DATA

SAMPLING DATE	BACKFILL VOLUME (C.Y.)	UNIT WEIGHT (lbs./ft^3)	SLUMP (inches)	GRADATION (% <200 Sieve)	APPARENT BENTONITE CONTENT (% Wet Wt)
6/27/83	185.8		3	58.8	4.3
			2	32	4
7/11/83	102.7				
7/12/83	147.4	110	3	55.8	5.4
		108	5	55.7	6.7
		120	3		
		120	3		
		120	3		
7/13/83	261.7	126	6	53.9	10.6
		120	5	42.8	5.7
		120	5	35.9	4.9
		126	3	62.6	5.4
		126	4	51.3	
		120	4	53.3	
		120	5		
		120	5		
			5		
7/14/83	245.9	120	6	55.1	6.9
		114	4	46.6	5.1
		120	4	51.8	6.3
		120	5	52.4	5.1
		126	4		
			5		
			3		
			3		
			4		
			4		

APPENDIX I - (cont'd)

BACKFILL QUALITY CONTROL DATA

SAMPLING DATE	BACKFILL VOLUME (C.Y.)	UNIT WEIGHT (lbs./ft^3)	SLUMP (inches)	GRADATION (% <200 Sieve)	APPARENT BENTONITE CONTENT (% Wet Wt)
7/15/83	169.5	126	4, 5	37.5	6.3
		120	5, 4	46.6	4
		120	4, 4	34.5	4.3
		132	5, 4	37.5	5.1
		120	4, 6		
		120	5, 5		
		120	4, 7		
		120	, 3.5		
7/18/83	111.3	120	4.5	45.1	4
		126	4.5	43.8	4
		120	3	41.2	4.9
		126	4.5	39.6	4.9
			6		
7/19/83	108.9	138	1	--[2]	--[2]
		125	2	--	--
		125	2		
		120	2		
		130			
		131			
7/20/83	84.4	130	4	52.1	5.7
		130	6	46.3	5.1
		130	6		
7/21/83	103.8	128	4	47.5	5.7
		129	3.5	53.8	4.9
		130	4		
		132	2		
7/22/83	181.2	130	5	53.6	5.1
		130	5	43	5.7
		131	2	34.1	5.7
		135	2	40.1	
		130	2		
		130	4		
		132	4		

APPENDIX I - (cont'd)

BACKFILL QUALITY CONTROL DATA

SAMPLING DATE	BACKFILL VOLUME (C.Y.)	UNIT WEIGHT (lbs./ft^3)	SLUMP (inches)	GRADATION (% <200 Sieve)	APPARENT BENTONITE CONTENT (% Wet Wt)
7/25/83	337.3	130	4.5	34.2	4
		132	5	32.3	4.6
		130	7	26.7	4.6
		132	5	27.2	3.7
		144	5		
		134	6		
		138	6		
			2		
			6		
7/26/83	314.3	133	3	30.9	3.1
		134	3	26.4	3.1
		138	4	22.2	3.7
		140	3	27.5	4
		138	7		
		135	7		
			6		
			3		
			2		
			3		
			4		
7/27/83	193	133	3	39.7	4
		135	3	34.3	3.4
		136	3		
		133	2		
			2		
			3		
			3		
			3		
8/1/83	176.9	132	3	26.3	2.9
		132	3.5	33.4	3.4
		133	4	34.5	
		131	2	28.8	

APPENDIX I - (cont'd)

BACKFILL QUALITY CONTROL DATA

SAMPLING DATE	BACKFILL VOLUME (C.Y.)	UNIT WEIGHT (lbs./ft^3)	SLUMP (inches)	GRADATION (% <200 Sieve)	APPARENT BENTONITE CONTENT (% Wet Wt)
8/2/83	212.7	129	3.5	42	4.3
		132	3.5	43.4	2.9
		133	3	21.6	3.4
		132	3	43.5	3.1
		132	4		3.4
		135	4		
		135	2		
		133	2		
8/31/83	99	123	4	--[2]	5.4
			4		
			4		
			2		
8/3/83	227.4	132	4	38.1	3.4
		135	4	38.6	3.1
		135	4	42.8	4
		132	4	40.7	4.5
		128	3		
		128	5		
		129	3		
		126	7		
8/4/83	167	130	2	41.5	4.4
		130	3	38.9	4.6
		129	4	41.8	4.9
		127	3	41.2	4.9
		128	3		
		126	3		
		131	3		
		129	4		
		127	3		
			4		

APPENDIX I - (cont'd)

BACKFILL QUALITY CONTROL DATA

SAMPLING DATE	BACKFILL VOLUME (C.Y.)	UNIT WEIGHT (lbs./ft^3)	SLUMP (inches)	GRADATION (% <200 Sieve)	APPARENT BENTONITE CONTENT (% Wet Wt)
8/5/83	320.1	125	6	41.9	5.4
		126	2	41	6.3
		128	3	38.7	4
		125	3	43.3	6.9
		122	4		
		122	4		
		123	4		
			5		
			6		
8/8/83	358.6	126	5	39.3	6.3
		121	3	35.2	5.4
		119	6	39.5	3.7
		132	4	36.9	5.1
		125	2		
		127	3		
		127	4		
		126	4		
			3		
8/9/83	399	126	4	50.1	4.4
		124	4	43.9	6
		126	5	45.3	5.1
		123	3.5	44.4	5.7
		126	4		
		130	4		
		132	4		
		126	3		
		130	5		
		130	4		
			4		
			4		
			3		
			3		
			4		

APPENDIX I - (cont'd)

BACKFILL QUALITY CONTROL DATA

SAMPLING DATE	BACKFILL VOLUME (C.Y.)	UNIT WEIGHT (lbs./ft^3)	SLUMP (inches)	GRADATION (% <200 Sieve)	APPARENT BENTONITE CONTENT (% Wet Wt)
8/10/83	315.1	125	5 ,4	44.9	4.6
		125	4, 2	27	4.6
		126	4, 2	34.5	4.6
		122	3, 4	36.8	5.1
		122	3, 4	44.5	
		125	4, 4	47.8	
		127	5, 2		
		124	5		
8/15/83	368.8	127	4.5, 4	35.9	5.1
		124	4.5, 2	47.4	4.9
		125	4.5, 2	41.8	3.4
		127	4, 3	42.4	3.4
		124	4, 3	59.5	
		126	5, 4.5	46.2	
		126	5		
		127	4		
8/16/83	216	128	3	45	5.1
		123	3	57.5	4.6
				46.9	
		124	2	45.1	
		126	2	36.2	
			3		
8/17/83	218.4	123	4	42.4	4.9
		127	4	44.8	5.1
		130	3	14.1	
			3	38.5	
			4	48	
				51.9	
8/22/83	397.1	128	4	53.8	4.6
		127	4	34.2	5.1
		125	2	55.7	5.1
		124	5	46.1	4.9
		130	4	42	
		125	4	51.4	
		131	4		
		125	4		
			2		
			3		
			4		
			4		

APPENDIX I - (cont'd)

BACKFILL QUALITY CONTROL DATA

SAMPLING DATE	BACKFILL VOLUME (C.Y.)	UNIT WEIGHT (lbs./ft^3)	SLUMP (inches)	GRADATION (% <200 Sieve)	APPARENT BENTONITE CONTENT (% Wet Wt)
8/23/83	427.8	127	3.5, 4	43.1	5.1
		129	3, 4	57	5.7
		126	4, 3	38.6	5.7
		126	4, 4	40.3	5.1
		128	5	43.6	
		132	5	35.1	
			4		
			2		
8/24/83	189.6	128	4, 3	50.4	4.6
		127	4, 3	42.9	4.6
		126	6, 3	47.1	4.9
		122	6, 3	30.9	5.4
		129	5, 2		
		125	5		
			5		
			4		
8/25/83	371	127	4, 3	46.6	4.6
		125	3, 5	36.2	5.4
		125	3, 5	34.4	4.4
		127	5, 4	26.6	5.1
		122	5, 5		
		127	4		
		116	3		
		122	4		
8/26/83	284.7	121	4, 2	29.8	4.9
		122	4, 4	32.2	5.4
		119	4, 4.5	32	5.7
		123	5, 4	30.9	5.1
		125	4, 4		
		122	4, 4.5		
		121	3		
		124	2		
8/29/83	191.5	124	6, 6	39.2	4
		123	7, 6	35.2	5.4
		129	7, 4	38.1	5.1
		124	6, 4		
		125	4		
		129	6		
			4		
			6		

APPENDIX I - (cont'd)

BACKFILL QUALITY CONTROL DATA

SAMPLING DATE	BACKFILL VOLUME (C.Y.)	UNIT WEIGHT (lbs./ft^3)	SLUMP (inches)	GRADATION (% <200 Sieve)	APPARENT BENTONITE CONTENT (% Wet Wt)
8/30/83	231.6	126	6	38.1	4.9
		125	6	41.4	5.1
		125	4	37.1	
		126	4		
			6		
			4		
			6		
			4		
			4.5		
			5		

NOTE: * Wash sieve analysis
2. No backfill samples taken
6-22-83 - two samples without dry bentonite added
3. Insufficient quantity of sample
5. large stone present in sample

APPENDIX J

PERMEABILITY TESTING OF CONSTRUCTED CONTAINMENT WALLS

APPENDIX J (Cont'd)

PERMEABILITY TESTING OF CONSTRUCTED CONTAINMENT WALLS

SAMPLING STATION	SAMPLING DATE	SAMPLING LOCATION	PERMEABILITY (cm/sec)
DOWNGRADIENT CONTAINMENT WALL (Cont'd)			
DGW-112	09/02/83	Station 47+50	7.2×10^{-8}
DGW-113	09/02/83	Station 42+50	6.8×10^{-8}
DGW-114[5]	09/08/83	Station 37+46	4.2×10^{-8}
DGW-114A[6]	09/08/83	Station 37+46	**
DGW-114B[7]	09/08/83	Station 37+48	**
DWG-115	09/08/83	Station 33+75	2.4×10^{-8}
OIL CONTAMINATED AREA CONTAINMENT WALL			
B-1	06/17/83	50' south of northwest corner	8.1×10^{-8}
B-2	06/17/83	10' north of southwest corner	8.9×10^{-8}

Notes:
* Permeability sample was examined after completion of test and a piece of gravel was present in center of sample. Therefore, this boring was retested for permeability.
** Boring with no permeability testing.
1. Sand lens evident in tip of Shelby tube pushed from the 4' to 6' depth.
2. Sampled from 4' to 6' depth only. No sand lens evident.
3. Sampled from 2' to 8' depth only. No sand lens evident.
4. Borings conducted on reconstructed upgradient containment wall.
5. Virgin soil evident on reconstructed upgradient containment wall.
6. Sample obtained after auger retrieval at the 2.5' to 4.5' depth only. No virgin soil evident.
7. Sampled from 2.5' to 4.5' depth only. No virgin soil evident.