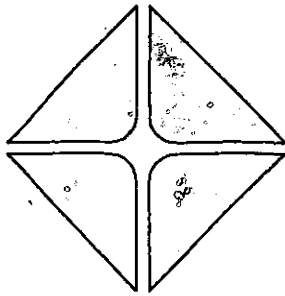


File on eDOCs Yes No
Site Name Sinclair Refining
Site No. 902003
County Allegheny
Town Wellsville
Foilable Yes No
File Name Documents / Reports
Scanned & eDOC

Report. HAW902003. 1993-09. RA - CENTRAL -
LANDFILL - VOL 3.



Prepared for

Atlantic Richfield Company

515 South Flower Street
Los Angeles, California 90071

**REMEDIAL ACTION REPORT
CENTRAL ELEVATED LANDFILL AREA**

**SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK**

VOLUME III

Prepared by



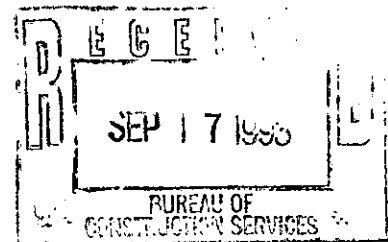
GEOSYNTEC CONSULTANTS

5775 Peachtree Dunwoody Road
Atlanta, Georgia 30342

Project Number: GQ3201

September 1993

APPENDIX E



SOIL BENTONITE CUTOFF WALL PRECONSTRUCTION TESTING

- **BENTONITE**
 - Letter of Certification to API-13A Section 4
 - Certificates of Compliance
 - Bills of Lading
 - Transportation and Material and Safety Data Sheet

- **UNPROCESSED CLAY**
 - Submittal Information
 - Borrow Pit and Sampling Locations
 - Geotechnical Tests
 - Chemical Analyses

- **PROCESSED CLAY**
 - Geotechnical Tests
 - Chemical Analyses

- **WATER SUPPLY**

- **CHEMICAL COMPATIBILITY OF SOIL-BENTONITE
BACKFILL**

BENTONITE

- **LETTER OF CERTIFICATION TO API-13A SECTION 4**
- **CERTIFICATES OF COMPLIANCE**
- **BILLS OF LADING**
- **TRANSPORTATION AND MATERIAL AND SAFETY
DATA SHEET**

**LETTER OF CERTIFICATION
TO API-13A SECTION 4**



GEOSYNTEC CONSULTANTS

ARCO 

SUBMITTAL COVER SHEET

1992 year

PROJECT: CELA SLURRY WALL

PROJECT NO.: GQ3201

TASK NO.: 02

LOCATION: WELLSVILLE, NEW YORK

CONTRACTOR: GEO-CON, INC. (C91027-003-01)

SUBMITTAL NO.: 27 DC #3

REVISION NO.: ADDENDUM No 2

SUBMITTAL TITLE: Bentonite Certificates of Compliance

DATE RECEIVED: 26 June / 92
(day/ month/ yr)

DATE REVIEWED: 28 June / 92
(day/ month/ yr)

RESUBMITTAL REQUIRED:

☐

YES

☒

NO

DATE APPROVED: 29 June / 92
(day/ month/ yr)

COMMENTS: Letter certifying conformance of bentonite to
API - 13A Section 4.

DISTRIBUTION:

BY:

GEOSYNTEC CONSULTANTS

BY:

ARCO

P1-0129

SUBMITTAL 27QC03
ADDENDUM NO. 2
CONTRACT NO. C91027-003-01
BENTONITE CERTIFICATES OF COMPLIANCE
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

Prepared for:

Atlantic Richfield Company
515 South Flower Street AP-4188
Los Angeles, CA 90017

Attn: Robert Ivy
Construction Supervisor

Prepared By:

GEO-CON, INC.
4075 Monroeville Boulevard
Corporate One Building II, Suite 400
Monroeville, Pennsylvania 15146
Telephone: (412) 856-7700



P.O. Box 42642

HOUSTON, TEXAS 77242

713 972-1310

TELEX 166743

June 24, 1992

Mr. Brett Redmon
Geo-Con, Inc.
PO BOX 17380
Pittsburgh, PA 15235

LETTER OF CERTIFICATION

This is to certify that the product FEDERAL JEL 90 / M-I GEL as manufactured by M-I DRILLING FLUIDS COMPANY conforms to the requirements as specified in API-13A SECTION 4.

This bentonite product will be the product delivered to your jobsite from railcars BN 321855, NIRX 14036 and NIRX 14045. All additional shipments to this project will be API-13A grade bentonite unless otherwise requested by you.

Clay Winnard
Sr. Account Representative

CERTIFICATES OF COMPLIANCE



GEO SYNTEC CONSULTANTS

ARCO 

SUBMITTAL COVER SHEET

1992 year

PROJECT: CELA SLURRY WALL PROJECT NO.: GQ3201 TASK NO.: 02
LOCATION: WELLSVILLE, NEW YORK CONTRACTOR: GEO-CON, INC. (C910 27-003-01)

SUBMITTAL NO.: 27 of 3 REVISION NO.: ADDENDUM No. 1

SUBMITTAL TITLE: Bentank Certificates of Compliance

DATE RECEIVED: 26 June 92
(day/ month/ yr)

DATE REVIEWED: 28 June 92
(day/ month/ yr)

RESUBMITTAL REQUIRED:

☐

YES

☒

NO

DATE APPROVED: 29 June 92
(day/ month/ yr)

COMMENTS: References Addendum No. 2

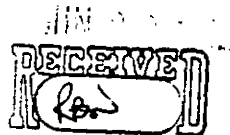
DISTRIBUTION:

BY:

R. J. [Signature]
GEO SYNTEC CONSULTANTS

BY:

[Signature]
ARCO



P1-0129

SUBMITTAL 27QC03
CONTRACT NO. C91027-003-01
BENTONITE CERTIFICATES OF COMPLIANCE
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

Prepared for:

Atlantic Richfield Company
515 South Flower Street AP-4188
Los Angeles, CA 90017

Attn: Robert Ivy
Construction Supervisor

Prepared By:

GEO-CON, INC.
4075 Monroeville Boulevard
Corporate One Building II, Suite 400
Monroeville, Pennsylvania 15146
Telephone: (412) 856-7700



P.O. BOX 42842 HOUSTON, TEXAS 77242

LABORATORY ANALYSIS

DATE TESTED

6-10-92

SOLO TO:

Geo-Con
Pittsburg, PA

SHIP TO:

M-I Drilling Fluids
c/o Midwest Transfer
Berwyn, Ill.
Futherance to Wellsville, NY

SHIP DATE	RAIL CAR OR TRUCK NUMBER	PLANT OF ORIGIN	TYPE OF MATERIAL
6-10-92	WIRX 14036	Greybull, WY	M-I Gel

NOTE: Our data for the above shipment shows the following test results: (Federal Test 96)

LABORATORY TEST RESULTS	LABORATORY TEST RESULTS
1 Vis - 48	7
2 PH Vis - 17	8
3 Y.P - 14	9
4 YP/PV ratio - .82	10
5 Filtrate - ~~.22~~ 12.3	Leonard K. Smith
6 Moist. - 2.6% ^{>75} micron - 2.1	SIGNED
	DATE

Should you have any questions or require additional information please let us know.

MI-2026

WHITE—CUSTOMER

CANARY—IND. MARKET-HOU

PINK—PLANT LAB FILE



P.O. BOX 42842

HOUSTON, TEXAS 77242

LABORATORY ANALYSIS

DATE TESTED

6-11-92

SOLD TO:

Geo-Con

Pittsburg, PA

SHIP TO:

M-I Drilling Fluids
c/o Midwest TransferBerwyn, Ill.
Futherance to wellsville, NY

SHIP DATE	RAIL CAR OR TRUCK NUMBER	PLANT OF ORIGIN	TYPE OF MATERIAL
6-11-92	NIRX 14045	Greybull, WY	M-I Gel (Federal Jet 90)

NOTE: Our data for the above shipment shows the following test results:

LABORATORY TEST RESULTS	LABORATORY TEST RESULTS
1 Vis - 43	7
2 PI Vis 16	8
3 Y.P. 11	9
4 YP/PV ratio .69	10
5 Filtrate 13.0	Leonard K. Smith
6 Moist - 7.8% 775 Aikon - 2.3	SIGNED
	DATE
	6-12-92

Should you have any questions or require additional information please let us know.

MI-2026

WHITE—CUSTOMER

CANARY—IND. MARKET-HOU

PINK—PLANT LAB FILE

P1-0129

SUBMITTAL 27QC03
ADDENDUM NO. 1
CONTRACT NO. C91027-003-01
BENTONITE CERTIFICATES OF COMPLIANCE
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

Prepared for:

Atlantic Richfield Company
515 South Flower Street AP-4188
Los Angeles, CA 90017

Attn: Robert Ivy
Construction Supervisor

Prepared By:

GEO-CON. INC.
4075 Monroeville Boulevard
Corporate One Building II, Suite 400
Monroeville, Pennsylvania 15146
Telephone: (412) 856-7700

P.O. BOX 42842 HOUSTON, TEXAS 77242

LABORATORY ANALYSIS

DATE TESTED

6-15-92

SOLD TO:

Geo-Con
 Pittsburg, PA

SHIP TO:

M-I Drilling Fluids
 c/o Midwest Transfer
 Berwyn, Ill.
 for furtherance to Webster, Mo.

SHIP DATE

RAIL CAR OR TRUCK NUMBER

PLANT OF ORIGIN

TYPE OF MATERIAL

6-15-92

BN 321855

Greybull, WY

M-I Gel

NOTE: Our data for the above shipment shows the following test results: Federal Test 190

LABORATORY TEST RESULTS

1 Vis - 37

2 PL Vis - 15

3 YP - 7

4 P/PV ratio .47

5 Filtrate 14.0

6 Moist 8.4% 775 micron 1.8

LABORATORY TEST RESULTS

7

8

9

10

Leonard K. Smith

6-16-92

SIGNED

DATE

Should you have any questions or require additional information please let us know.

P1-0129

SUBMITTAL 27QC03
ADDENDUM NO. 4
CONTRACT NO. C91027-003-01
BENTONITE CERTIFICATES OF COMPLIANCE
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

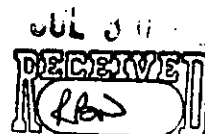
Prepared for:

Atlantic Richfield Company
515 South Flower Street AP-4188
Los Angeles, CA 90017

Attn: Robert Ivy
Construction Supervisor

Prepared By:

GEO-CON, INC.
4075 Monroeville Boulevard
Corporate One Building II, Suite 400
Monroeville, Pennsylvania 15146
Telephone: (412) 856-7700





P.O. BOX 42842

HOUSTON, TEXAS 77242

LABORATORY ANALYSIS

DATE TESTED

7-21-92

SOLD TO:

GEO-CON, INC.

P. O. BOX 17380

PITTSBURGH, PA 15235

SHIP TO:

GEO-CON, INC.

% ARCO-SINCLAIR REFINER Y

1448 S. BROOKLYN AVENUE

WELLSVILLE, NY 14895

SHIP DATE	RAIL CAR OR TRUCK NUMBER	PLANT OF ORIGIN	TYPE OF MATERIAL
7-24-92	PDD # 71	GREYBULL, WYOMING	FEDERAL GEL 90 180#

NOTE: Our data for the above shipment shows the following test results:

LABORATORY TEST RESULTS	LABORATORY TEST RESULTS
¹ V.S. - 48	7
² PL. V.S. - 14	8
³ Y. P. - 15	9
⁴ FILTRATE VOLUME - 13.6	10
⁵ MOIST. - 8.3 %	<i>Samuel H. Davis</i> 7-24-92
6	SIGNED DATE

Should you have any questions or require additional information please let us know.

BILLS OF LADING



GEO SYNTec CONSULTANTS

ARCO

SUBMITTAL COVER SHEET

1992 year

PROJECT: CELA SLURRY WALL

PROJECT NO.: GQ3201

TASK NO.: 03

LOCATION: WELLSVILLE, NEW YORK

CONTRACTOR: GEO-CON, INC. (C91027-003-01)

SUBMITTAL NO.: 270003

REVISION NO.: ADD No. 4

SUBMITTAL TITLE: BASTONITE CERTIFICATES OF COMPLIANCE.

DATE RECEIVED: 30/JUNE/92
(day/month/yr)

DATE REVIEWED: 31/JUNE/92
(day/month/yr)

RESUBMITTAL REQUIRED:

☐ YES

☒ NO

DATE APPROVED: 31/JUNE/92
(day/month/yr)

COMMENTS: None

DISTRIBUTION:

BY:

GEO SYNTec CONSULTANTS

BY:

ARCO

This Memorandum is an acknowledgment that a Bill of Lading has been issued and is not the Original Bill of Lading, nor a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

MINF-001C

Shipper No. _____

Carrier No. _____

Date 6/17/92

MIDWEST TRANSFER & STORAGE (AGENT)

(Name of Carrier)

TO: Consignee GEO-CON ARCO SINCLAIR REFINERY 2446 S. BROOKLYN AVE. WELLSVILLE, NY 14895 Destination Wellsville, NY Zip Code 14895		FROM: Shipper M I DRILLING FLUIDS CO 1705 S. RIDGELAND AVE. Street BETHUN, KANSAS Origin Bethun, Kansas Zip Code 66402

Route ADVANCED DISTRIBUTION TRUCK Vehicle Number TRI# 187002A

No. Shipping Units	HM	Kind of Packaging, Description of Articles, Special Marks, and Exceptions	WEIGHT (Subject to Correction)	RATE	CHARGES
455		100# bags CLAY NEC GROUND on 13 pils @ 35 bags each tare GROSS ex: boxcar U9LX 14036	45,955 650 46,605		
SEND FRT BILL TO: ATTN: SUSAN MUNCHRATH M I DRILLING FLUIDS CO P. O. BOX 589 HOUSTON, TX 77001					

REMIT C.O.D. TO ADDRESS	COD Amt.: \$	C.O.D. FEE: PREPAID ☐ COLLECT ☐ \$	TOTAL CHARGES: \$

* MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.		FREIGHT CHARGES FREIGHT PREPAID except when box is checked.	Check Box if Charges are to be ☐ COLLECT
NOTE - Where the rate is dependent on value shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding \$ _____	Subject to Section 7 of the conditions, 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 charges. (Signature of Consignor)		

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above 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 of, said property overall 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 bill of lading terms and conditions in the governing classification on the date of shipment.
Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER	CARRIER ADVANCED DISTRIBUTION
PER	PER <i>Richard H. Cell</i>
	DATE 6/21/92

DL 874

SHIPPER PLEASE NOTE ► FREIGHT CHARGES ARE PREPAID ON THIS BILL OF LADING UNLESS MARKED COLLECT.

RECEIVED
JUN 23 1992
RCS

This Memorandum is an acknowledgment that a Bill of Lading has been issued and is not the Original Bill of Lading, nor a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

Shipper No. **MIDE-001A**
Carrier No. _____
Date **6/17/92**

MIDWEST TRANSFER & STORAGE (AGENT)

(Name of Carrier)

TO: **GEO-CON**
Consignee **X ARCO SINCLAIR REFINERY**
Street **2446 S. BROOKLYN AVE.**
Destination **WELLSVILLE, NY** Zip Code **14895**

FROM: **H I DRILLING FLUIDS CO**
Shipper
Street **2905 E. RIDGELAND AVE.**
Origin **BERWYN, ILLINOIS** Zip Code **60402**

Route **CHAPARRAL TRUCK** Vehicle Number **TRL# 3008**

No Shipping Units	# HM	Kind of Packaging, Description of Articles, Special Marks, and Exceptions	WEIGHT (Subject to Correction)	RATE	CHARGES
455		1000 bags CLAY NEC GROUND	45,955		
		on 13 plts @ 35 bags each	650		
			GROSS 46,605		
		ex: boxcar USLX 14036			
		SEND FRT BILL TO: ATTN: SUSAN HUNCRATH H I DRILLING FLUIDS CO P. O. BOX 589 HOUSTON, TX 77001			

REMIT C.O.D. TO: ADDRESS **COD** Amt: \$ **COD FEE** PREPAID [] \$ COLLECT [] **TOTAL CHARGES: \$**

* MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding \$ _____ per _____

Subject to Section 7 of the conditions, 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 charges.

(Signature of Consignor)

FREIGHT CHARGES FREIGHT PREPAID except when box at right is checked ☐ **COLLECT**

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above 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 of, said property overall 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 bill of lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER _____ CARRIER **CHAPARRAL TRUCK**

PER _____ PER _____

DATE **6/17/92** **4**

SHIPPER PLEASE NOTE ► FREIGHT CHARGES ARE PREPAID ON THIS BILL OF LADING UNLESS MARKED COLLECT.

This Memorandum is an acknowledgment that a Bill of Lading has been issued and is not the Original Bill of Lading, nor a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

Shopper No. **HIDF-001A**
Carrier No. _____
Date **6/17/92**

MIDWEST TRANSFER & STORAGE (AGENT)
(Name of Carrier)

TO: GEO-CON	FROM: M I DRILLING FLUIDS CO
Consignee: X ARCO SINCLAIR REFINERY	Shipper: _____
Street: 2446 S. BROOKLYN AVE.	Street: 2905 S. MIDLAND AVE
Destination: WELLSVILLE, NY	Origin: BERWYN, ILLINOIS
Zip Code: 14895	Zip Code: 60401

Route: CHAPARRAL TRUCK	Vehicle Number: TBL# 4826

No Shipping Units	* HIM	Kind of Packaging, Description of Articles, Special Marks, and Exceptions	WEIGHT (Subject to Correction)	RATE	CHARGES
455		100# bags CLAY NEC GROUND	45,955		
		on 13 pils @ 35 bags each	care 650		
			GROSS 46,605		
		ext boxcar USLX 14036			
		SEND FRT BILL TO: ATTN: SUSAN MUNCHRATH M I DRILLING FLUIDS CO P. O. BOX 589 HOUSTON, TX 77001			

REMIT TO: _____	COD Amt: \$ _____	C.O.D. FEE: PREPAID ☐ COLLECT ☐ \$ _____	TOTAL CHARGES: \$ _____
* MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.			Check Box if Charges are to be ☐ COLLECT
NOTE - Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____.			

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above 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 of, said property overall 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 bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER: _____	CARRIER: CHAPARRAL TRUCK
PER: _____	DATE: _____

SHIPPER PLEASE NOTE ► FREIGHT CHARGES ARE PREPAID ON THIS BILL OF LADING UNLESS MARKED COLLECT.

This Memorandum is an acknowledgment that a Bill of Lading has been issued and is not the Original Bill of Lading, nor a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

Shipper No. **MIDF-002A**

Carrier No. _____

MIDWEST TRANSFER & STORAGE (AGENT)

Date **6/18/92**

(Name of Carrier)

TO: **GEO-COM**
Consignee **X ARCO SINCLAIR REFINERY**
Street **2446 S. BROOKLYN AVE.**
Destination **WELLSVILLE, NY** Zip Code **14895**

FROM: **M I DRILLING FLUIDS CO**
Shipper
Street **2905 S. MIDLAND AVE**
Origin **BETHUN, ILLINOIS** Zip Code **60402**

Route **CHAPARRAL TRUCK** Vehicle Number **TRL# 3131**

No. Shipping Units	* HM	Kind of Packaging, Description of Articles, Special Marks, and Exceptions	WEIGHT (Subject to Correction)	RATE	CHARGES
455		100# bags CLAY REC GROUND	45,955		
		on 13 pils @ 35 bags each	650		
			GROSS	46,605	
		ext boxcar USLX 14045			
		SEND FRT BILL TO: ATTN: SUSAN MUNCHRATH M I DRILLING FLUIDS CO P. O. BOX 589 HOUSTON, TX 77001			

REMIT C.O.D. TO: ADDRESS **COD** Amt.: \$ C.O.D. FEE: PREPAID ☐ \$ COLLECT ☐ \$ TOTAL CHARGES: \$

* MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding \$ _____ per _____

Subject to Section 7 of the conditions, 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 charges.

(Signature of Consignor)

FREIGHT CHARGES FREIGHT PREPAID ☐ except when box at right is checked. Check Box if Charges are to be ☐ COLLECT

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above 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 of, said property overall 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 bill of lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

CARRIER **CHAPARRAL TRUCK**

PER *Royce Thomas* 455 PCS. 4

DATE **6-20-92**

SHIPPER PLEASE NOTE ► FREIGHT CHARGES ARE PREPAID ON THIS BILL OF LADING UNLESS MARKED COLLECT.

MIDWEST TRANSFER & STORAGE (AGENT)

Carrier No. _____

Date **6/18/92**

(Name of Carrier)

GEO-CON

2 ARCO SINCLAIR REFINERY
2446 S. BROOKLYN AVE.

WELLSVILLE, NY

Zip Code

14895

FROM:
Shipper

M I DRILLING FLUIDS CO

Street

2905 S. HOOGLAND AVE.

Origin

PERWYN, ILLINOIS

Zip Code

60402

CHAPARRAL TRUCK

Vehicle
Number

No Shipping Units	Kind of Packaging, Description of Articles, Special Marks, and Exceptions	WEIGHT (Subject to Correction)	RATE	CHARGES
455	1000 bags CLAY NEC GROUND	45,955		
	on 11 plus 4 35 bags each	650		
		GROSS		
		46,605		
	net boxes USIX 14045			
	SEND BRT BILL TO: ATTN: SUSAN MUNCHRATH			
	M I DRILLING FLUIDS CO			
	P. O. BOX 589			
	HOUSTON, TX 77001			

REMIT C O	COD Amt.: \$	C.O.D. FEE: PREPAID \$ COLLECT \$	TOTAL CHARGES: \$

MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.	Check Box If Charges are to be ☐ COLLECT
NOTE - Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.	FREIGHT CHARGES FREIGHT PREPAID except when box at right is checked.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding	(Signature of Consignor)

RECEIVED subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above 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 of said property overall 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 bill of lading terms and conditions in the governing classification on the date of shipment.

SHIPPER	CARRIER CHAPARRAL TRUCK
PER	DATE 7-10-92
4	

SHIPPER PLEASE NOTE ► FREIGHT CHARGES ARE PREPAID ON THIS BILL OF LADING UNLESS MARKED COLLECT.

MIDWEST TRANSFER & STORAGE (AGENT)

Carrier No. _____

Date 6/18/92

(Name of Carrier)

TO: GEO-CON

2 ARCO SINCLAIR REFINERY
2446 S. BROOKLYN AVE.

WELLSVILLE, NY

Zip Code 14895

FROM: Shipper

M I DRILLING FLUIDS CO

2705 S. HIGGINS AVE.

Street

Origin

BERWYN, ILLINOIS

Zip Code

60402

CHAPARRAL TRUCK

Vehicle Number

No. Shipping Units	* HM	Kind of Packaging, Description of Articles, Special Marks, and Exceptions	WEIGHT (Subject to Correction)	RATE	CHARGES
455		100# bags CLAY HEC GROUND	45,955		
		on 13 plets @ 35 bags each	650		
		GROSS	46,605		
		one boxcar USIX 14045			
		SEND PRT BILL TO: ATTN: SUEAN HUNCHRAITH M I DRILLING FLUIDS CO P. O. BOX 589 HOUSTON, TX 77001			

REMIT TO: COD Amt: \$ C.O.D. FEE: PREPAID ☐ COLLECT ☐ \$ TOTAL CHARGES: \$	Check Box if Charges are to be ☐ COLLECT

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked consigned, and destined as indicated above 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 of, said property overall 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 bill of lading terms and conditions in the governing classification on the date of shipment.

SHIPPER PER DATE	CARRIER: CHAPARRAL TRUCK PER: <i>[Signature]</i> DATE: <i>July 10 1992</i>

SHIPPER PLEASE NOTE ► FREIGHT CHARGES ARE PREPAID ON THIS BILL OF LADING UNLESS MARKED COLLECT.

This Memorandum is an acknowledgment that a Bill of Lading has been issued and is not the Original Bill of Lading, nor a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

Shipper No. **HIDF-003C**

Carrier No. _____

MIDWEST TRANSFER & STORAGE (AGENT)

Date **6/24/92**

(Name of Carrier)

TO: Consignee	GEO-CON	FROM: Shipper	M I DRILLING FLUIDS CO
Street	1 ARCO SINCLAIR REFINERY 2446 S. BROOKLYN AVE.	Street	3705 E. MIDLAND AVE
Destination	WILLSVILLE, NY	Origin	BEEWING, ALABAMA
Zip Code	14895	Zip Code	36008
Route HAWK TRANSPORT		Vehicle Number	

No Shipping Units	* HM	Kind of Packaging, Description of Articles, Special Marks, and Exceptions	WEIGHT (Subject to Correction)	RATE	CHARGES
459		100# bags CLAY NEC GROUND	46,359		
		9 plts of 35 bags each	650		
		4 plts of 36 bags each	GROSS 47,009		
		ex: boxcar BN 321855			
		SEND FRT BILL TO: ATTN: SUSAN MUNCHEATH M I DRILLING FLUIDS CO P. O. BOX 589 HOUSTON, TX 77001			

REMIT C.O.D. TO: ADDRESS	COD Amt.: \$	C.O.D. FEE: PREPAID ☐ \$ COLLECT ☐	TOTAL CHARGES: \$

* MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.		FREIGHT CHARGES FREIGHT PREPAID except when box is checked.	Check Box if Charges are to be ☐ COLLECT
NOTE - Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.	Subject to Section 7 of the conditions, 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 charges.		
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____		(Signature of Consignor)	

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above 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 of said property overall 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 bill of lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER	CARRIER	HAWK TRANSPORT
	PER	<i>[Signature]</i>
	DATE	<i>[Signature]</i>

4

SHIPPER PLEASE NOTE ► FREIGHT CHARGES ARE PREPAID ON THIS BILL OF LADING UNLESS MARKED COLLECT.

This Memorandum is an acknowledgment that a Bill of Lading has been issued and is not the Original Bill of Lading, nor a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

Shipper No. **MIDF-003A**

Carrier No. _____

MIDWEST TRANSFER & STORAGE (AGENT)

Date **6/24/92**

Date _____

(Name of Carrier)

TO: Consignee	GEO-COM	FROM: Shipper	M I DRILLING FLUIDS CO
Street	X ARCO SINCLAIR REFINERY 2446 S. BROOKLYN AVE.	Street	1903 S. MIDLAND AVE
Destination	WELLSVILLE, NY	Origin	BETHUNA, ILLINOIS
	Zip Code 14895		Zip Code 62402

HAWK TRANSPORT

Vehicle
Number

No Shipping Units	* HM	Kind of Packaging, Description of Articles, Special Marks, and Exceptions	WEIGHT (Subject to Correction)	RATE	CHARGES
461		100# bags CLAY NEC GROUND	46,561		
		on 13 pits @ 35 bags each plus 5 bags	tare 650		
		note: 5 bags damaged subject to final consignees inspection	GROSS 47,211		
		ex: boxcar BN 321855			
		SEND FRT BILL TO: ATTN: SUSAN HUNCRATH M I DRILLING FLUIDS CO P. O. BOX 589 HOUSTON, TX 77001			

REMIT C.O.D. TO: ADDRESS	COD Amt: \$	C.O.D. FEE: PREPAID ☐ \$ COLLECT ☐	TOTAL CHARGES: \$

* MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.		FREIGHT CHARGES FREIGHT PREPAID except when box at right is checked	Check Box if Charges are to be ☐ COLLECT
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding \$ _____ per _____	Subject to Section 7 of the conditions, 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 charges. (Signature of Consignor)		

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above 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 of, said property overall 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 bill of lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER <i>Chris B...</i>	CARRIER HAWK TRANSPORT
PER	PER <i>[Signature]</i>
	DATE 7.7.92

BL 874

SHIPPER PLEASE NOTE ► FREIGHT CHARGES ARE PREPAID ON THIS BILL OF LADING UNLESS MARKED COLLECT.

known
dupl.

This Shipping Order must be legibly filled in, in Ink, in Indelible Pencil, or in Carbon, and retained by the Agent.

Shipper No. **MIDF-0038**

Carrier No. _____

MIDWEST TRANSFER & STORAGE (AGENT)

Date **6/24/92**

(Name of Carrier)

TO: GEO-CON		FROM: M I DRILLING FLUIDS CO	
Consignee X ARCO SINCLAIR REFINERY		Shipper	
Street 2446 S. BROOKLYN AVE.		Street 2905 S. RIDGELAND AVE.	
Destination WELLSVILLE, NY		Origin BERWYN, ILLINOIS	
Zip Code 14895		Zip Code 60402	
Route HAWK TRANSPORT			Vehicle Number

No Shipping Units	* HM	Kind of Packaging, Description of Articles, Special Marks, and Exceptions	WEIGHT (Subject to Correction)	RATE	CHARGES
459		100# bags CLAY NEC GROUND	46,359		
		9 plts of 35 bags each	tare 650		
		4 plts of 36 bags each	GROSS 47,009		
		ex: boxcar BN 321855			
		SEND FRT BILL TO: ATTN: SUSAN MUNCHRATH			
		M I DRILLING FLUIDS CO			
		P. O. BOX 589			
		HOUSTON, TX 77001			

REMIT C.O.D. TO: ADDRESS	COD Amt.: \$	C.O.D. FEE: PREPAID ☐ COLLECT ☐ \$	TOTAL CHARGES: \$
* MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS. NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____			Check Box if Charges are to be FREIGHT CHARGES FREIGHT PREPAID ☐ COLLECT ☐ except when box at right is checked.

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above 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 of, said property overall 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 bill of lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

CARRIER HAWK TRANSPORT	PER <i>Anthony Simon</i>	DATE 7-8-92	459	2

**TRANSPORTATION AND
MATERIAL SAFETY DATA SHEET**



GEOSYNTEC CONSULTANTS

ARCO 

SUBMITTAL COVER SHEET

1992 year

PROJECT: CELA SLURRY WALL PROJECT NO.: GQ3201 TASK NO.: 02
LOCATION: WELLSVILLE, NEW YORK CONTRACTOR: GEO-CON, INC. (C91027-003-01)

SUBMITTAL NO.: 27 of 33 REVISION NO.: _____

SUBMITTAL TITLE: BENTONITE SHAPPING MEMORANDA.

DATE RECEIVED: 13 July 92
(day/ month/ yr)

DATE REVIEWED: 15 July 92
(day/ month/ yr)

RESUBMITTAL REQUIRED:

☐ YES

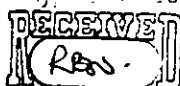
☒ NO

DATE APPROVED: 15 July 92
(day/ month/ yr)

COMMENTS: In order.

DISTRIBUTION:

BY: [Signature]
GEOSYNTEC CONSULTANTS
BY: [Signature]
ARCO



TRANSPORTATION & MATERIAL SAFETY DATA SHEET

P.O. Box 42842 Houston, Texas 77242, (713) 561-1507

TRADE NAME	M-I GEL	PREAMBLE M-I Drilling Fluids Co. is pleased to furnish this data at your request independent of any sale of the product. While every effort has been made to accurately describe this product and associated manifestations, some of the data is obtained from the open literature, independent laboratory studies, or other sources beyond our direct supervision. We cannot make any assertion as to the reliability or completeness; therefore, the Buyer may rely thereon only at Buyer's risk. We have made no effort to censor nor to conceal deleterious aspects of this product. Since we cannot anticipate or control the many different conditions under which this information and our products may be used, we make no guarantee that the health and safety precautions we have suggested will be adequate for all individuals and/or situations involving its handling and use. Likewise we make no guarantee or warranty of any kind that the use or disposal of this product is in compliance with all federal, state or local laws. It is the obligation of each user of this product mentioned herein to determine and comply with the requirements of all applicable statutes. M-I Drilling Fluids Co. will furnish, upon request, any additional available information to assist the Buyer; however, no warranty, either expressed or implied, nor liability of any nature with respect to the product or to the data herein is made or incurred hereunder.
Emergency Telephone Number	(713) 561-1600 561-1300 Day or Night	

I. PRODUCT IDENTIFICATION

COMMON NAME	Bentonite	CHEMICAL FORMULA	Natural clay
MANUFACTURER	M-I Drilling Fluids Company	CAS NUMBER	1302-78-9
PACKAGE QUANTITY	45.4 kg (100 lb)	UNIT OF ISSUE	kg (lb)
USE	Drilling fluid additive	APPLICATION	Viscosifier
FREIGHT DESCRIPTION	Drilling fluid additive		
CONTAINER SPECIFICATIONS	Multiwall paper bag meets DOT requirements (49 CFR 178)		

II. HAZARDOUS INGREDIENTS (DOT, EPA, OSHA, ACGIH)

MATERIAL OR COMPONENT	%	OSHA PEL	ACGIH TLV	OTHER LIMITS RECOMMENDED
Silica, crystalline quartz, respirable dust (14808-60-7)	2-15	0.1 mg/m ³ (1)	0.1 mg/m ³ (2)	NIOSH TWA: 0.1 mg/m ³ (3)
Silica, crystalline cristobalite, respirable dust (14464-46-1)	2-12	0.05 mg/m ³ (1)	0.05 mg/m ³ (2)	NIOSH TWA: 0.05 mg/m ³ (3)
Silica, crystalline tridymite, respirable dust (15468-32-3)	< 1.5	0.05 mg/m ³ (1)	0.05 mg/m ³ (2)	NIOSH TWA: 0.05 mg/m ³ (3)
Gypsum, respirable dust (13397-24-5)	1	5 mg/m ³ (1)	10 mg/m ³ (2)	

III. PHYSICAL DATA

BOILING POINT: 760 mm Hg	N.A.	MELTING POINT	N.A.
pH (1% Soln.)	N.D.	VAPOR PRESSURE @ 20°C	N.A.
SPECIFIC GRAVITY (H ₂ O=1)	N.D.	SOLUBILITY IN WATER @ 20°C	Insoluble
VAPOR DENSITY (air=1)	N.A.	EVAPORATION RATE (BUTYL ACETATE=1)	N.A.
PHYSICAL APPEARANCE	Powder	FLASH POINT (method used)	N.A.
BULK DENSITY	769-833 kg/m ³ (48-52 lb/ft ³)	ODOR & COLOR	Odorless, gray to white color

IV. REACTIVITY DATA

PRODUCT IS STABLE?	Yes	
PRODUCT DECOMPOSES?	No	
PRODUCT POLYMERIZES?	No	
INCOMPATIBILITY	AIR	HEAT
	ACID	BASE
	WATER	OXIDIZER
	OTHER (Specify) N.D.	

N.D.-Not Determined N.A.-Not Applicable <-Less Than >-Greater Than
Note: For additional information and interpretive assistance, please see last page.

FLAMMABLE LIMITS BY AIR, % BY VOL.	L.E.L.	N.A.	U.E.L.	N.A.	AUTO IGNITION TEMPERATURE	N.A.
PRODUCTS EVOLVED WHEN SUBJECTED TO HEAT BY COMBUSTION	Essentially none. This material is not combustible.					
EXTINGUISHING MEDIA	This material is compatible with all media that may be needed to extinguish nearby burning materials.					
SPECIAL FIRE FIGHTING PROCEDURES	High-efficiency particulate respirator or self-contained breathing apparatus must be worn if this material is raised as a dust into the air.					
UNUSUAL FIRE AND EXPLOSION HAZARDS	None determined.					

VI. HEALTH HAZARD INFORMATION

PRIMARY ROUTES OF EXPOSURE	EYE CONTACT	X	SKIN CONTACT	X	SKIN ABSORPTION		INHALATION	X	INGESTION	
	TARGET ORGAN	Lungs, liver				CARCINOGENICITY				
						NTP	No	IARC	Yes	OSHA
ACUTE EFFECTS OF EXPOSURE	Inhalation may result in distress in breathing, coughing, and irritation of the upper respiratory system.(4) Skin and eye contact may cause mechanical irritation.									
CHRONIC EFFECTS OF EXPOSURE	Crystalline silica is known to cause fibrosis, silicosis, and liver effects.(4) Limited evidence shows that the inhalation of crystalline silica does cause cancer in humans.(5)									
TOXICITY DATA	International Agency for Research on Cancer (IARC) Probable Carcinogen: overall evaluation is 2A; limited human data, sufficient animal data.(5) Oral: Mouse IDLo: 12000 g/kg/28 Wks-C; Tumorigen. Intravenous: Rat LD50: 35 mg/kg.(4)									

VII. EMERGENCY AND FIRST AID PROCEDURES

FIRST AID	EYES	Flush with water for at least 15 minutes and seek medical attention if irritation persists.
	SKIN	Wash thoroughly with soap and water. Launder clothes before reuse.
	INGESTION	Drink water. If large amounts have been ingested or if illness develops, seek medical attention immediately.
	INHALATION	Remove to fresh air. Seek medical attention if breathing becomes difficult.
OTHER INSTRUCTIONS	Ordinary measures of personal hygiene should be observed. Sensitive individuals should avoid further contact. Persons seeking medical attention should carry a copy of this mds to the physician.	

VIII. OCCUPATIONAL CONTROL MEASURES

RESPIRATORY	Wear a high-efficiency particulate respirator approved by NIOSH/MSHA.
VENTILATION	Supply adequate natural or mechanical ventilation.
SKIN	Cover all exposed skin with clothing and gloves.
EYES	Wear chemical safety goggles.
OTHER PROTECTIVE EQUIPMENT	Wear self-contained breathing apparatus if the proper respirator is not available when concentrations are above the PEL.

IX. SPECIAL PRECAUTIONS

PRECAUTIONARY LABELING	Warning! This material contains crystalline silica that is a carcinogen. See the mds for proper protective equipment.
PRECAUTIONS FOR TRANSPORTATION HANDLING AND STORAGE	Store in a dry area and keep dust to a minimum. Wear the proper respirator when this dust is airborne.

N.D.-Not Determined N.A.-Not Applicable <-Less Than >-Greater Than
Note: For additional information and interpretive assistance, please see last page.

M-I GEL, p. 2

X. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Wear protective equipment stated in Section VIII of this mds. Contain spill and minimize dust. Re-sack or place in a suitable container.
WASTE DISPOSAL METHOD	Consult your local authorities for the proper procedures for disposing of bentonite, a naturally-occurring clay.

XI. U.S. GOVERNMENT & OTHER REGULATORY AGENCY CONTROLS

SARA TITLE III	ACUTE X	CHRONIC X	FIRE	REACTIVITY	SUDDEN RELEASE OF PRESSURE
FDA: Safe designation 21 CFR 582.1155					

XII. TRANSPORTATION INFORMATION

A. DEPARTMENT OF TRANSPORTATION (DOT)

CLASSIFIED AS A HAZARDOUS MATERIAL ACCORDING TO DOT (49 CFR 172) No			
PROPER SHIPPING NAME	(See n.o.s. description)	HAZARD CLASS	Not regulated
IDENTIFICATION NO.	N.A.		
LABEL(S) REQUIRED	None		
N.O.S. DESCRIPTION	Drilling fluid additive, n.o.s. (bentonite clay)		
EXCEPTIONS & PACKAGING REQUIREMENTS (SEE SECTION) N.D.			
MAXIMUM QUANTITY IN ONE PACKAGE	PASSENGER AIRCRAFT	N.D.	
	CARGO AIRCRAFT	N.D.	

B. AIR TRANSPORT REGULATIONS (IATA/ICAO)

PROPER SHIPPING NAME	Drilling fluid additive, n.o.s. (bentonite clay)	UN NO.	N.A.
HAZARD CLASS	Not regulated	FLASH POINT	N.A. °F N.A. °C
MAXIMUM QUANTITY IN ONE PACKAGE	PASSENGER AIRCRAFT	N.D.	PACKAGING (SEE SECTION) N.D.
	CARGO AIRCRAFT	N.D.	PACKAGING (SEE SECTION) N.D.

C. INTERNATIONAL MARITIME ORGANIZATION (REGULATIONS (IMO)

SUBSTANCE NAME	Drilling fluid additive, n.o.s. (bentonite clay)	UN NO.	N.A.
HAZARD CLASS	Not regulated	CLASS NO.	N.A.
LABEL(S)	None	FLASH POINT	N.A. °F N.A. °C
DESCRIPTION	Oil well drilling fluid additive		

XIII. ADDITIONAL INFORMATION

References:

- (1) Chemical Guide to the OSHA Hazard Communication Standard, Sixth Edition; Clansky, K. B., Ed.; Roytech: Burlingame, CA, 1991.
- (2) 1991-1992 Threshold Limit Values; American Conference of Governmental Industrial Hygienists: Cincinnati, 1991.
- (3) NIOSH Pocket Guide to Chemical Hazards; National Institute for Occupational Safety and Health: Cincinnati, 1990.
- (4) Sax, N. I.; Lewis, Jr., R. J.; Dangerous Properties of Industrial Materials, Seventh Edition; Van Nostrand Reinhold: New York, 1989.
- (5) Silica and Some Silicates; IARC Monographs on the Evaluation of the Carcinogenic Risk of to Humans; World Health Organization, 1987; Vol. 42.

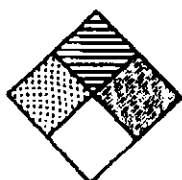
FOR ADDITIONAL INFORMATION CONTACT:	Prepared by <i>James H. Eubank</i>
Manager, Environmental Services (713) 561-1507	Date Prepared: May 1, 1992

N.D.-Not Determined N.A.-Not Applicable <-Less Than >-Greater Than
 Note: For additional information and interpretive assistance, please see last page.
 P. 04 M-1 DRILLING FLUIDS, R&E

M-I GEL, p. 3

05-25-1992 13:19

EXPLANATION OF THE TRANSPORTATION AND MATERIAL SAFETY DATA SHEET



NFPA Hazard Alert Symbols

From - "Identification System: Fire
Hazards of Materials 1975", National
Fire Protection Association, NFPA
Publication No. 704, 23 pp.)

Degree of Health Hazard



Type of Possible Injury

- 4 A few whiffs of the vapor could cause death; or the vapor or liquid could be fatal on penetrating the fire fighter's normal full protective clothing which is designed for resistance to heat.
- 3 Materials extremely hazardous to health, but areas may be entered with extreme care. Full protective clothing should be provided. No skin surface should be exposed.
- 2 Materials hazardous to health, but areas may be entered freely with self-contained breathing apparatus.
- 1 Materials only slightly hazardous to health.
- 0 Materials which on exposure under fire conditions would offer no health hazard beyond that of ordinary combustible material.

Degree of Flammability



Susceptibility of Materials to Burning

- 4 Very flammable gases, very volatile flammable liquids, and materials that in the form of dusts or mists readily form explosive mixtures when dispersed in air.
- 3 Ignitable under almost all normal temperature conditions so as to burn rapidly, and any material that ignites spontaneously at normal temperatures in air.
- 2 Liquids which must be moderately heated before ignition will occur and solids that readily give off flammable vapors.
- 1 Materials that must be preheated before ignition can occur.
- 0 Materials that will not burn.

Degree of Reactivity



Susceptibility to Release of Energy

Materials which in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures.

Materials which in themselves are capable of detonation or of explosive decomposition or of explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation.

Materials which in themselves are normally unstable and readily undergo violent chemical change but do not detonate.

Materials which in themselves are normally stable but which may become unstable at elevated temperatures and pressures or which may react with water with some release of energy but not violently.

- 4 Materials which are normally stable even under fire exposure conditions and which are not reactive with water.

The bottom space of the diamond alerts fire fighting personnel to the possible hazard in use of water. The violence of the reaction with water is indicated by the degree number in the REACTIVITY category.

SECTION II. HAZARDOUS INGREDIENTS

For the purposes of this form, a material shall be defined as hazardous if it meets any one of the following criteria (From — OSHA 29 CFR Part 1910 Hazard Communication):

- (1) **Toxicity** - A toxic substance is one that has demonstrated the potential to: endanger human life by exposure via any route found in the workplace; produce short- or long-term disease or bodily injury; affect health adversely; induce cancer or other neoplastic effects in man or experimental animals; induce a transmissible change in the characteristics of an offspring from those of its human or experimental animal parents; or cause the production of physical defects in the developing human or experimental animal embryo. As required by OSHA, these substances are identified if they are present in quantities greater than 1%, or in the case of carcinogens, greater than 0.1%, or if a hazard is determined at a lower concentration.

Toxic substances not regulated under OSHA 29 CFR 1910 but covered by other governmental regulations will be listed as required under any state regulation or the following federal regulations: CERCLA/Superfund 40 CFR 117; Toxic Substance Control Act (TSCA), FIFRA pesticide registration; Resource Conservation and Recovery Act (RCRA), and the Federal Clean Air and Water Acts 40 CFR 60-61, 40 CFR 401 and 116.

- (2) **Corrosive** - As defined by OSHA is a chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact.
- (3) **Irritant** - As defined by OSHA is a chemical which is not corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact.
- (4) **Sensitizer** - As defined by OSHA is a chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.
- (5) **Physical Hazards** - As defined by OSHA, DOT and RCRA will be based on the flammability, corrosivity, reactivity and/or explosive nature of the product as a whole, the mixture or individual ingredients as determined to be the most hazardous.

SECTION VI. HEALTH HAZARD INFORMATION

Primary Routes of Exposure: Should indicate one or more possible pathways by which substance may affect the human body.

Acute Effects of Exposure: Acute effect applies to injuries which rapidly follow through direct exposure to a hazardous material without implying degree of severity.

Chronic Effects of Exposure: Chronic effect applies to injuries which are delayed and occur after repeated or prolonged exposure to a hazardous material without implying degree of severity.

Median Lethal Dose (LD₅₀, LC₅₀): Median Lethal Dose (MLD) refers to the Lethal Dose (LD) or Lethal Concentration (LC) of the material which will produce death in 50 percent of the test animals. LD₅₀ is the single lowest reported dose that has proven to be fatal in one individual. TD₅₀ is the single lowest reported dose which has caused a specific toxic effect in an individual.

SECTION XI. U.S. GOVERNMENT AND OTHER REGULATORY AGENCY CONTROLS

Specifies if the use and marketing of the product is restricted by the indicated federal regulatory agencies or state and local regulations. This list is not intended as a comprehensive review of all regulations or concerned agencies; rather, it is a quick check of several major agencies or regulations.

UNPROCESSED CLAY

- **SUBMITTAL INFORMATION**
- **BORROW PIT AND SAMPLING LOCATIONS**
- **GEOTECHNICAL TESTS**
 - **Gradation Analyses**
 - **Standard Proctor Tests**
 - **Moisture Content Determinations**
- **CHEMICAL ANALYSES**
 - **PCB's**
 - **Dioxins**
 - **Priority Pollutants**
 - **Paste pH**

SUBMITTAL INFORMATION



GEOSYNTEC CONSULTANTS



SUBMITTAL COVER SHEET

1992 year

PROJECT: CELA SLURRY WALL

PROJECT NO.: GQ3201

TASK NO.: 02

LOCATION: WELLSVILLE, NEW YORK

CONTRACTOR: GEO-CON, INC. (C910 27-003-01)

SUBMITTAL NO.: 270C04

REVISION NO.: 0

SUBMITTAL TITLE: BORROW SOURCE & COMPLIANCE TEST.

DATE RECEIVED: 30 JUN 92
(day/ month/ yr)DATE REVIEWED: 1 JULY 92
(day/ month/ yr)

RESUBMITTAL REQUIRED:

☐ YES☒ NODATE APPROVED: 1 JULY 92
(day/ month/ yr)COMMENTS: RESULTS / DATA ONLY PROVIDED FOR UNPROCESSED CLAY,
FOR GEOTECHNICAL TESTING.

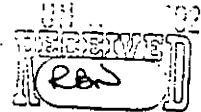
TEST No.	MDI (pcf)	OMC (%)
1	130.8	9.6
2	138.7	9.0
3	138.4	8.2
4	131.7	9.0
Avg.	134.9	9.0

ADDITIONAL DATA TO BE SUPPLIED
AS CONSTRUCTION CONTINUES.NATURAL MOIST. CONTENTS
10.2, 8.7, 8.9, 7.4 %

DISTRIBUTION:

BY:
GEOSYNTEC CONSULTANTSBY:
ARCO

P1-0129



SUBMITTAL 27QC04 & 28QC04
CONTRACT NO. C91027-003-01
AND
CONTRACT NO. C91028-003-01
BORROW SOURCE AND COMPLIANCE TESTS
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

Prepared for:

Atlantic Richfield Company
515 South Flower Street AP-4188
Los Angeles, CA 90017

Attn: Robert Ivy
Construction Supervisor

Prepared By:

GEO-CON, INC.
4075 Monroeville Boulevard
Corporate One Building II, Suite 400
Monroeville, Pennsylvania 15146
Telephone: (412) 856-7700

1. Clay and Fill Borrow Source

The proposed supplier for all clay and fill materials for use at the Sinclair Refinery site is Bakers of Jericho Hill. The borrow pit from which the clay and fill materials are taken is located on Route 19 in Wellsville. This pit is the same pit from which Ebasco took samples for use in the Laboratory Testing Program performed by Geosyntec Consultants.

Primarily two materials will be coming out of this borrow area, processed and unprocessed clay. The processing of the clay consists of field screening the raw soil material with a 2-in. square screen. The processed clay will be used as the select fill for the soil-bentonite cutoff wall. The unprocessed clay will be used for traffic cap material, the off-site fill material, and the common fill.

2. Geotechnical Compliance Tests

As per the Quality Assurance Project Plan, the following geotechnical tests have been completed on the unprocessed material:

<u>Materials</u>	<u>Tests</u>	<u>No. of Tests Completed</u>
Unprocessed Clay	Gradation Tests	4
-Common Fill	Standard Proctor	4
-Traffic Cap	Moisture Content	4
-Offsire Fill		

The results of all of these tests are attached. Additional tests of the unprocessed material will be conducted throughout the project as per specification. In addition, a separate submittal will be made when the confirmational testing of the processed material is complete.

3. Chemical Sampling & Testing

In addition to the above geotechnical tests, the borrow pit was tested as per specification for the following chemical contaminants: PCB's, Dioxins, Priority Pollutants, and Paste pH. Results of these tests are attached. Additional tests will be conducted throughout the project as per specification.

4. Borrow Area Map

Attached are maps of the borrow area showing locations of the chemical sampling as well as the geotechnical sampling.

5. Geotechnical and Chemical Laboratories

The following geotechnical and chemical testing laboratories will be used throughout the project.

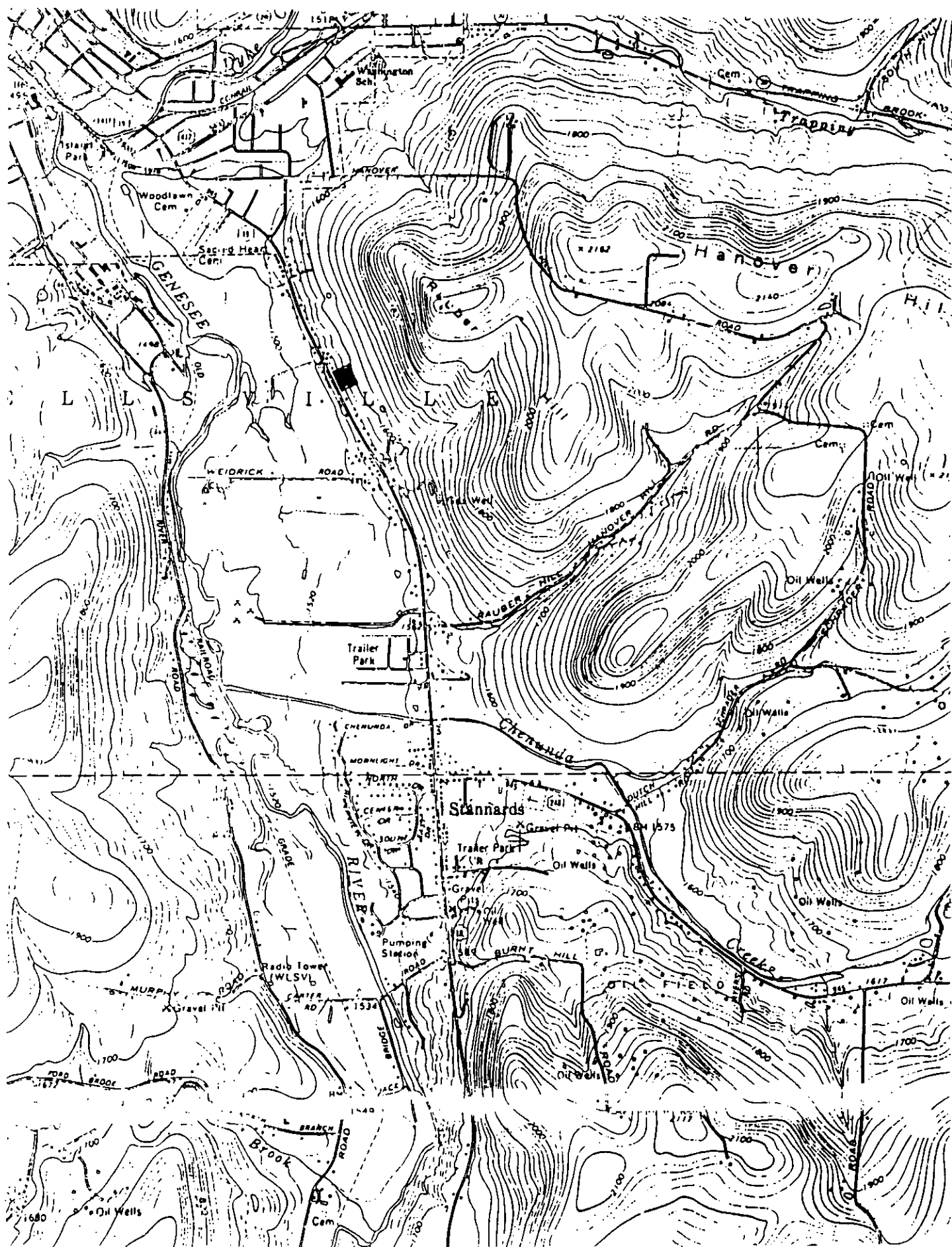
GAI Consultants
570 Beatty Road
Monroeville, Pennsylvania 15146

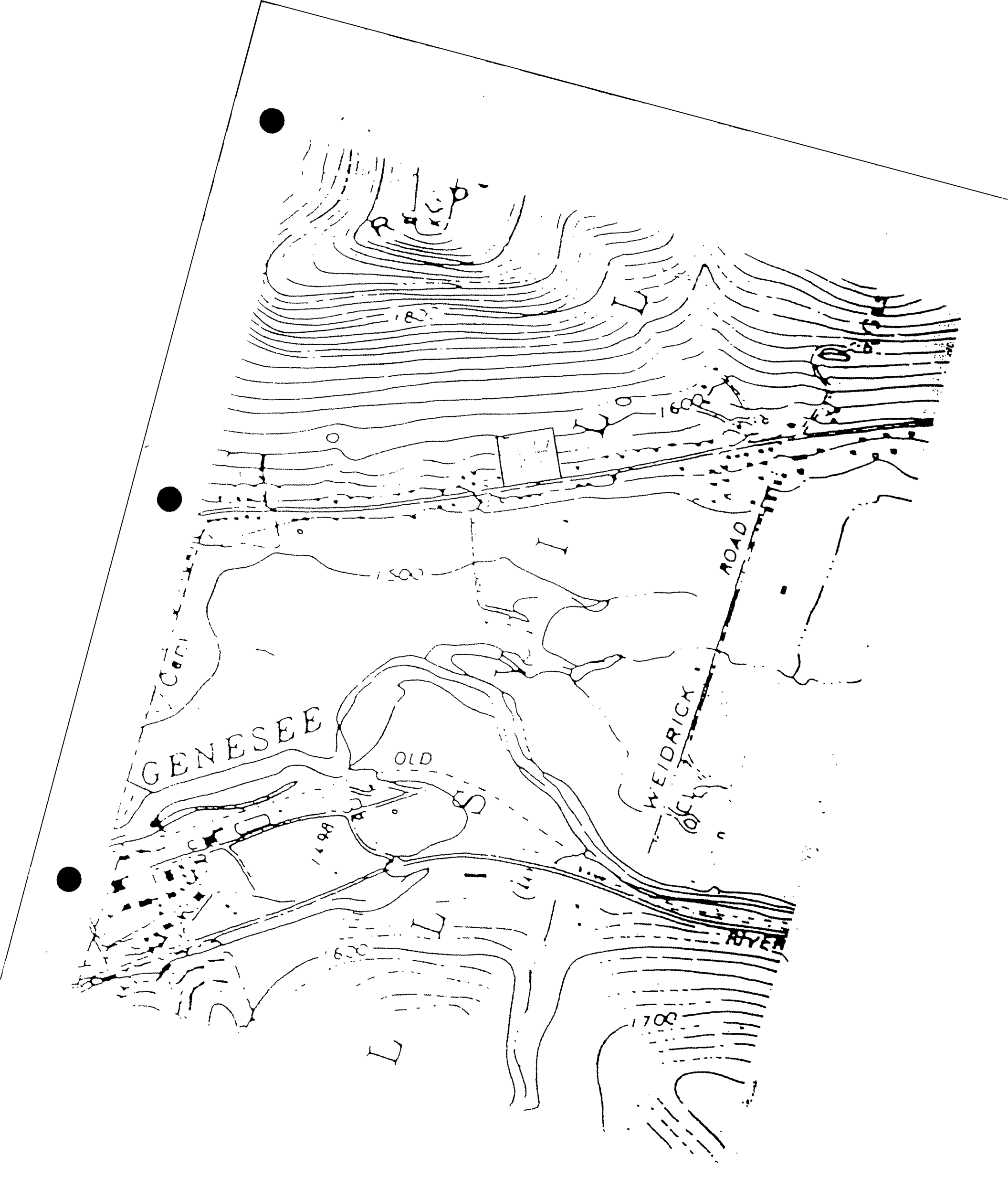
Geo Testing Express
66 Commonwealth Avenue
Concord, Massachusetts 01742

J & L Testing Co.
938 S. Central Avenue
Canonsburg, Pennsylvania 15317

Ceimic Corporation
Penn Center West II
Suite 103
Pittsburgh, Pennsylvania 15276

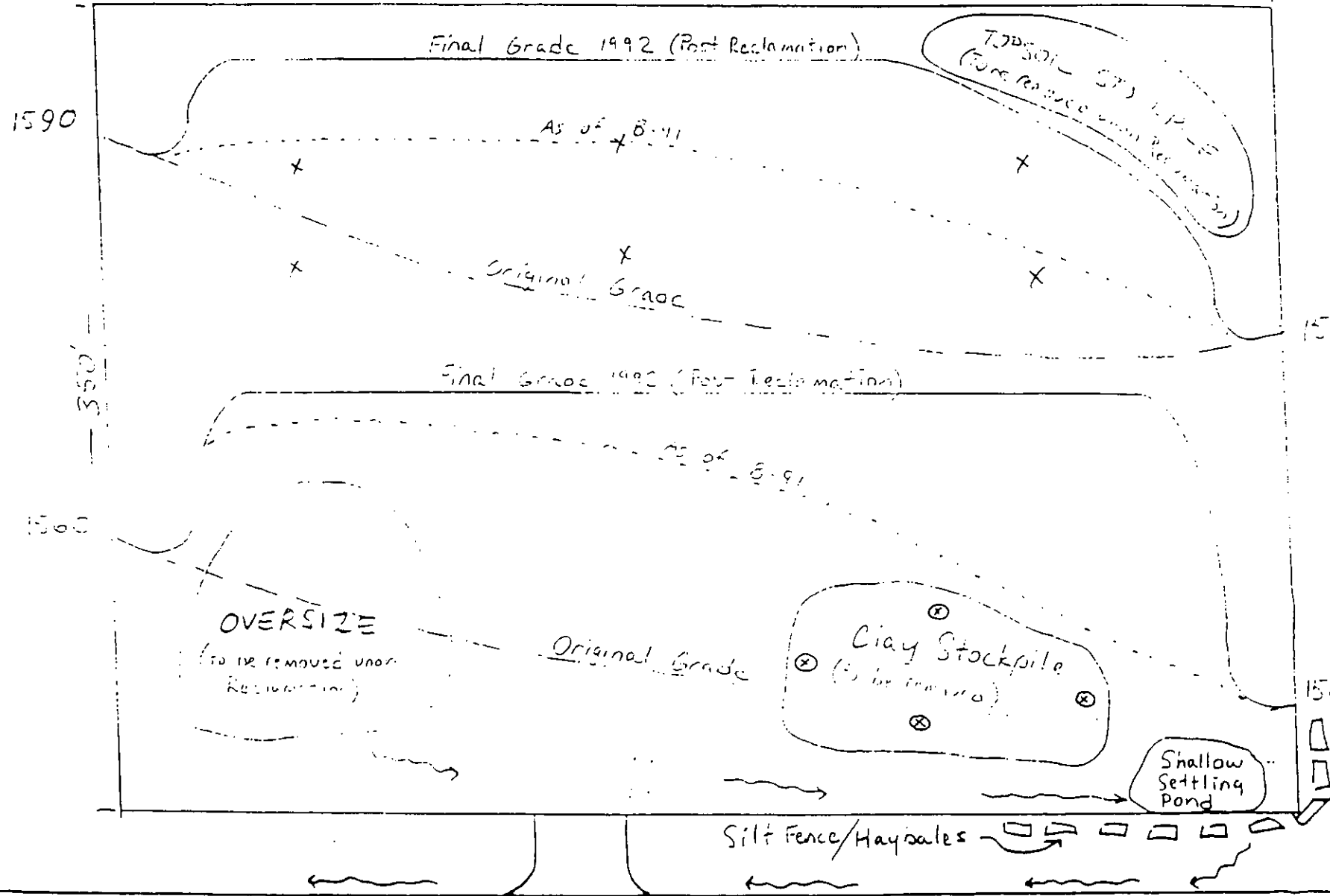
BORROW PIT AND SAMPLING LOCATIONS





3.6 inch. top
7.3 inch. Right

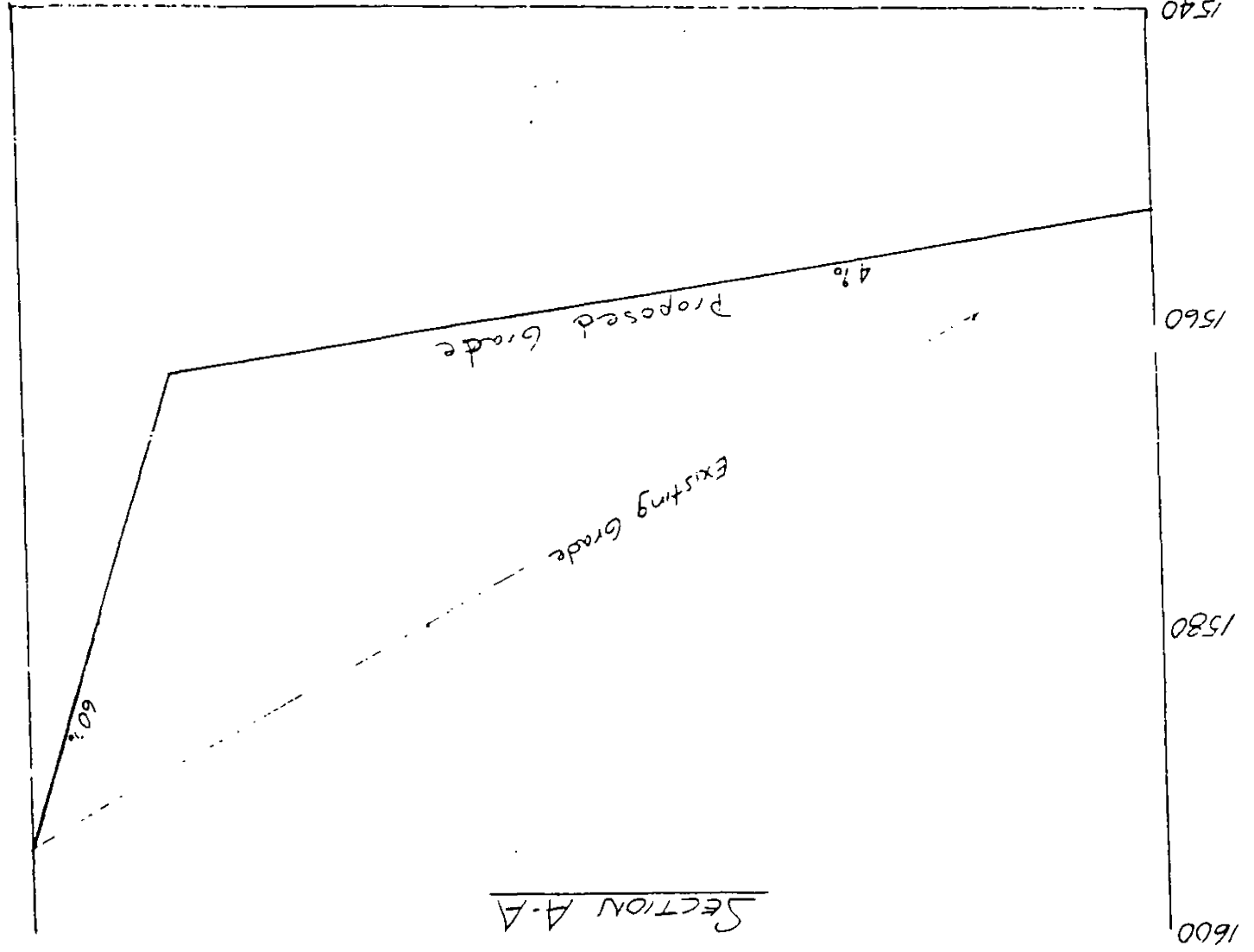
— 450' —



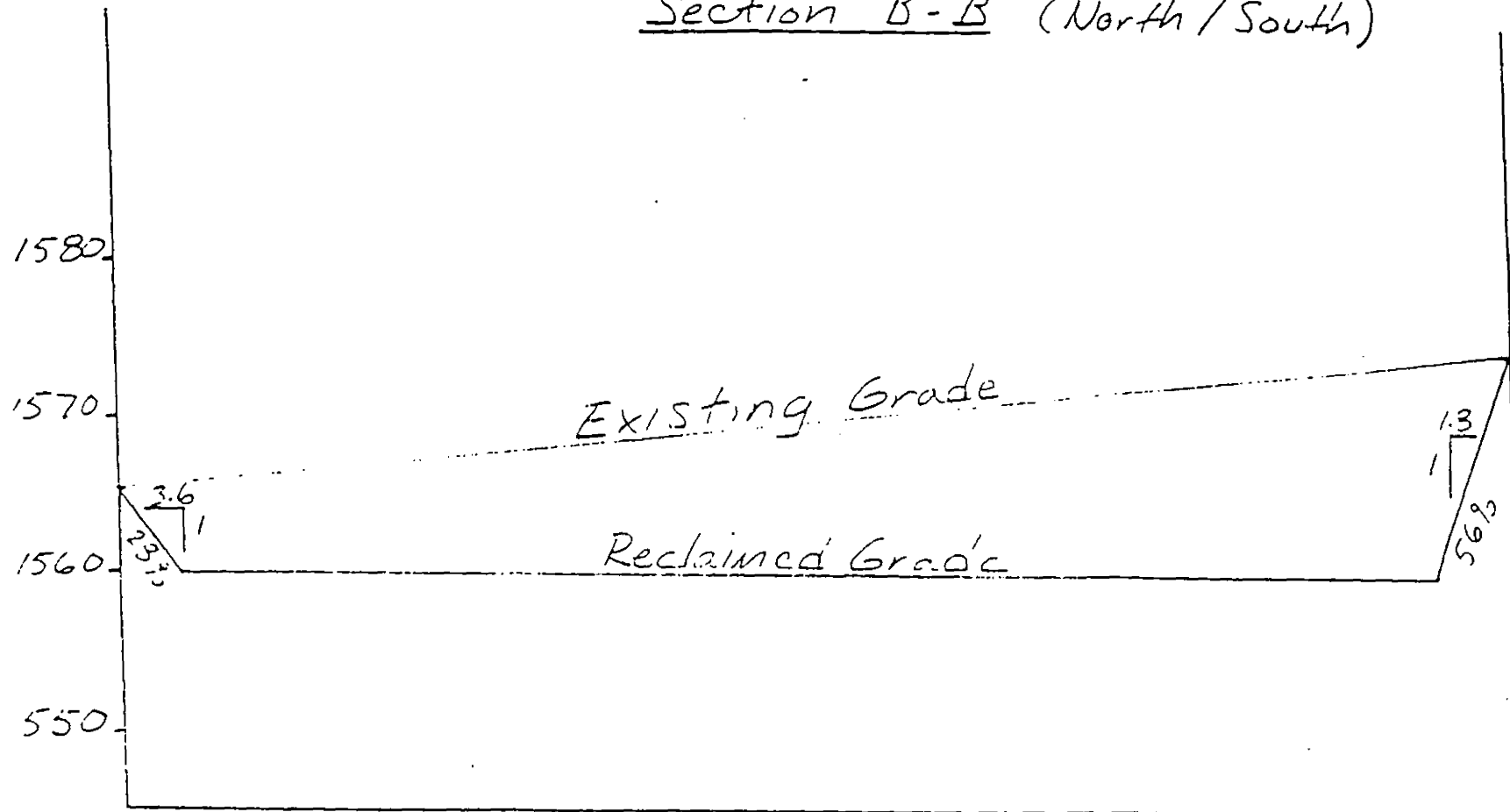
Route 19 NYST-DT

X - ANALYTICAL SAMPLE LOCATIONS
⊗ - GEOTECHNICAL SAMPLE LOCATIONS

VERT: 1"=10'
HORIZ: 1"=40'



Section B-B (North / South)

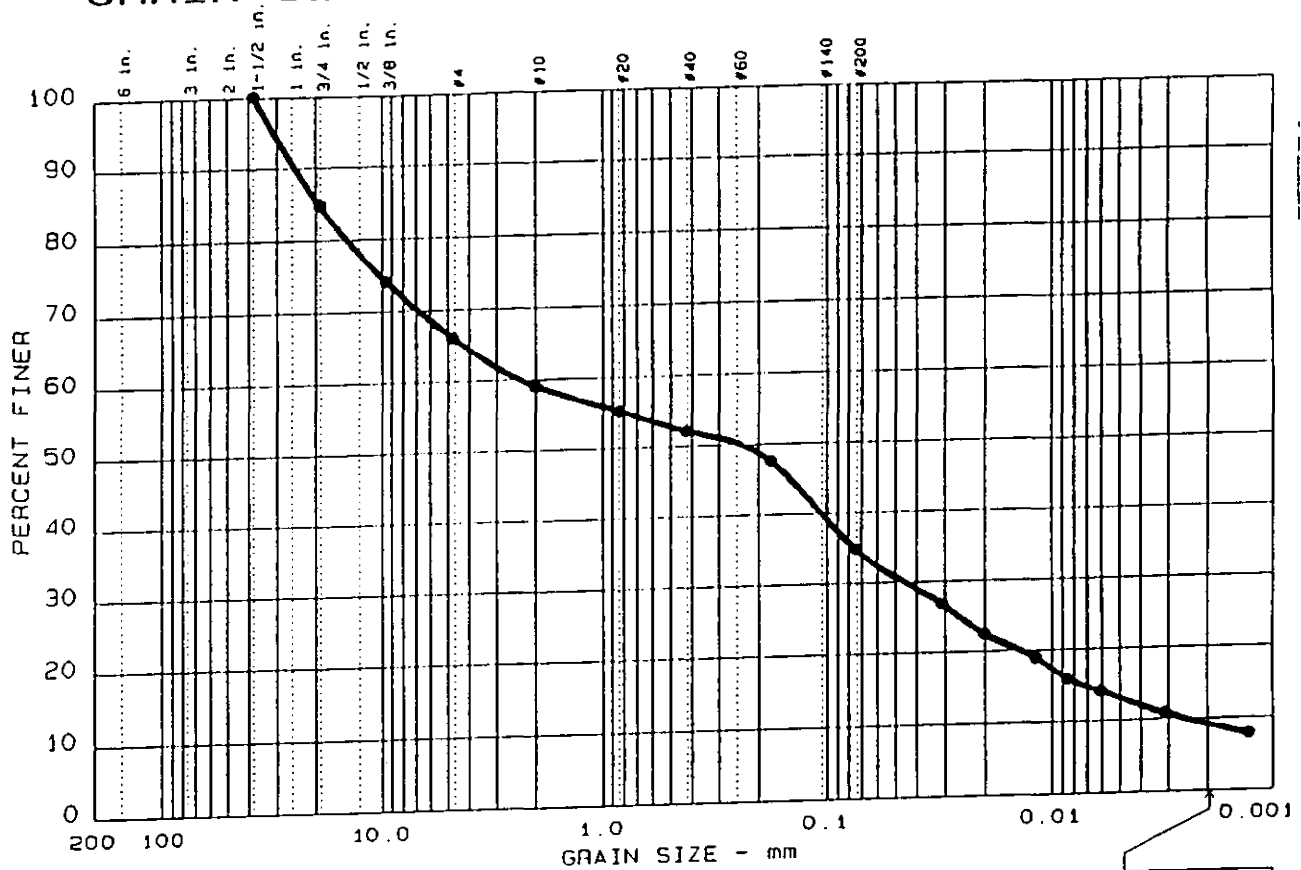


Vert: 1" = 10'
Horiz: 1" = 50'

GEOTECHNICAL TESTING

- **GRADATION ANALYSES**
- **STANDARD PROCTOR TESTS**
- **MOISTURE CONTENT DETERMINATIONS**

GRAIN SIZE DISTRIBUTION TEST REPORT



=====

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 7

Date: 5-25-92
 Project No.: 92-109-15
 Project: GeoCon Wellsville

=====

Sample Data

Location of Sample: Baker -3" Common Fill
 Sample Description:
 USCS Class: Liquid limit:
 AASHTO Class: Plasticity index:

Notes

Remarks: tested by pag/dfs entered by pag
 checked by DFS
 Fig. No.:

Mechanical Analysis Data

Initial
 Dry sample and tare= 1406.65
 Tare = 0.00
 Dry sample weight = 1406.65
 Sample split on number 10 sieve
 Split sample data:
 Sample and tare = 56.94 Tare = 0 Sample weight = 56.94

8 ve tare method

Sieve	Weight retained	Sieve tare	Percent finer
1.5 inches	0.00	0.00	100.0
0.75 inches	215.18	0.00	84.7
0.375 inches	149.04	0.00	74.1
# 4	113.56	0.00	66.0
# 10	99.33	0.00	59.0
# 20	3.66	0.00	55.2
# 40	2.98	0.00	52.1
# 80	4.49	0.00	47.4
# 200	12.39	0.00	34.6

Hydrometer Analysis Data

Separation sieve is number 10
 Percent -# 10 based on complete sample= 59.0
 Weight of hydrometer sample: 58.6
 Hygroscopic moisture correction:
 Moist weight & tare = 81.27
 Dry weight & tare = 79.08
 Tare = 4.04

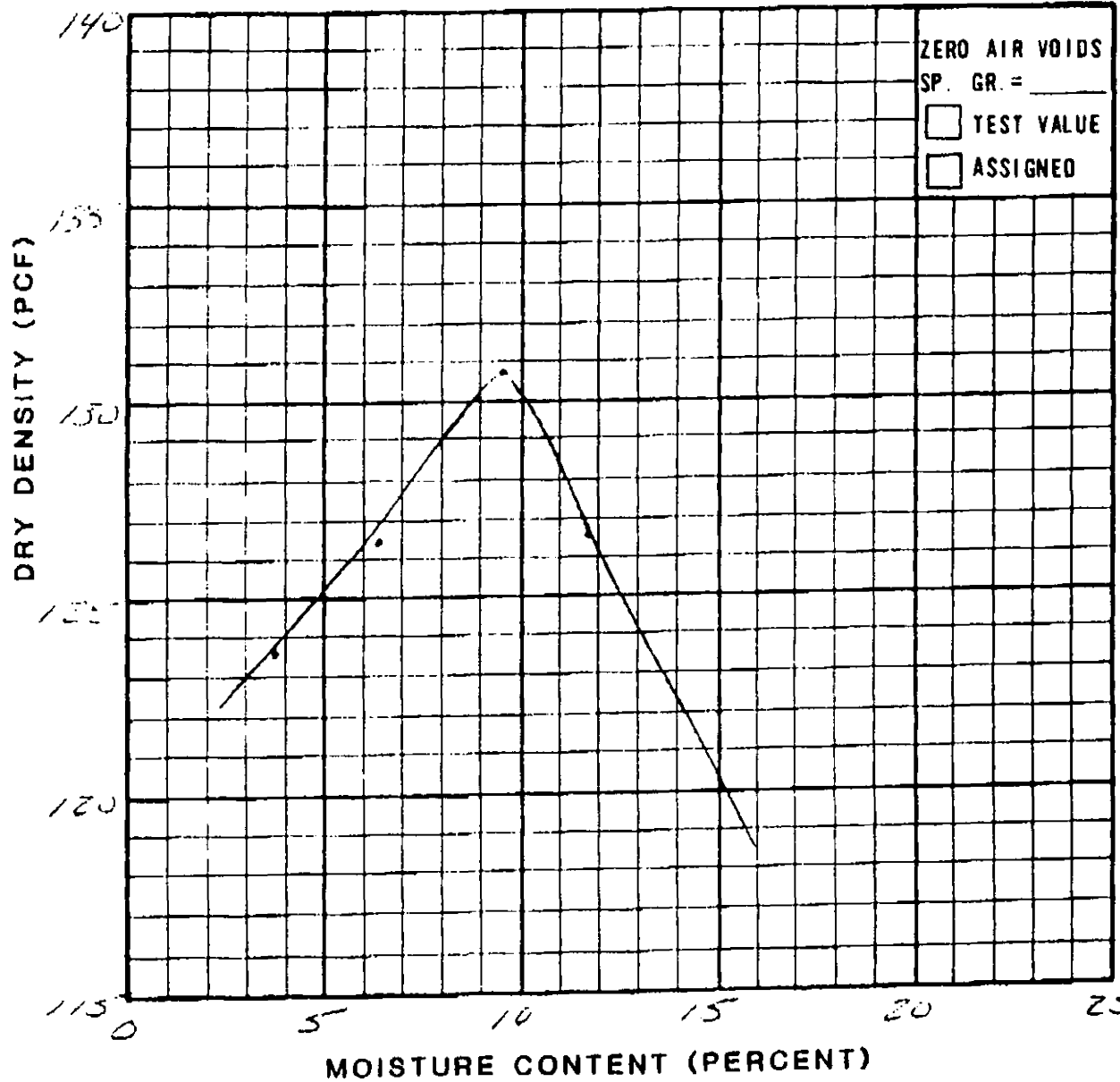
Hygroscopic moisture= 2.9 %
 Calculated biased weight= 96.55
 Table of composite correction values:
 Temp, deg C: 23.2 23.4 23.6 24.0
 Temp. corr: - 2.6 - 2.5 - 2.5 - 2.4
 Meniscus correction only= 0
 Specific gravity of solids= 2.7
 Specific gravity correction factor= 0.989
 Hydrometer type: 151H Effective depth L= 16.294964 - 0.2645 x Rm

Elapsed time, min	Temp, Actual deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.0	23.2	1.0188	1.0162	0.0129	18.8	11.3	0.0308	26.7
5.0	23.2	1.0162	1.0136	0.0129	16.2	12.0	0.0201	22.4
15.0	23.4	1.0140	1.0115	0.0129	14.0	12.6	0.0118	18.9
30.0	23.4	1.0122	1.0097	0.0129	12.2	13.1	0.0085	15.9
60.0	23.6	1.0110	1.0085	0.0129	11.0	13.4	0.0061	14.0
240.0	24.0	1.0089	1.0066	0.0128	8.9	13.9	0.0031	10.8
1440.0	23.6	1.0072	1.0047	0.0129	7.2	14.4	0.0013	7.8

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 34.0 % SAND = 31.4
 % SILT = 25.5 % CLAY = 9.1

D85= 19.28 D60= 2.344 D50= 0.243
 D30= 0.0457 D15= 0.00741 D10= 0.00243
 Cc = 0.3673 Cu = 966.0509



TEST

☒ ASTM D698-78

☐ ASTM D1557-78

METHOD: 6

MATERIAL DESCRIPTION

SOIL PREPARATION: ☒ DRY ☐ MOIST
RAMMER TYPE: ☐ MECHANICAL ☒ MANUAL

RESULTS:

OPTIMUM MOISTURE CONTENT 9.6%
MAXIMUM DRY DENSITY 130.8 PCF



Engineers • Geologists • Planners
Environmental Scientists
570 Beatty Rd., Pittsburgh
Murrysville, Pa 15148
412-850-6400

MOISTURE-DENSITY RELATIONSHIP TEST

3" COMPACTED FILL

WEZELSVILLE

DWN. PKI

CHKD. _____

APPD. _____ DATE _____

SCALE: _____
DRAWING NUMBER

92-109-15



GAI Consultants, Inc.

VISUAL CLASSIFICATION
MOISTURE CONTENT

PROJECT WELLSVILLE TESTED BY TAG DATE 6-11-92
PROJECT NO. 92-127-15 CALC. BY MM DATE 6-12-92
CHECKED BY TAG DATE 6-12-92

MOISTURE CONTENT

	BORROW	- 3" COMMON FILL	PAKER				
Sample No.	CLAY		TOPSOIL				
Depth							
Tare No.	BC-3	2-B	HTZ-3				
WT T + WS	582.13	320.64	329.92				
WT T + DS	520.87	271.90	277.69				
WT Tare	9.36	7.45	9.86				
WT DS	511.51	282.45	267.83				
WT Water	41.26	28.74	52.26				
WC	8.07	10.18	19.51				

VISUAL CLASSIFICATION

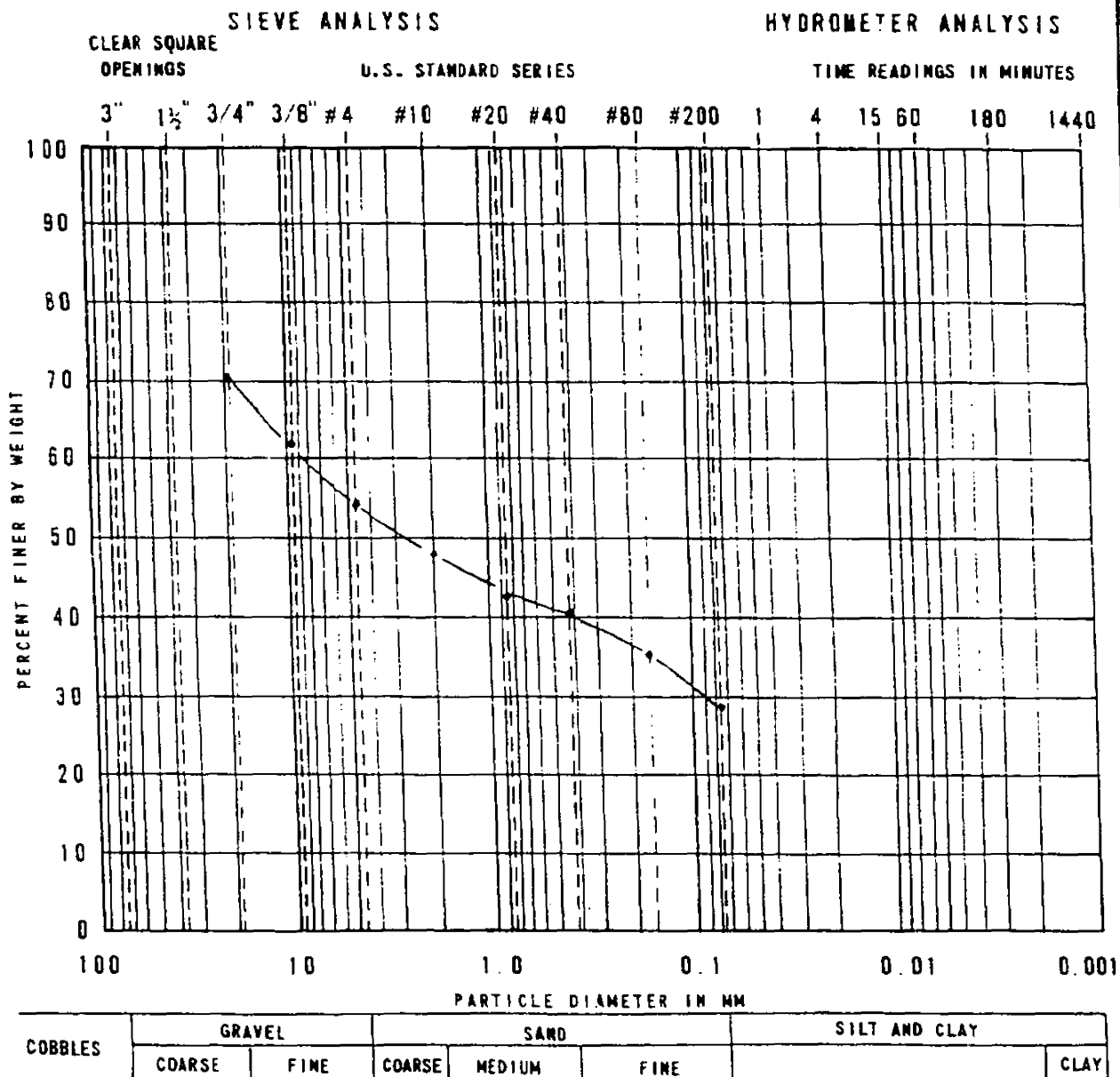
Classifi- cation and Comments								
U.S.C.S. Symbol								


 J. H. CONSULTANTS, INC.
 Engineers & Geologists & Surveyors
 Environmental Specialists
 210 Brady Ave. - Pittsburgh
 Monroeville, Pa. 15146
 (412) 242-8300

GRAIN SIZE ANALYSIS
 WELLSVILLE SAMPLE 6/19/92 A
 UNPROCESSED CLAY
 GEO. CON

DWN DJN CHKD ML
 APPD. _____ DATE _____
 SCALE: AS SHOWN
 DRAWING NUMBER
 92-109-15
 REV 

DESCRIPTION: DARK BROWN Silty CLAYEY GRAVEL WITH SAND



GRAIN SIZE ANALYSIS

Client Geo. Con. Wellsville
 Project No. 92-109-15
 Sample No. 6/11/92 A
 Soil Identification 100% FINE SAND

Tested by: DJN Date 6/23/92
 Calcs. by: DJN Date 6/24/92
 Check'd by: FAC Date 6-26-92

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (corrected for moisture)	<u>353.58</u>
WATER CONTENT FOR TOTAL SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

- #4 SAMPLE USED IN ANALYSIS	
WT of WS + Tare	<u>653.96</u>
WT of Tare	<u>7.46</u>
WT of Sample (wet)	<u>644.50</u>
WT of Sample (dry)	<u>593.13</u>
WATER CONTENT FOR - #4 SAMPLE	
WT of WS + Tare	<u>229.50</u>
WT of DS + Tare	<u>211.95</u>
WT of Tare	<u>9.35</u>
WT of DS	<u>202.60</u>
WT of Water	<u>17.55</u>
Moisture Content	<u>8.66</u>

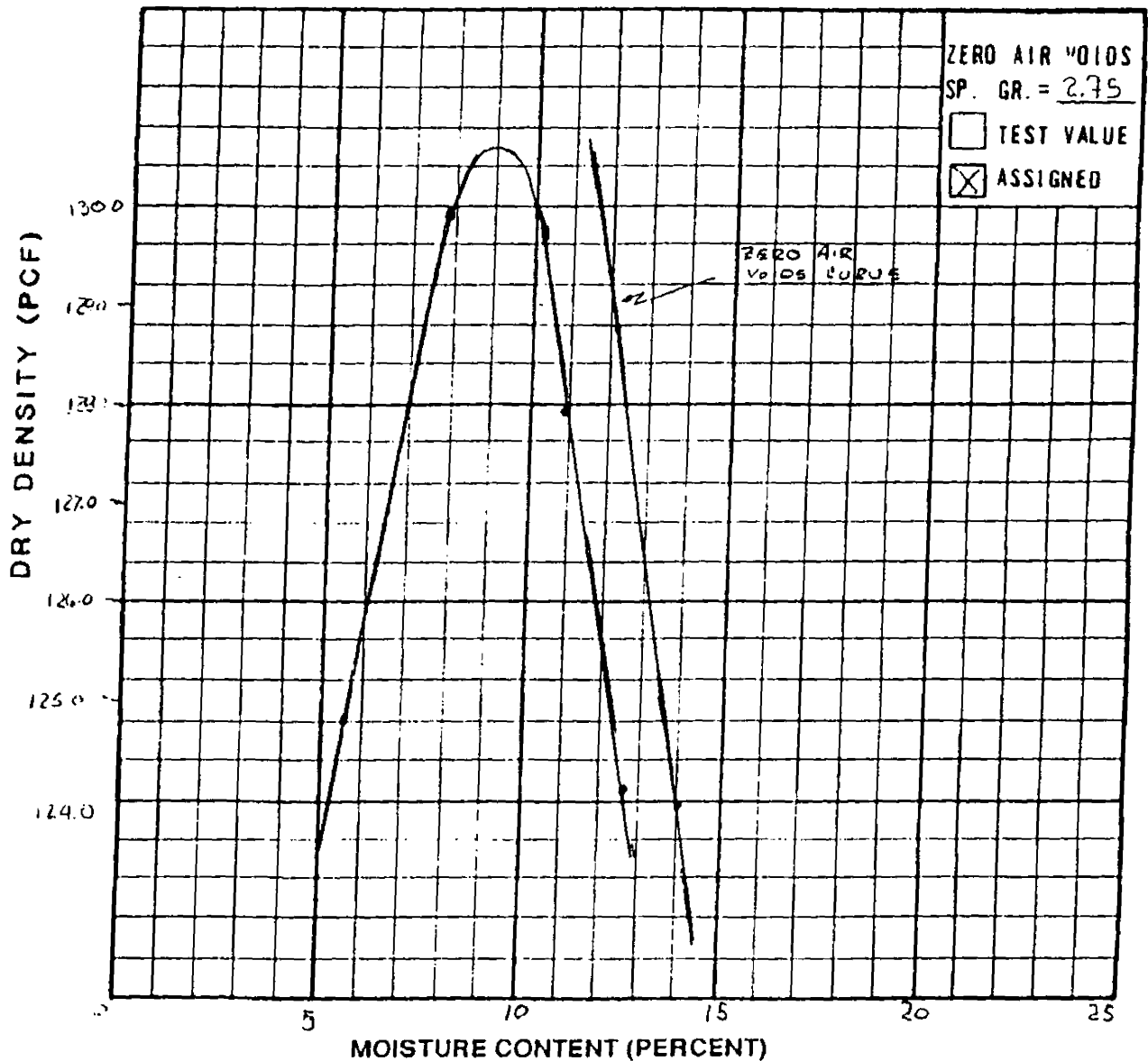
COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing Sieve	Percent Passing Sieve
#3"					
#2					
#1 1/2					
#1					
#3/4			<u>254.21</u>	<u>590.37</u>	<u>70.21</u>
#2			<u>687.26</u>	<u>5302.11</u>	<u>62.16</u>
#1 1/2			<u>652.21</u>	<u>4650.90</u>	<u>54.51</u>
No. 4					

2 3/4 %
20.8 %

FINE SIEVE SERIES

WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing Sieve	Fine Fraction % Passing Sieve	% Retained on Sieve	Total % Passing Sieve
No. 20		<u>0</u>	<u>593.13</u>	<u>100.0</u>	<u>54.51</u>	<u>54.51</u>
No. 40	<u>0</u>	<u>72.43</u>	<u>520.65</u>	<u>87.78</u>	<u>54.51</u>	<u>47.25</u>
No. 60		<u>52.33</u>	<u>468.32</u>	<u>78.96</u>		<u>43.04</u>
No. 80		<u>30.40</u>	<u>437.92</u>	<u>73.83</u>		<u>40.24</u>
No. 100		<u>44.13</u>	<u>393.79</u>	<u>66.39</u>		<u>36.19</u>
No. 200		<u>80.23</u>	<u>513.56</u>	<u>52.87</u>		<u>28.82</u>



TEST
☒ ASTM 0698-91
☐ ASTM D1557-91

MATERIAL DESCRIPTION:
DARK BROWN SILTY CLAYEY GRAVEL WITH SAND

PROCEDURE C

RESULTS:
 OPTIMUM MOISTURE CONTENT 9.0 %
 MAXIMUM DRY DENSITY 131.5 PCF
 OVERSIZE FRACTION 29.8 %
 SIEVE USED 3/4"
 $C_u = 138.7$

SOIL PREPARATION: — DRY ☒ MOIST
 HAMMER TYPE: — MECHANICAL ☒ MANUAL

NOTE MATERIAL SHORTAGE SAMPLE REUSED - AASHTO T-99

Geo Consultants, Inc.
 Engineers • Geologists • Planners
 Environmental Specialists
 170 Beatty Rd • Pittsburgh,
 Pennsylvania, Pa 15106
 412-266-9400

MOISTURE-DENSITY RELATIONSHIP TEST
WELLSVILLE 6-19-92 SAMPLE A

Geo • Con

DWN. JRE **CHKD.** DTN
APPD. _____ **DATE** _____
SCALE: _____
DRAWING NUMBER
92-109-15
REV

MOISTURE-DENSITY RELATIONSHIP

PROJECT Geo Con Willsville TESTED BY JRE/DJH DATE 6-24-92
 PROJECT NO. 02-109-15 CHECKED BY DJH DATE 6-25-92
 SAMPLE IDENTIFICATION 6-19-92 sample A
 MATERIAL DESCRIPTION Dark Brown Clayey Gravel

MOISTURE-DENSITY DETERMINATION

WT. MOLD + WS (GRS)	7291.0	7573.0	7670.0	7630.0	11230.0
WT. MOLD (GR)	2804.5	2804.5	2804.5	2804.5	6476.0
WT. WS GR/453.6 (LBS)	9.89	10.51	10.73	10.64	10.48
MOLD NO.	2	2	2	2	2
VOL. MOLD (CU. FT)	.075	.075	.075	.075	.075
γ (PCF)	131.88	140.17	143.02	141.84	139.74
TARE NO.	3	4	7-24	6-40	2-930
WT. TARE + WS (GR)	719.18	683.12	679.49	755.34	738.47
WT. TARE + DS (GR)	681.18	587.27	612.07	682.26	657.17
WT. TARE (GR)	9.80	9.27	9.72	10.06	10.00
WT. DS (GR)	671.38	578.00	607.35	672.20	647.11
WT. WATER (GR)	38.00	45.85	62.42	73.08	81.30
WC (%)	05.66	07.93	10.27	10.57	12.56
$\gamma_D = \gamma / (1 + WC)$ (PCF)	124.80	129.89	129.69	127.93	124.14

OVERSIZE CORRECTION DATA

SIEVE SIZE 3/4
 WT WS (Fine Fraction) _____
 WT WS (Coarse Fraction) _____
 WT DS (Fine Fraction) _____
 WT DS (Coarse Fraction) _____

WC OF - FRACTION
 T+WS _____
 T+DS _____
 TARE _____
 DS _____
 WT WATER _____
 WC _____

WC OF + FRACTION
 T+WS _____
 T+DS _____
 TARE _____
 DS _____
 WT WATER _____
 WC _____

FROM GRAIN SIZE DETERMINATION

FRACTION PERCENTS
 - FRACTION + FRACTION
 100 $\left(\frac{A}{A+B}\right)$ 100 $\left(\frac{B}{A+B}\right)$
 70.2% 29.8%

$$\gamma_2 = \frac{62.4 (2.75)}{1 + (2.75 \text{ } w)}$$

GRAPH FITTING

SP. GR ESTIMATED 2.75

OVER SIZED SPECIFIC GRAVITY VALUE 2.55
 METHOD C-127

ZERO AIR VOIDS CURVE

γ_D (PCF)	128.7	130.4	126.4	125.1	123.9
WC (%)	12.1	11.5	13.0	13.5	14.0

DRY DENSITY FITTING

γ (PCF)					
WC (%)					
γ_D (PCF)					

*BLOWS/LAYER

METHOD	MATERIAL SIZE	MOLD SIZE	BLOWS*
A	ALL PASSING NO. 4	4" DIA.	25
B	ALL PASSING NO. 3/4"	4" DIA.	25
C	ALL PASSING 3/4"	6" DIA.	56

DESIGNATION USED D678-91
 PROCEDURE USED C

DESIGNATION	HAM/DROP	LAYERS
D898-91	5.5 #12"	3
D1557-91	10 #18"	5

REV. 63 * NOTE SAMPLE SHORTAGE. MATERIAL WAS REUSED TO PRODUCE PROCTOR CURVE. NASHTO - T-99

SUBJECT GEO-CON WELLSVILLE
SAMPLE 6-19-92 SAMPLE 11
 BY DJN DATE 6/26/92 PROJ NO. 92-107-15
 CHKD BY PAC DATE _____ SHEET NO. _____ OF _____



LABORATORY CORRECTION OF UNIT WEIGHT
FOR SOIL CONTAINING OVERSIZE PARTICLES

SAMPLE : WELLSVILLE 6/19/92 SAMPLE A
 DESCRIPTION: SAND BRNDR SILTY CLAYEY GRAVEL WITH SAND

$$C \gamma_D = 100 \gamma_w G_m \gamma_w / (\gamma_w P_c + G_m \gamma_w P_F)$$

$$\gamma_w = 131.5 \text{ PCF}$$

$$G_m = 2.55$$

$$\gamma_w = 62.43 \text{ PCF}$$

$$P_c = 29.8\%$$

$$P_F = 70.2\%$$

$$C \gamma_D = \frac{(131.5 \text{ PCF})(2.55)(62.43 \text{ PCF})}{(131.5 \text{ PCF})(29.8\%) + (2.55)(62.43)(70.2\%)} \times 100$$

$$C \gamma_D = 138.7 \text{ PCF}$$

Geo. H. Rees
CONSULTANTS, INC.
Engineers • Geologists • Planners
Environmental Specialists
570 Barry Ave., • Phone 327
Montreal, P.Q. H3B 1A6
413 342 6650

GRAIN SIZE ANALYSIS
WELLSVILLE 3 AMPS 6/19/92 B
UNPROCESSED CLAY
G#01604

DWN. DJN

CHKD. 214

APPD. _____ DATE _____

SCALE: AS SHOWN

DRAWING NUMBER

92-108-15

REV

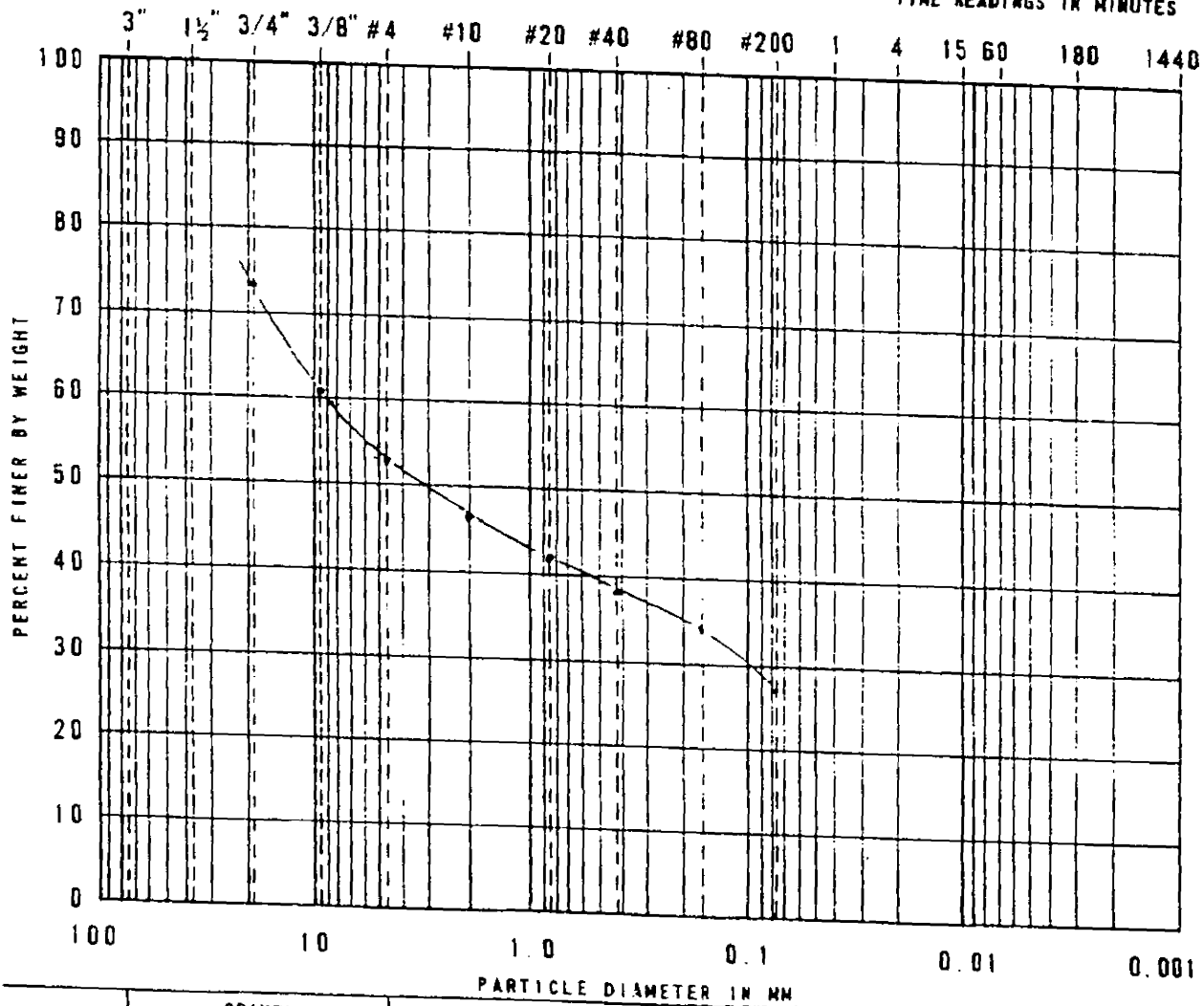
SIEVE ANALYSIS

**CLEAR SQUARE
OPENINGS**

U.S. STANDARD SERIES

HYDROMETER ANALYSIS

TIME READINGS IN MINUTES



PARTICLE DIAMETER IN MM							
COBBLES	GRAVEL		SAND			SILT AND CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE		CLAY

DESCRIPTION: Dark Brown Silty, Clayey Gravel with Sand

GRAIN SIZE ANALYSIS

Client GED CON WELLSVILLE
 Project No. 92-107-15
 Sample No. 2/19/92 3
 Soil Identification Unconsolidated CLAY

Tested by: Dry Date 6/23/92
 Calcs. by: DJH Date 6/24/92
 Chck'd by: PK Date

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (corrected for moisture)	<u>10424.77</u>
WATER CONTENT FOR TOTAL SAMPLE	
WT of HS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

- # 4 SAMPLE USED IN ANALYSIS	
WT of HS + Tare	<u>603.39</u>
WT of Tare	<u>10.09</u>
WT of Sample (wet)	<u>593.29</u>
WT of Sample (dry)	<u>544.85</u>
WATER CONTENT FOR - # 4 SAMPLE	
WT of HS + Tare	<u>239.47</u>
WT of DS + Tare	<u>220.73</u>
WT of Tare	<u>4.93</u>
WT of DS	<u>210.80</u>
WT of Water	<u>18.74</u>
Moisture Content	<u>8.89</u>

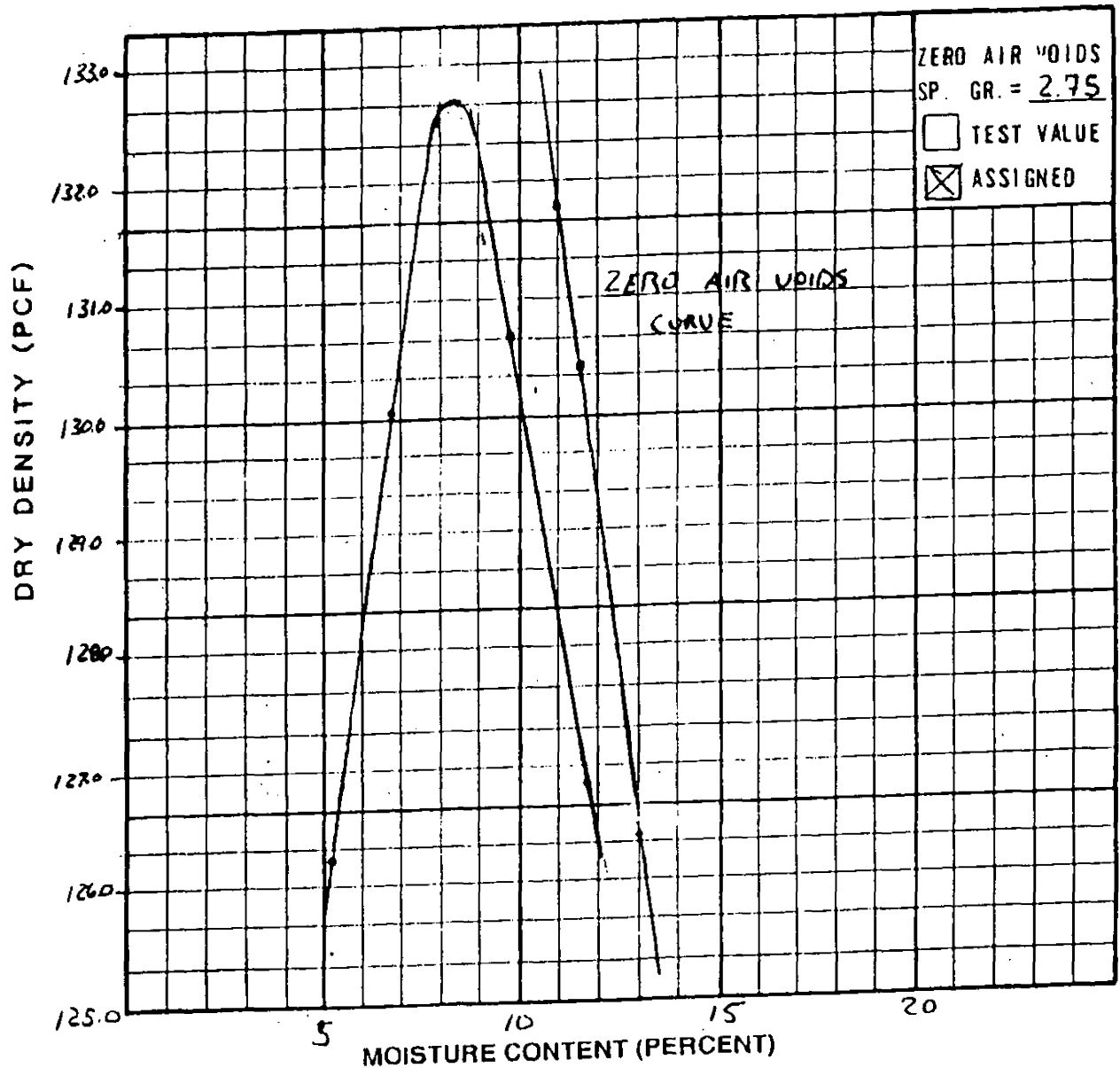
COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4			<u>2812.0</u>	<u>7612.77</u>	<u>73.02</u>
1/2					
3/8			<u>1300.54</u>	<u>6312.23</u>	<u>60.55</u>
No. 4	<u>824.02</u>	<u>3.80</u>	<u>815.22</u>	<u>5497.01</u>	<u>52.73</u>

FINE SIEVE SERIES

No.	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	Total % Passing Sieve
No. 20			<u>0</u>	<u>544.85</u>	<u>100.0</u>	<u>52.73</u>
No. 40			<u>70.01</u>	<u>474.84</u>	<u>83.15</u>	<u>45.95</u>
No. 60			<u>47.07</u>	<u>427.77</u>	<u>78.51</u>	<u>41.40</u>
No. 80			<u>25.98</u>	<u>401.79</u>	<u>73.74</u>	<u>38.80</u>
No. 100			<u>41.66</u>	<u>360.13</u>	<u>66.10</u>	<u>34.85</u>
No. 200			<u>77.63</u>	<u>282.50</u>	<u>51.85</u>	<u>27.34</u>

REMARKS: * K = $\frac{Q}{100}$



TEST

- ☒ ASTM 0898-91
- ☐ ASTM D1557-91

PROCEDURE C

MATERIAL DESCRIPTION:

Dark Brown Silty, Clayey gravel
with sand

SOIL PREPARATION: DRY ☒ MOIST
HAMMER TYPE: MECHANICAL ☒ MANUAL

RESULTS:

OPTIMUM MOISTURE CONTENT 9.2 %
MAXIMUM DRY DENSITY 132.7 PCF
OVERSIZE FRACTION 26.5 %
SIEVE USED 3/4
 $C_u = 138.4$ PCF



Engineers • Geologists • Planners
Environmental Specialists
370 Beatty Rd • Pittsburgh
Monroeville, Pa 15146
412-266-9400

MOISTURE-DENSITY RELATIONSHIP TEST

6-19-92 Sample B

Geo Con
WELLSVILLE

DWN. JRE CHKD. DJN

APPD. DATE 6-26-92

SCALE: 1" = 1'

DRAWING NUMBER
92-109-15



REV

PROJECT Sea Canal Improvement TESTED BY JRE DATE 6-29-82
 PROJECT NO. 92-104-15 CHECKED BY DTN DATE _____
 SAMPLE IDENTIFICATION 6-19 Sample 13
 MATERIAL DESCRIPTION Subgrade Clayey sand with gravel

MOISTURE-DENSITY DETERMINATION

WT. MOLD + WS (GRS)	7322.0	7526.0	7673.0	7690.0	11298
WT. MOLD (GR)	2804.5	2804.5	2804.5	2804.5	6476.0
WT. WS GR/453.6 (LBS)	9.96	10.41	10.73	10.77	10.63
MOLD NO.	2	2	2	2	2
VOL. MOLD (CU. FT)	.075	.075	.075	.075	.075
Y (PCF)	132.80	138.80	142.10	143.61	141.74
TARE NO.	MAN-6	123	TEB-1	346	L-41
WT. TARE + WS (GR)	677.19	561.77	595.27	551.68	739.24
WT. TARE + DS (GR)	644.25	526.99	552.11	502.97	658.08
WT. TARE (GR)	8.96	9.72	10.23	10.23	9.82
WT. DS (GR)	635.29	517.27	541.88	492.74	648.26
WT. WATER (GR)	32.89	37.48	43.16	48.71	76.16
WC (%)	5.18	6.72	7.96	9.89	11.75
Y D = Y / (1 + WC) (PCF)	126.26	130.06	132.54	130.69	126.84

OVERSIZE CORRECTION DATA

SIEVE SIZE

VT WS (Fine Fraction)
 VT WS (Coarse Fraction)
 WT DS (Fine Fraction)
 WT DS (Coarse Fraction)

3/4

WC OF - FRACTION

T+WS
 T+DS
 TARE
 DS
 WT WATER
 WC

WC OF + FRACTION

T+WS
 T+DS
 TARE
 DS
 WT WATER
 WC

FROM
 Grain Size Distribution
 FRACTION PERCENTS

- FRACTION

+ FRACTION

100 (A / A+B)

100 (B / A+B)

73.0%

26.98%

GRAPH FITTING

F 57. 2.75
 ZERO AIR VOIDS CURVE

OVER SIZE
 SPECIFIC GRAVITY VALUE 2.51
 METHOD C-127

Y D (PCF)	134.59	131.75	130.37	126.41	
WC (%)	10.0	11.0	11.5	13.0	

DRY DENSITY FITTING

Y (PCF)					
WC (%)					
Y D (PCF)					

*BLOWS/LAYER

METHOD	MATERIAL SIZE	MOLD SIZE	BLOWS*
A	ALL PASSING NO. 4	4" DIA.	25
B	ALL PASSING NO. 3/8	4" DIA.	25
C	ALL PASSING 3/4"	6" DIA.	56

DESIGNATION USED

DESIGNATION	HAM/DROP	LAYERS
D698-91	5.5 #12"	3
D1557-91	10#18"	5

REV. 83 * NOTE MATERIAL SHORTAGE. MATERIAL WAS REUSED.
 AASHTO T-99

LABORATORY CORRECTION OF UNIT WEIGHT
 FOR SOIL CONTAINING OVERSIZED PARTICLES

SAMPLE 6-19-91 SAMPLE B

DESCRIPTION: DARK BROWN SILTY CLAYEY GRAVEL WITH SAND

SUBJECT: San. Con Wastewater
 SAMPLE: 6-19-91 SAMPLE B
 BY: DJN DATE: 6/30/92
 CHECKED BY: PRL DATE: 6-26-92
 SHEET NO. 92-108-15 OF

$$C_u = 100 \frac{\gamma_s}{\gamma_w} \frac{G_m}{G_s} \frac{\gamma_w}{\gamma_s} \frac{P_1}{P_2} \quad (max)$$

$\gamma_s = 132.7 \text{ PCF}$

$G_m = 2.51$

$\gamma_w = 62.43 \text{ PCF}$

$P_2 = 27.0\%$

$P_1 = 73.0\%$

$$C_u = \frac{(132.7 \text{ PCF})(2.51)(62.43 \text{ PCF})}{(132.7 \text{ PCF})(27.0) + (2.51)(62.43)(73.0)} \times 100$$

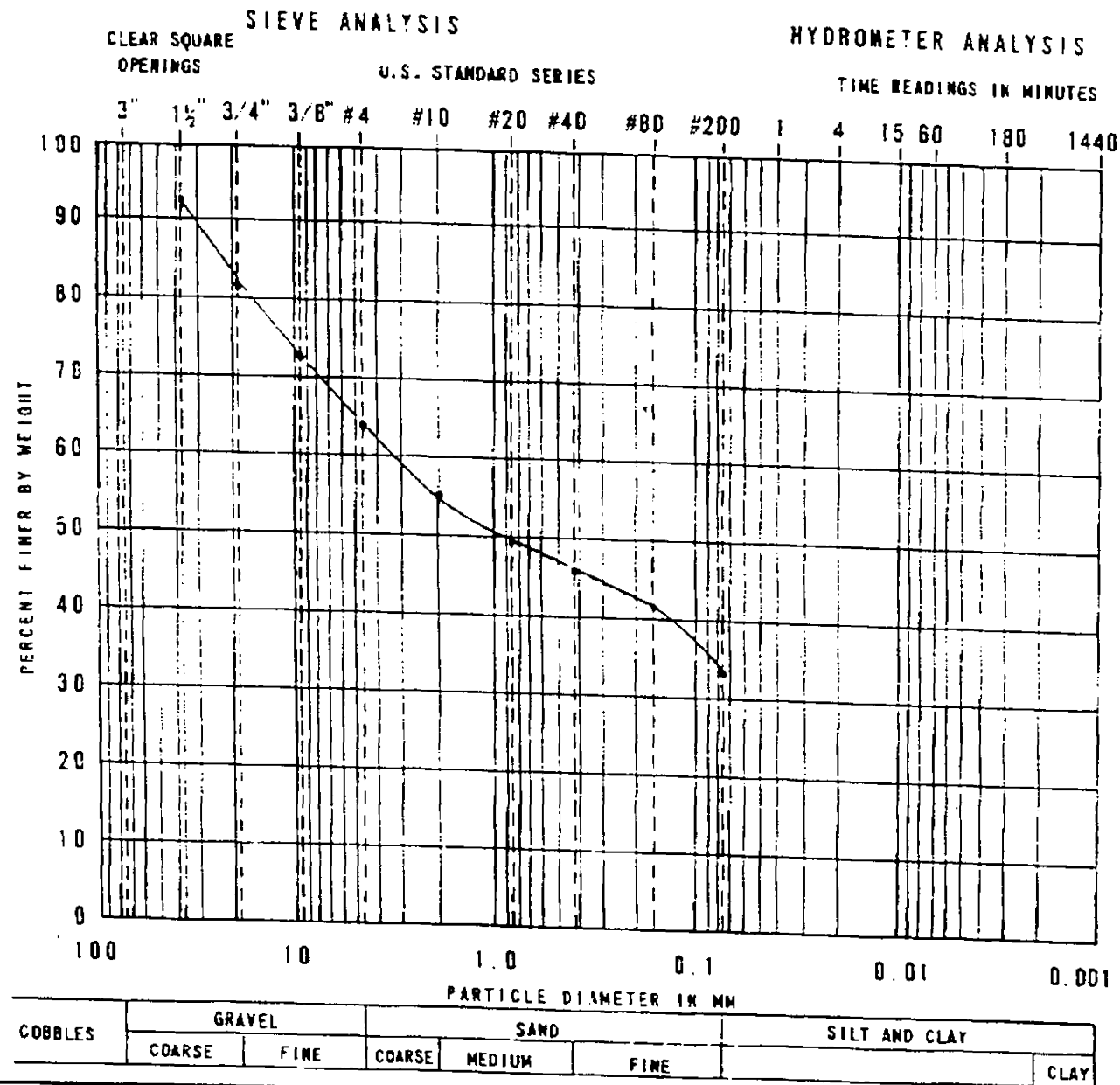
$$C_u = 138.4 \text{ PCF}$$

ENGINEERS & GEOTECHNICAL CONSULTANTS, INC.
 1700 BARRY RD. - SUITE 100
 WILMINGTON, DE 19804
 (302) 237-8500

GRAIN SIZE ANALYSIS
 WALLSVILLE
 SAMPLE G-24-92
 UNPROCESSED CLAY

DWN. DIN CHKD. RA
 APPD. _____ DATE _____
 SCALE: AS SHOWN
 DRAWING NUMBER
 92-109-15
 REV

DESCRIPTION: RED BROWN SILTY CLAYEY GRAVEL WITH SAND



COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2				2731.79	100
1 1/2			194.71	2537.05	92.87
1					
3/4			277.05	2260.0	82.73
1/2					
3/8			271.65	1988.35	72.79
No. 4			235.43	1752.92	64.17

FINE SIEVE SERIES

No.	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	%	Total % Passing Sieve
No. 20				360.79	100	64.7	64.17
No. 40			51.58	309.21	85.70	"	54.99
No. 60			32.44	276.72	76.70	"	49.22
No. 80			16.56	260.16	72.11	"	46.27
No. 100			25.78	234.88	65.10	"	41.77
No. 200			47.22	187.66	52.01	"	33.37

REMARKS: * K = $\frac{10}{100}$

TOTAL WEIGHT OF SAMPLE

WT of Sample + Tare	3564.96
WT of Tare S-C	657.33
WT of Sample (wet)	2907.13
WT of Sample (corrected for moisture)	2731.79

WATER CONTENT FOR TOTAL SAMPLE

WT of Ws + Tare	580.60
D-5 WT of DS + Tare	546.14
WT of Tare	2.99
WT of DS	537.15
WT of Water	34.46
Moisture Content	6.42

- # 4 SAMPLE USED IN ANALYSIS

WT of Ws + Tare	396.98
WT of Tare D-4	9.10
WT of Sample (wet)	387.38
WT of Sample (dry)	360.79

WATER CONTENT FOR - # 4 SAMPLE

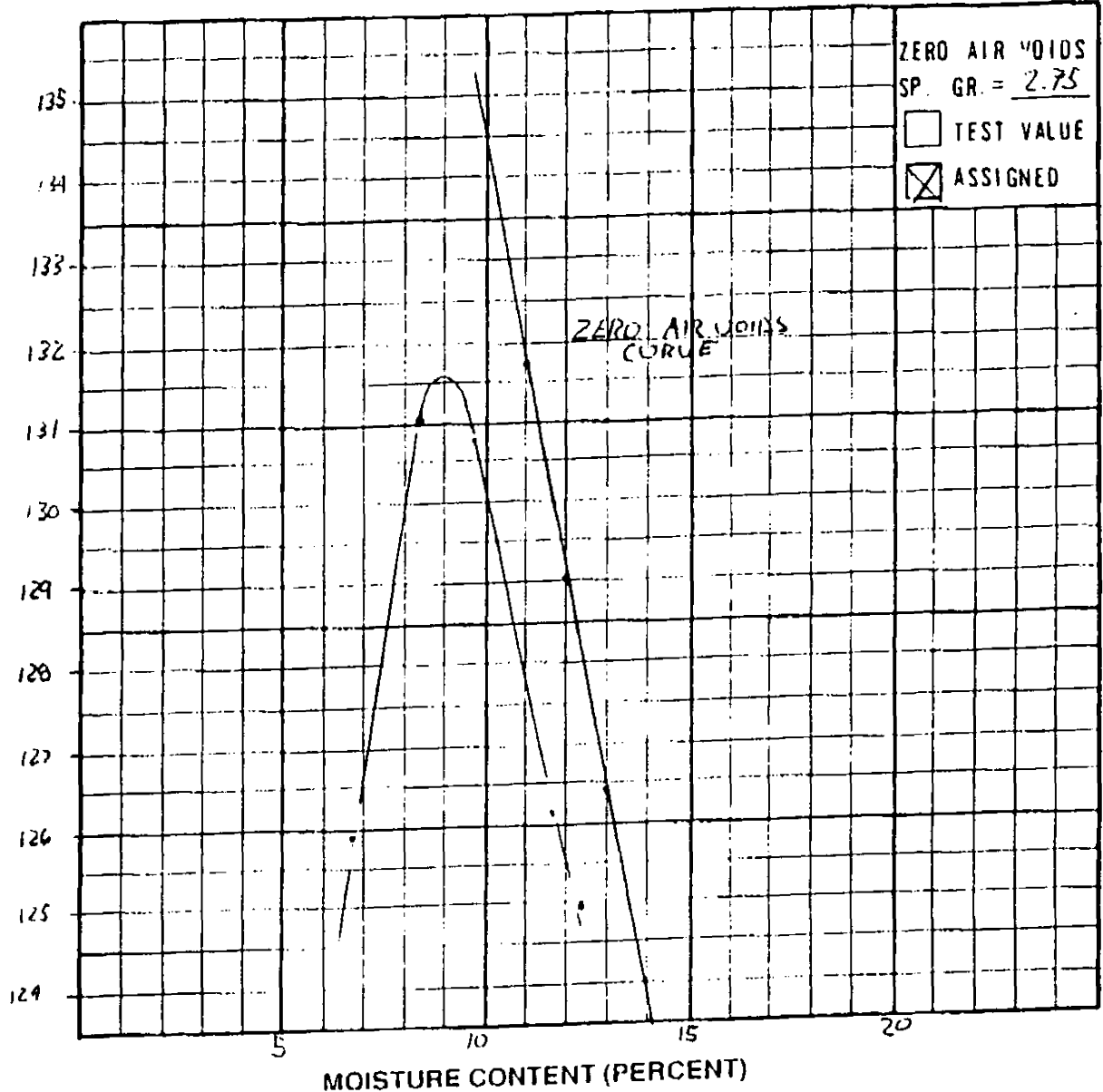
WT of Ws + Tare	413.52
WT of DS + Tare	385.76
WT of Tare D-1	8.95
WT of DS	376.81
WT of Water	27.76
Moisture Content	7.37

GRAIN SIZE ANALYSIS

Client Gro Con. Lubrication
 Project No. 92-129-15
 Sample No. 6-24
 Soil Identification Impress. / Clay

Tested by: JTC
 Calcs. by: DJH
 Chck'd by: TR
 Date 6-26-92
 Date 6-29-92
 Date 6-29-92

DRY DENSITY (PCF)



TEST

- ☒ ASTM D698-91
☐ ASTM D1557-91

MATERIAL DESCRIPTION:

* RED BROWN SILTY CLAYEY GRAVEL WITH SAND

SOIL PREPARATION: DRY ☒ MOIST
 RAMMER TYPE: MECHANICAL ☒ MANUAL

RESULTS:

OPTIMUM MOISTURE CONTENT 9.0 %
 MAXIMUM DRY DENSITY 131.6 PCF
 OVERSIZE FRACTION 14.1 %
 SIEVE USED 3/4

PROCEDURE

C
AASHTO - T-99 DUE TO MATERIAL SIZE RANGE

131.7 PCF

UNI
 CONSULTANTS, INC.
 Engineers • Geologists • Planners
 Environmental Specialists
 570 Baily Rd • Pittsburgh,
 Monroeville, Pa. 15146
 412-856-9400

MOISTURE-DENSITY RELATIONSHIP TEST
 UNPROCESSED CLAY
 Sample 6-24
 Geo Con
 WILLSVILLE

DWN. JRC CHKD. DJM
 APPD. _____ DATE 6-29-92
 SCALE: _____
 DRAWING NUMBER
92-109-15



MOISTURE-DENSITY RELATIONSHIP

PROJECT Geo Con Wells, LLC TESTED BY JNE DATE 6-26-92
 PROJECT NO. 92-109-15 CHECKED BY DJN DATE 6-29-92
 SAMPLE IDENTIFICATION C-24
 MATERIAL DESCRIPTION unprocessed clay DARK RED BROWN SILTY CLAYEY GRAVEL WITH SAND

MOISTURE-DENSITY DETERMINATION

WT. MOLD + WS (GRS)	7377.0	7639.0	7689.0	7605	7580.0
WT. MOLD (GR)	2805.0	2805.0	2805.0	2805.0	2805.0
WT. WS GR/453.6 (LBS)	10.08	10.66	10.77	10.58	10.63
MOLD NO.	3	3	3	3	3
VOL. MOLD (CU. FT)	0.075	0.075	0.075	0.075	0.075
Y (PCF)	139.4	142.1	143.6	141.1	140.4
TARE NO.	C-1	B1	C-3	C-5	C-2
WT. TARE + WS (GR)	521.28	468.79	604.04	563.99	578.15
WT. TARE + DS (GR)	468.60	433.19	550.92	505.66	515.91
WT. TARE (GR)	9.20	9.96	9.29	9.06	9.28
WT. DS (GR)	479.40	423.23	591.63	496.60	506.12
WT. WATER (GR)	32.68	35.80	53.12	58.33	62.74
WC (%)	6.82	8.46	9.81	11.74	12.40
Y D = Y / (1 + WC) (PCF)	125.82	131.02	130.74	126.27	124.01

OVERSIZE CORRECTION DATA

SIEVE SIZE	3/4	WC OF - FRACTION	WC OF + FRACTION	FRACTION PERCENTS
WT WS (Fine Fraction)	1774.1	T+WS	T+WS 652.58	- FRACTION + FRACTION
WT WS (Coarse Fraction)	2711.9	T+DS	T+DS 611.35	
WT DS (Fine Fraction)	16612.70 (A)	TARE	TARE 0.2 9.90	100 (A / (A+B))
WT DS (Coarse Fraction)	2736.2 (B)	DS	DS 602.45	100 (B / (A+B))
		WT WATER	WT WATER 91.23	
		WC	WC 6.84	85.9% 14.1%

$$Y_d = \frac{(62.4)(2.75)}{1 + (2.75 \cdot WC)}$$

GRAPH FITTING

SPECIFIC GRAVITY VALUE 2.75
 METHOD C-127

ZERO AIR VOIDS CURVE

Y D (PCF)	131.7	129.02	126.41	123.90
WC (%)	11.0	17.0	13.0	14.0

DRY DENSITY FITTING

Y (PCF)				
WC (%)				
Y D (PCF)				

*BLOWS/LAYER

METHOD	MATERIAL SIZE	MOLD SIZE	BLOWS*
A	ALL PASSING NO. 4	4" DIA.	25
B	ALL PASSING NO. 3/8	4" DIA.	25
C	ALL PASSING 3/4"	6" DIA.	56

DESIGNATION USED PROCEDURE USED

DESIGNATION	HAM/DROP	LAYERS
D898-91	5.5 #12"	3
D1557-91	10#/18"	5

SUBJECT GEO. CON WELLSVILLE
SAMPLE 6/24/92 UNPROCESSED CLAY
 BY DJN DATE 6/29/92 PROJ NO 92-109-15
 CHECK BY JK DATE _____ SHEET NO. _____ OF _____



LABORATORY CORRECTION OF UNIT WEIGHT
FOR SOIL CONTAINING OVERSIZE PARTICLES

SAMPLE: WELLSVILLE 6-24-92 UNPROCESSED CLAY

DESCRIPTION: DARK RED BROWN SILTY CLAYEY GRAVEL WITH SAND

$$C\gamma_c = 100 \frac{\gamma_F^{(max)} G_m \gamma_w}{(\gamma_F^{(max)} P_c + G_m \gamma_w P_F)}$$

$$\gamma_F^{(max)} = 131.6 \text{ PCF}$$

$$G_m = 2.12$$

$$\gamma_w = 62.43 \text{ #/ft}^3$$

$$P_c = 14.1\%$$

$$P_F = 85.9\%$$

$$C\gamma_c = \frac{(131.6 \text{ PCF})(2.12)(62.43 \text{ PCF})}{(131.6 \text{ PCF})(14.1\%) + (2.12)(62.43 \text{ PCF})(85.9\%)} \times 100$$

$$C\gamma_c = 131.7 \text{ PCF}$$

CHEMICAL ANALYSES

- **PCB's**
- **DIOXINS**
- **PRIORITY POLLUTANTS**
- **PASTE pH**

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

June 25, 1992

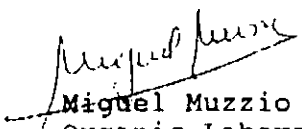
Mr. Chris Bailey
Geo-Con, Inc.
4075 Monroeville Blvd.
Corporate One
Building II, Suite 400
Monroeville, PA 15146

Dear Mr. Bailey:

Enclosed is the data report of results for the analyses of samples received at Ceimic on June 20, 1992.

Please call if you have any questions regarding this data.

Sincerely,


Miguel Muzzio
Organic Laboratory
Manager

MM/11

enc.

Original chain of Custody goes to Laboratory

Original chain of Custody goes to Laboratory

CEIMIC Corporation 10 Dean Knabss Drive, Narragansett, RI 02882 (401) 782-8900 FAX (401) 782-8905

VOLATILE ORGANIC ANALYSES

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

SURROGATE RECOVERY SUMMARY

Volatile Organics Analysis

Client: Geo-Con, Inc.

Date Samples Received: 6/20/92

Project No.: 920327

Matrix: Soil

Surrogate Compound	Method Blank	Samples		QC Limits
			-01	
1,2-Dichloroethane-d4	99 %		98 %	70 - 121%
Toluene-d8	104		105	84 - 138
Bromofluorobenzene	99		96	59 - 113

Reported by: CB

CEIMIC
CORPORATION
"Analytical Chemistry for Environmental Management"
VOLATILE ORGANICS
PRIORITY POLLUTANT LIST
EPA Method 624/8240

Client: Geo-Con, Inc.

Client Sample ID: Method Blank

Laboratory ID: V70621-B1

Date Sample Received: NA

Date Sample Prepared: 6/21/92

Date Sample Analyzed: 6/21/92

Concentration in: ug/kg (ppb)

Target Analyte	Sample Concentration	Method Reporting Limits
Acrolein	ND	100
Acrylonitrile	ND	100
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	10
Carbon tetrachloride	ND	5
Chlorobenzene	ND	5
Chloroethane	ND	10
Chlorodibromomethane	ND	5
2-Chloroethylvinyl ether	ND	5
Chloroform	ND	5
Chloromethane	ND	10
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5
1,2-Dichloroethane	ND	5
trans-1,2-Dichloroethene	ND	5
1,1-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethyl benzene	ND	5

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**VOLATILE ORGANICS
PRIORITY POLLUTANT LIST
EPA Method 624/8240**

Client: Geo-Con, Inc.

Client Sample ID: Method Blank

Laboratory ID: V70621-B1

Target Analyte	Sample Concentration	Method Reporting Limits
Methylene Chloride	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	10
Vinyl Chloride	ND	10

NA = Not applicable

ND = Not Detected

Reported By: CB

Approved by: AMC

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

VOLATILE ORGANICS

PRIORITY POLLUTANT LIST

EPA Method 624/8240

Client: Geo-Con, Inc.

Client Sample ID: Borrow Area 1

Laboratory ID: 920327-01

Date Sample Received: 6/20/92

Date Sample Prepared: 6/21/92

Date Sample Analyzed: 6/21/92

Concentration in: ug/kg (ppb)*

Target Analyte	Sample Concentration	Method Reporting Limits
Acrolein	ND	110
Acrylonitrile	ND	110
Benzene	ND	6
Bromodichloromethane	ND	6
Bromoform	ND	6
Bromomethane	ND	11
Carbon tetrachloride	ND	6
Chlorobenzene	ND	6
Chloroethane	ND	11
Chlorodibromomethane	ND	6
2-Chloroethylvinyl ether	ND	6
Chloroform	ND	6
Chloromethane	ND	11
1,2-Dichlorobenzene	ND	6
1,3-Dichlorobenzene	ND	6
1,4-Dichlorobenzene	ND	6
1,1-Dichloroethane	ND	6
1,2-Dichloroethane	ND	6
trans-1,2-Dichloroethene	ND	6
1,1-Dichloroethene	ND	6
1,2-Dichloropropane	ND	6
cis-1,3-Dichloropropene	ND	6
trans-1,3-Dichloropropene	ND	6
Ethyl benzene	ND	6

CEIMIC
CORPORATION

"Analytical Chemistry for Environmental Management"

VOLATILE ORGANICS
PRIORITY POLLUTANT LIST
EPA Method 624/8240

Client: Geo-Con, Inc.

Client Sample ID: Borrow Area 1

Laboratory ID: 920327-01

Target Analyte	Sample Concentration	Method Reporting Limits
Methylene Chloride	ND	6
1,1,2,2-Tetrachloroethane	ND	6
Tetrachloroethene	ND	6
Toluene	ND	6
1,1,1-Trichloroethane	ND	6
1,1,2-Trichloroethane	ND	6
Trichloroethene	ND	6
Trichlorofluoromethane	ND	11
Vinyl Chloride	ND	11

ND = Not Detected

+ Dry weight basis, solid = 90 %

Reported By: CB

Approved by: AK

SEMIVOLATILE ORGANIC ANALYSES

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

SURROGATE RECOVERY SUMMARY

Semivolatile Organics

Client: Geo-Con, Inc.

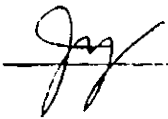
Project No.: 920327

Date Samples Received: 6/20/92

Matrix: Soil

Surrogate Compound	Method Blank	Samples		QC Limits
		-01	Laboratory Control Spike	
2-Fluorophenol	80%	72%	80%	25-121
2-Chlorophenol-d4*	92	81	96	20-110
Phenol-d5	83	73	86	24-113
2,4,6-Tribromophenol	82	79	79	19-122
1,2-Dichlorobenzene-d4*	81	72	82	20-110
Nitrobenzene-d5	82	72	80	23-120
2-Fluorobiphenyl	78	68	81	30-115
Terphenyl-d14	53	49	54	18-137

* Advisory

Reported by: 

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 625/8270

Client: Geo-Con, Inc.

Client Sample ID: Method Blank

Laboratory ID: S0620-B1

Date Sample Received: NA

Date Sample Prepared: 6/20/92

Date Sample Analyzed: 6/21/92

Concentration in: ug/kg (ppb)

Target Analyte	Sample Concentration	Method Reporting Limits
Phenol	ND	330
Bis(2-chloroethyl) ether	ND	330
2-Chlorophenol	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl) ether	ND	330
n-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	330
2,4-Dimethylphenol	ND	330
Bis(2-chloroethoxy) methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	ND	330
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	830
2-Chloronaphthalene	ND	830

Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 625/8270

Client: Geo-Con, Inc.

Client Sample ID: Method Blank

Laboratory ID: S0620-B1

Target Analyte	Sample Concentration	Method Reporting Limits
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
Acenaphthene	ND	330
2,4-Dinitrophenol	ND	830
4-Nitrophenol	ND	830
2,4-Dinitrotoluene	ND	330
2,6-Dinitrotoluene	ND	330
Diethyl phthalate	ND	330
4-Chlorophenyl phenyl ether	ND	330
Fluorene	ND	330
4,6-Dinitro-2-methylphenol	ND	830
n-Nitrosodiphenylamine	ND	330
4-Bromophenyl phenyl ether	ND	330
Hexachlorobenzene	ND	330
Pentachlorophenol	ND	830
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Benzidine	ND	3,300
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	330
Benzo(a)anthracene	ND	330
Bis(2-ethylhexyl)phthalate	ND	330
Chrysene	ND	330
Di-n-octylphthalate	ND	330
Benzo(b)fluoranthene	ND	330
Benzo(k)fluoranthene	ND	330

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 625/8270

Client: Geo-Con, Inc.

Client Sample ID: Method Blank

Laboratory ID: S0620-B1

Target Analyte	Sample Concentration	Method Reporting Limits
Benzo(a)pyrene	ND	330
Indeno(1,2,3-cd)pyrene	ND	330
Dibenzo(a,h)anthracene	ND	330
Benzo(g,h,i)perylene	ND	330
1,2-Diphenylhydrazine	ND	330
N-Nitrosodimethylamine	ND	330

ND = Not detected

NA = Not applicable

Reported by: Jy

Approved by: MA

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 625/8270

Client: Geo-Con, Inc.

Client Sample ID: Borrow Area 1

Laboratory ID: 920327-01

Date Sample Received: 6/20/92

Date Sample Prepared: 6/20/92

Date Sample Analyzed: 6/21/92

Concentration in: ug/kg (ppb)*

Target Analyte	Sample Concentration	Method Reporting Limits
Phenol	ND	360
Bis(2-chloroethyl)ether	ND	360
2-Chlorophenol	ND	360
1,3-Dichlorobenzene	ND	360
1,4-Dichlorobenzene	ND	360
1,2-Dichlorobenzene	ND	360
Bis(2-chloroisopropyl)ether	ND	360
n-Nitroso-di-n-propylamine	ND	360
Hexachloroethane	ND	360
Nitrobenzene	ND	360
Isophorone	ND	360
2-Nitrophenol	ND	360
2,4-Dimethylphenol	ND	360
Bis(2-chloroethoxy)methane	ND	360
2,4-Dichlorophenol	ND	360
1,2,4-Trichlorobenzene	ND	360
Naphthalene	ND	360
Hexachlorobutadiene	ND	360
4-Chloro-3-methylphenol	ND	360
Hexachlorocyclopentadiene	ND	360
2,4,6-Trichlorophenol	ND	900
2-Chloronaphthalene	ND	900

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 625/8270

Client: Geo-Con, Inc.

Client Sample ID: Borrow Area 1

Laboratory ID: 920327-01

Target Analyte	Sample Concentration	Method Reporting Limits
Dimethylphthalate	ND	360
Acenaphthylene	ND	360
Acenaphthene	ND	360
2,4-Dinitrophenol	ND	830
4-Nitrophenol	ND	830
2,4-Dinitrotoluene	ND	360
2,6-Dinitrotoluene	ND	360
Diethyl phthalate	ND	360
4-Chlorophenyl phenyl ether	ND	360
Fluorene	ND	360
4,6-Dinitro-2-methylphenol	ND	900
n-Nitrosodiphenylamine	ND	360
4-Bromophenyl phenyl ether	ND	360
Hexachlorobenzene	ND	360
Pentachlorophenol	ND	900
Phenanthrene	ND	360
Anthracene	ND	360
Di-n-butylphthalate	ND	360
Fluoranthene	ND	360
Benzidine	ND	3,600
Pyrene	ND	360
Butylbenzylphthalate	ND	360
3,3'-Dichlorobenzidine	ND	360
Benzo(a)anthracene	ND	360
Bis(2-ethylhexyl)phthalate	ND	360
Chrysene	ND	360
Di-n-octylphthalate	ND	360
Benzo(b)fluoranthene	ND	360
Benzo(k)fluoranthene	ND	360

CORPORATION
"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 625/8270

Client: Geo-Con, Inc.

Client Sample ID: Borrow Area 1

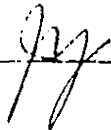
Laboratory ID: 920327-01

Target Analyte	Sample Concentration	Method Reporting Limits
Benzo(a)pyrene	ND	360
Indeno(1,2,3-cd)pyrene	ND	360
Dibenzo(a,h)anthracene	ND	360
Benzo(g,h,i)perylene	ND	360
1,2-Diphenylhydrazine	ND	360
N-Nitrosodimethylamine	ND	360

ND = Not detected

+ Dry weight basis, solid = 92%

Dioxin Screen: No dioxin isomers were detected

Reported by: 

Approved by: 

PESTICIDES ANALYSES

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**SURROGATE RECOVERY SUMMARY
Organochlorine Pesticides Analysis**

Client: Geo-Con, Inc.

Date Samples Received: 6/20/92

Project No.: 920327

Client ID	Laboratory ID	TCX Recovery	DCB Recovery
Borrow Area 1	P0620-B1	128%	110%

QA/QC

Method Blank	P0620-LCS1	128	108
Laboratory Control Sample	P20327-01	112	95

TCX = Tetrachloro-m-xylene
DCB = Decachlorobiphenyl

Reported by: XD.

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANTS

ORGANOCHLORINE PESTICIDES

EPA Method 608/8080

Client: Geo-Con, Inc.
Client Sample ID: Method Blank
Date Sample Received: NA
Date Sample Analyzed: 6/21/92

Laboratory ID: P0620-B1
Date Sample Prepared: 6/20/92
Concentration in: ug/kg (ppb)

Target Analyte	Sample Concentration	Method Reporting Limits
alpha-BHC	ND	8.0
beta-BHC	ND	8.0
delta-BHC	ND	8.0
gamma-BHC	ND	8.0
Heptachlor	ND	8.0
Aldrin	ND	8.0
Heptachlor epoxide	ND	8.0
Endosulfan I	ND	8.0
Dieldrin	ND	16.0
4,4'-DDE	ND	16.0
Endrin	ND	16.0
Endosulfan II	ND	16.0
4,4'-DDD	ND	16.0
Endosulfan sulfate	ND	16.0
4,4'-DDT	ND	16.0
Methoxychlor	ND	80.0
Endrin aldehyde	ND	16.0
Chlordane	ND	80.0
Toxaphene	ND	160.0
PCB-1016	ND	80.0
PCB-1221	ND	80.0
PCB-1232	ND	80.0
PCB-1242	ND	80.0
PCB-1248	ND	80.0
PCB-1254	ND	160.0
PCB-1260	ND	160.0

NA = Not applicable
ND = Not detected

Reported by: X.D.

Approved by: [Signature]

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANTS

ORGANOCHLORINE PESTICIDES

EPA Method 608/8080

Client: Geo-Con, Inc.

Client Sample ID: Borrow Area 1

Date Sample Received: 6/20/92

Date Sample Analyzed: 6/21/92

Laboratory ID: 920327-01

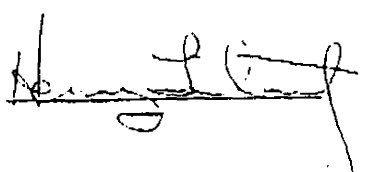
Date Sample Prepared: 6/20/92

Concentration in: ug/kg (ppb)

Target Analyte	Sample Concentration	Method Reporting Limits
alpha-BHC	ND	8.7
beta-BHC	ND	8.7
delta-BHC	ND	8.7
gamma-BHC	ND	8.7
Heptachlor	ND	8.7
Aldrin	ND	8.7
Heptachlor epoxide	ND	8.7
Endosulfan I	ND	8.7
Dieldrin	ND	17.0
4,4'-DDE	ND	17.0
Endrin	ND	17.0
Endosulfan II	ND	17.0
4,4'-DDD	ND	17.0
Endosulfan sulfate	ND	17.0
4,4'-DDT	ND	17.0
Methoxychlor	ND	87.0
Endrin aldehyde	ND	17.0
Chlordane	ND	87.0
Toxaphene	ND	170.0
PCB-1016	ND	87.0
PCB-1221	ND	87.0
PCB-1232	ND	87.0
PCB-1242	ND	87.0
PCB-1248	ND	87.0
PCB-1254	ND	170.0
PCB-1260	ND	170.0

ND = Not detected

Reported by: X.D.

Approved by: 

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**LABORATORY CONTROL SUMMARY
ORGANOCHLORINE PESTICIDE ANALYSIS**

EPA Method 608/8080

Client: Geo-Con, Inc.

Project No.: 920327

Matrix: Soil

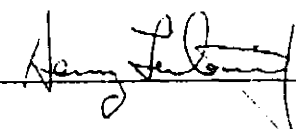
Laboratory Control ID: P0620-LCS1

Date of Preparation: 06/20/92

Spike Compound	Recovery	
	Blank Spike	QC Limits*
gamma-BHC (Lindane)	130%	46 - 127
Heptachlor	98	35 - 130
Aldrin	114	34 - 132
Dieldrin	114	31 - 134
Endrin	132	42 - 139
4,4'-DDT	126	23 - 134

* = These limits are for advisory purposes only.

Reported by: X.D.

Approved by: 

METALS ANALYSES

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

TOTAL METALS

Client: Geo-Con, Inc.

Client Sample ID: Borrow Area 1

Date Sample Received: 6/20/92

Laboratory ID: 920327-01

Date Analysis Completed: 6/25/92

Concentration in: mg/kg (ppm)*

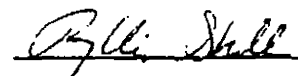
Target Analyte	Sample Concentration	Method Reporting Limit
Total Metals		
Antimony	ND	20
Arsenic	10	5*
Beryllium	ND	2
Cadmium	ND	2
Chromium	17	2
Copper	22	2
Lead	18	1
Mercury	ND	0.4
Nickel	31	7
Selenium	ND	1
Silver	ND	2
Thallium	ND	1
Zinc	79	2

ND = Not detected

+ Dry weight basis, solid = 90%

* Method Reporting Limit was adjusted to account for sample matrix effect.

Reported by: 

Approved by: 

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

QUALITY CONTROL

METHOD BLANK

Client: Geo-Con, Inc.

Client Sample ID: Method Blank

Project No.: 920327

Laboratory ID: 0620PBS

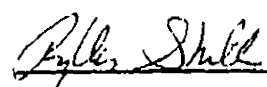
Date Analysis Completed: 6/25/92

Concentration in: mg/kg (ppm)

Target Analyte	Sample Concentration	Method Reporting Limit
Total Metals		
Antimony	ND	20
Arsenic	ND	1
Beryllium	ND	2
Cadmium	ND	2
Chromium	ND	2
Copper	ND	2
Lead	ND	1
Mercury	ND	0.4
Nickel	ND	8
Selenium	ND	1
Silver	ND	2
Thallium	ND	1
Zinc	4	2

ND = Not detected

Reported by: 

Approved by: 

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

QUALITY CONTROL

LABORATORY CONTROL SAMPLE

Client: Geo-Con, Inc.

Client Sample ID: Laboratory Control Sample

Project No.: 920327

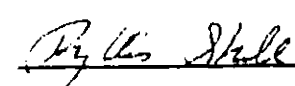
Laboratory ID: 0620LCSS

Date Analysis Completed: 6/25/92

Matrix: Soil

Target Analyte	% Recovery	Control Limits
Total Metals		
Antimony	139%	60-139 %
Arsenic	125	69-131
Beryllium	115	75-125
Cadmium	115	79-121
Chromium	116	75-125
Copper	113	75-125
Lead	104	75-125
Mercury	119	67-134
Nickel	113	75-125
Selenium	57	49-152
Silver	74	70-131
Thallium	78	63-137
Zinc	118	74-126

Reported by: 

Approved by: 

INORGANIC ANALYTES

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

INORGANIC ANALYTES

Client: Geo-Con, Inc.

Client ID: Borrow Area 1

Laboratory ID: 920327-01

Date Sample Received: 6/20/92

Date Sampled: 6/18/92

Target Analyte	Result	Units	Method Reporting Limit	Date Analyzed
pH	6.5	S.U	---	6/21/92
Total Cyanide*	ND	mg/kg (ppm)	1	6/24/92
Total Phenols*	ND	mg/kg (ppm)	2	6/23/92

ND = Not detected

* Reported on an "as is" basis

Reported by:

Jeffrey D. Maxson

Approved by:

Bylis Skell

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

QUALITY CONTROL

METHOD BLANK

Client: Geo-Con, Inc.

Client ID: Method Blank

Project No.: 920327

Laboratory ID: PBS

Target Analyte	Result	Units	Method Reporting Limit	Date Analyzed
Total Cyanide	ND	mg/kg (ppm)	1	6/24/92
Total Phenols	ND	mg/kg (ppm)	2	6/23/92

ND = Not detected

Reported by:

Sally D. Mayman

Approved by:

B. L. Stale

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**QUALITY CONTROL
LABORATORY CONTROL SAMPLE**

Client: Geo-Con, Inc.

Client Sample ID: Laboratory Control Sample

Project No.: 920327

Laboratory ID: LCS

Target Analyte	% Recovery	Control Limits
Total Cyanide	104%	75 - 125%
Total Phenols	95	75 - 125

Reported by:

Jeffrey D. Mayhew

Approved by:

By Lisa Skille

PROCESSED CLAY

- **GEOTECHNICAL TESTS**
 - **Gradation Analyses**
 - **Atterberg Limits Tests**
- **CHEMICAL ANALYSES**
 - **PCB's**
 - **Dioxins**
 - **Priority Pollutants**
 - **Paste pH**

GEOTECHNICAL TESTS

- **GRADATION ANALYSES**
- **ATTERBERG LIMITS TESTS**



GEOSYNTEC CONSULTANTS

ARCO 

SUBMITTAL COVER SHEET

1992 year

PROJECT: CELA SLURRY WALL PROJECT NO.: GQ3201 TASK NO.: 02
LOCATION: WELLSVILLE, NEW YORK CONTRACTOR: GEO-CON, INC. (C91027-003-01)

SUBMITTAL NO.: 27 QC #4 REVISION NO.: ADDENDUM No. 1

SUBMITTAL TITLE: BORROW SOURCE & COMPLIANCE TESTS

DATE RECEIVED: 09 / July / 92
(day / month / yr)

DATE REVIEWED: 09 / July / 92
(day / month / yr)

RESUBMITTAL REQUIRED:

☐ YES☒ NO

DATE APPROVED: 10 / July / 92
(day / month / yr)

COMMENTS: Specification 02108-3.1.6 requires flowing

Sieve Size % Passing by wt.

3/8"

65-100

40

30-80

200

25-50

Max Size = 4 in.

Results as follows:

Sieve Size	% Passing by weight	
	Test 1	Test 2
3/8"	75	78 (Estimated)
# 40	53	53
# 200	37	36

ATTERBERG LIMITS

	LL	PL	PI
TEST 1	23	17	7
TEST 2	26	18	8

MATERIAL IS CL
TO CL-ML.

Results OK full within specified range

DISTRIBUTION:

BY:

GEOSYNTEC CONSULTANTS

BY:

ARCO

P1-0129

SUBMITTAL 27QC04 & 28QC04
ADDENDUM NO. 1
CONTRACT NO. C91027-003-01
AND
CONTRACT NO. C91028-003-01
BORROW SOURCE AND COMPLIANCE TESTS
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

Prepared for:

Atlantic Richfield Company
515 South Flower Street AP-4188
Los Angeles, CA 90017

Attn: Robert Ivy
Construction Supervisor

Prepared By:

GEO-CON, INC.
4075 Monroeville Boulevard
Corporate One Building II, Suite 400
Monroeville, Pennsylvania 15146
Telephone: (412) 856-7700

JUL 9 1992
RECEIVED
RBS

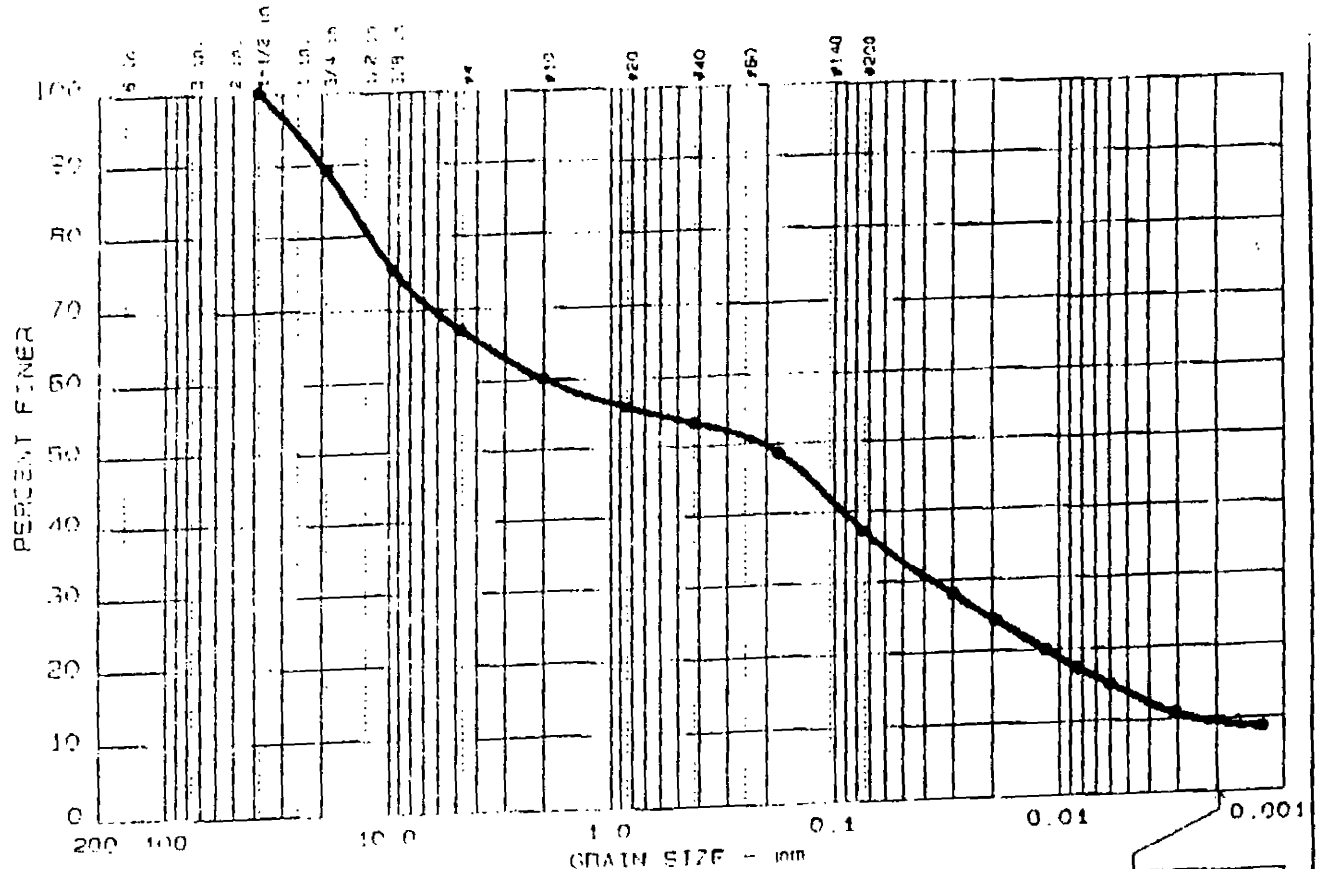
1. Geotechnical Compliance Tests

As per the Quality Assurance Project Plan, the following geotechnical tests have been completed on the <2" clay material from the Babbit Borrow Pit:

<u>Materials</u>	<u>Tests</u>	<u>No. of Tests Completed</u>
Processed Clay	Grainsize (200 sieve)	2
-Borrow for S.C.O.W.	Atterberg Limits	2

The results of all of these tests are attached. Additional tests of the processed material will be conducted throughout the project as per specification.

GRAIN SIZE DISTRIBUTION TEST REPORT



TEST	% SILT	% GRAVEL	% SAND	% SILT	% CLAY
8	0.0	33.0	30.2	27.6	9.2

LL	PI	D ₁₅	D ₃₀	D ₅₀	D ₆₀	D ₇₅	D ₁₀₀	C _c	C _u
15.49	2.02	0.21	0.030	0.0060	0.0026	0.28	785.2		

MATERIAL DESCRIPTION		USCS	AASHTO
brown silty sandy clay			
Project No. 92-109-15 Project Location - Wellsville Location: Baker 2" clay		Remarks: tested by dfs entered by pag checked by	
Date: 6-3-00		Figure No. _____	

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 8

Date: 6-3-92
Project No.: 92-109-15
Project: GeoCon - Wellsville

Sample Data

Location of Sample: Baker - 2" clay
Sample Description: brown silty sandy clay
USCS Class: Liquid limit:
AASHTO Class: Plasticity index:

Notes

Remarks: Tested by dfs entered by pag
checked by
Fig. No.:

Mechanical Analysis Data

Initial
Dry sample and tare = 1183.25
Tare = 0.00
Dry sample weight = 1183.25
Sample split on number 10 sieve
Split sample data:
Sample and tare = 70.68 Tare = 0 Sample weight = 70.68

Sieve tare method

Sieve	Weight retained	Sieve tare	Percent finer
.5 inches	0.00	0.00	100.0
.75 inches	128.39	0.00	89.1
0.375 inches	163.52	0.00	75.3
# 4	98.12	0.00	67.0
# 10	84.22	0.00	59.9
# 20	5.00	0.00	55.7
# 40	3.01	0.00	53.1
# 80	5.53	0.00	48.4
# 200	13.64	0.00	36.9

Hydrometer Analysis Data

operation sieve is number 10
percent -# 10 based on complete sample = 59.9
weight of hydrometer sample: 71.6
pyroscopic moisture correction:
Moist weight & tare = 84.64
Dry weight & tare = 83.61
Tare = 4.27

Hygroscopic moisture= 1.3 %
 Calculated biased weight= 117.96
 Table of composite correction values:
 Temp, deg C: 22.2 22.4 23.0 24.8
 temp. corr: - 2.9 - 2.8 - 2.6 - 2.1
 Discus correction only= 0
 Specific gravity of solids= 2.7
 Specific gravity correction factor= 0.989
 Hydrometer type: 151H Effective depth L= 16.294964 - 0.2645 x Rm

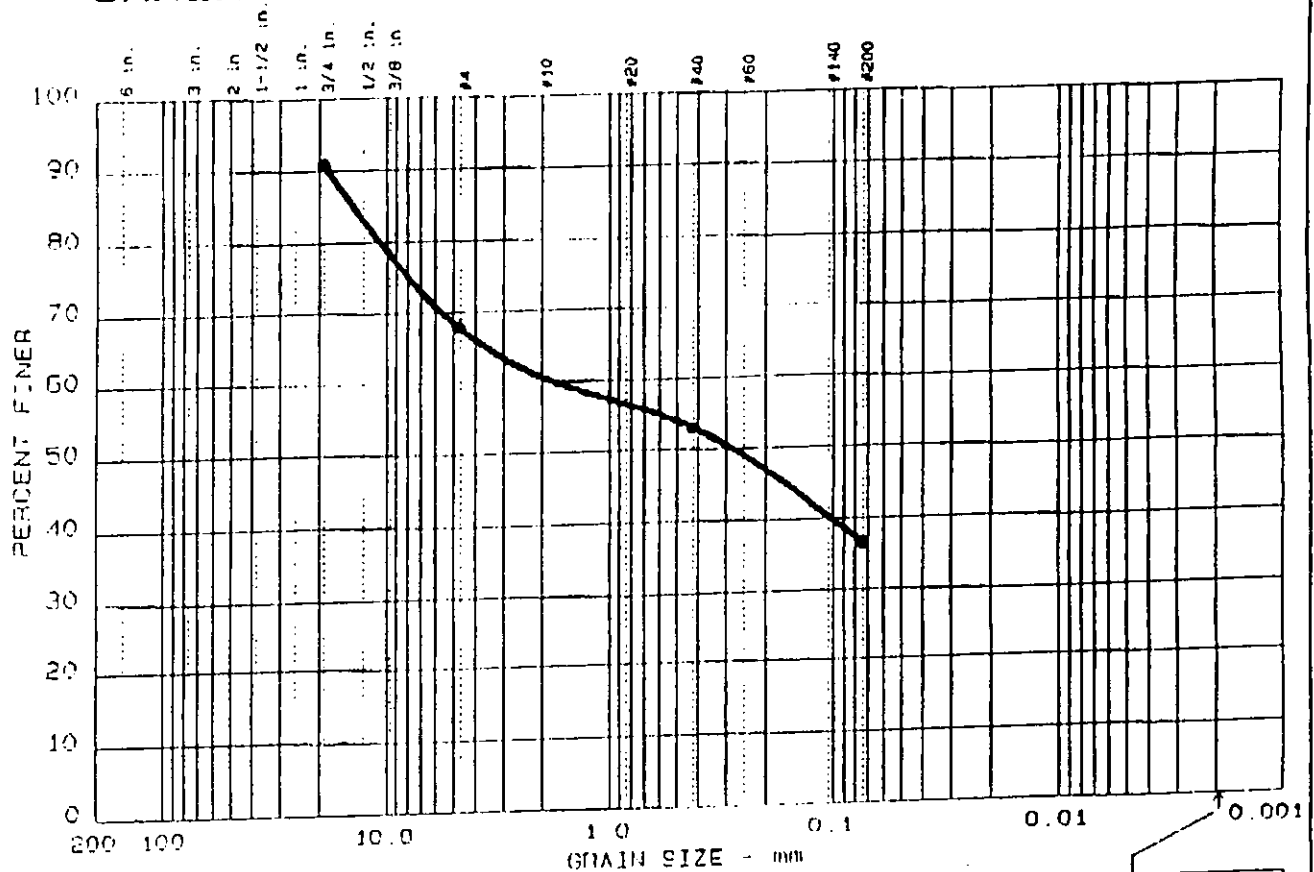
Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.0	22.2	1.0235	1.0206	0.0131	23.5	10.1	0.0294	27.8
5.0	22.2	1.0208	1.0179	0.0131	20.8	10.8	0.0192	24.1
15.0	22.2	1.0177	1.0148	0.0131	17.7	11.6	0.0115	20.0
30.0	22.4	1.0156	1.0128	0.0131	15.6	12.2	0.0083	17.2
60.0	22.4	1.0139	1.0111	0.0131	13.9	12.6	0.0060	14.9
240.0	23.0	1.0106	1.0080	0.0130	10.6	13.5	0.0031	10.7
1440.0	24.8	1.0085	1.0064	0.0127	8.5	14.0	0.0013	8.6

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 33.0 % SAND = 30.2
 % SILT = 27.6 % CLAY = 9.2

D60= 15.49 D60= 2.018 D50= 0.200
 D30= 0.0380 D15= 0.00603 D10= 0.00257
 Cc = 0.2786 Cu = 185.2356

GRAIN SIZE DISTRIBUTION TEST REPORT



GRAIN SIZE DISTRIBUTION TEST DATA		Test
Date:	6-11-92	
Project No.:	92-109-15	
Object:	GeoCon Wellsville	

Sample Data	
Location of Sample:	Borrow Clay
Sample Description:	
USCS Class:	Liquid limit:
AASHTO Class:	Plasticity index:

Notes
Remarks: tested by pag/mcu entered by pag checked by
Fig. No.:

Mechanical Analysis Data			
	Initial		
Dry sample and tare=	1231.05		
Tare =	0.00		
Dry sample weight =	1231.05		
Sieve tare method			
Sieve	Weight retained	Sieve tare	Percent finer
0.75 inches	116.06	0.00	90.6
# 4	281.51	0.00	67.7
# 40	183.67	0.00	52.8
# 200	203.50	0.00	36.3

Fractional Components		
% + 3 in. = 0.0	% GRAVEL = 32.3	% SAND = 31.5
% FINES = 36.2		
D55 = 14.13	D60 = 1.862	D50 = 0.285

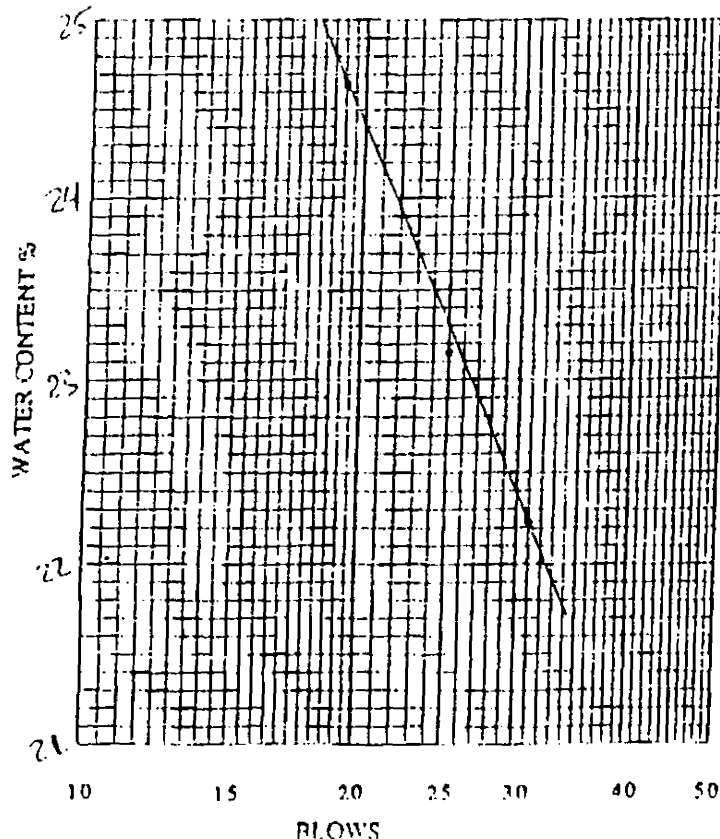
PROJECT NAME Geo. Cons / Wellsville PROJECT NO. 92-109-15
 SAMPLE IDENTIFICATION Brown Clay
 SAMPLE DESCRIPTION RED/Brown Clayey Silt TEST BY JRE
 PREPARATION METHOD WET ☒ DRY ☐ CHKD. BY FAI
 DATE 6-17-92

PLASTIC LIMIT

TRIAL NO.	1	2	3	4
TARE NO.	M8	520	14	m9
WT. TARE + WS	29.03	27.33	29.85	25.37
WT. TARE + DS	28.03	26.36	28.73	25.19
WT. TARE	22.32	20.54	22.01	20.39
WT. DS	5.71	5.82	6.72	4.55
WT. WATER	1.60	0.97	1.12	0.73
WC	17.51 %	16.67 %	16.67 %	16.04 %
AVERAGE WC		16.72		

LIQUID LIMIT

TRIAL NO.	1	2	3	4
TARE NO.	M13	M3	32	m4
WT. TARE + WS		30.01	31.91	28.52
WT. TARE + DS		28.11	29.92	26.96
WT. TARE	20.55	20.90	20.96	20.22
WT. DS		2.71	2.96	6.74
WT. WATER		1.90	1.94	1.56
WC	%	24.64 %	22.21 %	23.15 %
NO. BLOWS		19	37	25



LIQUID LIMIT 23.3
 PLASTIC LIMIT 16.7
 PLASTICITY INDEX 6.6
 SYMBOL OF MATERIAL CL - ML
 PASSING NO. 40 SIEVE

INSTRUCTIONS

- USE 3 TRIALS FOR PLASTIC LIMIT.
- USE 3 TRIALS FOR LIQUID LIMIT FROM 35 BLOWS TO 15 BLOWS

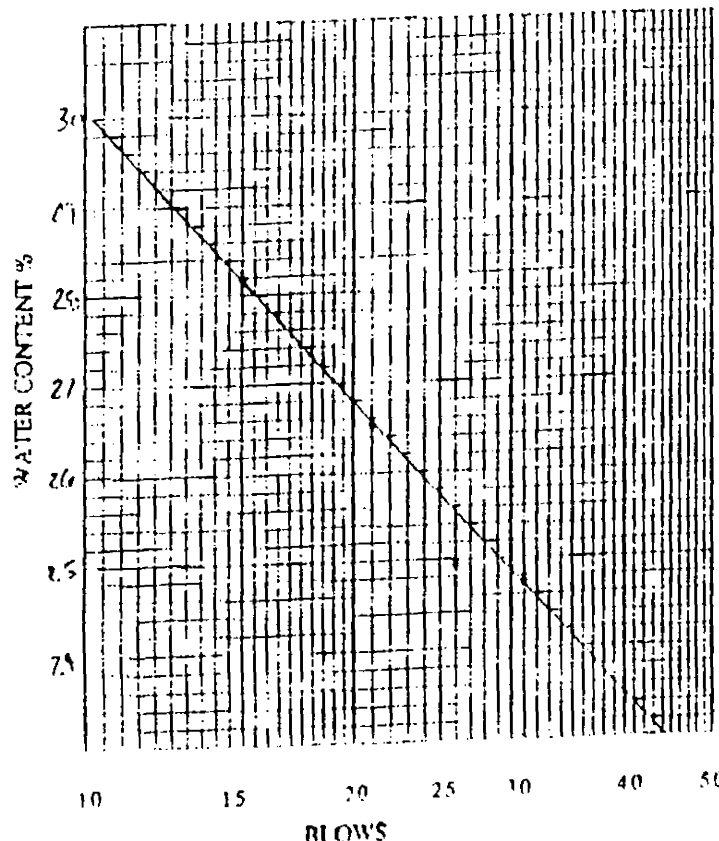
PROJECT NAME Wellsville PROJECT NO.
 SAMPLE IDENTIFICATION Unprocessed Clay
 SAMPLE DESCRIPTION Unprocessed Clay TEST BY SL
 PREPARATION METHOD CHKD. BY SL
 WET ☒ DRY ☐ DATE 7-7-

PLASTIC LIMIT

TRIAL NO.	1	2	3	
TARE NO.	27	28	27	
WT. TARE + WS	29.31	28.51	27.89	
WT. TARE + DS	28.71	27.30	27.00	
WT. TARE	21.71	21.91	22.01	
WT. DS	7.00	5.39	4.91	
WT. WATER	0.40	1.01	0.88	
WC	5.71 %	18.08 %	17.92 %	
AVERAGE WC		17.87		

LIQUID LIMIT

TRIAL NO.	1	2	3	
TARE NO.	3	4	113	114
WT. TARE + WS	31.49	29.87	27.71	29.
WT. TARE + DS	29.99	26.27	27.29	26.
WT. TARE	21.48	21.79	20.43	20.
WT. DS	8.01	6.48	6.86	6.
WT. WATER	2.00	1.60	1.82	1.
WC	24.97 %	24.69 %	26.53 %	26.
NO. BLOWS	26	31	21	15



LIQUID LIMIT 26.5
 PLASTIC LIMIT 17.9
 PLASTICITY INDEX 7.8
 SYMBOL OF MATERIAL CL
 PASSING NO. 40 SIEVE

INSTRUCTIONS

1. USE 3 TRIALS FOR PLASTIC L
2. USE 3 TRIALS FOR LIQUID LIA
35 BLOWS TO 15 BLOWS

CHEMICAL ANALYSES

- **PCB's**
- **DIOXINS**
- **PRIORITY POLLUTANTS**
- **PASTE pH**



GEOSYNTEC CONSULTANTS

ARCO 

SUBMITTAL COVER SHEET

1992 year

PROJECT: CELA SLURRY WALL

PROJECT NO.: GQ3201

TASK NO.: 0207

LOCATION: WELLSVILLE, NEW YORK

CONTRACTOR: GEO-CON, INC. (C91027-003-01)

SUBMITTAL NO.: 274C04

REVISION NO.: ADD No 3

SUBMITTAL TITLE:

Borrow Source & Compliance Tests
Chemical Analysis of Borrow Material

DATE RECEIVED:

10 / AUG / 92
(day/ month/ yr)

DATE REVIEWED:

12 / AUG / 92
(day/ month/ yr)

RESUBMITTAL REQUIRED:

☐

YES

☒

NO

DATE APPROVED:

12 / AUG / 92
(day/ month/ yr)

COMMENTS:

None

DISTRIBUTION:

BY:

GEOSYNTEC CONSULTANTS

BY:

ARCO

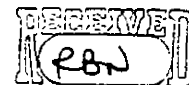
P1-0129

SUBMITTAL 27QC04 & 28QC04
CONTRACT NO. C91027-003-01
AND
CONTRACT NO. C91028-003-01
ADDENDUM NO. 3
CONTRACT NO. C91027-003-01
BORROW SOURCE AND COMPLIANCE TESTS
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

Prepared for:

Atlantic Richfield Company
515 South Flower Street AP-4188
Los Angeles, CA 90017

Attn: Robert Ivy
Construction Supervisor



Prepared By:

GEO-CON, INC.
4075 Monroeville Boulevard
Corporate One Building II, Suite 400
Monroeville, Pennsylvania 15146
Telephone: (412) 856-7700

Chemical Sampling & Testing

Results of the second set of chemical tests performed on the clay and fill materials which are being taken from the Babbit borrow pit are attached. This set of tests was performed on a sample of processed clay taken from the borrow pit, while the first set was performed on a sample of unprocessed clay. Testing was again completed as per specification for the following contaminants: PCB's, Dioxins, Priority Pollutants, and Paste pH.

Note: Attached results also include some testing that was performed on the originally proposed gas vent stone.

**THE FOLLOWING
IS/ARE THE BEST
IMAGES FROM POOR
QUALITY ORIGINAL(S)**

**IMAGE
DATA**

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

RECEIVED
AUG 15 1992
GEO-CON, INC.

August 4, 1992

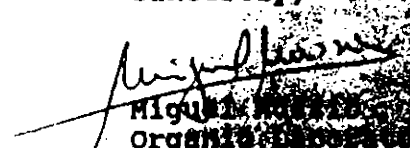
Mr. Chris Bailey
Geo-Con, Inc.
4075 Monroeville Blvd.
Corporate One
Building II, Suite 400
Monroeville, PA 15146

Dear Mr. Bailey:

Enclosed is the data report of results for the analyses of
samples received at Ceimic on July 10, 1992.

Please call if you have any questions regarding this data.

Sincerely,


Miguel Martinez
Organic Chemistry
Manager

MM/11

enc.

VOLATILE ORGANIC ANALYSES

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

SURROGATE RECOVERY SUMMARY

Volatile Organics Analysis

Client: Geo-Con, Inc.

Date Samples Received: 7/08/92

Project No.: 920348

Matrix: Rock/Clay

Surrogate Compound	Samples				QC Limits
	Method Blank #1	Method Blank #2	-01%	-01%	
1,2-Dichloroethane-d4	102%	95%	100%	93%	70-121%
Toluene-d8	101	101	98	101	84-138
Bromofluorobenzene	97	98	97	99	89-113

* Crushed Stone

** Processed Clay

Reported by: CB

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**VOLATILE ORGANICS
PRIORITY POLLUTANT LIST**

EPA Method 624/8240

Client: Geo-Con, Inc.

Client Sample ID: Method Blank #1

Laboratory ID: V70709-B1

Date Sample Received: NA

Date Sample Prepared: 7/09/92

Date Sample Analyzed: 7/09/92

Concentration in: ug/g (ppb)

Target Analyte	Sample Concentration	Method Reporting Limits
Acrolein	ND	100
Acrylonitrile	ND	100
Benzene	ND	100
Bromodichloromethane	ND	100
Bromoform	ND	100
Bromomethane	ND	100
Carbon tetrachloride	ND	100
Chlorobenzene	ND	100
Chloroethane	ND	100
Chlorodibromomethane	ND	100
2-Chloroethylvinyl ether	ND	100
Chloroform	ND	100
Chloromethane	ND	100
1,2-Dichlorobenzene	ND	100
1,3-Dichlorobenzene	ND	100
1,4-Dichlorobenzene	ND	100
1,1-Dichloroethane	ND	100
1,2-Dichloroethane	ND	100
trans-1,2-Dichloroethene	ND	100
1,1-Dichloroethene	ND	100
1,2-Dichloropropane	ND	100
cis-1,3-Dichloropropene	ND	100
trans-1,3-Dichloropropene	ND	100
Ethyl benzene	ND	100

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**VOLATILE ORGANICS
PRIORITY POLLUTANT LIST
EPA Method 624/8240**

Client: Geo-Con, Inc.

Client Sample ID: Method Blank #1

Laboratory ID: 101

Target Analyte	Sample Concentration
Methylene Chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
Toluene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl Chloride	ND

NA = Not applicable
ND = Not Detected

Reported By: CB

Approved: CB

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**VOLATILE ORGANICS
PRIORITY POLLUTANT LIST
EPA Method 624/8240**

Client: Geo-Con, Inc.

Client Sample ID: Method Blank #2

Laboratory

Date Sample Received: NA

Date Sample

Date Sample Analyzed: 7/13/92

Concentration

Target Analyte	Sample Concentration
Acrolein	ND
Acrylonitrile	ND
Benzene	ND
Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chlorobenzene	ND
Chloroethane	ND
Chlorodibromomethane	ND
2-Chloroethylvinyl ether	ND
Chloroform	ND
Chloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
trans-1,2-Dichloroethene	ND
1,1-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Ethyl benzene	ND

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**VOLATILE ORGANICS
PRIORITY POLLUTANT LIST
EPA Method 824/8240**

Client: Geo-Con, Inc.

Client Sample ID: Method Blank #2

Laboratory

Target Analyte	Sample Concentration
Methylene Chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
Toluene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl Chloride	ND

NA = Not applicable
ND = Not Detected

Reported By: CB

Approved: _____

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**VOLATILE ORGANICS
PRIORITY POLLUTANT LIST
EPA Method 624/8240**

Client: Geo-Con, Inc.

Client Sample ID: Processed Clay

Laboratory

Date Sample Received: 7/10/92

Date Sample

Date Sample Analyzed: 7/13/92

Concentration

Target Analyte	Sample Concentration
Acrolein	ND
Acrylonitrile	ND
Benzene	ND
Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chlorobenzene	ND
Chloroethane	ND
Chlorodibromomethane	ND
2-Chloroethylvinyl ether	ND
Chloroform	ND
Chloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
trans-1,2-Dichloroethene	ND
1,1-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Ethyl benzene	ND

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**VOLATILE ORGANICS
PRIORITY POLLUTANT LIST
EPA Method 824/8240**

Client: Geo-Con, Inc.

Client Sample ID: Processed Clay

Laboratory

Target Analyte	Sample Concentration
Methylene Chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
Toluene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoroethane	ND
Vinyl Chloride	ND

ND = Not Detected

+ Dry weight basis, solid = 88%

Reported By: CB

Approved: _____

SEMIVOLATILE ORGANIC ANALYSES

**GEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

SURROGATE RECOVERY SUMMARY

Semivolatile Organics

Client: Geo-Con, Inc.

Project No.: 920348

Date Samples Received: 7/10/92

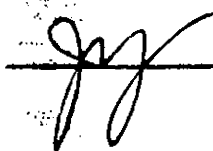
Matrix: Rock/Clay

Surrogate Compound	Method Blank	Samples
		-01**
2-Fluorophenol	61	81
2-Chlorophenol-d4*	72	88
Phenol-d5	73	80
2,4,6-Tribromophenol	72	81
1,2-Dichlorobenzene-d4*	79	80
Nitrobenzene-d5*	88	87
2-Fluorobiphenyl	85	97
Terphenyl-d14	92	78

* Advisory

** Crushed Stone

*** Processed Clay

Reported by: 

**CEMICO
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 625/8270

Client: Geo-Con, Inc.

Client Sample ID: Method Blank

Laboratory

Date Sample Received: NA

Date Sample

Date Sample Analysed: 7/21/92

Concentration

Target Analyte	Sample Concentration
Phenol	ND
Bis(2-chloroethyl) ether	ND
2-Chlorophenol	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,2-Dichlorobenzene	ND
Bis(2-chloroisopropyl) ether	ND
n-Nitroso-di-n-propylamine	ND
Hexachloroethane	ND
Nitrobenzene	ND
Isophorone	ND
2-Nitrophenol	ND
2,4-Dimethylphenol	ND
Bis(2-chloroethyl) methane	ND
2,4-Dichlorophenol	ND
1,2,4-Trichlorobenzene	ND
Naphthalene	ND
Hexachlorobutadiene	ND
4-Chloro-2-nitrophenol	ND
Hexachlorocyclopentadiene	ND
2,4,6-Trichlorophenol	ND
2-Chloronaphthalene	ND

CEINIC CORPORATION

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 8260/8270

Client: Geo-Con, Inc.

Client Sample ID: Method Blank

Laboratory

Target Analyte	Sample Concentration
Dimethylphthalate	ND
Acenaphthylene	ND
Acenaphthene	ND
2,4-Dinitrophenol	ND
4-Nitrophenol	ND
2,4-Dinitrotoluene	ND
2,6-Dinitrotoluene	ND
Diethyl phthalate	ND
4-Chlorophenyl phenyl ether	ND
Fluorene	ND
4,6-Dinitro-1-naphthylphenol	ND
n-Nitrosodiphenylamine	ND
4-Bromophenyl phenyl ether	ND
Hexachlorobenzene	ND
Pentachlorophenol	ND
Phenanthrene	ND
Anthracene	ND
Di-n-butylphthalate	ND
Fluoranthene	ND
Benzidine	ND
Pyrene	ND
Butylbenzylphthalate	ND
3,3'-Dichlorobenzidine	ND
Benzo(a)anthracene	ND
Bis(2-ethylhexyl)phthalate	ND
Chrysene	ND
Di-n-octylphthalate	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 625/8270

Client: Method Blank

Client Sample ID: Method Blank

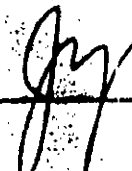
Laboratory

Target Analyte	Sample Concentration
Benzo(a)pyrene	ND
Indeno(1,2,3-cd)pyrene	ND
Dibenzo(a,h)anthracene	ND
Benzo(g,h,i)perylene	ND
1,2-Diphenylhydrazine	ND
N-Nitrosodimethylaniline	ND

NA = Not applicable

ND = Not detected

Dioxin Screen: No dioxin isomers detected in

Reported by: 

Approved: _____

**CEMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 825/8270

Client: Geo-Con, Inc.

Client Sample ID: Processed Clay

Laboratory

Date Sample Received: 7/10/92

Date Sample

Date Sample Analysed: 7/17/92

Concentration

Target Analyte	Sample Concentration
Phenol	ND
Bis(2-chloroethyl) ether	ND
2-Chlorophenol	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,2-Dichlorobenzene	ND
Bis(2-chloroisopropyl) ether	ND
n-Nitroso-di-n-propylamine	ND
Hexachloroethane	ND
Nitrobenzene	ND
Isophorone	ND
2-Nitrophenol	ND
2,4-Dimethylphenol	ND
Bis(2-chloroethoxy) methane	ND
2,4-Dichlorophenol	ND
1,2,4-Trichlorobenzene	ND
Naphthalene	ND
Hexachlorobutadiene	ND
4-Chloro-3-methylphenol	ND
Hexachlorocyclopentadiene	ND
2,4,6-Trichlorophenol	ND
2-Chloronaphthalene	ND

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 615/8170

Client: Geo-Con, Inc.

Client Sample ID: Processed Clay

Laboratory

Target Analyte	Sample Concentration
Dimethylphthalate	ND
Acenaphthylene	ND
Acenaphthene	ND
2,4-Dinitrophenol	ND
4-Nitrophenol	ND
2,4-Dinitrotoluene	ND
2,6-Dinitrotoluene	ND
Diethyl phthalate	ND
4-Chlorophenyl phenyl ether	ND
Fluorene	ND
4,6-Dinitro-2-methylphenol	ND
n-Nitrosodiphenylamine	ND
4-Bromophenyl phenyl ether	ND
Hexachlorobenzene	ND
Pentachlorophenol	ND
Phenanthrene	ND
Anthracene	ND
Di-n-butylphthalate	ND
Fluoranthene	ND
Benzidine	ND
Pyrene	ND
Butylbenzylphthalate	ND
3,3'-Dichlorobenzidine	ND
Benzo(a)anthracene	ND
Bis(2-ethylhexyl)phthalate	ND
Chrysene	ND
Di-n-octylphthalate	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

EXTRACTABLE ORGANICS

EPA Method 825/8270

Client: Geo-Con, Inc.

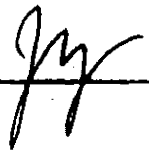
Client Sample ID: Processed Clay

Laboratory

Target Analyte	Sample Concentration
Benzo(a)pyrene	ND
Indeno(1,2,3-cd)pyrene	ND
Dibenzo(a,h)anthracene	ND
Benzo(g,h,i)perylene	ND
1,2-Diphenylhydrazine	ND
N-Nitrosodimethylamine	ND

ND = Not detected

Dioxin Screen: No dioxin isomers detected in sample

Reported by: 

Approved: _____

PESTICIDES ANALYSES

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

SURROGATE RECOVERY SUMMARY

Organochlorine Pesticides Analysis

Client: Geo-Con, Inc.

Date Samples Received: 7/10/92

Project No.: 920348

Client ID	Laboratory ID	TCX Recovery
Crushed Stone	920348-01	108%
Processed Clay	920348-02	160

QA/QC

Method Blank	P0713-B1	105
Laboratory Control Sample	P0713-LCS1	110

TCX = Tetrachloro-m-xylene
DCB = Decachlorobiphenyl

Reported by: g Rodman

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

PRIORITY POLLUTANT LIST

ORGANOCHLORINE PESTICIDES

EPA Method 808/8080

Client: Geo-Con, Inc.

Client Sample ID: Method Blank

Laboratory

Date Sample Received: NA

Date Sample

Date Sample Analyzed: 7/24/92

Concentration

Target Analyte	Sample Concentration
alpha-BHC	ND
beta-BHC	ND
delta-BHC	ND
gamma-BHC	ND
Heptachlor	ND
Aldrin	ND
Heptachlor epoxide	ND
Endosulfan I	ND
Dieldrin	ND
4,4'-DDE	ND
Endrin	ND
Endosulfan II	ND
4,4'-DDD	ND
Endosulfan sulfate	ND
4,4'-DDT	ND
Methoxychlor	ND
Endrin aldehyde	ND
Endrin Ketone	ND
Chlordane	ND
Toxaphene	ND

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**PRIORITY POLLUTANT LIST
ORGANOCHLORINE PESTICIDES**

EPA Method 608/8080

Client: Geo-Con, Inc.

Client Sample ID: Method Blank

Laborator

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
Chlorobenzilate	ND
Isodrin	ND
Kepone	ND
Methyl parathion	ND
Ethyl parathion	ND

NA - Not applicable

ND - Not detected

Reported by: Y. Redman

Approved by:

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**PRIORITY POLLUTANT LIST
ORGANOCHLORINE PESTICIDES
EPA Method 608/8080**

Client: Geo-Con, Inc.

Client Sample ID: Processed Clay

Laboratory: 1000

Date Sample Received: 7/10/92

Date Sample Analyzed: 7/24/92

Date Sample Analyzed: 7/24/92

Concentration: 1000

Target Analyte	Sample Concentration
alpha-BHC	ND
beta-BHC	ND
delta-BHC	ND
gamma-BHC	ND
Heptachlor	ND
Aldrin	ND
Heptachlor epoxide	ND
Endosulfan I	ND
Dieldrin	ND
4,4'-DDE	ND
Endrin	ND
Endosulfan II	ND
4,4'-DDD	ND
Endosulfan sulfate	ND
4,4'-DDT	ND
Methoxychlor	ND
Endrin aldehyde	ND
Endrin Ketone	ND
Chlordane	ND
Toxaphene	ND

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**PRIORITY POLLUTANT LIST
ORGANOCHLORINE PESTICIDES**

EPA Method 608/8080

Client: Geo-Con, Inc.

Client Sample ID: Processed Clay

Laboratory ID: 1000000000

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
Chlorobenzilate	ND
Isodrin	ND
Kepone	ND
Methyl parathion	ND
Ethyl parathion	ND

ND = Not detected

Reported by: J. Rodman

Approved by: _____

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**LABORATORY CONTROL SUMMARY
ORGANOCHLORINE PESTICIDE ANALYSIS**

EPA Method 608/8080

Client: Geo-Con, Inc.

Project No.: 920348

Matrix: Soil

Laboratory Control ID: P0713-LCS1

Date of Report: 10/1/82

Recovery	
Spike Compound	
gamma-BHC (Lindane)	92%
Heptachlor	86
Aldrin	96
Dieldrin	103
Endrin	133
4,4'-DDT	104

* - These limits are for advisory purposes only.

Reported by: J. Radman

Approved: _____

METALS ANALYSES

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

TOTAL METALS

Client: Geo-Con, Inc.

Client Sample ID: Processed Clay

Date Sample Received: 7/10/92

Laboratory: 1010

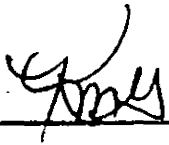
Date Analysis Completed: 8/03/92

Concentration: 1010

Target Analyte	Sample Concentration
Antimony	ND
Arsenic	13.3
Beryllium	ND
Cadmium	5
Chromium	19
Copper	26
Lead	45
Mercury	ND
Nickel	36
Selenium	ND
Silver	ND
Thallium	ND
Zinc	81

ND - Not detected

+ Dry weight basis, solid = 84%

Reported by: 

Approved by:

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

QUALITY CONTROL

METHOD BLANK

Client: Geo-Con, Inc.

Client Sample ID: Method Blank

Project No.: 920348

Laboratory

Date Analysis Completed: 8/03/92

Concentration

Target Analyte	Sample Concentration
Total Metals	
Antimony	ND
Arsenic	ND
Beryllium	ND
Cadmium	ND
Chromium	ND
Copper	ND
Lead	ND
Mercury	ND
Nickel	ND
Selenium	ND
Silver	ND
Thallium	ND
Zinc	ND

ND = Not detected

Reported by:



Approved by:

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

QUALITY CONTROL

LABORATORY CONTROL SAMPLE

Client: Geo-Con, Inc.

Client Sample ID: Laboratory Control Sample

Project No.: 920348

Laboratory

Date Analysis Completed: 8/03/92

Matrix: Soil

Target Analyte	Recovery
Total Metals	
Antimony	101%
Arsenic	103
Beryllium	96
Cadmium	92
Chromium	96
Copper	102
Lead	89
Mercury	84
Nickel	99
Selenium	94
Silver	105
Thallium	84
Zinc	98

Reported by: 

Approved by:

INORGANIC ANALYTES

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

INORGANIC ANALYTES

Client: Geo-Con, Inc.

Client ID: PROCESSED CLAY

Laboratory ID: 920348-02

Date Sample Received: 7/10/92

Date Sampled: 7/09/92

Target Analyte	Result	Units	Method Reported Limit
pH	7.6	S.U	
Total Cyanide	ND	mg/kg (ppm)	1
Total Phenols	ND	mg/kg (ppm)	1

ND = Not detected

Reported by:

Jeffrey D. Maymon

Approved by:

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

QUALITY CONTROL

METHOD BLANK

Client: Geo-Con, Inc.

Client ID: Method Blank

Project No.: 920348

Laboratory ID: PBS

Target Analyte	Result	Units	Method Reporting	Date Analyzed
Total Cyanide	ND	mg/kg (ppm)	1	1/23/92
Total Phenols	ND	mg/kg (ppm)	1	1/23/92

ND = Not detected

Reported by:

Jeffrey D. Mayhew

Approved by:

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

**QUALITY CONTROL
LABORATORY CONTROL SAMPLE**

Client: Geo-Con, Inc.

Client Sample ID: Laboratory Control Sample

Project No.: 920348

Laboratory ID:

Matrix: Solid

Target Analyte	% Recovery
Total Cyanide	116%
Total Phenols	93%

ND = Not detected

Reported by:

Jeffrey D. Mayron

Approved by:

[Signature]

WATER SUPPLY



GEOSYNTEC CONSULTANTS

ARCO 

SUBMITTAL COVER SHEET

1992 year

PROJECT: CELA SLURRY WALL PROJECT NO.: GQ3201 TASK NO.: 02
LOCATION: WELLSVILLE, NEW YORK CONTRACTOR: GEO-CON, INC. (C91027-003-01)

SUBMITTAL NO.: 27 QCS REVISION NO.:

SUBMITTAL TITLE: WATER SOURCE TEST RESULTS

DATE RECEIVED: 09 July 92
(day/ month/ yr)

DATE REVIEWED: 10 July 92
(day/ month/ yr)

RESUBMITTAL REQUIRED:

☐ YES

☒ NO

DATE APPROVED: 10 July 92
(day/ month/ yr)

COMMENTS:

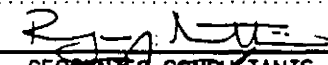
Specification 02168 3.1.2 requires that:

TDS < 500 ppm - reported value 102 - OK

pH > 7 - reported value 7.9 - OK

⇒ Results meet spec requirements

DISTRIBUTION:

BY: 
GEOSYNTEC CONSULTANTS

BY: 
ARCO

P1-0129

SUBMITTAL 27QC05
CONTRACT NO. C91027-003-01
WATER SOURCE AND TEST RESULTS
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

Prepared for:

Atlantic Richfield Company
515 South Flower Street AP-4188
Los Angeles, CA 90017

Attn: Robert Ivy
Construction Supervisor

Prepared By:

GEO-CON, INC.
4075 Monroeville Boulevard
Corporate One Building II, Suite 400
Monroeville, Pennsylvania 15146
Telephone: (412) 856-7700

JUL 9 1992
RECEIVED
RAS

Water Source

Water for mixing the bentonite slurry will be obtained from the on-site water system by hooking directly to one of the on-site fire hydrants.

Chemical Analysis of Water Source

As per the specifications, the on-site water was chemically analyzed. Results of these tests are attached. As can be seen, results are within the specified values.

GAI CONSULTANTS, INC.

Sample Designation Sew WATER Submitted by PAC
 GAI Sample No. _____ Date Submitted _____
 Project No. 92-109-15 Project Manager PAC/SRD
 Special Instructions _____

pH 7.9
 Cond., umhos/cm _____
 Res. (TDS), mg/L 102
 Res. (TSS), mg/L _____
 Res. (TS), mg/L _____
 Acid. (cold), mg/L as CaCO_3 _____
 Acid. (hot), mg/L as CaCO_3 _____
 Alk, mg/L as CaCO_3 _____
 NH_3 , mg/L _____
 BOD (5-day), mg/L _____
 Chloride, mg/L _____
 COD, mg/L _____
 Coliform, colonies/100ml _____
 CN (free), mg/L _____
 CN (total), mg/L _____
 DO, mg/L _____

Al, mg/L _____
 Sb, mg/L _____
 As, mg/L _____
 Ba, mg/L _____
 Be, mg/L _____
 B, mg/L _____
 Cd, mg/L _____
 Ca, mg/L _____
 Cr, mg/L _____
 Cr (+6), mg/L _____
 Co, mg/L _____
 Cu, mg/L _____
 Fe, mg/L _____
 Fe (+2), mg/L _____
 Pb, mg/L _____

Other: _____

Fluoride, mg/L _____
 Hardness, mg/L _____
 Nitrate, mg/L _____
 Nitrite, mg/L _____
 N-Kjeldahl, mg/L _____
 Oil & Grease, mg/L _____
 Phenol, mg/L _____
 P (ortho), mg/L _____
 P (hydrolyzable) mg/L _____
 P (total), mg/L _____
 Settl. Matter, mL/L _____
 Sulfate, mg/L _____
 Surfactants, mg/L _____
 TOC, mg/L _____
 TOH, mg/L _____
 Turbidity, NTU _____

Ng, mg/L _____
 Mn, mg/L _____
 Hg, mg/L _____
 Mo, mg/L _____
 Ni, mg/L _____
 K, mg/L _____
 Se, mg/L _____
 Si, mg/L _____
 Ag, mg/L _____
 Na, mg/L _____
 Ti, mg/L _____
 Sn, mg/L _____
 Tl, mg/L _____
 V, mg/L _____
 Zn, mg/L _____

Other: _____

Analyst: [Signature]

Approved by _____

Date _____

**CHEMICAL COMPATIBILITY OF
SOIL-BENTONITE BACKFILL**



GEOSYNTEC CONSULTANTS

ARCO 

SUBMITTAL COVER SHEET

1992 year

PROJECT: CELA SLURRY WALL PROJECT NO.: GQ3201 TASK NO.: 02
LOCATION: WELLSVILLE, NEW YORK CONTRACTOR: GEO-CON, INC. (C910 27-003-01)

SUBMITTAL NO.: 27 QCD 3 REVISION NO.: ADDENDUM No. 3

SUBMITTAL TITLE: CHEMICAL COMPATIBILITY OF SOIL-BLASTITE WALL MIX

DATE RECEIVED: 09 July 92
(day/ month/ yr)

DATE REVIEWED: 10 July 92
(day/ month/ yr)

RESUBMITTAL REQUIRED:

☐ YES

☒ NO

DATE APPROVED: 10 July 92
(day/ month/ yr)

COMMENTS: None

DISTRIBUTION:

BY: [Signature]
GEOSYNTEC CONSULTANTS
BY: [Signature]
ARCO

P1-0129

SUBMITTAL 27QC03
ADDENDUM NO. 3
CONTRACT NO. C91027-003-01
CHEMICAL COMPATIBILITY OF SOIL-BENTONITE CUTOFF WALL MIX
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

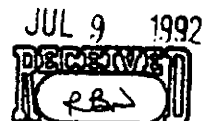
Prepared for:

Atlantic Richfield Company
515 South Flower Street AP-4188
Los Angeles, CA 90017

Attn: Robert Ivy
Construction Supervisor

Prepared By:

GEO-CON, INC.
4075 Monroeville Boulevard
Corporate One Building II, Suite 400
Monroeville, Pennsylvania 15146
Telephone: (412) 856-7700



1. Chemical Compatibility of the Soil-Bentonite Mix

The following referenced documents prepared by Geosyntec Consultants for the Atlantic Richfield Company are submitted as per Specification Section 02168-2.1.4 in order to satisfy the requirement of the Contractor to certify the chemical compatibility of the soil-bentonite mix with site waste or floating product:

Laboratory Testing Report, Volume I of II
Mix Design and Component Compatibility
Soil-Bentonite Slurry Trench Cutoff Wall
Landfill Remediation
Sinclair Refinery Site, Wellsville, New York

Laboratory Testing Report, Volume II of II
Mix Design and Component Compatibility
Soil-Bentonite Slurry Trench Cutoff Wall
Landfill Remediation
Sinclair Refinery Site, Wellsville, New York

Laboratory Testing Report
Subsurface Clay Used For Key of
Soil-Bentonite Slurry Trench Cutoff Wall
Landfill Remediation
Sinclair Refinery Site, Wellsville, New York

APPENDIX F

SOIL-BENTONITE CUTOFF WALL CONSTRUCTION TESTING

- **CONSTRUCTION SUMMARY TABLE**
- **TRAFFIC CAP**
 - **Standard Proctor Test Results**
 - **Density Test Results**
 - **Permeability Data**
 - **Plug Density Test Results**
- **IMPORTED SOIL FOR SOIL-BENTONITE BACKFILL**
 - **Gradation Analyses**
 - **Atterberg Limits Tests**
- **SLURRY TRENCH QUALITY CONTROL FORMS**
- **KEY TRENCH ATTERBERG LIMITS TESTS**
- **BENTONITE SLURRY DATA AT MIXING PLANT SUMMARY TABLE**
- **BENTONITE SLURRY DATA IN TRENCH SUMMARY TABLE**
- **SOIL-BENTONITE BACKFILL**
 - **Summary Table**
 - **Gradation Analyses, Geo-Con**
 - **Gradation Analyses, GeoSyntec Consultants**
 - **Permeability Data, Geo-Con**
 - **Permeability Data, GeoSyntec Consultants**
- **STORMWATER ANALYTICAL DATA FROM TEMPORARY PONDS IN SLA**

CONSTRUCTION SUMMARY TABLE

CONSTRUCTION SUMMARY TABLE
SOIL-BENTONITE CUTOFF WALL

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

DATE (1992)	STATION	KEY DEPTH (ft)	TOTAL DEPTH (ft)	DEPTH CLAY (ft)	TOTAL LENGTH (ft)	INCREMENTAL AREA (sq.ft)	TOTAL AREA (sq.ft)	INCREMENTAL VOLUME (cu.yd)	TOTAL VOLUME (cu.yd)
7/9	270	3	32	29	0				
7/9	260	3	32	29	10	320	320	28	28
7/9	240	3	33	30	30	650	970	57	85
7/9	220	3	33	30	50	660	1,630	58	143
7/10	200	3	41	38	70	740	2,370	64	207
7/10	180	3	43	40	90	840	3,210	71	278
7/10	160	3	43	40	110	860	4,070	73	350
7/10	140	3	38	35	130	810	4,880	69	419
7/10	120	3	38	35	150	760	5,640	65	484
7/10	100	3	38	35	170	760	6,400	65	550
7/13	80	3	35	32	190	730	7,130	63	613
7/13	60	3	35	32	210	700	7,830	61	673
7/13	40	3	36	33	230	710	8,540	61	735
7/13	20	3	36	33	250	720	9,260	62	797
7/13	0	3	36	33	270	720	9,980	62	859
7/14	2820	3	37	34	293	840	10,820	72	932
7/14	2800	3	37	34	313	740	11,560	64	995
7/14	2780	3	40	37	333	770	12,330	66	1,061
7/15	2760	3	43	40	353	830	13,160	70	1,132
7/15	2740	3	43	40	373	860	14,020	73	1,204
7/15	2720	3	43	40	393	860	14,880	73	1,277
7/15	2700	3	43	40	413	860	15,740	73	1,349
7/15	2680	3	43	40	433	860	16,600	73	1,422
7/15	2660	3	39	36	453	820	17,420	70	1,492
7/15	2640	3	39	36	473	780	18,200	67	1,558
7/16	2620	3	35	32	493	740	18,940	64	1,622
7/16	2600	3	35	32	513	700	19,640	61	1,683
7/16	2580	3	33	30	533	680	20,320	59	1,742
7/16	2560	3	33	30	553	660	20,980	58	1,800
7/16	2540	3	34	31	573	670	21,650	59	1,858
7/16	2520	3	34	31	593	680	22,330	59	1,918
7/16	2500	7	34	27	613	680	23,010	59	1,977
7/16	2480	7	34	27	633	680	23,690	59	2,036
7/17	2460	7	34	27	653	680	24,370	59	2,095
7/17	2440	7	34	27	673	680	25,050	59	2,155
7/17	2420	9	34	25	693	680	25,730	59	2,214
7/17	2400	9	34	25	713	680	26,410	59	2,273
7/17	2380	3.5	30.5	27	733	645	27,055	57	2,330
7/17	2360	3.5	30.5	27	753	610	27,665	54	2,384
7/20	2340	3	30	27	773	605	28,270	54	2,438
7/20	2320	3	30	27	793	600	28,870	53	2,491
7/20	2300	4	30	26	813	600	29,470	53	2,544
7/20	2280	4	30	26	833	600	30,070	53	2,598
7/20	2260	3.5	30.5	27	853	605	30,675	54	2,651
7/20	2240	6.5	30.5	24	873	610	31,285	54	2,705
7/20	2220	4	29	25	893	595	31,880	53	2,758
7/20	2200	4	29	25	913	580	32,460	52	2,810

CONSTRUCTION SUMMARY TABLE
SOIL-BENTONITE CUTOFF WALL

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

DATE (1992)	STATION	KEY DEPTH (ft)	TOTAL DEPTH (ft)	DEPTH CLAY (ft)	TOTAL LENGTH (ft)	INCREMENTAL AREA (sq.ft)	TOTAL AREA (sq.ft)	INCREMENTAL VOLUME (cu.yd)	TOTAL VOLUME (cu.yd)
7/21	2180	3	31	28	933	600	33,060	53	2,864
7/21	2160	3	31	28	953	620	33,680	55	2,918
7/21	2140	3	31	28	973	620	34,300	55	2,973
7/21	2120	3	31	28	993	620	34,920	55	3,028
7/21	2100	3	31	28	1,013	620	35,540	55	3,083
7/21	2080	3	32	29	1,033	630	36,170	56	3,138
7/21	2060	3	32	29	1,053	640	36,810	56	3,195
7/21	2040	3	31	28	1,073	630	37,440	56	3,250
7/21	2020	3	31	28	1,093	620	38,060	55	3,305
7/21	2000	3	32	29	1,113	630	38,690	56	3,361
7/21	1980	3	32	29	1,133	640	39,330	56	3,417
7/22	1960	3	30	27	1,153	620	39,950	55	3,472
7/22	1940	3	30	27	1,173	600	40,550	53	3,525
7/22	1920	3	30	27	1,193	600	41,150	53	3,578
7/22	1900	3	25	22	1,213	550	41,700	50	3,628
7/22	1880	3	25	22	1,233	500	42,200	46	3,674
7/22	1860	3	25	22	1,253	500	42,700	46	3,720
7/22	1840	3	25	22	1,273	500	43,200	46	3,766
7/22	1820	3	25	22	1,293	500	43,700	46	3,812
7/22	1800	3	25	22	1,313	500	44,200	46	3,858
7/23	1780	3	27	24	1,333	520	44,720	47	3,905
7/23	1760	3	27	24	1,353	540	45,260	49	3,954
7/23	1740	3	27	24	1,373	540	45,800	49	4,003
7/23	1720	3	33	30	1,393	600	46,400	53	4,056
7/23	1700	3	33	30	1,413	660	47,060	58	4,114
7/23	1680	3	33	30	1,433	660	47,720	58	4,172
7/24	1660	3	37	34	1,453	700	48,420	61	4,232
7/24	1640	3	36	33	1,473	730	49,150	63	4,295
7/24	1620	3	36	33	1,493	720	49,870	62	4,358
7/24	1600	3	31	28	1,513	670	50,540	59	4,416
7/24	1580	3	31	28	1,533	620	51,160	55	4,471
7/24	1560	6	35	29	1,553	660	51,820	58	4,529
7/24	1540	6	35	29	1,573	700	52,520	61	4,589
7/27	1520	10	38	28	1,593	730	53,250	63	4,652
7/27	1500	10	38	28	1,613	760	54,010	65	4,718
7/27	1480	8	38	30	1,633	760	54,770	65	4,783
8/4	1460	4.5	37.5	33	1,653	755	55,525	65	4,848
8/4	1440	4.5	37.5	33	1,673	750	56,275	64	4,912
8/4	1420	3.5	36.5	33	1,693	740	57,015	64	4,976
8/4	1400	3.5	36.5	33	1,713	730	57,745	63	5,039
8/4	1380	5.5	36.5	31	1,733	730	58,475	63	5,102
8/4	1360	5.5	36.5	31	1,753	730	59,205	63	5,165
8/5	1340	4.5	34.5	30	1,773	710	59,915	61	5,226
8/5	1320	4.5	34.5	30	1,793	690	60,605	60	5,286
8/5	1300	6.5	32.5	26	1,813	670	61,275	59	5,345
8/5	1280	6.5	32.5	26	1,833	650	61,925	57	5,402
8/5	1260	6	32	26	1,853	645	62,570	57	5,458
8/5	1240	6	32	26	1,873	640	63,210	56	5,515
8/5	1220	7	31	24	1,893	630	63,840	56	5,570
8/5	1200	7	31	24	1,913	620	64,460	55	5,625

CONSTRUCTION SUMMARY TABLE
SOIL-BENTONITE CUTOFF WALL

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

DATE (1992)	STATION	KEY DEPTH (ft)	TOTAL DEPTH (ft)	DEPTH CLAY (ft)	TOTAL LENGTH (ft)	INCREMENTAL AREA (sq. ft)	TOTAL AREA (sq. ft)	INCREMENTAL VOLUME (cu. yd)	TOTAL VOLUME (cu. yd)
8/6	1180	5	30	25	1,933	610	65,070	54	5,679
8/6	1160	5	30	25	1,953	600	65,670	53	5,732
8/6	1140	3	33	30	1,973	630	66,300	56	5,788
8/6	1120	3	33	30	1,993	660	66,960	58	5,846
8/6	1100	3	29	26	2,013	620	67,580	55	5,901
8/6	1080	3	29	26	2,033	580	68,160	52	5,952
8/6	1060	5	27	22	2,053	560	68,720	50	6,003
8/6	1040	5	27	22	2,073	540	69,260	49	6,052
8/6	1020	3	30	27	2,093	570	69,830	51	6,103
8/6	1000	3	30	27	2,113	600	70,430	53	6,156
8/7	980	3	31	28	2,133	610	71,040	54	6,210
8/7	960	3	31	28	2,153	620	71,660	55	6,265
8/7	940	3	28	25	2,173	590	72,250	53	6,318
8/7	920	3	28	25	2,193	560	72,810	50	6,368
8/7	900	3	28	25	2,213	560	73,370	50	6,418
8/7	880	3	28	25	2,233	560	73,930	50	6,469
8/7	860	3	28	25	2,253	560	74,490	50	6,519
8/7	840	3	28	25	2,273	560	75,050	50	6,569
8/7	820	3	28	25	2,293	560	75,610	50	6,620
8/7	800	3	28	25	2,313	560	76,170	50	6,670
8/8	780	3	28	25	2,333	560	76,730	50	6,721
8/8	760	3	28	25	2,353	560	77,290	50	6,771
8/8	740	4.5	23.5	19	2,373	515	77,805	47	6,818
8/8	720	4.5	23.5	19	2,393	470	78,275	44	6,862
8/8	700	4.5	23.5	19	2,413	470	78,745	44	6,905
8/8	680	4.5	23.5	19	2,433	470	79,215	44	6,949
8/8	660	7	25	18	2,453	485	79,700	45	6,994
8/8	640	9	27	18	2,473	520	80,220	47	7,041
8/8	620	6.5	28.5	22	2,493	555	80,775	50	7,091
8/8	600	6.5	28.5	22	2,513	570	81,345	51	7,142
8/10	580	7	30	23	2,533	585	81,930	52	7,195
8/10	560	7	30	23	2,553	600	82,530	53	7,248
8/10	540	8	31	23	2,573	610	83,140	54	7,302
10/2	520	9	31	22	2,593	620	83,760	55	7,357
10/2	500	6.5	31	24.5	2,613	620	84,380	55	7,412
10/2	480	4.5	31	26.5	2,633	620	85,000	55	7,466
10/2	460	4	31	27	2,653	620	85,620	55	7,521
10/2	440	4	31	27	2,673	620	86,240	55	7,576
10/2	420	4	32	28	2,693	630	86,870	56	7,632
10/2	400	4	32	28	2,713	640	87,510	56	7,688
10/2	380	4	32	28	2,733	640	88,150	56	7,744
10/3	360	3	33	30	2,753	650	88,800	57	7,801
10/3	340	3	32	29	2,773	650	89,450	57	7,858
10/3	320	3	32	29	2,793	640	90,090	56	7,915
10/3	300	3	32	29	2,813	640	90,730	56	7,971
10/3	280	3	32	29	2,833	640	91,370	56	8,027
10/3	270	3	32	29	2,843	320	91,690	28	8,055

TRAFFIC CAP

- **STANDARD PROCTOR TEST RESULTS**
- **DENSITY TEST RESULTS**
- **PERMEABILITY DATA**
- **PLUG DENSITY TEST RESULTS**

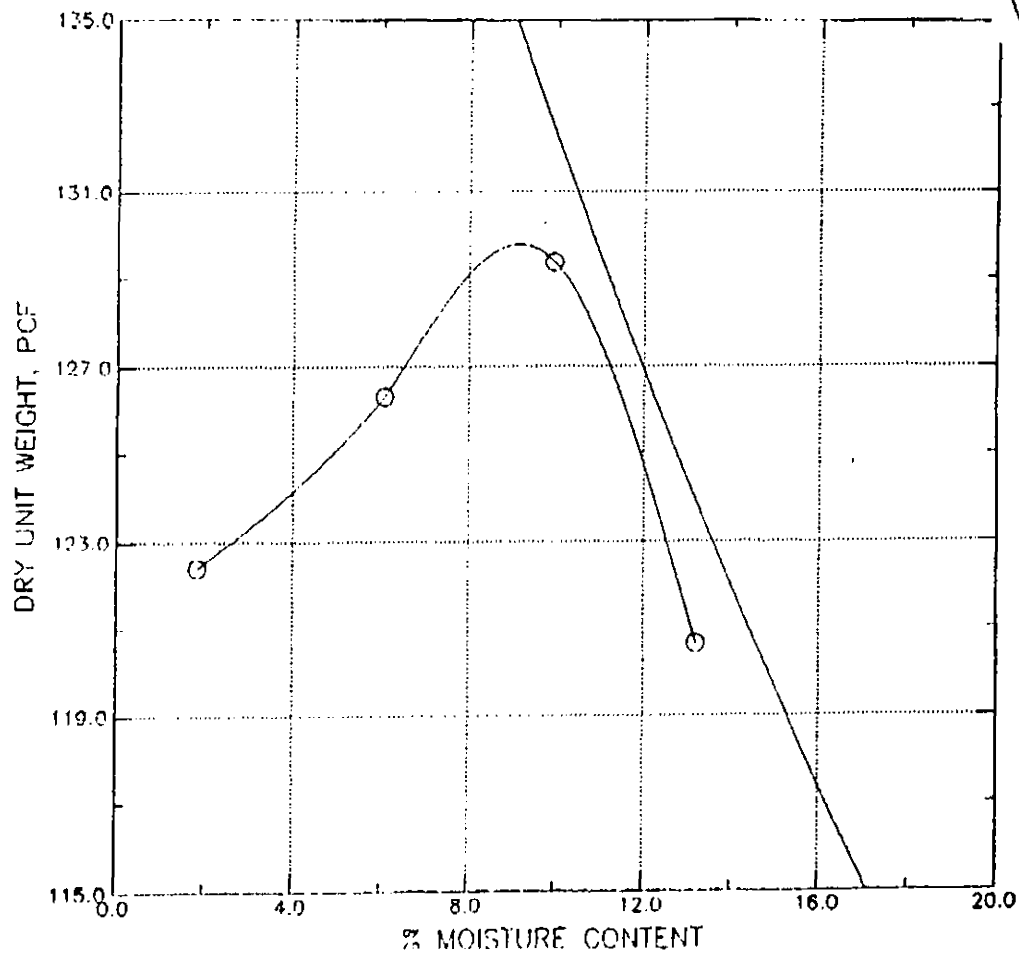
STANDARD PROCTOR TEST RESULTS

Boring No. : ---
 Sample No. : SIA19-00
 Tested by : JJF
 Filename : STA19-00

Project : Sinclair Refinery
 Project No. : GTX234
 Location : Wellsville, NY
 Date : Sun Jul 21 1991

Hand by transmitter memo 7671
 CHRS BAILEY
 GEO CON
 From: BIL OSTEWSKI
 Co: GTR 3698304
 Phone: 508 3698304
 Fax: 508 3698304
 Date: 7/16/93-782

COMPACTION



Sample Description : Gravelly fat clay
 Compaction Test Designation : ASTM D698-A
 Maximum Dry Density : 129.8 PCF
 Optimum Moisture Content : 9.2 %

TRAFFIC CAP. - PROCTOR

Figure 1

Sun Jul 21 14:25:24 1991

Page : 1

GEOTECHNICAL LABORATORY TEST DATA

Project : Sinclair Refinery
Project No. : GTX234
Boring No. : ---
Sample No. : STA19-00
Location : Wallkillville, NY
Soil Description : Gravely fat clay
Remarks : ---

Depth : ---
Test Date : 7/20/92
Test Method : ASTM-D698

Filename : STA19 00
Elevation : ---
Tested by : JJF
Checked by : WJO

COMPACTION TEST

Mold ID : ---
Method Used : ASTM D698-A
Volume of Mold : 0.03334 ft³
Mass of Mold : 4305 gm
Specific Gravity : 2.69

Moisture Content ID	Mass of Container (gm)	Mass of Container + Moist Soil (gm)	Mass of Container + Dry Soil (gm)	Mass of Mold + Specimen (gm)	Moisture Content (%)	Dry Density (PCF)
A9	8.17	221.40	217.52	6100.00	1.9	122.4
A6	8.44	261.11	246.64	6331.00	6.1	126.3
A4	8.32	282.24	257.45	6456.00	10.0	129.4
A1	8.32	287.71	255.13	6370.00	13.2	120.6
Optimum Dry Density		= 129.8 PCF				
Optimum Moisture Content		= 9.2 %				

DENSITY TEST RESULTS

- **SUMMARY TABLE**
- **DATA**

SUMMARY OF TRAFFIC CAP DENSITY TEST RESULTS

Date (1992)	Station or "Grid Reference"	Density (pcf)	Moisture Content (%)	Compaction (%)
29 June	27+30	NR	NR	96.3
	25+36	NR	NR	98.0
	23+20	NR	NR	98.7
	22+18	NR	NR	96.5
30 June	2+90	NR	NR	98.3
	22+00	NR	NR	98.6
	25+00	NR	NR	96.2
	0+00	NR	NR	98;7
	2+00	NR	NR	97.8
08 July	20+18	133.8	8.2	99.2
	16+73	132.9	8.3	98.6
28 July	7+00	129.1	9.4	95.7
	9+00	131.5	10.4	97.5
	12+50	129.2	11.1	95.8
23 October	"X"	129.5	NR	99.4
	"V"	118.5	NR	90.9
28 October	"AA & 1000"	125.2	NR	96.0
	"1000"	119.3	NR	91.6
08 September	19+50	117.7	9.7	90.3
TOTAL NUMBER TESTS = 19		AVERAGE COMPACTION = 96.6%		

Note: NR = Not Recorded.

Geotechnical Contracting
"Experience and Expertise"

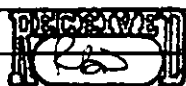
DATE: 6-29-92 JOB NAME: WELLSVILLE JOB NO: P1-0129

MATERIAL: TRAFFIC CAP FUNCTION:

GRID COORDINATE	DENSITY	W.C.	GRAIN SIZE	LAB SAMPLE	COMMENTS

VOLUME PLACED

COMMENTS:



GEO-CON, INC.:

OWNER:

GEO•CON INC.

Geotechnical Contracting
"Experience and Expertise"

EARTHWORK
QUALITY CONTROL

DATE: 6-30-92 JOB NAME: WELLSVILLE JOB NO: A-0129

MATERIAL: TRAPPA CAP FUNCTION:

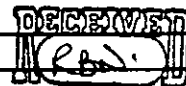
QUALITY CONTROL

GRID COORDINATE	DENSITY	W.C.	GRAIN SIZE	LAB SAMPLE	COMMENTS
STA. 2+90	98.3 %				LIT No. 1
STA. 22+00	98.6 %				LIT No. 2
STA. 25+00	96.2 %				LIT No. 2
STA. 0+00	98.7 %				LIT No. 2
STA. 2+00	97.8 %				LIT No. 2

VOLUME PLACED

STATION	LENGTH (L)	WIDTH	AVE. THICKNESS WIDTH (W)	AVE. DEPTH (D)	AREA = L x W	VOLUME = AREA x D
STA. 0+00				718"		
STA. 3+00				718"		
STA. 22+00				718"		
STA. 25+00				718"		

JUL 1 1992



COMMENTS:

TRAPPA CAP COMPLETE 0+00 - 3+00 & 21+45 - 28+43

GEO-CON, INC.:

Chris Bailey

OWNER:

Robert E. Long

Geotechnical Contracting
"Experience and Expertise"

DATE: 7-8-92 JOB NAME: SINCLAIR REFINERY JOB NO: P1-0129

MATERIAL: TRAFFIC CAP UNPROCESSED CLAY FUNCTION:

GRID COORDINATE	DENSITY	W.C.	GRAIN SIZE	LAB SAMPLE	COMMENTS
20 + 18	133.8 PCF	% Moisture			at 8"
	99.2% of Proctor	8.2%			
16 + 73	132.9 PCF	% Moisture			at 6"
	98.6% of Proctor	8.3%			

[illegible]

COMMENTS: THE IN PLACE DENSITY AND MOISTURES WERE PERFORMED
ON LIFT NUMBER 1

TRAFFIC CAP COMPLETE 21+45 → 18+00

GEO-CON, INC.:

OWNER:

Geotechnical Contracting
"Experience and Expertise"

DATE: 7-28-92 JOB NAME: SINCLAIR REFINERY JOB NO: P1-0129

MATERIAL: TRAFFIC LAP SUBGRADE FUNCTION:

GRID COORDINATE	DENSITY	W.C.	GRAIN SIZE	LAB SAMPLE	COMMENTS

VOLUME PLACED

COMMENTS: ALL TESTING WAS PERFORMED AT A DEPTH OF 8"

GEO-CON, INC.:

OWNER:

FOXTA #21E

EARTHWORK QUALITY CONTROL

Geotechnical Contracting
"Experience and Expertise"

MATERIAL: *TRAFFIC CAP* FUNCTION:

QUALITY CONTROL

GRID COORDINATE	DENSITY	W.C.	GRAIN SIZE	LAB SAMPLE	COMMENTS
AA TO 1000	125.2 PCF				
	96%				
AT 1000	119.3 PCF				
	91.6%				

VOLUME PLACED

[illegible]

COMMENTS:

Revision: 0

Date: 12/01/88 Page: 5-37

GEO-CON, INC.:

OWNER:

PERMEABILITY DATA

TRAFFIC CAP

PERMEABILITY DATA

Date Sampled (1992)	Station or "Grid Location"	Permeability (cm/sec)
<i>Geo-Con</i>		
02 October	"F800"	9×10^{-8}
31 October	"O/S 850"	4×10^{-8}
<i>GeoSyntec Consultants</i>		
02 October	17+00	3.7×10^{-8}
31 October	6+00	8.2×10^{-8}

PERMEABILITY TEST SUMMARY

CLIENT: GEO-CON	JOB NUMBER: 234	BORING:
SITE: Sinclair Refinery	DATE: 10-2-82	SAMPLE: F 800
SPECIMEN TYPE: Tube	TEST TYPE: ASTM D5048	
SPECIMEN SIZE, L: 4.45" D: 2.9"	GRADIENT: 17	
VISUAL DESCRIPTION: Clay with gravel		

INITIAL CONDITIONS	WET UNIT WEIGHT, pcf	115.8
	DRY UNIT WEIGHT, pcf	103.8
	WATER CONTENT, %	11.6%
	VOID RATIO, e_0	—
AFTER CONSOLIDATION	CONFINING STRESS, psi	104
	BACKPRESSURE, psi	100

PERMEABILITY: 9×10^{-8} cm/sec

TRAFFIC CAP.

PERMEABILITY TEST SUMMARY

CLIENT: Geo-Con		JOB NUMBER: GTX-234	BORING:
SITE: Sinclair Refinery		DATE: 11-9-92	SAMPLE NO: no name
SPECIMEN TYPE: tube		TEST TYPE: ASTM D.5084	
SPECIMEN SIZE, L: 3.43in. D: 2.98in.		GRADIENT: 17	
VISUAL DESCRIPTION: Brown clay with gravel			
INITIAL CONDITIONS	WET UNIT WEIGHT, pcf		125.0
	DRY UNIT WEIGHT, pcf		99.4
	WATER CONTENT, %		25.8
	VOID RATIO, e_0		---
AFTER CONSOLIDATION	CONFINING STRESS, psi		100
	BACKPRESSURE, psi		97.2

PERMEABILITY: 4×10^{-8} cm/sec

TRAFFIC CAP



(FOR INTERNAL USE ONLY)

PROJECT: WELLSVILLE PROJECT NO.: 603201.03 LE: NSR PM: RN
SOURCE: SITE MAT. VISUAL DESC.: DARK BRN SILT W/ GRAVEL APPLICATION S.W.
SHIPPER: FED EX REQUESTED BY: RN DATE: 11/4 SITE SAMPLE ID. 6+00
GEL SAMPLE NO. 92K08.2

TASK	AS RECEIVED PERCENT SPECIFIC MOISTURE PASSING GRAVITY			GRAIN SIZE ASTM D 422		ATTESTED LIMITS ASTM D 422			LO CARBON CONT.	COMPACTION ASTM D 558 C ASTM D 1557 C			HYDRAULIC CONDUCTIVITY FWFW (ASTM D 5824) ✓ CHFW (ASTM D 2424) C					
	CONTEST NO. 100			SHELVES	UNDIRECTED	15	20	25		A B C D			TUBE SAMPLE ✓ REMOVED SAMPLE C					
										SOIL CLASSIFICATION ASTM D 2487						$\gamma_{sat} = \frac{W}{V} = \frac{W}{V_{sat}} = \frac{W}{V_{sat}} = \frac{W}{V_{sat}}$ $\gamma_{sat} = \frac{W}{V} = \frac{W}{V_{sat}} = \frac{W}{V_{sat}} = \frac{W}{V_{sat}}$		
	ASTM D 2215 (-)	ASTM D 1140 (-)	ASTM D 224 (-)						ASTM D 311 (-)	ASTM D 2304 (-)	UNIT WL (-g)	OPT. MOIST. CONT. (%)	DRY UNIT WL (-g)	MOIST. CONT. (-)	α (cm/sec) =			
															$G_s = 5$ $\rho = 1.01$			

[illegible][illegible][illegible]

RELATIONS:

2nd TUBE TEST RESULTS TRAFFIC CAP.
SAMPLED 31/OCT

RECEIVED 32



GEO SYNTEC CONSULTANTS

GEOMECHANICS AND ENVIRONMENTAL LABORATORY

LABORATORY TEST SUMMARY

(FOR INTERNAL USE ONLY)

PROJECT: WELLSVILLE PROJECT NO.: G03201-03 LE: NSR PM: R.N.

SOURCE: slurry wall MAT. VISUAL DESC.: BRN / SI SQ CLAY W/ GRAVEL APPLICATION: —

SHIPPER: Ed X REQUESTED BY: RN DATE: 10/9/92 SITE SAMPLE ID. UNDISTURBED

GEL SAMPLE NO. 92J35

TASK	AS RECEIVED	PERCENT PASSING	SPECIFIC GRAVITY	GRAN SIZE		ATTERBERG LIMITS			SOIL CLASSIFICATION	LO	CAREG	COMPACTION				HYDRAULIC CONDUCTIVITY		
	MOISTURE	NO. 200		ASTM D 422		ASTM D 4328						ASTM D 558 C				FIELD (ASTM D 5084)		
	CONTENT											ASTM D 1557 C				LABORATORY		
	ASTM D 3215 (1)	ASTM D 1140 (1)	ASTM D 354 (1)															

DEADLINE																		

PRELIMINARY	VALUE																	
	DATE																	

FINAL	VALUE																	
	DATE																	

REMARKS:

TRAFFIC CAP - CLAY PLUG

SAMPLED 2/OCT/92

STATION 17+00 APPROX

CHECKED BY: NR

PLUG DENSITY TEST RESULTS

TRAFFIC CAP PLUG

DENSITY TEST RESULTS

Date (1992)	Station or "Grid Reference"	Density (pcf)	Moisture Content (%)	Compaction (%)	Result
09 September	20+80	117.4	11.4	90.1	P
	25+20	120.0	9.0	91.9	P
	19+50	117.7	9.7	90.3	P
08 October	"L-Line"	NR	NR	69.2	F
	"20' North H-Line"	NR	NR	88.2	F
	"20' North H-Line"	NR	NR	92.1	P
	"J-Line"	NR	NR	90.0	P

Note: NR = Not Recorded

IMPORTED SOIL FOR SOIL-BENTONITE BACKFILL

- **GRADATION ANALYSES**
- **ATTERBERG LIMITS TESTS**

GRADATION ANALYSES

IMPORTED SOIL FOR SOIL-BENTONITE BACKFILL**GRADATION ANALYSES**

Date Tested (1992)	Station	% Passing No. 200 Sieve
24 July	19+00	42
06 August	16+50	44
11 August	11+75	36
06 August	8+00	34
11 August	5+00	31
26 August	4+00	40
26 August	3+00	40

Criteria = 25-50 percent finer than No. 200 sieve.

Thu Aug 27 16:02:43 1992

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GEOTECHNICAL LABORATORY TEST DATA

Project : Sinclair Refinery
Project No. : GTX234.01
Boring No. : ---
Sample No. : STA 10+00
Location : Wellsville, NY
Soil Description : Sandy clay
Remarks : ---

Depth : ---
Test Date : 7/24/92
Test Method : ASTM D422

Filename : SIA1900
Elevation : ---
Tested by : JJF
Checked by : WJO

Sieve Mesh	Sieve Openings		FINE SIEVE SET		Percent Finer (%)
	Inches	Millimeters	Weight Retained (gm)	Cumulative Weight Retained (gm)	
#200	0.003	0.07	136.97	136.97	42
Pan			107.45	244.42	0

Total Dry Weight of Sample = 244.42

D85 : N/A
D60 : N/A
D50 : N/A
D30 : N/A
D15 : N/A
D10 : N/A

Soil Classification

ASTM Group Symbol : SC
ASTM Group Name : Clayey sand
AASHTO Group Symbol : A-6(1)
AASHTO Group Name : Clayey Soils

AUG 28 '92 05:18

F.05

Thu Aug 27 16:00:49 1992

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GEOTECHNICAL LABORATORY TEST DATA

Project : Sinclair Refinery
Project No. : GTX234.01
Boring No. : ---
Sample No. : STA 16+50
Location : Wellsville, NY
Soil Description : Sandy clay
Remarks : ---

Depth :
Test Date : 8/6/92
Test Method : ASTM D4318

Filename : STA16_50
Elevation : ---
Tested by : JJF
Checked by : WJO

Sieve Mesh	Sieve Openings		FINE SIEVE SET		Percent Finer (%)
	Inches	Millimeters	Weight Retained (gm)	Cumulative Weight Retained (gm)	
#200	0.003	0.07	101.30	101.30	44
Pan			89.37	190.67	0

Total Dry Weight of Sample = 190.67

D85 : N/A
D60 : N/A
D50 : N/A
D30 : N/A
D15 : N/A
D10 : N/A

Soil Classification

ASTM Group Symbol : SC
ASTM Group Name : Clayey sand
AASHTO Group Symbol : A-6(2)
AASHTO Group Name : Clayey Soils

AUG 28 '92 05:17

Aug 14 10:23:16 1992

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GEOTECHNICAL LABORATORY TEST DATA

Project : Sinclair Refinery

Project No. : GTX234.02

Boring No. : ---

Sample No. : STA 11+75

Location : Wallville, NY

Soil Description : Sandy clay

Remarks : Labeled Processed Clay From Station 11+75 (8-6-92)

Depth : ---

Test Date : 8/11/92

Test Method : ASTM D4318

Filename : STA11_75

Elevation : ---

Tested by : JJF

Checked by : WJO

Sieve Mesh	Sieve Openings		FINE SIEVE SET		Percent Finer (%)
	Inches	Millimeters	Weight Retained (gm)	Cumulative Weight Retained (gm)	
#200	0.005	0.07	157.01	157.01	36
Pan			91.55	240.49	0
Total Weight of Sample = 0					
Tare Weight = 8.07					
Moisture Content = 0					

D85 : N/A

D60 : N/A

D50 : N/A

D30 : N/A

D15 : N/A

D10 : N/A

Soil Classification

ASTM Group Symbol : N/A

ASTM Group Name : N/A

AASHTO Group Symbol : N/A

AASHTO Group Name : N/A

AUG 28 '92 05:17

11.05

Thu Aug 27 16:02:41 1992

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GEOTECHNICAL LABORATORY TEST DATA

Project : Sinclair Refinery
Project No. : GTX234.01
Boring No. : ---
Sample No. : STA 8+00
Location : Wellsville, NY
Soil Description : Sandy clay
Remarks : Borrow clay

Depth : ---
Test Date : 8/6/92
Test Method : ASTM D4318

Filename : STAB_00
Elevation : ---
Tested by : JJF
Checked by : WJD

Sieve Mesh	Sieve Openings		FINE SIEVE SET		Percent Finer (%)
	Inches	Millimeters	Weight Retained (gm)	Cumulative Weight Retained (gm)	
#200	0.003	0.07	104.56	104.56	34
Pan			60.98	165.54	0

Total Dry Weight of Sample = 165.54

D85 : N/A
D60 : N/A
D50 : N/A
D30 : N/A
D15 : N/A
D10 : N/A

Soil Classification

ASTM Group Symbol : SC
ASTM Group Name : Clayey sand
AASHTO Group Symbol : A-2-6(0)
AASHTO Group Name : Clayey Gravel and Sand

AUG 28 '92 05:17

Fri Aug 14 10:22:41 1992

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GEOTECHNICAL LABORATORY TEST DATA

Project : Sinclair Refinery

Project No. : GTX234.02

Boring No. : ---

Sample No. : STA 5+00

Location : Wallsville, NY

Soil Description : Sandy clay

Remarks : Labeled Processed Clay From Station 5+00 (8 7 92)

Depth : ---

Test Date : 8/11/92

Test Method : ASTM D4318

Filename : STA5_00

Elevation : ---

Tested by : JJF

Checked by : WJO

Sieve Mesh	Sieve Openings		FINE SIEVE SET		Percent Finer (%)
	Inches	Millimeters	Weight Retained (gm)	Cumulative Weight Retained (gm)	
#200	0.003	0.07	173.74	173.74	31
Pan			83.34	249.09	0

Total Weight of Sample = 0

Tare Weight = 7.99

Moisture Content = 0

D85 : N/A

D60 : N/A

D50 : N/A

D30 : N/A

D15 : N/A

D10 : N/A

Soil Classification

ASTM Group Symbol : N/A

ASTM Group Name : N/A

AASHTO Group Symbol : N/A

AASHTO Group Name : N/A

Grain Size Analysis

Tested By: Chris Gault
Date: 8-26-92
Checked By: Fred Mantel
Date: 8-26-92

Material Description: PROCESSED CLAY FOR WORK PAD
(TAKEN FROM SLURRY IMPOUNDMENT)

TOTAL WEIGHT OF SAMPLE..	
WT of Sample + Tare ..	
WT of Tare ..	
WT of Sample (wet)	<u>2491.8g</u>
WT of Sample (corrected for moisture)	<u>2339.9g</u>
WATER CONTENT FOR TOTAL SAMPLE	
WT of H ₂ O + Tare ..	
WT of DS + Tare ..	
WT of Tare ..	
WT of DS ..	
WT of Water ..	
Moisture Content	

-#10 SAMPLE USED IN ANALYSIS	
WT of Ws + Tare	_____
WT of Tare	_____
WT of Sample (wet)	_____
WT of Sample (dry)	_____ ②
WATER CONTENT FOR -#10 SAMPLE	
WT of Ws + Tare	_____
WT of DS + Tare	_____
WT of Tare	_____
WT of DS	_____
WT of Water	_____
Moisture Content	

COARSE SIEVE SERIES[illegible]

THE FINE GIEVE SERIES

WT Tare + Mat'l	Weight Of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % Passing Sieve
328.5	1894.7	1376.8	943.1	40.3%		40.3%
16.200						

REMARKS: * K = $\frac{U}{100}$

SCREEN ANALYSIS

MATERIAL <i>PROCESSED CLAY</i>		WEIGHT OF SAMPLE <i>2339.9g</i>		SAMPLE SOURCE <i>STR. #100</i>		
DATE	TIME	SAMPLED BY <i>C. BAILEY</i>		TESTED BY <i>Chris Bailey</i>		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED % RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"						
No. 4						
No. 8						
No. 16						
No. 30						
No. 50						
No. 100						
No. 200	<i>1396.8</i>	<i>59.7%</i>	<i>59.7%</i>	<i>40.3%</i>	<i>25-50% FINES</i>	<i>OK</i>
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE <i>Chris Bailey</i>				TITLE <i>PROJECT ENGINEER</i>		

SCREEN ANALYSIS

MATERIAL		WEIGHT OF SAMPLE		SAMPLE SOURCE		TESTED BY		DATE	
Processed by		1988.3		STN. 3100		C. Bailey		8-26-92	
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS			
7"									
6"									
5"									
4"									
3"									
2"									
1 1/2"									
1"									
3/4"									
1/2"									
3/8"									
No. 4									
No. 8									
No. 16									
No. 30									
No. 50									
No. 100									
No. 200	1190.5	59.9	59.9	40.1	25-50% Fines	0.1%			
PAN									
TOTAL									

ACCEPTED ☒

REJECTED ☐

SIGNATURE *Jim Bailey*

TITLE Project Engineer

ATTERBERG LIMITS TESTS

IMPORTED SOIL FOR SOIL-BENTONITE BACKFILL**ATTERBERG LIMITS TESTS**

Date Tested (1992)	Station	LL (%)	PL (%)	PI (%)
21 July	2+00	26	15	11
21 July	26+00	26	15	10
21 July	22+00	24	14	10
11 August	19+00	26	15	10
12 August	16+50	29	17	11
14 August	11+75	26	16	10
13 August	8+00	26	16	10
14 August	5+00	35	17	18

ATTERBERG LIMITS

PROJECT Sinclair Refinery	PROJECT NUMBER CTF234	TESTED BY JIF	BORING NUMBER ---
LOCATION Wellsville, NY		CHECKED BY WJO	SAMPLE NUMBER STA2+00
SAMPLE DESCRIPTION Grovelly fat clay with sand		DATE Sun Jul 21 1991	FILENAME STA2 00

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	15	F7	J2		
WT. WET SOIL + TARE	9.42	11.08	11.98		
WT. DRY SOIL + TARE	8.27	10.22	10.21		
WT. WATER	1.15	1.66	1.77		
TARE WT.	3.69	3.69	3.74		
WT. DRY SOIL	4.58	6.53	6.47		
WATER CONTENT, w_H (%)	25.11	25.42	27.36		
NUMBER OF BLOWS, N	32	24	15		
ONE-POINT LIQUID LIMIT, LL	25.67	25.30	25.72		

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	72	18			
WT. WET SOIL + TARE	27.47	26.43			
WT. DRY SOIL + TARE	28.8	25.83			
WT. WATER	0.67	0.8			
TARE WT.	22.35	20.31			
WT. DRY SOIL	4.45	5.32			
WATER CONTENT (%)	15.06	15.04			

SUMMARY OF RESULTS

NATURAL WATER CONTENT, w (%)	
LIQUID LIMIT, LL	25.6
PLASTIC LIMIT, PL	15.0
PLASTICITY INDEX, PI	10.6
LIQUIDITY INDEX, LI*	

$$*LI = (w - PL)/PI$$

PLASTICITY CHART

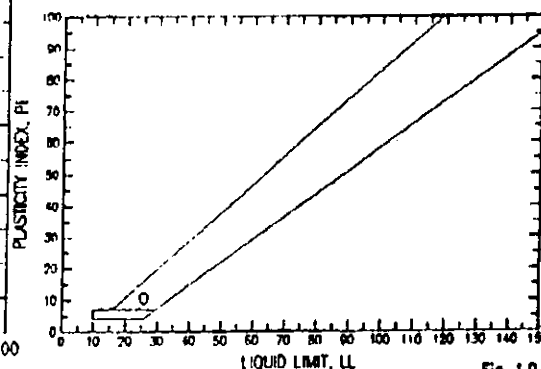
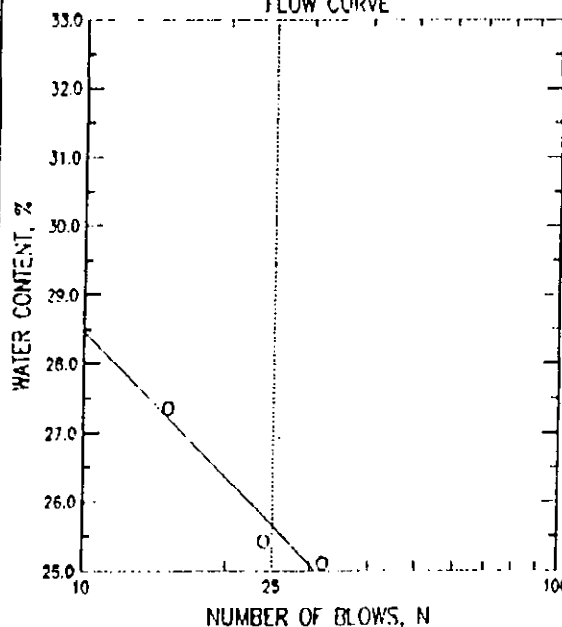


Fig. 1.0

FLOW CURVE



ATTERBERG LIMITS

PROJECT Sinclair Refinery	PROJECT NUMBER CTX234	TESTED BY JJP	BORING NUMBER ---
LOCATION Wellsville, NY		CHECKED BY WJO	SAMPLE NUMBER STA26+00
SAMPLE DESCRIPTION Gravelly fat clay with sand		DATE Sun Jul 21 1991	FILENAME STA26.00

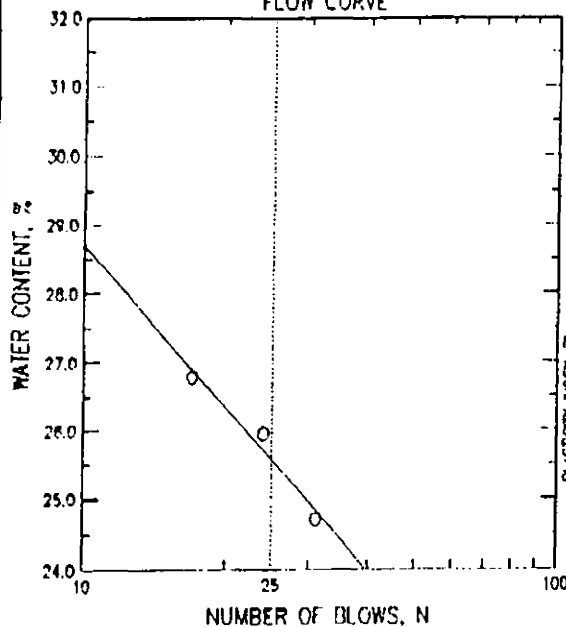
LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	03	01	45		
WT. WET SOIL + TARE	28.3	29.46	32.06		
WT. DRY SOIL + TARE	26.69	27.61	30		
WT. WATER	1.61	1.85	2.06		
TARE WT.	20.17	20.48	22.31		
WT. DRY SOIL	6.52	7.13	7.69		
WATER CONTENT, w_w (%)	24.69	25.95	26.79		
NUMBER OF BLOWS, N	31	24	17		
ONE-POINT LIQUID LIMIT, LL	25.34	25.82	25.57		

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	21	19			
WT. WET SOIL + TARE	22.38	23.01			
WT. DRY SOIL + TARE	22.09	22.73			
WT. WATER	0.29	0.28			
TARE WT.	20.25	20.88			
WT. DRY SOIL	1.84	1.87			
WATER CONTENT (%)	15.76	14.97			

FLOW CURVE



SUMMARY OF RESULTS

NATURAL WATER CONTENT, w (%)	
LIQUID LIMIT, LL	25.6
PLASTIC LIMIT, PL	15.4
PLASTICITY INDEX, PI	10.2
LIQUIDITY INDEX, LI^*	

$$*LI = (w - PL)/PI$$

PLASTICITY CHART

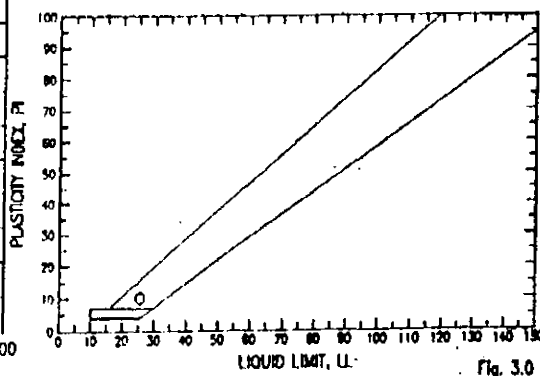


Fig. 3.0

ATTERBERG LIMITS

PROJECT Sinclair Refinery	PROJECT NUMBER GTX234	TESTED BY JUT	BORING NUMBER ---
LOCATION Wallsville, NY		CHECKED BY WJO	SAMPLE NUMBER STA22+00
SAMPLE DESCRIPTION Gravelly fat clay		DATE Sun Jul 21 1991	FILENAME STA22.00

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	14	F4	111		
WT. WET SOIL + TARE	10.61	10.9	12.38		
WT. DRY SOIL + TARE	9.29	9.51	10.59		
WT. WATER	1.32	1.39	1.79		
TARE WT.	3.89	3.74	3.74		
WT. DRY SOIL	5.6	5.77	6.85		
WATER CONTENT, W_n (%)	23.57	24.09	26.13		
NUMBER OF BLOWS, N	29	24	13		
ONE-POINT LIQUID LIMIT, LL	24.00	23.97	24.14		

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	F9	F14			
WT. WET SOIL + TARE	7.91	8.82			
WT. DRY SOIL + TARE	7.4	8.17			
WT. WATER	0.51	0.65			
TARE WT.	3.77	3.71			
WT. DRY SOIL	3.63	4.46			
WATER CONTENT (%)	14.05	14.57			

SUMMARY OF RESULTS

NATURAL WATER CONTENT, W (%)	
LIQUID LIMIT, LL	24.0
PLASTIC LIMIT, PL	14.3
PLASTICITY INDEX, PI	9.7
LIQUIDITY INDEX, LI^*	

$$*LI = (W - PL)/PI$$

PLASTICITY CHART

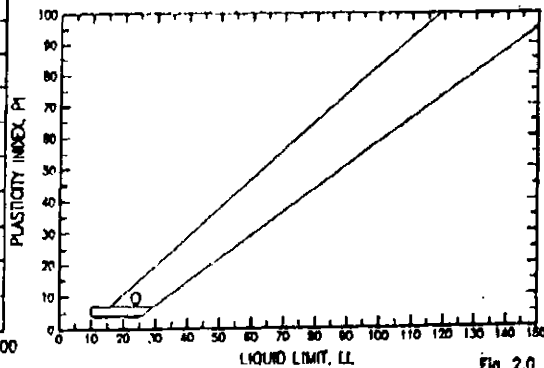
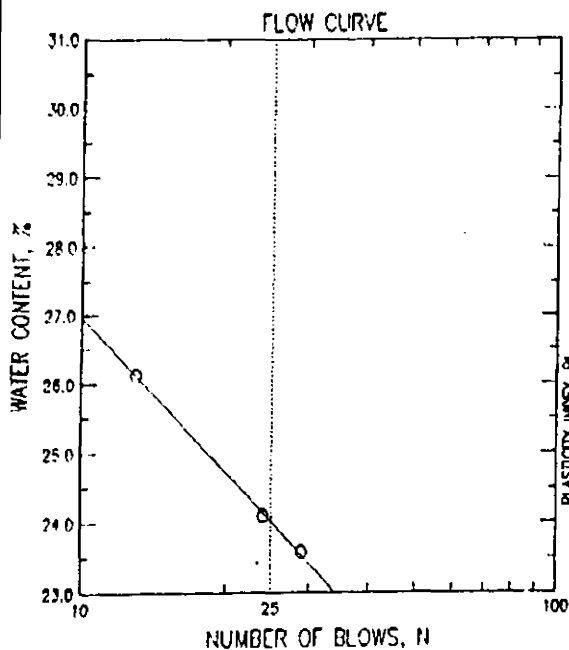


Fig. 2.0

ATTERBERG LIMITS

PROJECT Sinclair Refinery	PROJECT NUMBER GT2411	TESTED BY JLF	BORING NUMBER ---
LOCATION Wellsville, NY		CHECKED BY WJO	SAMPLE NUMBER STA 19+00
SAMPLE DESCRIPTION Sandy clay		DATE Sun Aug 11 1991	FILENAME STA19_00

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	U1	J2	16		
WT. WET SOIL + TARE	11.5	9.39	9.06		
WT. DRY SOIL + TARE	9.92	8.19	7.91		
WT. WATER	1.58	1.2	1.17		
TARE WT.	3.65	3.75	3.69		
WT. DRY SOIL	6.27	4.44	4.22		
WATER CONTENT, w_h (%)	25.20	27.03	27.73		
NUMBER OF BLOWS, N	27	21	15		
ONE-POINT LIQUID LIMIT, LL	25.44	26.46	26.06		

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	F5	F1			
WT. WET SOIL + TARE	10.49	10.3			
WT. DRY SOIL + TARE	9.59	9.42			
WT. WATER	0.9	0.88			
TARE WT.	3.69	3.74			
WT. DRY SOIL	5.9	5.68			
WATER CONTENT (%)	15.25	15.49			

SUMMARY OF RESULTS

NATURAL WATER CONTENT, w (%)	
LIQUID LIMIT, LL	25.8
PLASTIC LIMIT, PL	15.4
PLASTICITY INDEX, PI	10.4
LIQUIDITY INDEX, LI^*	

$$*LI = (w - PL)/PI$$

PLASTICITY CHART

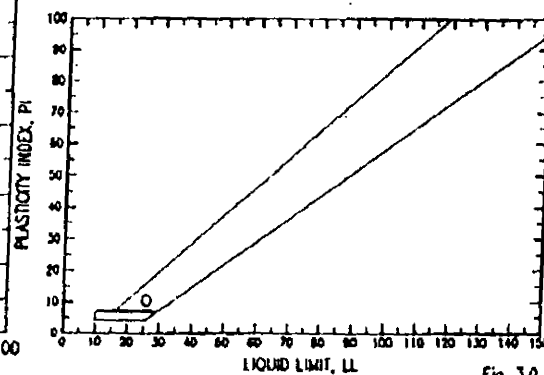
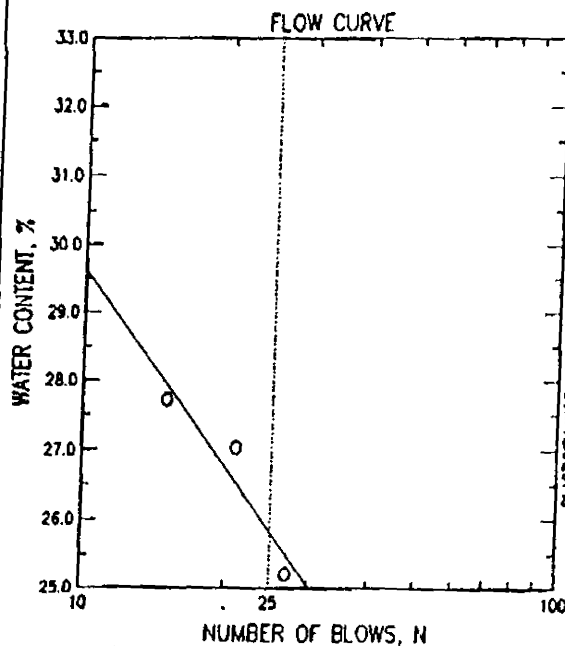


Fig. 3.0

ATTERBERG LIMITS

PROJECT Sinclair Refinery	PROJECT NUMBER GT234.01	TESTED BY JWF	BORING NUMBER ---
LOCATION Wellsville, NY		CHECKED BY WJO	SAMPLE NUMBER STA 16+50
SAMPLE DESCRIPTION Sandy clay		DATE Mon Aug 12 1991	FILENAME STA16_50

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	I3	F5	I11	F9
WT. WET SOIL + TARE	9.41	9.96	9.09	9.23
WT. DRY SOIL + TARE	8.2	8.53	7.87	7.94
WT. WATER	1.21	1.43	1.22	1.29
TARE WT.	3.69	3.64	3.67	3.72
WT. DRY SOIL	4.51	4.89	4.2	4.22
WATER CONTENT, W_n (%)	26.83	29.24	29.05	30.57
NUMBER OF BLOWS, N	37	22	21	16
ONE-POINT LIQUID LIMIT, LL	28.13	28.79	28.44	28.96

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	F8	U1	14
WT. WET SOIL + TARE	8.42	10.92	9.76
WT. DRY SOIL + TARE	7.72	9.91	8.73
WT. WATER	0.7	1.01	0.97
TARE WT.	3.63	3.6	3.61
WT. DRY SOIL	4.09	6.31	5.18
WATER CONTENT (%)	17.11	16.01	18.73

SUMMARY OF RESULTS

NATURAL WATER CONTENT, W (%)	
LIQUID LIMIT, LL	28.5
PLASTIC LIMIT, PL	17.3
PLASTICITY INDEX, PI	11.2
LIQUIDITY INDEX, LI'	

$$LI' = (W - PL)/PI$$

PLASTICITY CHART

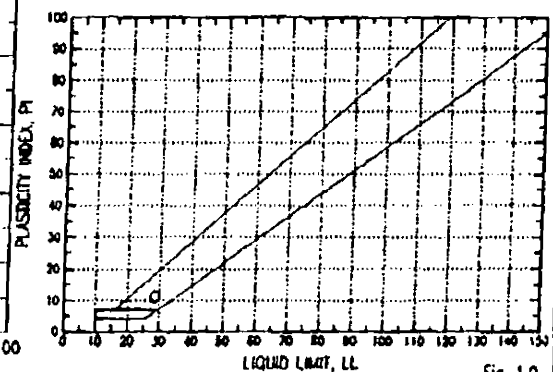
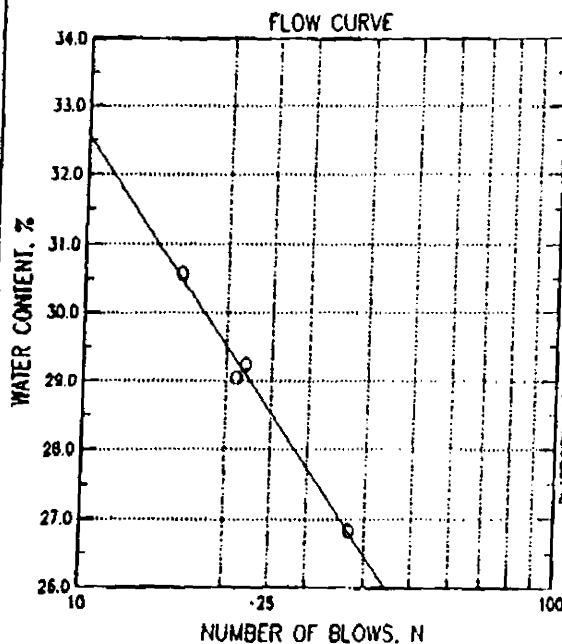


Fig. 1.0

ATTERBERG LIMITS

PROJECT Sinclair Refinery	PROJECT NUMBER GTX234.02	TESTED BY JJF	BORING NUMBER ---
LOCATION Wellsville, NY		CHECKED BY WJO	SAMPLE NUMBER SIA 11475
SAMPLE DESCRIPTION Sandy clay		DATE Fri Aug 14 1992	FILENAME SIA11_75

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	11	01	32		
WT. WET SOIL + TARE	28.51	25.86	25.29		
WT. DRY SOIL + TARE	25.21	24.77	24.1		
WT. WATER	1.3	1.19	1.19		
TARE WT.	20.2	20.42	19.91		
WT. DRY SOIL	5.01	4.35	4.19		
WATER CONTENT, w_w (%)	25.95	27.36	28.40		
NUMBER OF BLOWS, N	25	19	13		
ONE-POINT LIQUID LIMIT, LL	25.95	26.46	26.24		

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	26	36	31		
WT. WET SOIL + TARE	27.24	24.33	24.92		
WT. DRY SOIL + TARE	26.22	23.75	24.36		
WT. WATER	1.02	0.58	0.56		
TARE WT.	20.03	20.06	20.9		
WT. DRY SOIL	6.19	3.69	3.46		
WATER CONTENT (%)	16.48	15.72	16.18		

SUMMARY OF RESULTS

NATURAL WATER CONTENT, w (%)	
LIQUID LIMIT, LL	26.1
PLASTIC LIMIT, PL	16.1
PLASTICITY INDEX, PI	10.0
LIQUIDITY INDEX, LI^*	

$$*LI = (w - PL) / PI$$

PLASTICITY CHART

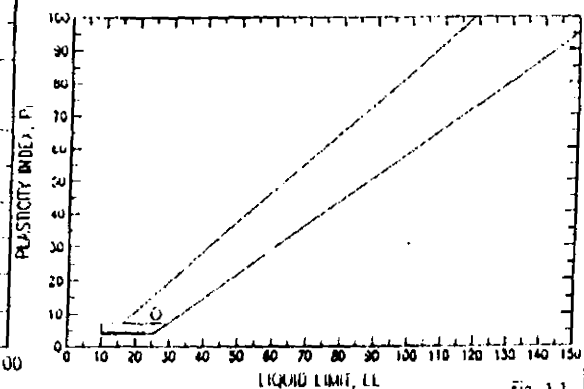
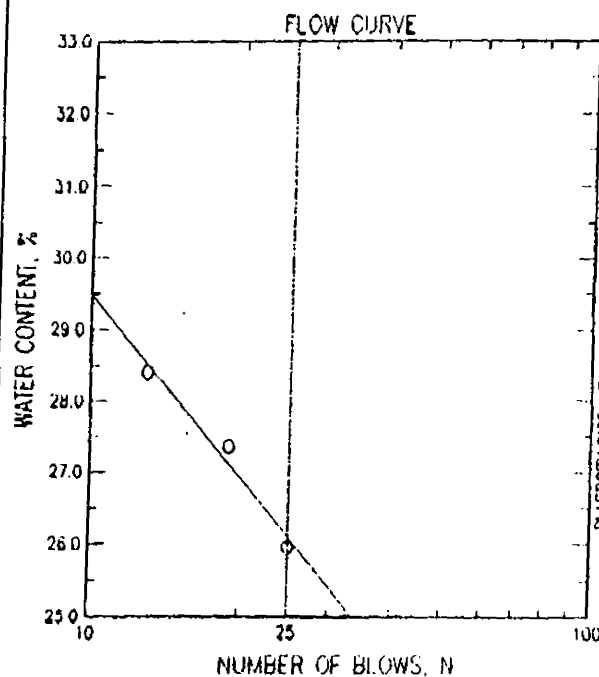


Fig. 1.1

AUG 13 '92 10:27

P.01

ATTERBERG LIMITS

PROJECT Sinclair Refinery	PROJECT NUMBER GTX234.01	TESTED BY JJF	BORING NUMBER ---
LOCATION Wellsville, NY		CHECKED BY WJO	SAMPLE NUMBER STA 8+00
SAMPLE DESCRIPTION Sandy clay		DATE Thu Aug 13 1992	FILENAME STAB_00

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	41	20	09		
WT. WET SOIL + TARE	29.58	25.55	27.23		
WT. DRY SOIL + TARE	28.07	24.39	25.75		
WT. WATER	1.51	1.16	1.48		
TARE WT.	22.23	20.05	20.7		
WT. DRY SOIL	5.84	4.34	5.05		
WATER CONTENT, w_H (%)	25.86	26.73	29.31		
NUMBER OF BLOWS, N	29	23	13		
ONE-POINT LIQUID LIMIT, LL	26.32	26.46	27.08		

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	36	27	70		
WT. WET SOIL + TARE	24.95	25.9	26.3		
WT. DRY SOIL + TARE	24.25	25.16	25.49		
WT. WATER	0.7	0.74	0.81		
TARE WT.	20.09	20.61	20.46		
WT. DRY SOIL	4.16	4.55	5.03		
WATER CONTENT (%)	16.83	16.26	16.10		

Post-It™ brand fax transmittal memo 7671 # of pages > 2

To CHRIS BAILEY	From BILL
Co. GEO CON	Co. GTX
Dept.	Phone #
Fax # 716 593 7882	Fax #

SUMMARY OF RESULTS

NATURAL WATER CONTENT, w (%)	
LIQUID LIMIT, LL	26.4
PLASTIC LIMIT, PL	16.4
PLASTICITY INDEX, PI	10.0
LIQUIDITY INDEX, LI^*	

$$*LI = (W - PL)/PI$$

PLASTICITY CHART

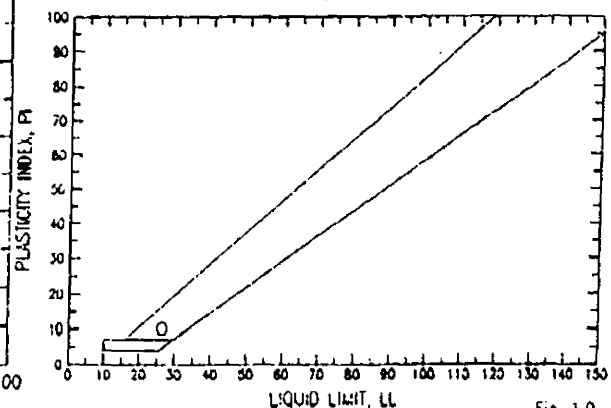
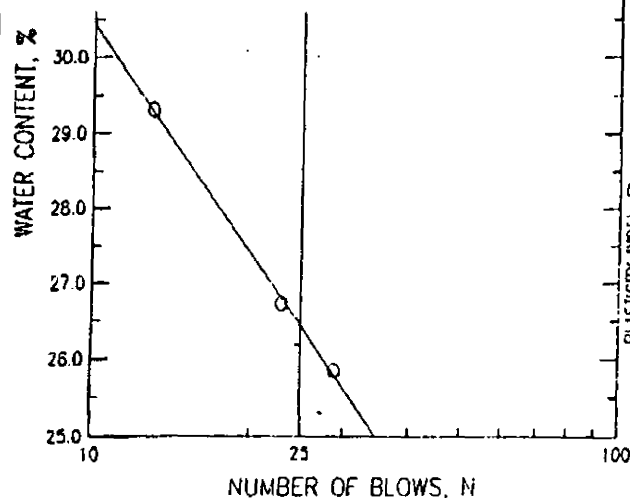


Fig 1.0

ATTERBERG LIMITS

PROJECT Sinclair Refinery	PROJECT NUMBER GTX234.02	TESTED BY JJF	BORING NUMBER ---
LOCATION Wellsville, NY		CHECKED BY WJO	SAMPLE NUMBER STA 5100
SAMPLE DESCRIPTION Sandy clay		DATE Fri Aug 14 1992	FILENAME STA5_00

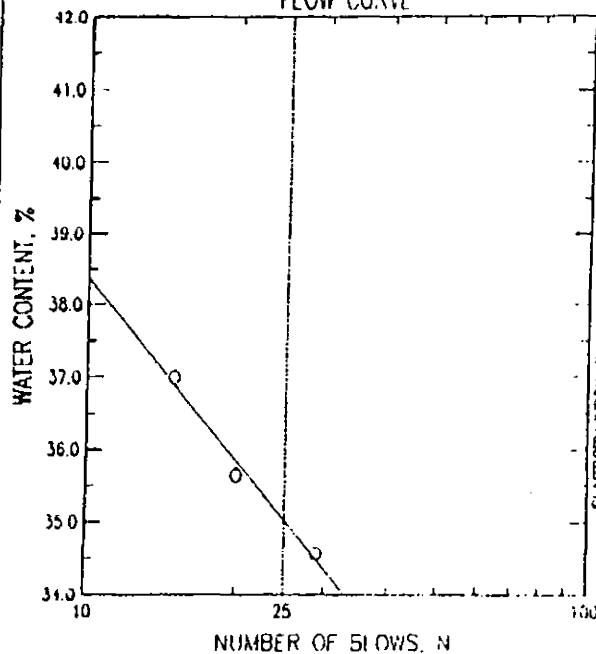
LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	33	22	47		
WT. WET SOIL + TARE	26.2	25.9	27.78		
WT. DRY SOIL + TARE	24.71	24.41	26.3		
WT. WATER	1.49	1.49	1.48		
TARE WT.	20.4	20.23	22.3		
WT. DRY SOIL	4.31	4.18	4		
WATER CONTENT, W_n (%)	34.57	35.65	37.00		
NUMBER OF BLOWS, N	29	20	15		
ONE-POINT LIQUID LIMIT, LL	35.20	31.70	34.78		

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	20	35	27		
WT. WET SOIL + TARE	23.34	24.33	24.42		
WT. DRY SOIL + TARE	22.84	23.74	23.85		
WT. WATER	0.5	0.59	0.57		
TARE WT.	20.03	20.23	20.58		
WT. DRY SOIL	2.81	3.51	3.27		
WATER CONTENT (%)	17.79	16.81	17.43		

FLOW CURVE

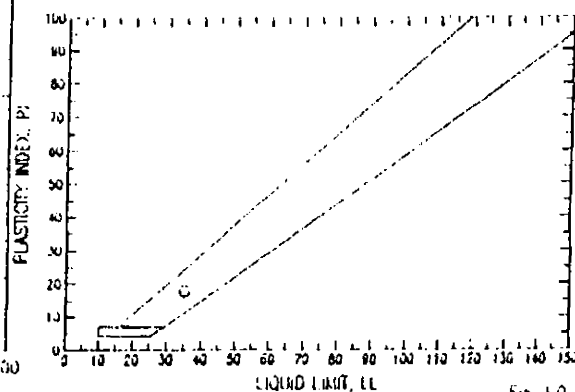


SUMMARY OF RESULTS

NATURAL WATER CONTENT, W (%)	
LIQUID LIMIT, LL	35.0
PLASTIC LIMIT, PL	17.3
PLASTICITY INDEX, PI	17.7
LIQUIDITY INDEX, LI*	

$$*LI = (W - PL)/PI$$

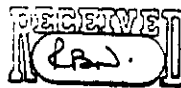
PLASTICITY CHART



SLURRY TRENCH QUALITY CONTROL FORMS

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SLURRY TRENCH QUALITY CONTROL

DATE 7-9-92

JOB NAME Arco Wellsville

JOB NUMBER *D10129*

[illegible]

BACKFILL					COMMENTS	
STA	TIME	DENS	SLUMP	FINES		LAB
2+00	2:00		4.5		Back fill slope Not Topped	
					out	
					2+70 -23	
					2+60 -24	
					2+40 25	
					2+20 -27+5	

[illegible]

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SLURRY TRENCH QUALITY CONTROL

DATE 7-13-92

JOB NAME Arco - Wellsville

JOB NUMBER P10129

[illegible]

BACKFILL					Profile	COMMENTS	
STA	TIME	DENS	SLUMP	FINES			LAB
3+00	Am		4		2+70 -Top	0+20-36	
					2+40-10	0+00-36	
					2+00-21		
					1+60-25	6.25% :1	
					1+20-29		
					0+80-32		
					0+40-33		

[illegible]

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Owner

14. July. 92.
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SLURRY TRENCH QUALITY CONTROL

DATE 7-15-92

JOB NAME *Arco - Wellsprille* JOB NUMBER *P10129*

EXCAVATION				COMMENTS
STATION	DEPTH	KEY	Sq ft	
27+50	40	3	-	1.) TOOK SHELBY TUBE AT STA. 27+60
27+60	43	3	830	<del> </del>
27+40	43	3	860	2.) TOOK KEY SAMPLE FOR ATTENBERG LIMITS AT STA. 27+00
27+20	43	3	860	
27+00	43	3	860	
26+80	43	3	860	3.) TOOK BACKFILL SAMPLE FOR CRADATION TESTING AT STA. 1+00.
26+60	39	3	820	
26+40	39	3	780	
				LF 140
			Checked Verticality 27+00 100% level	SF to Day = 5870
			Bentonite 2 Ton	SF to Date = 18201.69

BACKFILL					Backfill Slope - COMMENTS	
STA	TIME	DENS	SLUMP	FINES		LAB
1+20	Pm	134	3		0+40 - Top	
					0+00 - 14	
					28+20 - 21	5.21:1
					27+80 - 29	
					27+40 - 33	
					27+00 - 37	
					26+60 - 39	

[illegible]

Geo-Con, Inc.

Owner

Ry Nether 16/July/92



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Geotechnical Contracting
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SLURRY TRENCH QUALITY CONTROL

DATE 7-17-92

JOB NAME *Arco - Wellsville*

JOB NUMBER *D10129*

EXCAVATION				COMMENTS
STATION	DEPTH	KEY	Sz ft	
24+80	34	7	-	1.) COMPLETED GRAINSIZE ANALYSIS IN BACKFILL AT STA. 28+00 (SEE ATTACHED SHEET): % PASSING #10 = 73.00% (65-100% REQ'D) % PASSING No. 40 = 50.5% (30-80% REQ'D) % PASSING No. 200 = 34.74% (25-50% REQ'D)
24+60	34	7	680	
24+40	34	7	680	
24+20	34	9	680	
24+00	34	9	680	
23+80	30.5	3.5	645	
23+60	30.5	3.5	610	2.) Instructed By Geo-technic at station 24+00 To go to Design Depth that place where key excavation reaches then 3' Shut Down 3'45 Lightning
				120 LF
			Checked Verticality 24+00 100% Level	SF to Day = 3975
			Determine O	SF to Date = 2766669

BACKFILL					Backfill slope COMMENTS	
STA	TIME	DENS	SLUMP	FINES		LAB
28+00	Am	134	4"		26+80 - Top	24+00-30
					26+40 - 12	23+80-30.5
					26+00 - 17	
					25+60 - 20	
					25+20 - 24	9.83:1
					24+80 - 27	cleaned Backfill
					24+40 - 27	Face

[illegible]

5600 6870

32461.69


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 SLURRY TRENCH
 QUALITY CONTROL

DATE 7-21-92

JOB NAME Arco Wellsville

JOB NUMBER P10129

EXCAVATION				COMMENTS
STATION	DEPTH	KEY		
22+00	27	4	—	1.) RESULTS OF EXTRA PAVEMENT ON TRAFFIC CAP
21+80	31	3	600	MATERIAL @ STA 19+00:
21+60	31	3	620	MAX DRY DENSITY = 129.8 PCF
21+40	31	3	620	OPT. MOISTURE = 9.2%
21+20	31	3	620	2.) ATT. LIMITS @ STA 2+00: LL = 25.6, PL = 15, PI = 11.
21+00	31	3	620	OF BORROW MATERIAL
20+80	32	3	630	3.) ATT. LIMITS OF BORROW MATERIAL @ STA. 26+00:
20+60	32	3	640	LL = 25.6, PL = 15.9, PI = 10.2
20+40	31	3	630	4.) ATT. LIMITS OF BORROW MATERIAL @ STA 22+00:
20+20	31	3	620	LL = 24.0, PL = 14.3, PI = 9.7
20+00	32	3	630	(SEE ATTACHED SHEETS FOR DATA)
19+80	32	3	640	5.) Agitated Permittivity
				LF 220
				6.) Checked Vert. comp. 21+00 + 20+00 / 100% Level
				Bentallite 12.25
				SF to Day = 6870
				SF to Date = 39331.69

BACKFILL					COMMENTS	
STA	TIME	DENS	SLUMP	FINES		LAB
24+20	Pm	143	3.5		22+26 Top	
					21+80 13	
					21+40 -25	
					21+00 -28	7.5:1
					20+60 -29	
					20+20 -30	
					19+80 32	

SLURRY									COMMENTS
TRENCH				PLANT					
STA	TIME	VISC	DENS	TIME	pH	DENS	FILT	VISC	
21+60	Am	49	87	Am	8	66	—	93	
21+20	Am	46	83	Pm	8	66	13	99	
21+00	Pm	46	84						

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Colin P. Swanson

7/22/92

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SLURRY TRENCH
QUALITY CONTROL

DATE 7-23-92

JOB NAME Arco Wellsville JOB NUMBER D10129

EXCAVATION			S _z ft	COMMENTS
STATION	DEPTH	KEY		
18+00	25	3	-	RESULTS OF FOLLOWING TESTS ARE ATTACHED:
17+80	27	3	520	1) GRADATION OF BACKFILL @ STA. 22+00
17+60	27	3	540	1/2" PASSING 3/8" = 74% (65-100% REQ'D)
17+40	27	3	540	1/2" PASSING No. 40 = 58% (35-80% REQ'D)
17+20	33	3	600	1/2" PASSING No. 200 = 36% (25-50% REQ'D)
17+00	33	3	660	2) PERMEABILITY OF BACKFILL @ STA. 2+60: K = 2X10 ⁻⁸ cm/sec
16+80	33	3	660	3) ATTERBURG LIMITS OF KEY SAMPLE @ STA. 27+00:
				PI 16+51 3' from Centerline
				Adopted Backfill
				120
				Checked Verticality 17+00
				100% Local
				Brutonite 3.5 Ton
				SF to Day = 3520
				SF to Date = 47721.67

BACKFILL					COMMENTS	LAB
STA	TIME	DENS	SLUMP	FINES		
17+60	Pm	138	4		Backfill	
					19+00-Top	
					18+80-15"	
					18+20-19	
					17+80-23 6.6711	
					17+40-26	
					17+00-30	
					16+80-33	

SLURRY									COMMENTS
TRENCH				PLANT					
STA	TIME	VISC	DENS	TIME	pH	DENS	FILT	VISC	
17+60	Am	40	84	Am	8.0	66	15	45	
17+40	Pm	40	84	Pm	8.0	66	—	44	

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Chris Bailey
Pme

Owner

William R. Schoen

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DATE 7-27-92

JOB NAME Arco - Wellsville

JOB NUMBER P/0/29

[illegible]

BACKFILL					Backfill	COMMENTS	
STA	TIME	DENS	SLUMP	FINES			LAB
1B+60	Am	138 PCF	4"	—	17+10 - Top	14+80 - 36	
					16+80 - 10	64:1	
					16+40 - 19		
					16+00 - 23		
					15+60 - 27		
					15+20 - 32		

[illegible]

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SLURRY TRENCH QUALITY CONTROL

DATE 7-30-92

JOB NAME

SINCLAIR REFINERY

JOB NUMBER

P1-0129

[illegible][illegible][illegible]



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SLURRY TRENCH
QUALITY CONTROL

DATE 8-5-92

JOB NAME Arco - Wellsville

JOB NUMBER P11029

EXCAVATION			COMMENTS
STATION	DEPTH	KEY	
13+60	36.5	6.5	54 ft
13+40	34.5	4.5	710
13+20	34.5	4.5	690
13+00	32.5	6.5	670
12+80	32.5	6.5	650
12+60	32	6	645
12+40	32	6	640
12+20	31	7	630
12+00	31	7	620
			1) BACKFILL GRADATION COMPLETED @ STA. 15+00
			1. PASSING 3/8" 79%. (65-100% REQ'D)
			1. PASSING No. 40: 56%. (30-80% REQ'D)
			1. PASSING No. 200: 40%. (25-50% REQ'D)
			SEE ATTACHED SHEETS FOR CALCULATIONS
			Adjustable Backfill
			Verticality Checked 13+00 LF 160
			+ 12+00 100% Level
			SF to Day = 5255.
			Benchmark 5.25 SF to Date = 6445.67

BACKFILL					COMMENTS	
STA	TIME	DENS	SLUMP	FINES		LAB
15+00	Pm	134	3.5	—	14+00 Top	
					13+60 - 17	
					13+20 - 26 645' 11"	
					12+80 - 27	
					12+40 30	
					12+00 - 31	

SLURRY								COMMENTS
TRENCH				PLANT				
STA	TIME	VISC	DENS	TIME	pH	DENS	FILT	VISC
1300	Am	43	80	Am	8	65	/	46
13+60	Pm	45	86	Pm	7	65	/	44

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Pm

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QUALITY CONTROL

DATE 8-7-92

JOB NAME Arco - Wellbore

JOB NUMBER P10129

EXCAVATION			COMMENTS	
STATION	DEPTH	KEY		
10+00	30	3	39 ft	1) COMPLETED BACKFILL GUANTION @ STA. 12+40:
9+80	31	3	610	% PASSING 3/8" : 73% (65-100% REQ'D)
9+60	31	3	620	% PASSING No. 40 : 54% (30-80% REQ'D)
9+40	28	3	590	% PASSING No. 200 : 40% (25-50% REQ'D)
9+20	28	3	560	-SEE ATTACHED SHEET FOR CALCULATIONS
9+00	28	3	560	
8+80	28	3	560	
8+60	28	3	560	
8+40	28	3	560	
8+20	28	3	560	
8+00	28	3	560	
				Adgetated Backfill LF 200
				checked Verticality 9+00
				8+00 100% Level
				Bentonite 10.5 Ton
				SF to Day = 5740
				SF to Date = 76166.69

BACKFILL					COMMENTS	
STA	TIME	DENS	SLUMP	FINES		LAB
10+00	Am	132	3.5	—	8+00-28	
					8+40-27	
					8+80-24 5.71:1	
					9+20-17	
					9+60 Top	

SLURRY								COMMENTS
TRENCH				PLANT				
STA	TIME	VISC	DENS	TIME	pH	DENS	FILT	VISC
9+60	Am	65	87	Am	8	67		50
8+60	Pm	51	86	Pm	8	66	14	90

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Owner

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SLURRY TRENCH QUALITY CONTROL

DATE 8-10-92

JOB NAME Arco Wellville JOB NUMBER D10129

JOB NUMBER D, D 129

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SLURRY TRENCH QUALITY CONTROL

DATE 10-1-92 JOB NAME WELLSVILLE, NY JOB NUMBER P10129

[illegible][illegible][illegible]

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SLURRY TRENCH QUALITY CONTROL

DATE 10-3-92

JOB NAME

WELLSVILLE, NY

JOB NUMBER

P10129

[illegible]

BACKFILL					COMMENTS	
STA	TIME	DENS	SLUMP	FINES		LAB
4150	10:00	139	3"	—	3+20 TOP	
					3+00 17	
4100	14:00	137	3½"	—	2+80 20	
					2+65 29	

[illegible]

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Owner

Collins P. Lukow

KEY TRENCH

ATTERBERG LIMITS TESTS

KEY TRENCH SAMPLES

ATTERBERG LIMITS

Date Sampled (1992)	Station	LL (%)	PL (%)	PI (%)
15 July	27+00	35	25	10
21 July	22+00	37	21	16
23 July	17+00	34	23	11
05 August	12+00	31	21	10
08 August	7+00	29	27	2
23 October	3+00	34	20	14

ATTERBERG LIMITS

PROJECT Sindair Refinery	PROJECT NUMBER ATX237	TESTED BY SWJ	BORING NUMBER ---
LOCATION Wellsville, NY	CHECKED BY WJO	SAMPLE NUMBER ST27002680	
SAMPLE DESCRIPTION Lean clay with sand	DATE Thu Jul 23 1992	FILENAME STA 27	

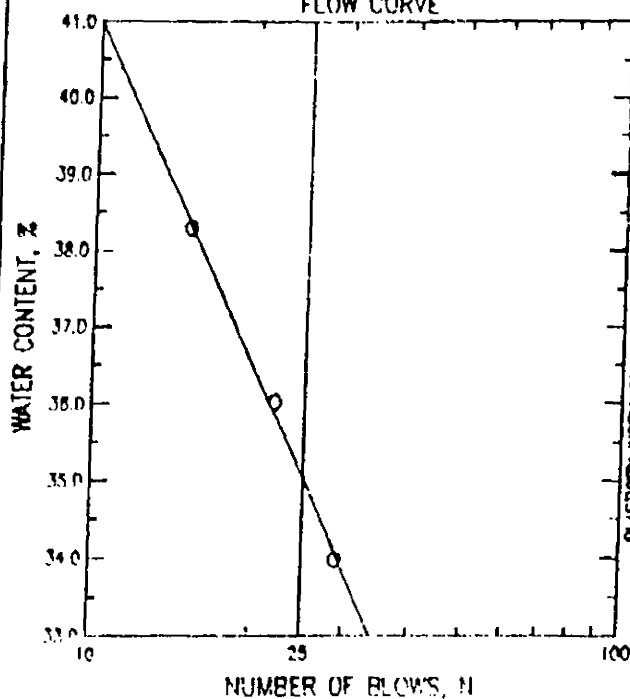
LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	45	18	21		
WT. WET SOIL + TARE	29.89	28.85	29.44		
WT. DRY SOIL + TARE	27.88	25.05	24		
WT. WATER	2.01	1.8	1.44		
TARE WT.	22.3	20.34	20.24		
WT. DRY SOIL	5.58	4.71	3.78		
WATER CONTENT, W_n (%)	36.02	33.97	38.30		
NUMBER OF BLOWS, N	27	29	15		
ONE-POINT LIQUID LIMIT, LL	35.47	34.59	38.00		

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	50	19			
WT. WET SOIL + TARE	24.34	22.15			
WT. DRY SOIL + TARE	23.94	21.89			
WT. WATER	0.4	0.26			
TARE WT.	22.29	20.88			
WT. DRY SOIL	1.65	1.01			
WATER CONTENT (%)	24.24	25.74			

FLOW CURVE



SUMMARY OF RESULTS

NATURAL WATER CONTENT, w (%)	
LIQUID LIMIT, LL	35.0
PLASTIC LIMIT, PL	25.0
PLASTICITY INDEX, PI	10.0
LIQUIDITY INDEX, LI^1	

$$LI = (w - PL) / PI$$

PLASTICITY CHART

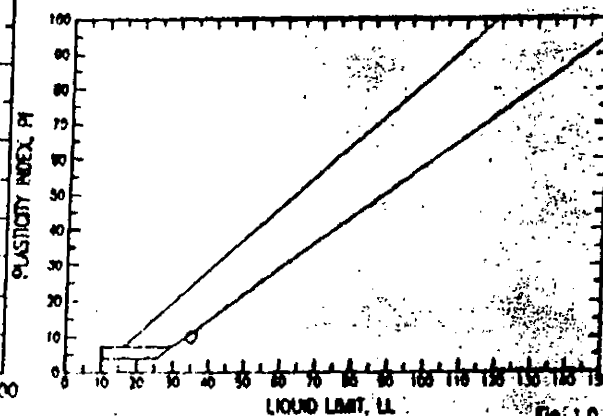


Fig. 1.0

To CHRIS BAILEY
 Co. GEO CON
 Dept.
 From BILL CZEWSKI
 Co. GTX
 Phone 508 369 8304
 Fax 716 593-7882

ATTERBERG LIMITS

PROJECT Sinclair Refinery	PROJECT NUMBER GTX241	TESTED BY JIF	BORING NUMBER ---
LOCATION Webbville, NY	CHECKED BY WJO		SAMPLE NUMBER STA 22+00
SAMPLE DESCRIPTION Sandy clay	DATE Mon Aug 12 1991		FRENAME STA22_00

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	J1	111	F9	F13
WT. WET SOIL + TARE	9.5	9.51	9.78	10.03
WT. DRY SOIL + TARE	7.93	7.92	8.12	8.31
WT. WATER	1.57	1.59	1.66	1.72
TARE WT.	3.67	3.7	3.75	3.7
WT. DRY SOIL	4.26	4.22	4.37	4.61
WATER CONTENT, w_w (%)	36.85	37.68	37.99	37.31
NUMBER OF BLOWS, N	30	17	21	33
ONE-POINT LIQUID LIMIT, LL	37.68	35.96	37.19	38.58

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	13	F7	F2
WT. WET SOIL + TARE	9.29	7.69	6.96
WT. DRY SOIL + TARE	8.3	7	6.39
WT. WATER	0.99	0.69	0.57
TARE WT.	3.73	3.89	3.74
WT. DRY SOIL	4.57	3.31	2.65
WATER CONTENT (%)	21.66	20.85	21.51

SUMMARY OF RESULTS

NATURAL WATER CONTENT, w (%)	
LIQUID LIMIT, LL	37.4
PLASTIC LIMIT, PL	21.3
PLASTICITY INDEX, PI	16.1
LIQUIDITY INDEX, LI^*	

$$*LI = (w - PL)/PI$$

PLASTICITY CHART

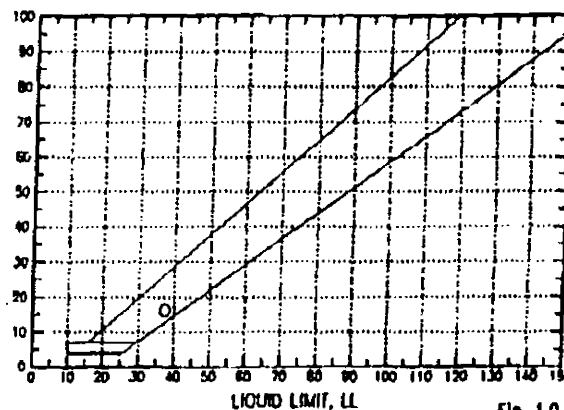
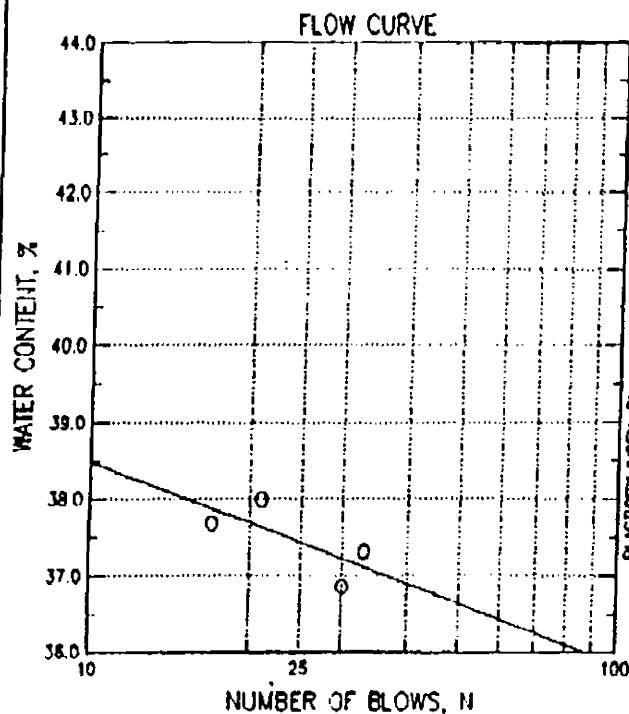


Fig. 1.0

ATTERBERG LIMITS

PROJECT Sinclair Refinery	PROJECT NUMBER GTX241	TESTED BY JLF	BORING NUMBER ---
LOCATION Wellsville, NY		CHECKED BY WJO	SAMPLE NUMBER STA 17+00
SAMPLE DESCRIPTION Sandy clay		DATE Sun Aug 11 1991	FILENAME STA17 00

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	33	31	18		
WT. WET SOIL + TARE	25.22	28.22	27.58		
WT. DRY SOIL + TARE	24.01	26.31	25.64		
WT. WATER	1.21	1.91	1.92		
TARE WT.	20.42	20.87	20.3		
WT. DRY SOIL	3.59	5.44	5.34		
WATER CONTENT, W_n (%)	33.70	35.11	35.98		
NUMBER OF BLOWS, N	30	20	15		
ONE-POINT LIQUID LIMIT, LL	34.46	34.17	33.80		

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	25	26			
WT. WET SOIL + TARE	24.63	24.39			
WT. DRY SOIL + TARE	23.91	23.59			
WT. WATER	0.72	0.8			
TARE WT.	20.93	20.01			
WT. DRY SOIL	2.98	3.58			
WATER CONTENT (%)	24.16	22.35			

SUMMARY OF RESULTS

NATURAL WATER CONTENT, W (%)	
LIQUID LIMIT, LL	34.3
PLASTIC LIMIT, PL	23.3
PLASTICITY INDEX, PI	11.1
LIQUIDITY INDEX, LI^*	

$$*LI = (W - PL)/PI$$

PLASTICITY CHART

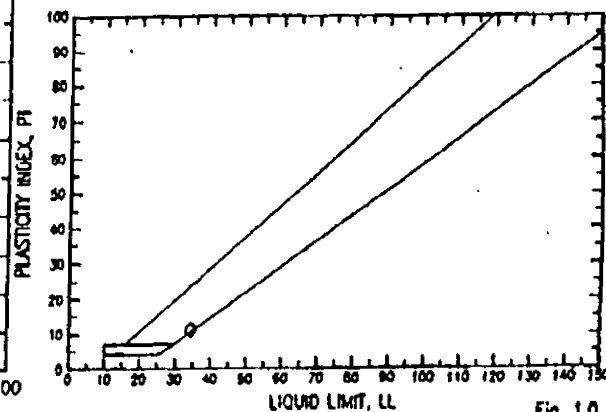
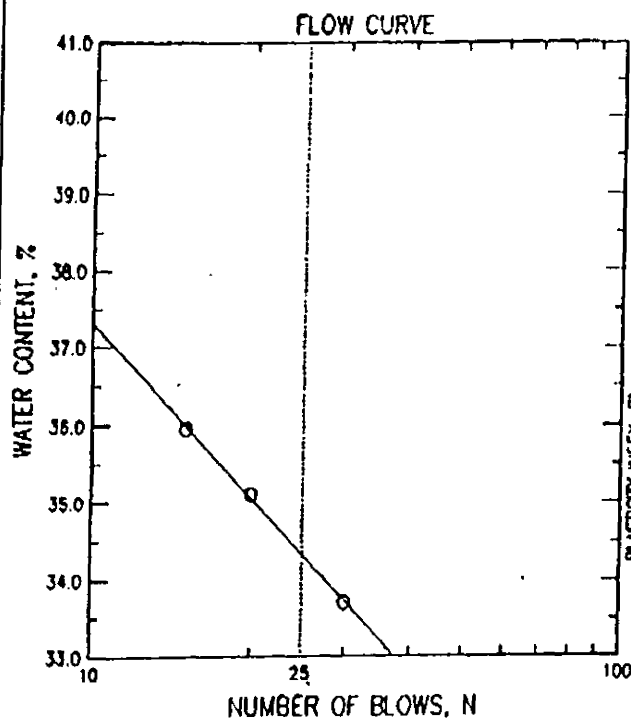


Fig. 1.0

ATTERBERG LIMITS

PROJECT Sinclair Refinery	PROJECT NUMBER GTX234.01	TESTED BY JJF	BORING NUMBER ---
LOCATION Wellsville, NY	CHECKED BY WJO	DATE Thu Aug 13 1992	SAMPLE NUMBER STA 12+00
SAMPLE DESCRIPTION Sandy clay		FILENAME STA12_00	

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	35	05	26		
WT. WET SOIL + TARE	26.67	27.33	25.88		
WT. DRY SOIL + TARE	25.14	25.83	24.26		
WT. WATER	1.53	1.5	1.42		
TARE WT.	20.28	20.88	20.02		
WT. DRY SOIL	4.88	4.97	4.24		
WATER CONTENT, w_n (%)	31.35	30.18	33.49		
NUMBER OF BLOWS, N	21	36	13		
ONE-POINT LIQUID LIMIT, LL	30.70	31.54	30.94		

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	31	33	18		
WT. WET SOIL + TARE	25.62	25.15	25.09		
WT. DRY SOIL + TARE	24.8	24.33	24.25		
WT. WATER	0.82	0.82	0.84		
TARE WT.	20.88	20.42	20.31		
WT. DRY SOIL	3.92	3.91	3.94		
WATER CONTENT (%)	20.92	20.97	21.32		

SUMMARY OF RESULTS

NATURAL WATER CONTENT, w (%)	
LIQUID LIMIT, LL	31.2
PLASTIC LIMIT, PL	21.1
PLASTICITY INDEX, PI	10.1
LIQUIDITY INDEX, LI^*	

$$^*LI = (w - PL)/PI$$

PLASTICITY CHART

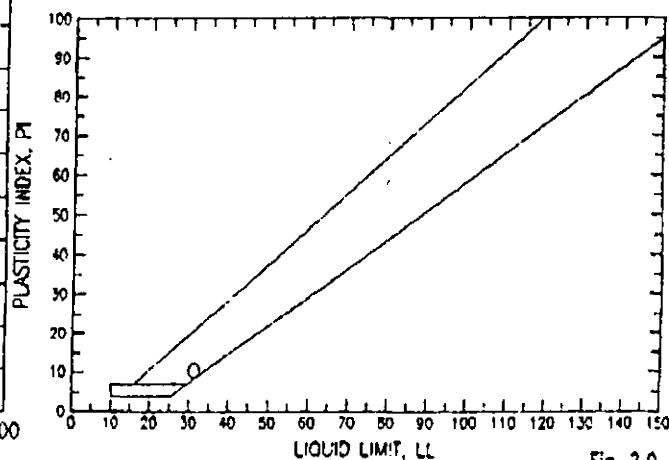
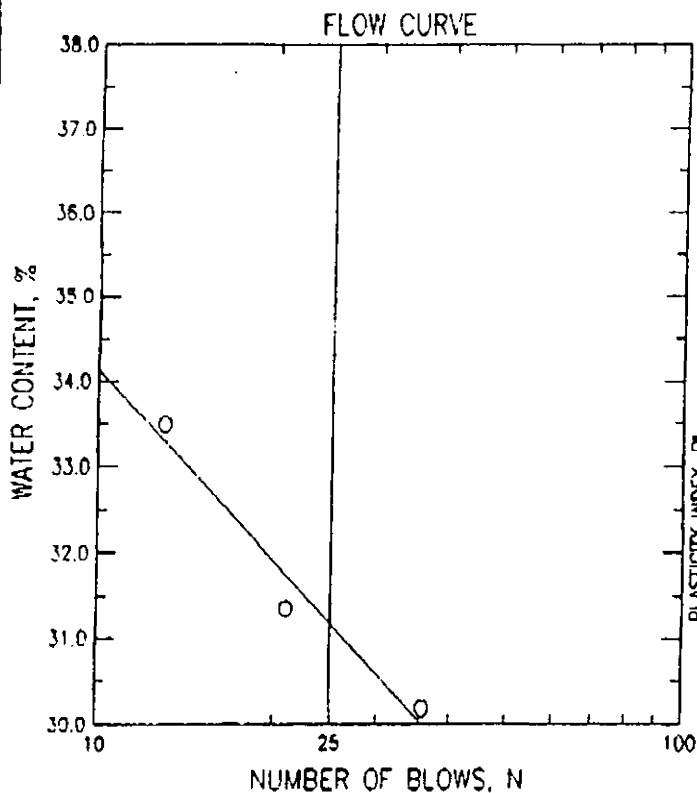


Fig. 2.0

COPY

ATTERBERG LIMITS

PROJECT Skelair Refinery	PROJECT NUMBER 670234.03	TESTED BY SWJ	BORING NUMBER ---
LOCATION Wellesley, NY	CHECKED BY WAM	SAMPLE NUMBER STA 7+00	
SAMPLE DESCRIPTION Silt	DATE Thu Sep 01 1992	FILENAME STA7_00	

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	05				
WT. WET SOIL + TARE	29.06				
WT. DRY SOIL + TARE	27.1				
WT. WATER	1.98				
TARE WT.	20.86				
WT. DRY SOIL	6.24				
WATER CONTENT, w_p (%)	31.73				
NUMBER OF BLOWS, N	12				
ONE-POINT LIQUID LIMIT, LL	29.03				

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	47	42			
WT. WET SOIL + TARE	31.13	38.88			
WT. DRY SOIL + TARE	29.31	33.3			
WT. WATER	1.82	3.58			
TARE WT.	22.34	22.29			
WT. DRY SOIL	6.97	13.01			
WATER CONTENT (%)	26.11	27.52			

SUMMARY OF RESULTS

NATURAL WATER CONTENT, w (%)	
LIQUID LIMIT, LL	29.1
PLASTIC LIMIT, PL	28.8
PLASTICITY INDEX, PI	1.3
LIQUIDITY INDEX, LI*	

$$*LI = (w - PL)/PI$$

PLASTICITY CHART

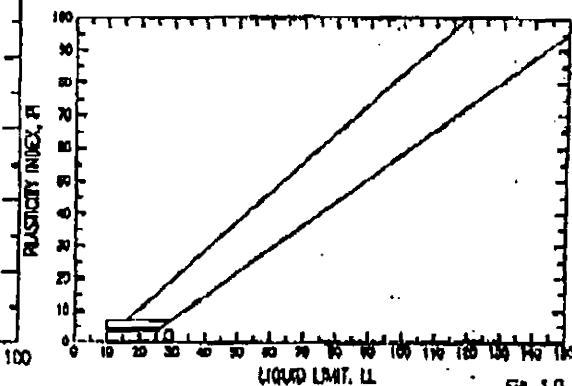
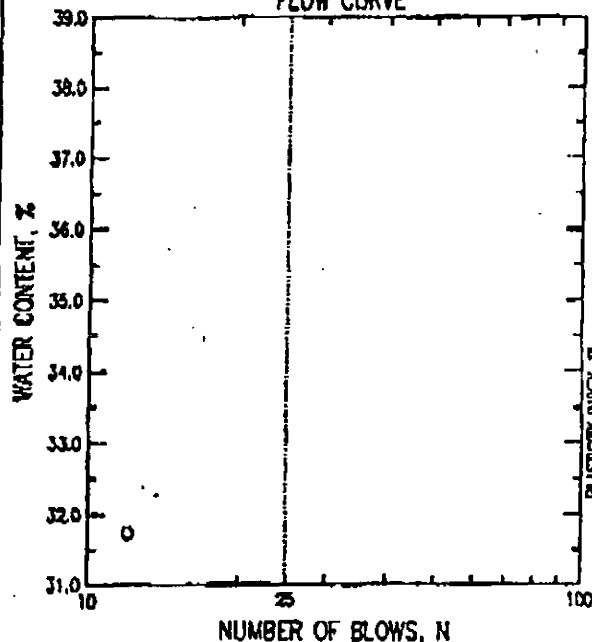


Fig. 1.0

FLOW CURVE



NUMBER OF BLOWS, N

Tue Sep 01 13:20:47 1992

Page : 1

GEOTECHNICAL LABORATORY TEST DATA

Project : Sinclair Refinery
 Project No. : G72234.03
 Boring No. : ---
 Sample No. : STA 7+00
 Location : Wallingville, MT
 Soil Description : Silt
 Remarks : ---

Depth : ---
 Test Date : 9/1/92
 Test Method : ASTM D4116

Filename : STA7_00
 Elevation : ---
 Tested by : SWJ
 Checked by : WAT

Moisture Content ID	Mass of Container (gm)	Plastic Limit		Moisture Content (%)
		Mass of Container and Moist Soil (gm)	Mass of Container and Dried Soil (gm)	
1) 47	22.34	31.13	29.31	26.11
2) 42	22.29	38.88	35.30	27.82

Plastic Limit = 26.01

Moisture Content ID	Mass of Container (gm)	Liquid Limit		Number of Drops	Moisture Content (%)
		Mass of Container and Moist Soil (gm)	Mass of Container and Dried Soil (gm)		
1) 05	20.06	29.08	27.10	12	31.73

Liquid Limit = 29.06
 Plastic Index = 2.24

COPY

Testing Express
 Concord, MA

ATTERBERG LIMITS

PROJECT Sindlor Refinery	PROJECT NUMBER GTX234	TESTED BY CNR	BORING NUMBER ---
LOCATION Wellsville NY		CHECKED BY WAM	SAMPLE NUMBER STA 3400
SAMPLE DESCRIPTION		DATE Fri Oct 23 1992	FILENAME STA3_00

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	18	71	41		
WT. WET SOIL + TARE	25.89	29.98	28.4		
WT. DRY SOIL + TARE	24.43	27.59	26.85		
WT. WATER	1.46	2.39	1.55		
TARE WT.	20.28	21.2	22.18		
WT. DRY SOIL	4.15	6.39	4.67		
WATER CONTENT, W_n (%)	35.18	37.40	33.19		
NUMBER OF BLOWS, N	18	12	32		
ONE-POINT LIQUID LIMIT, LL	33.81	34.22	34.20		

PLASTIC LIMIT DETERMINATIONS

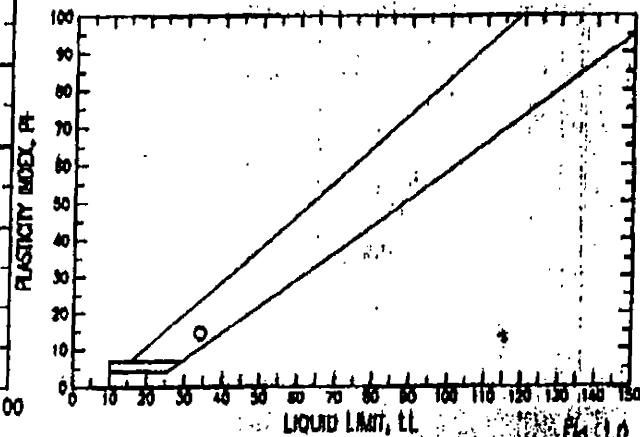
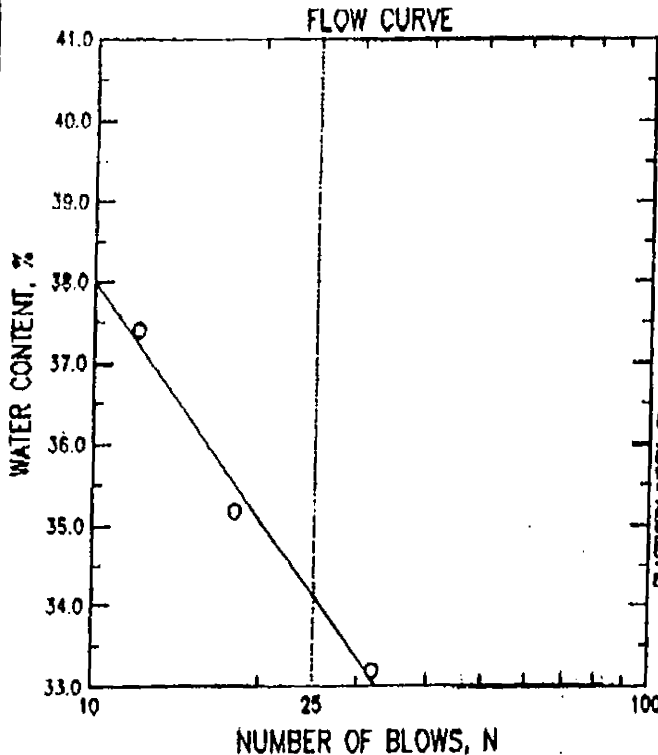
CONTAINER NUMBER	35	50			
WT. WET SOIL + TARE	21.79	23.55			
WT. DRY SOIL + TARE	21.53	23.32			
WT. WATER	0.28	0.23			
TARE WT.	20.2	22.18			
WT. DRY SOIL	1.33	1.18			
WATER CONTENT (%)	19.55	19.83			

SUMMARY OF RESULTS

NATURAL WATER CONTENT, W (%)	
LIQUID LIMIT, LL	34.1
PLASTIC LIMIT, PL	19.7
PLASTICITY INDEX, PI	14.4
LIQUIDITY INDEX, LI^*	

$$*LI = (W - PL)/PI$$

PLASTICITY CHART



Fri Oct 23 13:38:29 1992

Page: 1

GEOTECHNICAL LABORATORY TEST DATA

Project : Sinclair Refinery
 Project No. : GTX734
 Boring No. : ---
 Sample No. : STA 3+00
 Location : Wellsville NY
 Soil Description :
 Remarks : Clay Key sample

Depth : 32 ft
 Test Date : 10/13/92
 Test Method : ---

Filename : STA3_00
 Elevation : ---
 Tested by : CWR
 Checked by : WAM

Moisture Content ID	Mass of Container (gm)	Plastic Limit		Moisture Content (%)
		Mass of Container and Moist Soil (gm)	Mass of Container and Dried Soil (gm)	
1) 35	20.20	21.79	21.59	19.55
2) 50	22.16	22.55	22.32	19.83

Plastic Limit = 19.69

Moisture Content ID	Mass of Container (gm)	Liquid Limit		Number of Drops	Moisture Content (%)
		Mass of Container and Moist Soil (gm)	Mass of Container and Dried Soil (gm)		
1) 18	20.28	29.89	24.43	18	35.18
2) 71	21.20	29.98	27.59	12	37.40
3) 41	22.18	28.40	26.85	32	33.19

Liquid Limit = 34.11

Plastic Index = 14.42

**BENTONITE SLURRY DATA
AT MIXING PLANT SUMMARY TABLE**

SOIL-BENTONITE CUTOFF WALL
MIXING PLANT BENTONITE SLURRY DATA

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

GEO-CON DATA

DATE (1992)	TIME	SLURRY DENSITY (pcf)	SLURRY VISCOSITY (sec)	SLURRY pH	SLURRY FILTRATE (ml/30 min)
7/9	am	65	45	7	
7/9	am	65	42		
7/9	pm	65	40	7	17
7/10	am	65	40		
7/10	am	68	41	7	18
7/13	am	65	41		
7/13	pm	65	43	7	16
7/14	am	65	42		
7/14	pm	65	43	7	15
7/15	am	65	53	8	
7/15	pm	65	52	8	16
7/16	am	65	53		
7/16	pm	65	43	7	13
7/17	am	65	56	8	14
7/20	am	66	53	8	
7/20	pm	68	120	8	15
7/21	am	66	93		
7/21	pm	66	99	8	13
7/22	am	65	46	8	
7/22	pm	65	45	7	15
7/23	am	66	45	8	15
7/23	pm	66	44	8	
7/24	am	66	45	8	
7/24	pm	68	53	8	16
7/27	am	65	42	8	
7/27	pm	66	44	8	15
8/4	am	65	44	8	
8/4	pm	66	45	8	15
8/5	am	65	46	8	
8/5	pm	65	44	7	
8/6	am	67	61	8	
8/6	pm	66	42	8.5	15
8/6	pm	65	37	7	15
8/7	am	67	50	8	
8/7	pm	66	40	8	14
8/8	am	66	42	8	
8/8	pm	67	46	8	14
8/10	am	67	47	7	16
8/10	pm	68	47	7	16
10/1	am	65	40		
10/1	pm	65	45	8	16
10/2	am	67	90	8	
10/2	pm	67	120	8	12
10/3	am	65	50	8	
10/3	pm	65	47	8	14

=====

TOTAL TESTS	45	45	38	23

SOIL-BENTONITE CUTOFF WALL
MIXING PLANT BENTONITE SLURRY DATA

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

GEOSYNTEC CONSULTANTS DATA

DATE (1992)	SLURRY DENSITY (pcf)	SLURRY VISCOSITY (sec)	SLURRY pH	SLURRY FILTRATE (ml/30 min)
7/16			7	13
7/20	66	52		
7/21	66	99	8	13
8/6	65	37	7	15
8/10	68	47	7	16
10/1	65	40		
10/2			8	12
=====				
TOTAL TESTS	8	5	5	5

**BENTONITE SLURRY DATA
IN TRENCH SUMMARY TABLE**

TRENCH BENTONITE SLURRY DATA
SOIL-BENTONITE CUTOFF WALL

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

GEO-CON DATA

DATE (1992)	STATION START FINISH	TIME	SLURRY VISCOSITY (sec)	SLURRY DENSITY (pcf)
7/9	270 220	am	45	65
7/9	270 220	am	45	67
7/9	270 220	pm	40	67
7/9	270 220	pm	42	67
7/10	220 100	am	46	66
7/10	220 100	am	44	67
7/10	220 100	pm	46	67
7/13	100 0	am	50	67
7/13	100 0	pm	50	66
7/14	0 2780	am	48	67
7/14	0 2780	pm	50	67
7/15	2780 2640	am	50	68
7/15	2780 2640	pm	45	74
7/16	2640 2480	am	50	70
7/16	2640 2480	pm	48	74
7/17	2480 2360	am	45	73
7/17	2480 2360	pm	50	74
7/20	2360 2200	am	50	81
7/20	2360 2200	pm	47	85
7/21	2200 1980	am	49	87
7/21	2200 1980	am	46	83
7/21	2200 1980	pm	46	84
7/22	1980 1800	am	52	88
7/22	1980 1800	pm	38	76
7/22	1980 1800	pm	40	88
7/23	1800 1680	am	40	84
7/23	1800 1680	pm	40	84
7/24	1680 1540	am	58	84
7/24	1680 1540	pm	48	85
7/27	1540 1480	am	40	84
7/27	1540 1480	pm	46	87
8/4	1480 1360	am	64	89
8/4	1480 1360	pm	60	86
8/5	1360 1200	am	43	80
8/5	1360 1200	pm	45	86
8/6	1200 1000	am	54	90
8/6	1200 1000	pm	61	89
8/7	1000 800	am	65	87
8/7	1000 800	pm	51	86
8/8	800 600	am	67	87
8/8	800 600	pm	72	91
8/10	600 530	am	40	86
10/1	535 525	pm	46	87
10/2	525 380	am	57	67
10/2	525 380	pm	53	67
10/3	380 265	am	58	72
10/3	380 265	pm	57	69
TOTAL TESTS			49	49

TRENCH BENTONITE SLURRY DATA
SOIL-BENTONITE CUTOFF WALL

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

GEOSYNTEC CONSULTANTS DATA

DATE (1992)	STATION		SLURRY	SLURRY
	START	FINISH	VISCOSITY (sec)	DENSITY (pcf)
7/16	2640	2480	42	67
7/22	1980	1800	74	82
8/8	800	600	51	90
8/10	600	530	57	86
10/2	525	380	53	67
=====				
TOTAL TESTS			5	5

SOIL-BENTONITE BACKFILL

- **SUMMARY TABLE**
- **GRADATION ANALYSES (GEO.CON)**
- **GRADATION ANALYSES (GEOSYNTEC CONSULTANTS)**
- **PERMEABILITY DATA (GEO.CON)**
- **PERMEABILITY DATA (GEOSYNTEC CONSULTANTS)**

SUMMARY TABLE

SOIL-BENTONITE BACKFILL DATA
SOIL-BENTONITE CUTOFF WALL

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

GEO-CON DATA

STATION	% PASSING SIEVE		
	3/8	#40	#200
100	70.8	50.0	33.6
2800	73.1	50.5	34.7
2600	74.0	51.4	35.5
2400	77.0	53.5	37.6
2200	74.1	50.7	35.8
2000	68.8	48.6	34.7
1800	71.7	52.4	37.0
1650	70.1	51.1	35.4
1500	79.1	56.2	39.7
1380	83.1	62.8	48.6
1240	72.8	54.4	40.4
1120	71.8	54.5	40.9
1000	77.3	57.5	49.1
880	77.0	56.1	41.4
760	80.3	60.5	44.8
640	74.4	56.4	42.6
530	68.9	51.5	39.5
535	80.0	56.1	42.2
500	80.0	56.1	42.2
280	82.7	64.1	44.7
=====			
NUMBER TESTS			20

SOIL-BENTONITE BACKFILL DATA
SOIL-BENTONITE CUTOFF WALL

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

GEOSYNTEC CONSULTANTS DATA

STATION	% PASSING SIEVE		
	3/8	#40	#200
2420	71.9	49.3	33.7
1840	73.7	49.0	33.6
1400	70.1	45.8	34.4
550	82.2	56.6	43.0
450	86.7	63.6	42.5
=====			
NUMBER TESTS			5

SOIL-BENTONITE BACKFILL DATA
SOIL-BENTONITE CUTOFF WALL

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

GEO-CON DATA

DATE (1992)	TIME	STATION	BACKFILL DENSITY (pcf)	BACKFILL SLUMP (in)
7/9	pm	260		4.5
7/10	am	200	132	4
7/13	am	300		4
7/14	pm	200	133	4
7/15	pm	120	134	3
7/16	am	0	132	4.5
7/17	am	2800	134	4
7/20	pm	2600	134	4
7/21	pm	2420	143	3.5
7/22	pm	2180	140	3.5
7/23	pm	1960	138	4
7/24	am	1800	140	4
7/27	am	1760	138	4
8/5	pm	1500	134	3.5
8/6	am	1260	135	4.5
8/7	am	1000	132	3.5
8/8	am	800	135	4
8/10	am	700	132	4
10/2	am	535	138	4
10/2	pm	500	140	3.5
10/3	am	450	139	3
10/3	pm	400	137	3.5
=====				
TOTAL TESTS			20	22

SOIL-BENTONITE BACKFILL DATA
SOIL-BENTONITE CUTOFF WALL

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

GEOSYNTEC CONSULTANTS DATA

DATE (1992)	TIME	STATION	BACKFILL DENSITY (pcf)	BACKFILL SLUMP (in)
7/16	NR	NR		3.5
7/22	NR	2320	133	4
7/24	NR	1840	131	
8/6	NR	1400	127	4.5
8/10	NR	550	128	4
10/3	NR	450	126	4
=====				
TOTAL TESTS			5	5

GRADATION ANALYSES
(GEO.CON)

**SOIL-BENTONITE BACKFILL
GRADATION ANALYSES
(GEO-CON)**

Date Tested (1992)	Station	% Passing Sieves		
		3/8 in.	#40	#200
10 July	3+00	73	51	35
16 July	1+00	71	50	34
17 July	28+00	73	51	35
20 July	26+00	74	51	36
22 July	24+00	77	54	38
23 July	22+00	74	51	36
24 July	20+00	69	49	35
27 July	18+00	72	52	37
04 August	16+50	70	51	35
05 August	15+00	79	56	40
06 August	13+80	83	63	49
07 August	12+40	73	54	40
16 August	11+20	72	54	41
10 August	10+00	77	57	49
11 August	8+80	77	56	41
11 August	7+60	80	60	45
16 August	6+40	74	56	43
16 August	5+30	69	51	40
05 October	5+35	76	56	43
05 October	5+00	80	56	42
05 October	2+80	83	64	45
<i>TOTAL = 21</i>				
<i>ACCEPTABLE RANGES</i>		<i>65-100</i>	<i>30-80</i>	<i>25-50</i>

JUL 17 1992



COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	644.8	65.5	579.3	1401.1	70.84%
No. 4					
No. 10					①

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % passing Sieve
No. 10 ②							
No. 20							
No. 40	480.5	65.5	415.0	992.1	49.95		49.95
No. 80							
No. 200	391.1	65.5	325.6	666.5	33.55		33.55

REMARKS: * K = $\frac{①}{②}$

GEO-CON, INC.

Grain Size Analysis

Project Name: SINCLAIR REFINERYTested By: FRED MASTELEProject Number: P1-0129Date: 7-16-92Sample Identification: STA 1+00Checked By: Chris BaileyDate: 7-16-92Material Description: BACKFILL MIXTURE

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	2117.4 gm
WT of Tare	131.0 gm
WT of Sample (wet)	
WT of Sample (Dry) (corrected for moisture)	1986.4
WATER CONTENT FOR TOTAL SAMPLE	
WT of Ws + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

- #10 SAMPLE USED IN ANALYSIS	
WT of Ws + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (dry) ②	
WATER CONTENT FOR -#10 SAMPLE	
WT of Ws + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

SCREEN ANALYSIS

MATERIAL BACKFILL		WEIGHT OF SAMPLE 1986.4 GRAMS		SAMPLE SOURCE Station 1+00		
DATE 7-15-92	TIME 1400	SAMPLED BY FRED MASTELE		TESTED BY FRED MASTELE		

SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	579.3	29.16%	29.16%	70.84%	PASSING 65-100%	OK
No. 4						
No. 8						
No. 16						
No. ~~40~~ 40	415.0	20.89%	50.05%	49.95%	PASSING 30-80%	OK
No. 50						
No. 100						
No. 200	325.6	16.39%	66.44%	33.55%	PASSING 25-50%	OK
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	

☒ ACCEPTED

☐ REJECTED

SIGNATURE

TITLE

JUL 17 1992



Grain Size Analysis

Project Name: SINCLAIR REFINERY
 Project Number: PI-0129
 Sample Identification: BACKFILL FROM
STATION 28+00
 Material Description: _____

Tested By: FRED MASTELE
 Date: 7-17-92
 Checked By: Chris Bailey
 Date: 7-20-92

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	773.0	65.5	707.5	1920.5	73.08
No. 4					
No. 10					①

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	2759.0
WT of Tare	131.0
WT of Sample (wet)	—
WT of Sample DRY	2628.0
(corrected for moisture)	
WATER CONTENT FOR TOTAL SAMPLE	
WT of Ws + Tare	—
WT of DS + Tare	—
WT of Tare	—
WT of DS	—
WT of Water	—
Moisture Content	—

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* Total % Passing Sieve
No. 10 ②						
No. 20						
No. 40	658.9	65.5	593.4	1327.1	50.5	50.5
No. 80						
No. 200	479.6	65.5	414.1	913	34.74	34.74

-#10 SAMPLE USED IN ANALYSIS	
WT of Ws + Tare	—
WT of Tare	—
WT of Sample (wet)	—
WT of Sample (dry)	②
WATER CONTENT FOR -#10 SAMPLE	
WT of Ws + Tare	—
WT of DS + Tare	—
WT of Tare	—
WT of DS	—
WT of Water	—
Moisture Content	—

REMARKS: * K = $\frac{①}{100}$

SCREEN ANALYSIS

MATERIAL BACKFILL		WEIGHT OF SAMPLE 26.28.0 GRAMS		SAMPLE SOURCE STATION 28100		
DATE 7-17-92	TIME AM	SAMPLED BY F. MASTELE		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	707.5	26.92	26.92	73.08	% Passing 65-100	OK
No. 4						
No. 8						
No. 16						
No. ~~30~~ 40	593.4	22.58	49.5	50.5	% Passing 30-80	OK
No. 50						
No. 100						
No. 200	414.1	15.76	65.26	34.74	% Passing 25-50	OK
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE			TITLE			

Grain Size Analysis

Project Name: SINCLAIR REFINERYTested By: FRED MASTELEProject Number: P1-0129Date: 7-20-92Sample Identification: BACKFILL ATChecked By: Chris BaileySTATION 26T00Date: 7-21-92Material Description: BACKFILL

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	572.9	65.5	507.4	1441.2	73.96
No. 4					
No. 10					①

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % Passing Sieve
No. 10 ②							
No. 20							
No. 40	505.3	65.5	439.8	1001.4	51.39		51.39
No. 80							
No. 200	374.9	65.5	309.4	692	35.51		35.51

REMARKS: * K = $\frac{①}{100}$

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	2074.6
WT of Tare	131.0
WT of Sample (wet)	
WT of Sample DRY 1948.6	
(corrected for moisture)	
WATER CONTENT FOR TOTAL SAMPLE	
WT of Ws + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

- #10 SAMPLE USED IN ANALYSIS	
WT of Ws + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (dry) ②	
WATER CONTENT FOR - #10 SAMPLE	
WT of Ws + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

SCREEN ANALYSIS

MATERIAL BACKFILL		WEIGHT OF SAMPLE 1948.6 GRAMS		SAMPLE SOURCE BACKFILL MATERIAL		
DATE 7-20-92	TIME —	SAMPLED BY		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED % RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	507.4	26.04	26.04	73.96%	65 to 100	OK
No. 4						
No. 8						
No. 16						
No. ⁴⁰ ~~30~~	439.8	22.57	48.61	51.39	30 to 80	OK
No. 50						
No. 100						
No. 200	309.4	15.88	64.49	35.51	25 to 50	OK
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE			TITLE			

Grain Size Analysis

Project Name: SINCLAIR REFINERYTested By: F. MASTELEProject Number: P1-0129Date: 7-22-92Sample Identification: BACKFILLChecked By: Chris BaileySTATION 24+00Date: 7-22-92Material Description: SLURRY WALL BACKFILL FROM STA 24+00

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	306.1	65.5	240.6	806.1	77.01
No. 4					
No. 10					①

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	1112.2 gm
WT of Tare	65.5 gm
WT of Sample (wet)	
WT of Sample DRY (corrected for moisture)	1046.7 gm
WATER CONTENT FOR TOTAL SAMPLE	
WT of Ws + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction * Passing Sieve	* K	Total % Passing Sieve
No. 10 ②							
No. 20							
No. 40	311.5	65.5	246.0	560.1	53.51		53.51
No. 80							
No. 200	231.9	65.5	166.4	393.7	37.61		37.61

-#10 SAMPLE USED IN ANALYSIS	
WT of Ws + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (dry)	②
WATER CONTENT FOR -#10 SAMPLE	
WT of Ws + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

REMARKS: * K = $\frac{①}{100}$

SCREEN ANALYSIS

MATERIAL BACKFILL STA 24100		WEIGHT OF SAMPLE 1046.7 gm		SAMPLE SOURCE STA 24100	
DATE 7-22-92	TIME 0900	SAMPLED BY		TESTED BY F. MASTELE	

SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED % RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	240.6	22.99	22.99	77.01	% Passing 65-100	OK
No. 4						
No. 8						
No. 16						
No. ~~30~~ 40	246	23.50	46.49	53.51	% Passing 30-80	OK
No. 50						
No. 100						
No. 200	166.4	15.90	62.39	37.61	% Passing 25-50	OK
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	

☒ ACCEPTED

☐ REJECTED

SIGNATURE

TITLE

GEO-CON, INC.

Grain Size Analysis

Project Name: SINCLAIR REFINERYTested By: F. MASTELEProject Number: PI-0129Date: 7-23-92Sample Identification: BACKFILLChecked By: Chris BaileyDate: 7-23-92Material Description: BACKFILL FOR SLURRY WALL FROM STATION 22100

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
2					
2					
1 1/2					
1					
3/4					
1/2					
3/8	324.6	65.5	259.1	74.9	74.12
No. 4					
No. 10					①

FINE SIEVE SERIES

No.	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* Total % Passing Sieve
No. 10						
No. 20						
No. 40	299.8	65.5	234.3	507.6	50.71	50.71
No. 80						
No. 200	214.3	65.5	148.8	358.8	35.84	35.84

REMARKS: * K = $\frac{①}{100}$

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	1066.5
WT of Tare	65.5
WT of Sample (wet)	
WT of Sample DRY (corrected for moisture)	1001.0
WATER CONTENT FOR TOTAL SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

-#10 SAMPLE USED IN ANALYSIS	
WT of WS + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (dry)	②
WATER CONTENT FOR -#10 SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

SCREEN ANALYSIS

MATERIAL Backfill		WEIGHT OF SAMPLE 1001.0 GM		SAMPLE SOURCE STA 22+00		
DATE 7-23-92	TIME 1000	SAMPLED BY F. MASTELE		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
8"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	259.1	25.88	25.88	74.12	% Passing 65 To 100	PASSED
No. 4						
No. 8						
No. 16						
No. 40	234.3	23.41	49.29	50.71	% Passing 30-80	PASSED
No. 50						
No. 100						
No. 200	148.8	14.87	64.16	35.84	% Passing 25-50	PASSED
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE				TITLE		

Grain Size Analysis

Project Name: SINCLAIR REFINERY
 Project Number: PI-0129
 Sample Identification: BACKFILL

Tested By: F. MASTELE
 Date: 7-24-92
 Checked By: Chris Bailey
 Date: 7-24-92

Material Description: BACKFILL FROM STATION 20100

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing Sieve	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	395.4	65.5	329.9	726.2	68.76
No. 4					
No. 10					①

FINE SIEVE SERIES

No. 10	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing Sieve	Fine Fraction % Passing Sieve	* Total % Passing Sieve
(2)						
No. 20						
No. 40	278.9	65.5	213.4	512.8	48.56	48.56
No. 80						
No. 200	211.8	65.5	146.3	366.5	34.70	34.70

REMARKS: * K = $\frac{①}{100}$

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	1121.6 gm
WT of Tare	65.5 gm
WT of Sample (wet)	
WT of Sample DRY (corrected for moisture)	1056.1 gm
WATER CONTENT FOR TOTAL SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

-#10 SAMPLE USED IN ANALYSIS	
WT of WS + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (dry)	②
WATER CONTENT FOR -#10 SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

SCREEN ANALYSIS					
MATERIAL	WEIGHT OF SAMPLE	SAMPLED BY	TESTED BY	SAMPLE SOURCE	
BACKFILL	1056.1 gm	F. HASTELE	F. HASTELE	STATION 20+00	
DATE 7-24-92	TIME 0915				
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS
7"					
6"					
5"					
4"					
3"					
2"					
1 1/2"					
1"					
3/4"					
1/2"					
3/8"	329.9	31.24	31.24	68.76	% Passing 65-100 Passed
No. 4					
No. 8					
No. 16					
No. 30	213.4	20.21	51.45	48.56	% Passing 30-80 Passed
No. 50					
No. 100					
No. 200	146.3	13.85	65.30	34.70	% Passing 25-50 Passed
PAN					
TOTAL					
ACCEPTED ☒ REJECTED ☐					
SIGNATURE			TITLE		

Grain Size Analysis

Project Name: SINCLAIR REFINERY
 Project Number: P1-0129
 Sample Identification: BACKFILL

Tested By: F. MASTELE
 Date: 7-27-92
 Checked By: Chris Bailey
 Date: 7-28-92

Material Description: BACKFILL MATERIAL FROM STATION 18+00

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	1225.6	941.4	284.2	720.8	71.72
No. 4					
No. 10					①

FINE SIEVE SERIES

No. 10	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % Passing Sieve
No. 20							
No. 40	1135.3	941.4	193.9	526.9	52.43		52.43
No. 80							
No. 200	1096.2	941.4	154.8	372.1	37.03		37.03

REMARKS: * K = $\frac{①}{100}$

TOTAL WEIGHT OF SAMPLE
WT of Sample + Tare <u>1070.5 gm</u>
WT of Tare <u>65.5 gm</u>
WT of Sample (wet) _____
WT of Sample <u>DRY 1005.0 gm</u> (corrected for moisture)
WATER CONTENT FOR TOTAL SAMPLE
WT of WS + Tare _____
WT of DS + Tare _____
WT of Tare _____
WT of DS _____
WT of Water _____
Moisture Content _____

-#10 SAMPLE USED IN ANALYSIS
WT of WS + Tare _____
WT of Tare _____
WT of Sample (wet) _____
WT of Sample (dry) <u>②</u>
WATER CONTENT FOR -#10 SAMPLE
WT of WS + Tare _____
WT of DS + Tare _____
WT of Tare _____
WT of DS _____
WT of Water _____
Moisture Content _____

SCREEN ANALYSIS

MATERIAL		WEIGHT OF SAMPLE		SAMPLED BY		TESTED BY		SAMPLE SOURCE	
BACKFILL		1005.0 gm		F. MASTEE		F. MASTEE		STATION 18+00	
DATE		TIME		SAMPLER		TESTER		REMARKS	
7-27-92		10:15		F. MASTEE		F. MASTEE			
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS				
3/8"	284.2	28.28	28.28	71.72	% Passing 65-100	PASSED			
No. 4									
No. 8									
No. 16									
No. 30	193.9	19.29	47.48	52.43	% Passing 30-80	PASSED			
No. 50									
No. 100									
No. 200	154.8	15.40	62.88	37.03	% Passing 25-50	PASSED			
PAN									
TOTAL									

☒ ACCEPTED
☐ REJECTED

TITLE _____
 SIGNATURE _____

Grain Size Analysis

Project Name: SINCLAIR REFINERY Tested By: F. MASTALE
 Project Number: P1-0129 Date: 8-4-92
 Sample Identification: BACKFILL Checked By: John Duff
 Date: 8-4-92
 Material Description: BACKFILL FROM STATION 16+50

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	1238.4	941.4	297.0	695.5	70.08
No. 4					
No. 10					①

TOTAL WEIGHT OF SAMPLE

WT of Sample + Tare 1933.9
 WT of Tare 941.4
 WT of Sample (wet) _____
 WT of Sample DRY 992.5
 (corrected for moisture)

WATER CONTENT FOR TOTAL SAMPLE

WT of Ws + Tare _____
 WT of DS + Tare _____
 WT of Tare _____
 WT of DS _____
 WT of Water _____
 Moisture Content _____

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* X	Total % Passing Sieve
No. 10							
No. 20							
No. 40	1129.6	941.4	188.2	507.3	51.11		51.11
No. 80							
No. 200	1097.5	941.4	156.1	351.2	35.39		35.39

-#10 SAMPLE USED IN ANALYSIS

WT of Ws + Tare _____
 WT of Tare _____
 WT of Sample (wet) _____
 WT of Sample (dry) _____ ②

WATER CONTENT FOR -#10 SAMPLE

WT of Ws + Tare _____
 WT of DS + Tare _____
 WT of Tare _____
 WT of DS _____
 WT of Water _____
 Moisture Content _____

REMARKS: * K = $\frac{①}{100}$

SCREEN ANALYSIS

MATERIAL BACKFILL		WEIGHT OF SAMPLE 992.5		SAMPLE SOURCE STATION 16+50		
DATE 8-4-92	TIME —	SAMPLED BY F. MASTELE		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED % RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	297.0	29.92	29.92	70.08	% PASSING 65 TO 100	PASSED
No. 4						
No. 8						
No. 16						
No. 40	188.2	18.96	48.88	51.11	% PASSING 30 TO 80	PASSED
No. 50						
No. 100						
No. 200	156.1	15.73	64.61	35.39	% PASSING 25 TO 50	PASSED
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE			TITLE			

Grain Size Analysis

Project Name: SINCLAIR REFINERY
 Project Number: PI-0129
 Sample Identification: BACKFILL

Tested By: _____

Date: _____

Checked By: _____

Date: _____

Material Description: BACKFILL FROM STATION 15+00

F. MASTELE

8-5-92

8-5-92

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1½					
1					
¾					
½					
¼	1195.4	941.4	254.0	958.6	79.05
No. 4					
No. 10					①

TOTAL WEIGHT OF SAMPLE

WT of Sample + Tare 2154.0WT of Tare 941.4

WT of Sample (wet) _____

WT of Sample DRY 1212.6
(corrected for moisture)

WATER CONTENT FOR TOTAL SAMPLE

WT of Ws + Tare _____

WT of DS + Tare _____

WT of Tare _____

WT of DS _____

WT of Water _____

Moisture Content _____

-#10 SAMPLE USED IN ANALYSIS

WT of Ws + Tare _____

WT of Tare _____

WT of Sample (wet) _____

WT of Sample (dry) _____ ②

WATER CONTENT FOR -#10 SAMPLE

WT of Ws + Tare _____

WT of DS + Tare _____

WT of Tare _____

WT of DS _____

WT of Water _____

Moisture Content _____

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % Passing Sieve
No. 10							
No. 20							
No. 40	1218.5	941.4	277.1	681.5	56.20		56.20
No. 80							
No. 200	1141.0	941.4	199.6	481.9	39.74		39.74

REMARKS: * K = $\frac{①}{100}$

SCREEN ANALYSIS

MATERIAL <i>BACKFILL</i>		WEIGHT OF SAMPLE <i>1212.6 grams</i>		SAMPLE SOURCE <i>STATION 15+00</i>		
DATE <i>8-5-92</i>	TIME —	SAMPLED BY <i>M. WESTBROOK</i>		TESTED BY <i>F. MASTELE</i>		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	254.0	20.95	20.95	79.05	% PASSING 65 TO 100%	PASSED
No. 4						
No. 8						
No. 16						
⁴⁰ No. 40	277.1	22.85	43.80	56.20	% PASSING 30 TO 80%	PASSED
No. 50						
No. 100						
No. 200	199.6	16.46	60.26	39.74	% PASSING 25 TO 50%	PASSED
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE			TITLE			

Grain Size Analysis

Project Name: SINCLAIR REFINERY
 Project Number: P1-0129
 Sample Identification: BACKFILL

Tested By: F. MASTELE
 Date: 8-6-92
 Checked By: [Signature]
 Date: 8-6-92

Material Description: SURVEY WALL BACKFILL FROM STATION 13+80

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1½					
1					
¾					
½					
¼	1141.1	941.4	199.7	984.2	83.13
No. 4					
No. 10					①

TOTAL WEIGHT OF SAMPLE.

WT of Sample + Tare 2125.3
 WT of Tare 941.4
 WT of Sample (wet) _____
 WT of Sample DAY 1183.9
 (corrected for moisture)

WATER CONTENT FOR TOTAL SAMPLE

WT of Ws + Tare _____
 WT of DS + Tare _____
 WT of Tare _____
 WT of DS _____
 WT of Water _____
 Moisture Content _____

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % Passing Sieve
No. 10 ②							
No. 20							
No. 40	1182.1	941.4	240.7	743.5	62.80		62.80
No. 80							
No. 200	1109.0	941.4	167.6	575.9	48.64		48.64

-#10 SAMPLE USED IN ANALYSIS

WT of Ws + Tare _____
 WT of Tare _____
 WT of Sample (wet) _____
 WT of Sample (dry) _____ ②

WATER CONTENT FOR -#10 SAMPLE

WT of Ws + Tare _____
 WT of DS + Tare _____
 WT of Tare _____
 WT of DS _____
 WT of Water _____
 Moisture Content _____

REMARKS: * K = $\frac{①}{100}$

SCREEN ANALYSIS

MATERIAL SLURRY WALL BACKFILL		WEIGHT OF SAMPLE 1183.9		SAMPLE SOURCE STATION 13+80		
DATE 8-6-92	TIME —	SAMPLED BY M. WESTBROOK		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMLATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1½"						
1"						
¾"						
½"						
3/8"	199.7	16.87	16.87	83.13	% PASSING 65 TO 100	PASSED
No. 4						
No. 8						
No. 16						
No. ~~20~~ 40	240.7	20.33	37.20	62.80	% PASSING 30 TO 80	PASSED
No. 50						
No. 100						
No. 200	167.6	14.16	51.36	48.64	% PASSING 25 TO 50	PASSED
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE			TITLE			

Grain Size Analysis

Project Name:

SINCLAIR REFINERY

Tested By:

F. MASTALE

Project Number:

P1-0129

Date:

8-7-92

Sample Identification:

STATION 12440

Checked By:

Chris B. B. B.

Material Description:

SUREY WALLBACKFILL

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1½					
1					
¾					
½					
¼	1380.4	941.4	439.0	1174.2	72.79
No. 4					
No. 10					①

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* -K	Total % Passing Sieve
No. 10 ①							
No. 20							
No. 40	1238.5	941.4	297.1	877.1	54.37		54.37
No. 80							
No. 200	1166.8	941.4	225.4	651.7	40.4		40.4

REMARKS: * K = $\frac{①}{100}$

TOTAL WEIGHT OF SAMPLE

WT of Sample + Tare 2554.6WT of Tare 941.4

WT of Sample (wet) _____

WT of Sample DRY 1613.2
(corrected for moisture)

WATER CONTENT FOR TOTAL SAMPLE

WT of Ws + Tare _____

WT of DS + Tare _____

WT of Tare _____

WT of DS _____

WT of Water _____

Moisture Content _____

-#10 SAMPLE USED IN ANALYSIS

WT of Ws + Tare _____

WT of Tare _____

WT of Sample (wet) _____

WT of Sample (dry) _____ ②

WATER CONTENT FOR -#10 SAMPLE

WT of Ws + Tare _____

WT of DS + Tare _____

WT of Tare _____

WT of DS _____

WT of Water _____

Moisture Content _____

SCREEN ANALYSIS

MATERIAL BACKFILL		WEIGHT OF SAMPLE 1613.2		SAMPLE SOURCE STATION 12+40		
DATE 8-7-92	TIME —	SAMPLED BY M. WESTBROOK		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	439.0	27.21	27.21	72.79	9% PASSING 65 TO 100	PASSED
No. 4						
No. 8						
No. 16						
No. 40 ~~30~~	297.1	18.42	45.63	54.37	9% PASSING 30 TO 80	PASSED
No. 50						
No. 100						
No. 200	225.4	13.97	59.60	40.4	9% PASSING 25 TO 50	PASSED
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE				TITLE		

Grain Size Analysis

Project Name: SINCLAIR REFINERYTested By: F. MASTELEProject Number: D1-0129Date: 8-16-92Sample Identification: BACKFILL

Checked By: _____

Date: _____

Material Description: SLURRY WALL BACKFILL (RETEST OF STA 11720)
THE #200 SIEVE FAILED THE FIRST TIME (HOLE WAS FOUND IN SIEVE)

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COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing Sieve	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	374.5	65.7	308.8	786.8	71.82
No. 4					
No. 10					①

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing Sieve	Fine Fraction Passing Sieve	* K	Total % Passing Sieve
No. 10 ②							
No. 20							
No. 40	255.5	65.7	189.8	597	54.49		54.49
No. 80							
No. 200	214.7	65.7	149.0	448	40.89		40.89

REMARKS: * K = $\frac{①}{100}$

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	2038.4
WT of Tare	942.8
WT of Sample (wet)	
WT of Sample DRY (corrected for moisture)	1095.6
WATER CONTENT FOR TOTAL SAMPLE	
WT of Ws + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

-#10 SAMPLE USED IN ANALYSIS	
WT of Ws + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (dry) ②	
WATER CONTENT FOR -#10 SAMPLE	
WT of Ws + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

SCREEN ANALYSIS

MATERIAL BACKFILL		WEIGHT OF SAMPLE 1095.6 grams		SAMPLE SOURCE STA 11+20		
DATE 8-16-92	TIME —	SAMPLED BY F. MASTELE		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	308.8	28.18	28.18	71.82	% PASSING 65 TO 100	PASSED
No. 4						
No. 8						
No. 16						
No. ~~30~~ 40	189.8	17.32	45.50	54.49	% PASSING 30 TO 80	PASSED
No. 50						
No. 100						
No. 200	149.0	13.60	59.10	40.89	% PASSING 25 TO 50	PASSED
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE F. MASTELE			TITLE PROJECT ENGINEER			

Grain Size Analysis

Project Name: SINCLAIR REFINERY
 Project Number: P1-0129
 Sample Identification: BACKFILL

Tested By: F. MASTELE
 Date: 8-10-92
 Checked By: [Signature]
 Date: 8-11-92

Material Description: SLURRY WALL BACKFILL STATION 10+00

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CS

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	1211.3	941.4	269.9	920.7	77.33
No. 4					
No. 10					①

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	2132.0
WT of Tare	941.4
WT of Sample (wet)	
WT of Sample DRY (corrected for moisture)	1190.6
WATER CONTENT FOR TOTAL SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % Passing Sieve
No. 10 (2)							
No. 20							
No. 40	1177.8	941.4	236.4	684.3	57.47		57.47
No. 80							
No. 200	1041.2	941.4	99.8	584.5	49.09		49.09

-#10 SAMPLE USED IN ANALYSIS	
WT of WS + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (dry)	②
WATER CONTENT FOR -#10 SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

REMARKS: * K = $\frac{①}{100}$

FOUND HOLE IN #200 SIEVE - REPAIRED

SCREEN ANALYSIS

MATERIAL BACKFILL		WEIGHT OF SAMPLE 1190.6 gm		SAMPLE SOURCE STATION 10+00		
DATE 8-10-92	TIME	SAMPLED BY M. WESTBROOK		TESTED BY F. MASTELE		

SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED % RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	269.9	22.67	22.67	77.33	% PASSING 65 TO 100	PASSED
No. 4						
No. 8						
No. 16						
No. ~~30~~ 40	236.4	19.86	42.53	57.47	% PASSING 30 TO 80	PASSED
No. 50						
No. 100						
No. 200	99.8	8.38	50.91	49.09	% PASSING 25 TO 50	PASSED
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	

☒ ACCEPTED

☐ REJECTED

SIGNATURE

TITLE

Grain Size Analysis

Project Name: SINCLAIR REFINERY
 Project Number: PI-0129
 Sample Identification: BACKFILL
 Material Description: SLURRY WALL BACKFILL FROM STATION 8+80

Tested By: F. MASTELE
 Date: 8-11-92
 Checked By: [Signature]
 Date: 8-11-92

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	<u>1199.6</u>
WT of Tare	<u>65.7</u>
WT of Sample (wet)	
WT of Sample Dry	<u>1123.9</u>
(corrected for moisture)	
WATER CONTENT FOR TOTAL SAMPLE	
WT of Ws + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

-#10 SAMPLE USED IN ANALYSIS	
WT of Ws + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (dry)	
WATER CONTENT FOR -#10 SAMPLE	
WT of Ws + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing Sieve	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	<u>1199.6</u>	<u>941.4</u>	<u>258.2</u>	<u>865.7</u>	<u>77.03</u>
No. 4					
No. 20					

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing Sieve	Fine Fraction % Passing Sieve	* Total % Passing Sieve
No. 10						
No. 20						
No. 40	<u>1176.8</u>	<u>941.4</u>	<u>235.4</u>	<u>630.3</u>	<u>56.05</u>	<u>56.08</u>
No. 80						
No. 200	<u>1106.9</u>	<u>941.4</u>	<u>165.5</u>	<u>464.8</u>	<u>41.36</u>	<u>41.36</u>

REMARKS: * K = $\frac{(1)}{100}$

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 [Signature]

SCREEN ANALYSIS

MATERIAL BACKFILL		WEIGHT OF SAMPLE 1123.9 gm		SAMPLE SOURCE STATION 8+80		
DATE 8-11-92	TIME	SAMPLED BY M. WESTBROOK		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED % RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	258.2	22.97	22.97	77.03	% PASSING 65 TO 100	PASSED
No. 4						
No. 8						
No. 16						
No. ~~30~~ 40	235.4	20.95	43.92	56.08	% PASSING 30 TO 80	PASSED
No. 50						
No. 100						
No. 200	165.5	14.73	58.65	41.35	% PASSING 25 TO 50	PASSED
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE			TITLE			

Grain Size Analysis

Project Name: SINCLAIR REFINERY
 Project Number: P1-0129
 Sample Identification: BACKFILL

Tested By: F. MASTELE
 Date: 8-11-92
 Checked By: [Signature]
 Date: 8-11-92

Material Description: SLURRY WALL BACKFILL FROM STA 7+60

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	1106.2
WT of Tare	65.7
WT of Sample (wet)	
WT of Sample DRY (corrected for moisture)	1040.5
WATER CONTENT FOR TOTAL SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

- #10 SAMPLE USED IN ANALYSIS	
WT of WS + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (dry)	②
WATER CONTENT FOR - #10 SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8					
No. 4	1146.9	941.4	205.5	835.0	80.25
No. 10					①

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % Passing Sieve
No. 10 ②							
No. 20							
No. 40	1147.2	941.4	205.8	629.2	60.47		60.47
No. 80							
No. 200	1104.7	941.4	163.3	465.9	44.78		44.78

REMARKS: * K = $\frac{①}{②} \times 100$

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SCREEN ANALYSIS

MATERIAL <u>BACKFILL</u>		WEIGHT OF SAMPLE <u>1040.5</u>		SAMPLE SOURCE <u>STATION 7+60</u>		
DATE <u>8-11-92</u>	TIME <u>—</u>	SAMPLED BY <u>M. WESTBROOK</u>		TESTED BY <u>F. MASTELE</u>		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED % RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	<u>205.5</u>	<u>19.75</u>	<u>19.75</u>	<u>80.25</u>	% PASSING 65 TO 100	<u>PASSED</u>
No. 4						
No. 8						
No. 16						
No. ⁴⁰ ~~30~~	<u>205.8</u>	<u>19.78</u>	<u>39.53</u>	<u>60.47</u>	% PASSING 30 TO 80	<u>PASSED</u>
No. 50						
No. 100						
No. 200	<u>163.3</u>	<u>15.69</u>	<u>55.22</u>	<u>44.78</u>	% PASSING 25 TO 50	<u>PASSED</u>
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			<u>FM</u>	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE				TITLE		

Grain Size Analysis

Project Name: SINCLAIR REFINERYTested By: F. MASTELEProject Number: PI-0129Date: 8-16-92Sample Identification: BACKFILL

Checked By: _____

Date: _____

Material Description: SLURRY WALL BACKFILL STA 6+40

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COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	311.8	65.7	246.1	715.0	74.39
No. 4					
No. 10					①

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % passing Sieve
No. 10 ②							
No. 20							
No. 40	238.4	65.7	172.7	542.3	56.43		56.43
No. 80							
No. 200	198.5	65.7	132.8	409.5	42.61		42.61

REMARKS: * K = $\frac{①}{100}$

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	1902.5
WT of Tare	941.4
WT of Sample (wet)	
WT of Sample Dry (corrected for moisture)	961.1
WATER CONTENT FOR TOTAL SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

-#10 SAMPLE USED IN ANALYSIS	
WT of WS + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (dry) ②	
WATER CONTENT FOR -#10 SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

SCREEN ANALYSIS

MATERIAL		DATE		TESTED BY		SAMPLE SOURCE		REMARKS	
BACKFILL	8-16-92	F. MASTALE	F. MASTALE	STA 6+40					
WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS					
7"									
6"									
5"									
4"									
3"									
2"									
1 1/2"									
1"									
3/4"									
1/2"									
3/8"	246.1	25.61	74.39	% PASSING 65 TO 100	Passed				
No. 4									
No. 8									
No. 16									
No. 40	172.7	17.97	56.43	% PASSING 30 TO 80	Passed				
No. 50									
No. 100									
No. 200	132.8	13.82	57.40	% PASSING 25 TO 50	Passed				
PAN									
TOTAL									

☒ ACCEPTED
☐ REJECTED

TITLE: PROJECT ENGINEER
 SIGNATURE: *Adrian M. M...*

Grain Size Analysis

Project Name: SINCLAIR REFINERY Tested By: F. MASTELE
 Project Number: PI-0129 Date: 8-16-92
 Sample Identification: BACKFILL Checked By: _____
 Date: _____
 Material Description: SLURRY WALL BACKFILL STA 5+30

AUG 18 1992



COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1 1/2					
1					
3/4					
1/2					
3/8	345.6	65.7	279.9	619.7	68.89
No. 4					
No. 10					①

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % Passing Sieve
No. 10 ②							
No. 20							
No. 40	222.5	65.7	156.8	462.9	51.46		51.46
No. 80							
No. 200	173.1	65.7	107.4	355.5	39.52		39.52

 REMARKS: * K = $\frac{①}{②} = \frac{100}{100}$

TOTAL WEIGHT OF SAMPLE	
WT of Sample + Tare	1842.4
WT of Tare	942.8
WT of Sample (wet)	
WT of Sample DRY (corrected for moisture)	899.6
WATER CONTENT FOR TOTAL SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

- #10 SAMPLE USED IN ANALYSIS	
WT of WS + Tare	
WT of Tare	
WT of Sample (wet)	
WT of Sample (dry)	②
WATER CONTENT FOR - #10 SAMPLE	
WT of WS + Tare	
WT of DS + Tare	
WT of Tare	
WT of DS	
WT of Water	
Moisture Content	

SCREEN ANALYSIS

MATERIAL BACKFILL		WEIGHT OF SAMPLE 899.6		SAMPLE SOURCE STA 5+30		
DATE 8-16-92	TIME —	SAMPLED BY F. MASTELE		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED % RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	279.9	31.11	31.11	68.89	% PASSING 65 TO 100	PASSED
No. 4						
No. 8						
No. 16						
No. ⁴⁰ ~~30~~	156.8	17.43	48.54	51.46	% PASSING 30 TO 80	PASSED
No. 50						
No. 100						
No. 200	107.4	11.94	60.48	39.52	% PASSING 25 TO 50	PASSED
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE Fredrick J. Mastle			TITLE PROJECT ENGINEER			

OCT 06 1992



COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1½					
1					
¾					
½					
¼	288.6	45.5	243.1	785	76.35
No. 4					
No. 10					①

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % Passing Sieve
No. 10							
No. 20							
No. 40	257.8	45.5	212.3	572.7			55.71
No. 80							
No. 200	178.3	45.5	132.8	439.9			42.79

REMARKS: * K = $\frac{①}{100}$

TOTAL WEIGHT OF SAMPLE

WT of Sample + Tare 1969.5
 WT of Tare 941.4
 WT of Sample 1028.1 ^{DRY} _(wet)
 WT of Sample _____
 (corrected for moisture)

WATER CONTENT FOR TOTAL SAMPLE

WT of Ws + Tare _____
 WT of DS + Tare _____
 WT of Tare _____
 WT of DS _____
 WT of Water _____
 Moisture Content _____

-#10 SAMPLE USED IN ANALYSIS

WT of Ws + Tare _____
 WT of Tare _____
 WT of Sample (wet) _____
 WT of Sample (dry) _____ ②

WATER CONTENT FOR -#10 SAMPLE

WT of Ws + Tare _____
 WT of DS + Tare _____
 WT of Tare _____
 WT of DS _____
 WT of Water _____
 Moisture Content _____

Project Name: SINOCLAIR REFINERY
 Project Number: P1-0129
 Sample Identification: BACKFILL
 STA-5735
 Material Description: SOIL-BENTONITE BACKFILL (PROCESSED CLAY +
BENTONITE SLURRY)
 Tested By: F. MASTELE
 Date: 10-5-92
 Checked By: [Signature]
 Date: 10-6-92

Grain Size Analysis

GEO-COR, INC.

SCREEN ANALYSIS

MATERIAL BACKFILL		WEIGHT OF SAMPLE 1028.1		SAMPLE SOURCE STATION - 5+35		
DATE 10-5-92	TIME —	SAMPLED BY F. MASTELE		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	243.1	23.65	23.65	76.35	% PASSING 65 TO 100%	PASS
No. 4						
No. 8						
No. 16						
No. 40 ~~No. 30~~	212.3	20.65	44.30	55.71	% PASSING 30 TO 80	PASS
No. 50						
No. 100						
No. 200	132.8	12.92	57.22	42.79	% PASSING 25 TO 50	PASS
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE Frederick J. Mastele			TITLE			

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COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1½					
1					
¾					
½					
¼	189.3	45.5	143.8	575.9	80.02
No. 4					
No. 10					①

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction % Passing Sieve	* K	Total % Passing Sieve
No. 10							
No. 20							
No. 40	217.4	45.5	171.9	404.0			56.13
No. 80							
No. 200	145.6	45.5	100.1	303.9			42.23

REMARKS: * K = $\frac{①}{100}$

TOTAL WEIGHT OF SAMPLE

WT of Sample + Tare 1661.1
 WT of Tare 941.4
 WT of Sample (wet) 719.7
 WT of Sample (corrected for moisture)

WATER CONTENT FOR TOTAL SAMPLE

WT of Ws + Tare _____
 WT of DS + Tare _____
 WT of Tare _____
 WT of DS _____
 WT of Water _____
 Moisture Content _____

-#10 SAMPLE USED IN ANALYSIS

WT of Ws + Tare _____
 WT of Tare _____
 WT of Sample (wet) _____
 WT of Sample (dry) _____ ②

WATER CONTENT FOR -#10 SAMPLE

WT of Ws + Tare _____
 WT of DS + Tare _____
 WT of Tare _____
 WT of DS _____
 WT of Water _____
 Moisture Content _____

Project Name: SINGAPORE REFINERY Tested By: T. MASTELE
 Project Number: P1-0129 Date: 10-5-92
 Sample Identification: BACKFILL Checked By: [Signature]
 STA - 5+00 Date: 10-6-92
 Material Description: SOIL - BEAUNITE BACKFILL
BEAUNITE (SUEY) PROCESSED CLAY +

GEO-COPI, INC.

Grain Size Analysis

MATERIAL BACKFILL		WEIGHT OF SAMPLE 719.7		SAMPLE SOURCE STATION - 5+00		
DATE 10-5-92	TIME —	SAMPLED BY F. MASTELE		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED & RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	143.8	19.98	19.98	80.02	% PASSING 65 TO 100	PASS
No. 4						
No. 8						
No. 16						
No. ~~20~~ 40	171.9	23.89	43.87	56.13	% PASSING 30 TO 80	PASS
No. 50						
No. 100						
No. 200	100.1	13.91	57.78	42.23	% PASSING 25 TO 50	PASS
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	

☒ ACCEPTED
 ☐ REJECTED

SIGNATURE <i>Fredrick J Mastele</i>	TITLE

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COARSE SIEVE SERIES

Sieve Size	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Percent Passing Sieve
+3"					
3					
2					
1½					
1					
¾					
½					
¼	188.4	45.5	142.9	684.9	82.74
No. 4					
No. 10					①

FINE SIEVE SERIES

	WT Tare + Mat'l	Weight of Tare	WT Mat'l Retained on Sieve	Weight Mat'l Passing	Fine Fraction * Passing Sieve	* K	Total % Passing Sieve
No. 10							
No. 20							
No. 40	199.6	45.5	154.1	530.8			64.12
No. 80							
No. 200	206.4	45.5	160.9	369.9			44.69

REMARKS: * K = $\frac{①}{100}$

TOTAL WEIGHT OF SAMPLE

WT of Sample + Tare 1769.2
 WT of Tare 941.4
 WT of Sample 827.8 (corrected for moisture)
 WT of Sample (corrected for moisture)

WATER CONTENT FOR TOTAL SAMPLE

WT of Ws + Tare _____
 WT of DS + Tare _____
 WT of Tare _____
 WT of DS _____
 WT of Water _____
 Moisture Content _____

-#10 SAMPLE USED IN ANALYSIS

WT of Ws + Tare _____
 WT of Tare _____
 WT of Sample (wet) _____
 WT of Sample (dry) _____ ②

WATER CONTENT FOR -#10 SAMPLE

WT of Ws + Tare _____
 WT of DS + Tare _____
 WT of Tare _____
 WT of DS _____
 WT of Water _____
 Moisture Content _____

Project Name: SINCLAIR REFINERY Tested By: F. MASTELE
 Project Number: P1-0129 Date: 10-5-92
 Sample Identification: BACKFILL Checked By: [Signature]
 STA - 2+80 Date: 10-6-92
 Material Description: SOIL - BENTONITE BACKFILL (PROCESSED CLAY + BENTONITE SLURRY)

Grain Size Analysis

GEO-CORP, INC.

SCREEN ANALYSIS

MATERIAL BACKFILL		WEIGHT OF SAMPLE 827.8		SAMPLE SOURCE STATION 2+80		
DATE 10-5-92	TIME —	SAMPLED BY F. MASTELE		TESTED BY F. MASTELE		
SCREEN SIZE	WEIGHT RETAINED	PERCENT RETAINED	ACCUMULATED % RETAINED	PERCENT PASSING	JOB SPECIFICATIONS	REMARKS
7"						
6"						
5"						
4"						
3"						
2"						
1 1/2"						
1"						
3/4"						
1/2"						
3/8"	142.9	17.26	17.26	82.74	% PASSING 65 TO 100	PASS
No. 4						
No. 8						
No. 16						
No. ⁴⁰ ~~20~~	154.1	18.62	35.88	64.12	% PASSING 30 TO 80	PASS
No. 50						
No. 100						
No. 200	160.9	19.44	55.32	44.69	% PASSING 25 TO 50	PASS
PAN				XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
TOTAL			FM	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX	
☒ ACCEPTED ☐ REJECTED						
SIGNATURE Frederick J. Mastele				TITLE		

**GRADATION ANALYSES
(GEOSYNTEC CONSULTANTS)**

SOIL-BENTONITE BACKFILL**GRADATION ANALYSES
(GEOSYNTEC CONSULTANTS)**

Date Tested (1992)	Station	% Passing Sieves		
		3/8 in.	#40	#200
28 July	24+20	72	49	34
31 August	18+40	74	49	34
12 August	14+00	70	46	34
22 August	5+50	82	57	43
13 October	4+50	87	64	43
<i>TOTAL = 5</i>				
<i>ACCEPTABLE RANGE</i>		<i>65-100</i>	<i>30-80</i>	<i>25-50</i>



GEOSYNTEC CONSULTANTS

ARCO 

PARTICLE SIZE ANALYSIS

MECHANICAL SIEVE METHOD (ASTM D 422)

DATE: 28 day 7 mo 92 year

PROJECT: Sinclair Refinery Remediation PROJECT NO.: GQ3201 TASK NO.: 03

SOURCE: _____ MATERIAL TYPE: SLURRY WALL BACKFILL SAMPLE NO.: 1 QA ID: CS
24120

SOIL SAMPLE SIZE (ASTM D 114D)

DIAMETER OF LARGEST PARTICLE (SIEVE SIZE)	(grams)	NO. 10	NO. 4	3/4 in.
APPROXIMATE MINIMUM WT. OF SAMPLE	(grams)	200	500	1500

		BEFORE WASH	AFTER WASH
WT. OF DRY SAMPLE PLUS TARE	(grams)	2726.3	1953.7
WT. OF TARE	(grams)	196.8	196.8
WT. OF DRY SAMPLE	(grams)	2529.5	1756.9

SIEVE ANALYSIS

[illegible]
$$\% \text{ FINER} = 100 - \sum \% \text{ RETAINED}$$

ARTICLE SIZE ANALYSIS

MECHANICAL SIEVE METHOD (ASTM D 422) DATE: 3 day 8 mo 92 year

PROJECT: Sinclair Refinery Remed. PROJECT NO.: 603201 TASK NO.: 03

SOURCE: _____ MATERIAL TYPE: SLURRY BACKFILL SAMPLE NO.: 02 QA ID: CS
4420 1B+40

SOIL SAMPLE SIZE (ASTM D 1140)

DIAMETER OF LARGEST PARTICLE (SIEVE SIZE)	(grams)	NO. 10	NO. 4	3/4 in.
APPROXIMATE MINIMUM WT. OF SAMPLE	(grams)	200	500	1500

		BEFORE WASH	AFTER WASH
WT. OF DRY SAMPLE PLUS TARE	(grams)	2273.8	1579.3
WT. OF TARE	(grams)	131.4	131.4
WT. OF DRY SAMPLE	(grams)	2142.2	1447.9

SIEVE ANALYSIS

[illegible]
$$\% \text{ FINER} = 100 - \sum \% \text{ RETAINED}$$

ARCO 

MECHANICAL SIEVE METHOD (ASTM D 422) DATE: 12 day 8 mo 92 year

PROJECT: SINCLAIR REFINERY REMEDIATION PROJECT NO.: 603201 TASK NO.: 03

SOURCE: _____ MATERIAL TYPE: SLURRY SAMPLE NO.: 03 QA ID: CS
BACKFILL 2/14/00

DIAMETER OF LARGEST PARTICLE (SIEVE SIZE)	(grams)	NO. 10	NO. 4	3/4 in.
APPROXIMATE MINIMUM WT. OF SAMPLE	(grams)	200	500	1500

		BEFORE WASH	AFTER WASH
WT. OF DRY SAMPLE PLUS TARE	(grams)	2027.1	1391.7
WT. OF TARE	(grams)	131.4	~~@1391.7~~ 131.4
WT. OF DRY SAMPLE	(grams)	1895.7	1260.3

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER	PROJECT SPECIFICATIONS
3/8		~~61~~ 32.7 567.0	29.9	70.1	65% → 100%
#40		1027.0	54.2	45.8	30% → 80%
#200		1243.5	65.6	34.4	25% → 50%
PAN		1260.3	—	—	—

$$\% \text{ FINER} = 100 - \sum \% \text{ RETAINED}$$



ARCO 

MECHANICAL SIEVE METHOD (ASTM D 422) DATE: 22 day 8 mo 92 year

SOURCE: _____ MATERIAL TYPE: SLURRY WALL SAMPLE NO.: 04 QA ID: CS
BACKFILL ST. 5+50

DIAMETER OF LARGEST PARTICLE (SIEVE SIZE)	(grams)	NO. 10	NO. 4	3/4 in.
APPROXIMATE MINIMUM WT. OF SAMPLE	(grams)	200	500	1500

SIEVE ANALYSIS

$$\% \text{ FINER} = 100 - \sum \% \text{ RETAINED}$$



GEOSYNTEC CONSULTANTS

ARCO 

ARTICLE SIZE ANALYSIS

MECHANICAL SIEVE METHOD (ASTM D 422)

DATE: 13 day 10 mo 92 year

PROJECT: Sinclair Refinery / ARCO PROJECT NO.: 64-3201 TASK NO.: 03

SOURCE: _____ MATERIAL TYPE: SLURRY WALL SAMPLE NO.: 05 QA ID: CS
BACKFILL at 4+50

SOIL SAMPLE SIZE (ASTM D 114D)

DIAMETER OF LARGEST PARTICLE (SIEVE SIZE)	(grams)	NO. 10	NO. 4	3/4 in.
APPROXIMATE MINIMUM WT. OF SAMPLE	(grams)	200	500	1500

		BEFORE WASH	AFTER WASH
WT. OF DRY SAMPLE PLUS TARE	(grams)	2103.6	1298.9
WT. OF TARE	(grams)	136.5	136.5
WT. OF DRY SAMPLE	(grams)	1967.1	1162.4

SIEVE ANALYSIS

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER	PROJECT SPECIFICATIONS
3/8		261.5	13.3	86.7	65-100
#40		716.8	36.4	63.6	30-80
#200		1131.3	57.5	42.5	25-50
Pass		1162.4	—	—	—

$$\% \text{ FINER} = 100 - \sum \% \text{ RETAINED}$$

**PERMEABILITY DATA
(GEO.CON)**

**SOIL-BENTONITE BACKFILL
PERMEABILITY DATA
(GEO-CON)**

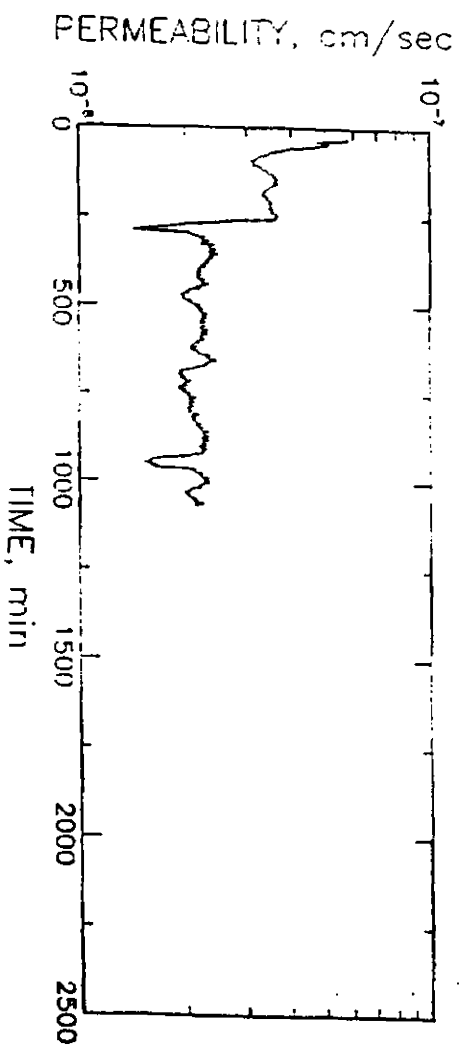
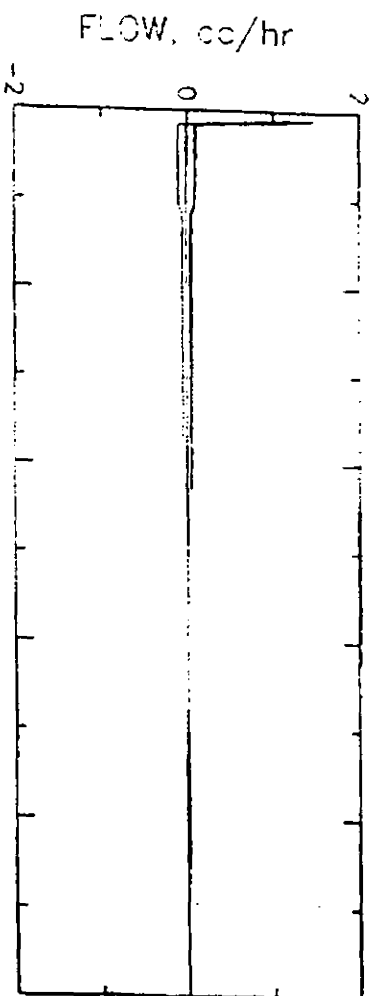
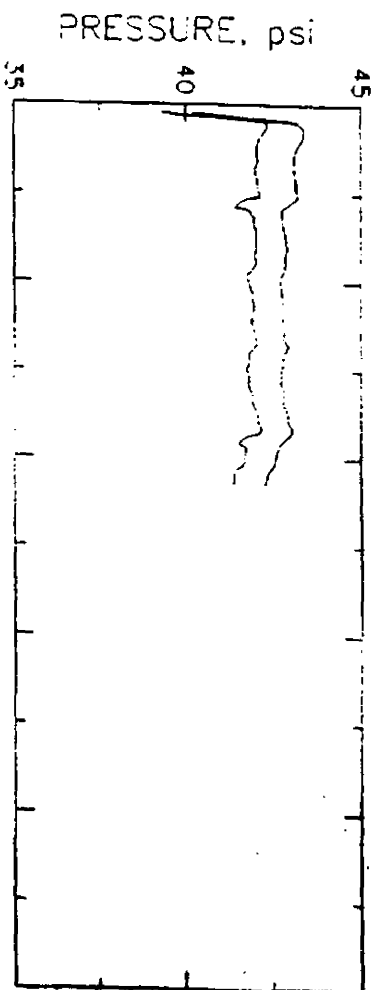
Date Backfilled (1992)	Date Sampled (1992)	Station	Permeability (cm/sec)
13 July	15 July	2+60	1.1×10^{-8}
20 July	21 July	26+00	3.6×10^{-8}
21 July	27 July	23+00	3.4×10^{-8}
23 July	27 July	20+00	2×10^{-8}
27 July	06 August	17+00	3.1×10^{-8}
05 August	06 August	14+00	3.5×10^{-8}
06 August	27 August	12+00	4.8×10^{-8}
07 August	27 August	10+00	5.5×10^{-8}
08 August	27 August	8+00	5×10^{-8}
10 August	27 August	6+00	5.5×10^{-8}
02 October	06 October	5+00	5×10^{-8}
03 October	06 October	3+80	5×10^{-8}
<i>TOTAL = 12 TESTS</i>			

PERMEABILITY TEST SUMMARY

CLIENT: Geo-Con		JOB NUMBER: GTX-234	Location: 2 + 60
SITE: Sinclair Refinery		DATE: 7-20-92	TEST NO: K1
SPECIMEN TYPE: tube		TEST TYPE: constant volume	
SPECIMEN SIZE, L: 1.5in. D: 2.84in.		GRADIENT: 16	
VISUAL DESCRIPTION: clay bentonite backfill			
SAMPLE CONDITIONS	WET UNIT WEIGHT, pcf		108.3
	DRY UNIT WEIGHT, pcf		94.6
	WATER CONTENT, %		14.5
	VOID RATIO, e_0		
PERMEATING CONDITIONS	TOTAL CONFINING STRESS, psi		50.2
	EFFECTIVE CONFINING STRESS, psi		8.5

PERMEABILITY: 0.11 * 10⁻⁷ cm/sec

PERMEABILITY TEST
STEP 1



Project Name : Sinclair Refinery
Project No :
Test Date : 7/20/92
Description : Silty Clay

Boring No : 2#60
Test No : K1

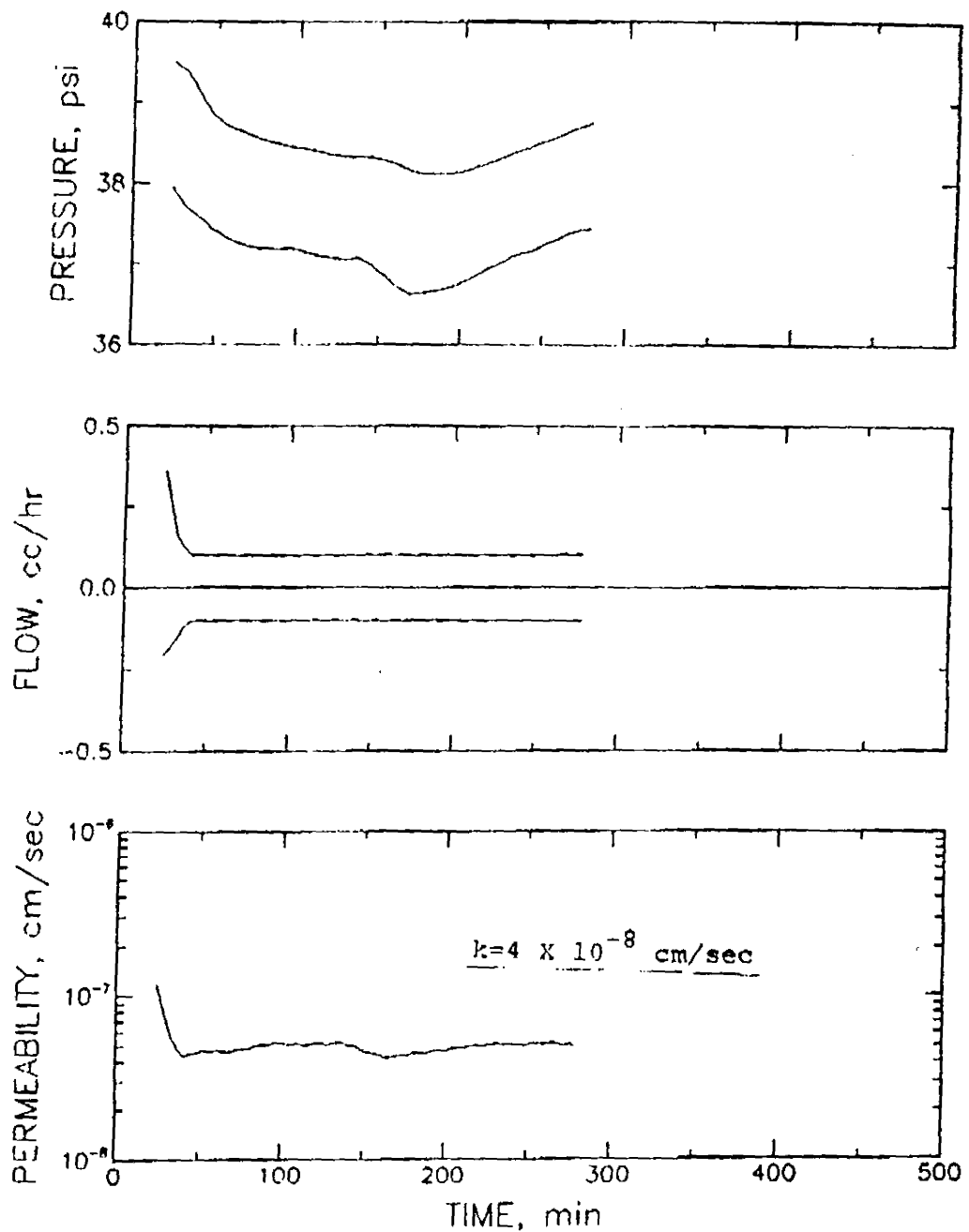
Sample No : S1
Depth : --

PERMEABILITY TEST SUMMARY

CLIENT: Geo-Con		JOB NUMBER: GTX-234	Location: 26+00
SITE: Sinclair Refinery		DATE: 7-20-92	TEST NO: K4
SPECIMEN TYPE: tube		TEST TYPE: constant volume	
SPECIMEN SIZE, L: 1.95in. D: 2.96in.		GRADIENT: 17	
VISUAL DESCRIPTION: clay bentonite backfill			
SAMPLE CONDITIONS	WET UNIT WEIGHT, pcf		118.3
	DRY UNIT WEIGHT, pcf		101.4
	WATER CONTENT, %		16.7
	VOID RATIO, e_0		---
PERMEATING CONDITIONS	TOTAL CONFINING STRESS, psi		49.5
	EFFECTIVE CONFINING STRESS, psi		11.55

PERMEABILITY: 0.36 * 10⁻⁷ cm/sec

PERMEABILITY TEST STEP 1

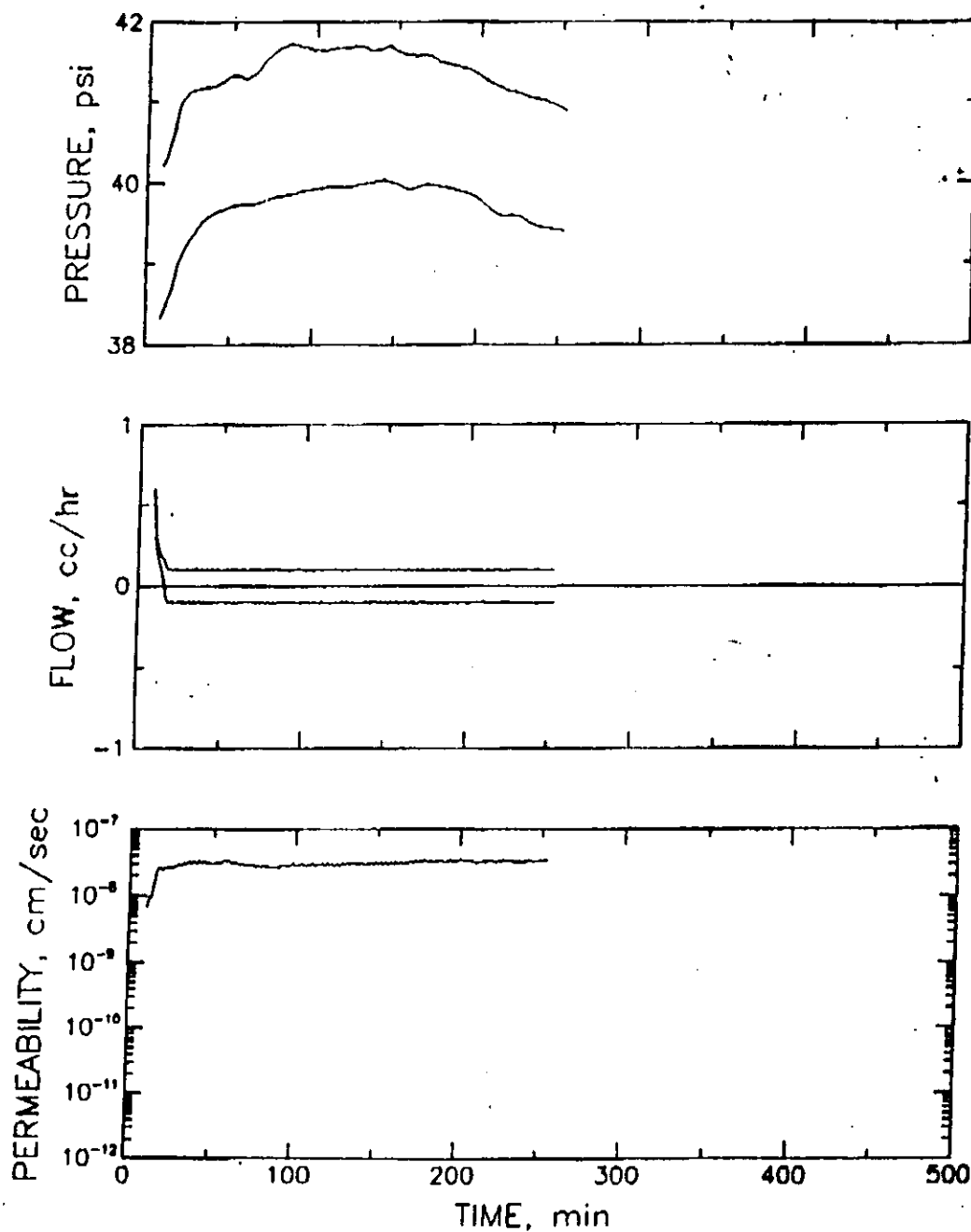


Project Name : Sinclair Refinery	Boring No : STA26+00	Sample No : S4
Project No : GTX235	Test No : K2	Depth : --
Test Date : 7/20/92		
Description : Silty Clay		

PERMEABILITY TEST SUMMARY

CLIENT: Geo-Con		JOB NUMBER: GTX-234	Location:23+00
SITE: Sinclair Refinery		DATE: 7-28-92	TEST NO:K6
SPECIMEN TYPE: tube		TEST TYPE: constant volume	
SPECIMEN SIZE, L: 2.15in. D: 2.95in.		GRADIENT: 18	
VISUAL DESCRIPTION: clay bentonite backfill			
SAMPLE CONDITIONS	WET UNIT WEIGHT, pcf		93.0
	DRY UNIT WEIGHT, pcf		80.2
	WATER CONTENT, %		15.9
	VOID RATIO, e_0		—
PERMEATING CONDITIONS	TOTAL CONFINING STRESS, psi		50
	EFFECTIVE CONFINING STRESS, psi		9.85

PERMEABILITY: 0.34 * 10⁻⁷ cm/sec

PERMEABILITY TEST
STEP 1

Project Name : Sinclair Refinery

Project No : GTX224

Boring No : STA 23+00

Sample No : S1

Test Date : 7/28/92

Test No : K6

Depth : ---

Description : Silty Clay

PERMEABILITY TEST SUMMARY

CLIENT: Geo-Con		JOB NUMBER: GTX-234	Location:20+00
SITE: Sinclair Refinery		DATE: 7-28-92	TEST NO:K5
SPECIMEN TYPE: tube		TEST TYPE: constant volume	
SPECIMEN SIZE, L: 1.5in. D: 2.9in.		GRADIENT: 33	
VISUAL DESCRIPTION: clay bentonite backfill			

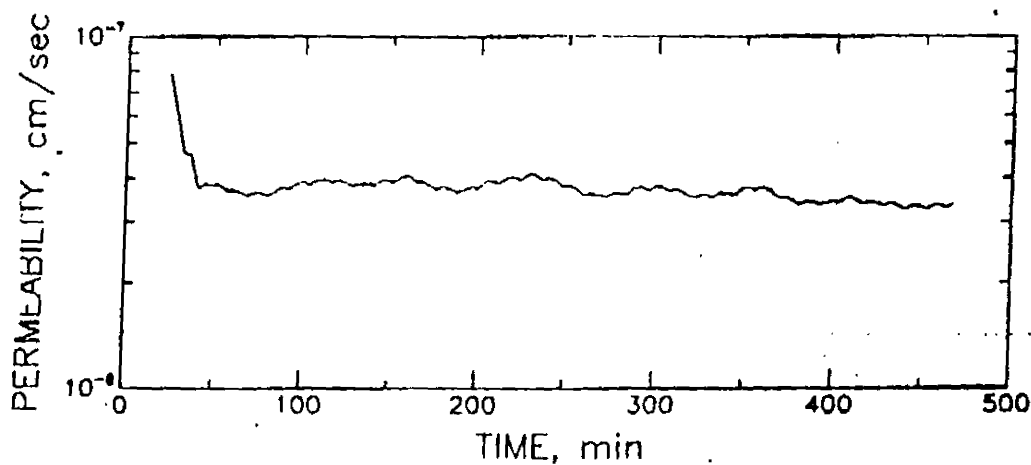
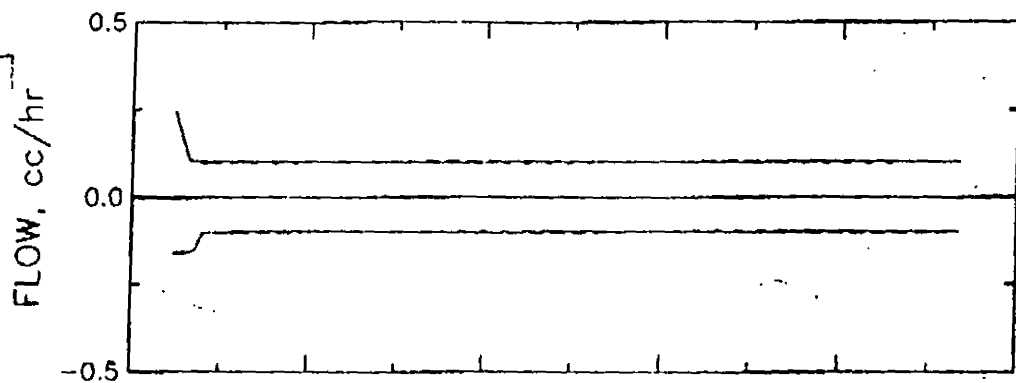
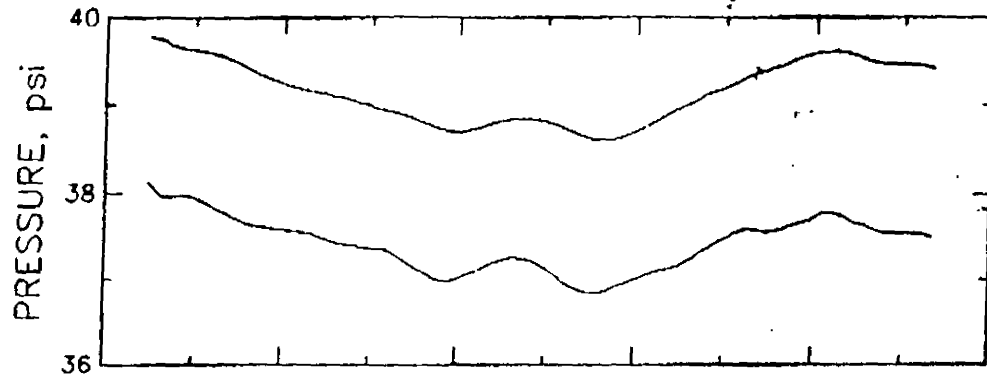
SAMPLE CONDITIONS	WET UNIT WEIGHT, pcf	135.0
	DRY UNIT WEIGHT, pcf	117.8
	WATER CONTENT, %	14.6
	VOID RATIO, e_0	---
PERMEATING CONDITIONS	TOTAL CONFINING STRESS, psi	49.8
	EFFECTIVE CONFINING STRESS, psi	11.10

PERMEABILITY: 0.2 * 10⁻⁷ cm/sec

AUG 05 '92 16:02

P.01

PERMEABILITY TEST STEP 1



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To	CHRIS BAILEY
From	BILL
Cc	GTX
Dept.	
Phone	
Fax	

Project Name : Sinclair Refinery
 Project No : GTX Boring No : STA20+00 Sample No : S1
 Test Date : 7/28/92 Test No : K5 Depth : --
 Description : Silty Clay

PERMEABILITY TEST SUMMARY

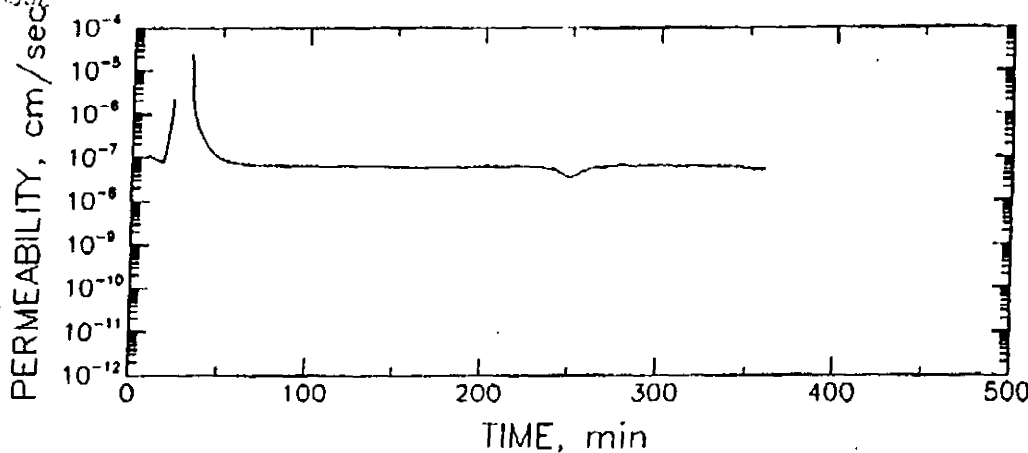
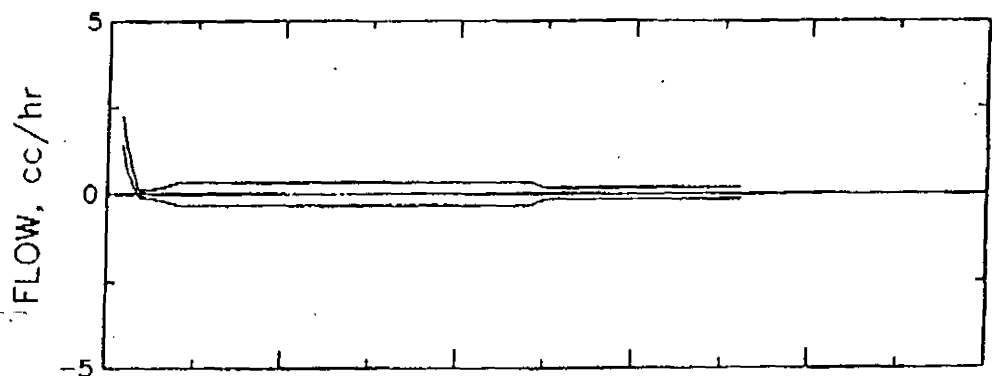
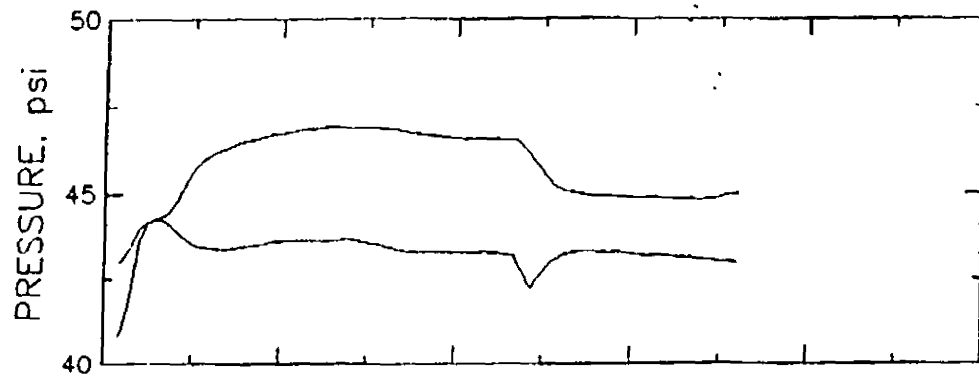
CLIENT: Geo-Con		JOB NUMBER: GTX-234	Location: 17+00
SITE: Sinclair Refinery		DATE: 8-11-92	TEST NO: K12
SPECIMEN TYPE: tube		TEST TYPE: constant volume	
SPECIMEN SIZE, L: 1.85in, D: 0.1in		GRADIENT: 18	
VISUAL DESCRIPTION: clay bentonite backfill			
SAMPLE CONDITIONS	WET UNIT WEIGHT, pcf	114.9	
	DRY UNIT WEIGHT, pcf	98.7	
	WATER CONTENT, %	15.8	
	VOID RATIO, e_0	—	
PERMEATING CONDITIONS	TOTAL CONFINING STRESS, psi	52.2	
	EFFECTIVE CONFINING STRESS, psi	3.85	

PERMEABILITY: 0.31×10^{-7} cm/sec

AUG 12 '92 12:38

P. 07

PERMEABILITY TEST STEP 1



PERME
K10
AUG 18 1992

Project Name : Sinclair Refinery	Boring No : STA 17+00	Sample No : S1
Project No : GTX235	Test No : K10	Depth : ---
Test Date : 8/11/92		
Description : Silty Clay		

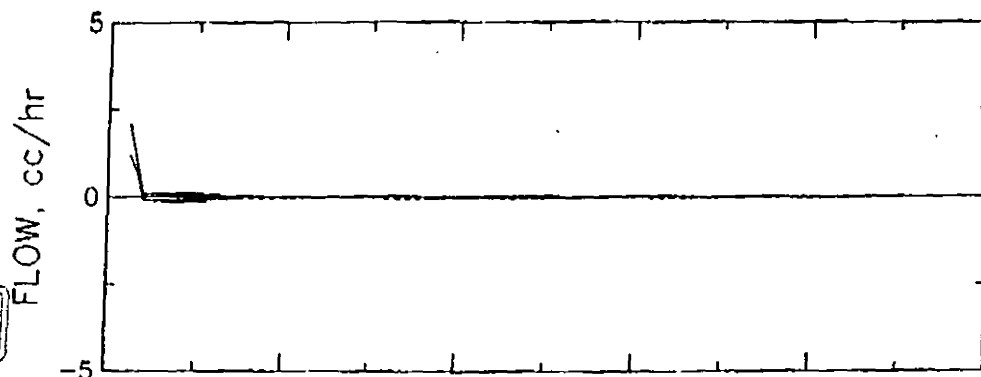
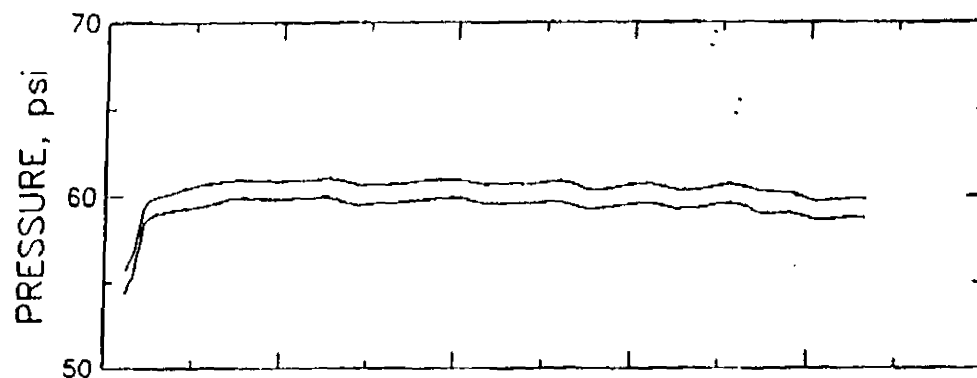
PERMEABILITY TEST SUMMARY

CLIENT: Geo-Con	JOB NUMBER: GTX-234	Location: 14+00
SITE: Sinclair Refinery	DATE: 8-11-92	TEST NO: K11
SPECIMEN TYPE: tube	TEST TYPE: constant volume	
SPECIMEN SIZE, L: 2.6in. D: 2.93in.	GRADIENT: 18	
VISUAL DESCRIPTION: clay bentonite backfill		
SAMPLE CONDITIONS	WET UNIT WEIGHT, pcf	121.5
	DRY UNIT WEIGHT, pcf	109.4
	WATER CONTENT, %	15.2
	VOID RATIO, e_v	—
PERMEATING CONDITIONS	TOTAL CONFINING STRESS, psi	50.8
	EFFECTIVE CONFINING STRESS, psi	8.3

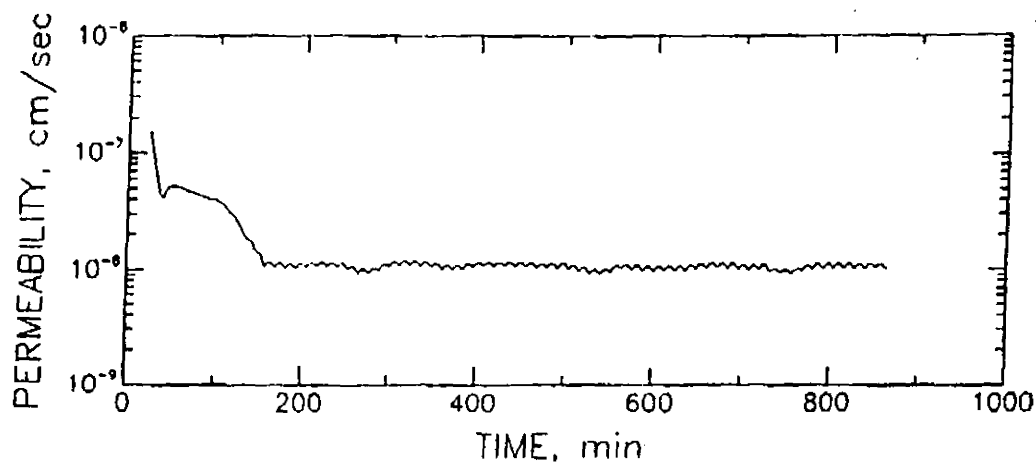
PERMEABILITY: $0.35 \cdot 10^{-7}$ cm/sec

AUG 12 '92 12:37

PERMEABILITY TEST STEP 1



RECEIVED
AUG 13 1992



Project Name : Sinclair Refinery
Project No : GTX235 Boring No : STA14+00 Sample No : S1
Test Date : 8/11/92 Test No : K9 Depth : --
Description : Silty Clay

F. 03

The figure consists of three vertically stacked plots sharing a common x-axis representing TIME in minutes, ranging from 0 to 500. The top plot shows PRESSURE in psi, with two curves rising from approximately 40 psi at 25 minutes to steady-state values of about 41.5 psi and 43.5 psi by 100 minutes. The middle plot shows FLOW in cc/hr, with two curves dropping sharply from approximately 0.45 cc/hr and 0.15 cc/hr at 25 minutes to steady-state values of about 0.1 cc/hr and -0.1 cc/hr by 50 minutes. The bottom plot shows PERMEABILITY in cm/sec on a logarithmic scale from 10^{-8} to 10^{-7} , with a single curve decreasing from approximately 6×10^{-8} cm/sec at 25 minutes to a steady-state value of about 2.5×10^{-8} cm/sec by 100 minutes.

④ 同义句转换

PERMEABILITY TEST SUMMARY

CLIENT: Geo-Con		JOB NUMBER: GTX-234	Location: 12+00
SITE: Sinclair Refinery		DATE: 8-28-92	TEST NO: K16
SPECIMEN TYPE: tube		TEST TYPE: constant volume	
SPECIMEN SIZE, L: 2.2in. D: 2.96in.		GRADIENT: 16.6	
VISUAL DESCRIPTION: clay bentonite backfill			
SAMPLE CONDITIONS	WET UNIT WEIGHT, pcf	102.8	
	DRY UNIT WEIGHT, pcf	88.7	
	WATER CONTENT, %	15.8	
	VOID RATIO, e_0	—	
PERMEATING CONDITIONS	TOTAL CONFINING STRESS, psi	63.0	
	EFFECTIVE CONFINING STRESS, psi	10.70	

PERMEABILITY: 0.48×10^{-7} cm/sec

GeoTesting Express
Concord, MA

PERMEABILITY TEST SUMMARY

CLIENT: Geo-Con	JOB NUMBER: GTX-234	Location: 10+00
SITE: Sinclair Refinery	DATE: 8-28-92	TEST NO: K18
SPECIMEN TYPE: tube	TEST TYPE: constant volume	
SPECIMEN SIZE, L: 2.2in. D: 2.98in.	GRADIENT: 23	
VISUAL DESCRIPTION: clay bentonite backfill		

SAMPLE CONDITIONS	WET UNIT WEIGHT, pcf	130.0
	DRY UNIT WEIGHT, pcf	114.4
	WATER CONTENT, %	13.9
	VOID RATIO, e_0	—
PERMEATING CONDITIONS	TOTAL CONFINING STRESS, psi	63.4
	EFFECTIVE CONFINING STRESS, psi	8.20

PERMEABILITY: 9.55×10^{-7} cm/sec

PERMEABILITY TEST SUMMARY

CLIENT: Geo-Con	JOB NUMBER: GTX-234	Location: 8+00.
SITE: Sinclair Refinery	DATE: 8-28-92	TEST NO: K14
SPECIMEN TYPE: tube	TEST TYPE: constant volume	
SPECIMEN SIZE, L: 2.66in. D: 3.01in.	GRADIENT: 15	
VISUAL DESCRIPTION: clay bentonite backfill		
SAMPLE CONDITIONS	WET UNIT WEIGHT, pcf	129.8
	DRY UNIT WEIGHT, pcf	118.8
	WATER CONTENT, %	13.9
	VOID RATIO, e_0	—
PERMEATING CONDITIONS	TOTAL CONFINING STRESS, psi	58.0
	EFFECTIVE CONFINING STRESS, psi	4.55

PERMEABILITY: 0.50×10^{-7} cm/sec

PERMEABILITY TEST SUMMARY

CLIENT: Geo-Con	JOB NUMBER: GTX-234	Location: 6+00
SITE: Sinclair Refinery	DATE: 8-28-82	TEST NO: K15
SPECIMEN TYPE: tube	TEST TYPE: constant volume	
SPECIMEN SIZE, L: 2.0in D: 3.05in	GRADIENT: 10	
VISUAL DESCRIPTION: clay bentonite backfill		
SAMPLE CONDITIONS	WET UNIT WEIGHT, pcf	127.4
	DRY UNIT WEIGHT, pcf	110.9
	WATER CONTENT, %	14.9
	VOID RATIO, e_0	—
PERMEATING CONDITIONS	TOTAL CONFINING STRESS, psi	63.0
	EFFECTIVE CONFINING STRESS, psi	10.10

PERMEABILITY: 0.55×10^{-7} cm/sec

PERMEABILITY TEST SUMMARY

CLIENT: GEO-CON		JOB NUMBER: 234	BORING:
SITE: Sinclair Refinery		DATE: 10-13-92	SAMPLE: Sta 5+00
SPECIMEN TYPE: Tube		TEST TYPE: ASTM D5048	
SPECIMEN SIZE, L: 1.8" D: 3.05"		GRADIENT: 39	
VISUAL DESCRIPTION: Clay			

INITIAL CONDITIONS	WET UNIT WEIGHT, pcf	138.0
	DRY UNIT WEIGHT, pcf	115.2
	WATER CONTENT, %	18.1
	VOID RATIO, e_0	---
AFTER CONSOLIDATION	CONFINING STRESS, psi	42
	BACKPRESSURE, psi	36

PERMEABILITY: 5×10^{-8} cm/sec

SOIL- BEDSTONE BACKFILL

PERMEABILITY TEST SUMMARY

CLIENT: GEO-CON		JOB NUMBER: 234	BORING:
SITE: Sinclair Refinery		DATE: 13 OCT 1992	SAMPLE: Sta 3+80
SPECIMEN TYPE: Tube		TEST TYPE: ASTM D5048	
SPECIMEN SIZE, L: 2.05" D: 2.91"		GRADIENT: 25	
VISUAL DESCRIPTION: Clay			
INITIAL CONDITIONS	WET UNIT WEIGHT, pcf		128.1
	DRY UNIT WEIGHT, pcf		107.3
	WATER CONTENT, %		19.3
	VOID RATIO, e_0		—
AFTER CONSOLIDATION	CONFINING STRESS, psi		112
	BACKPRESSURE, psi		108

PERMEABILITY: 5×10^{-8} cm/sec

SOIL - BENTONITE BACKFILL

**PERMEABILITY DATA
(GEOSYNTEC CONSULTANTS)**

**SOIL-BENTONITE BACKFILL
PERMEABILITY DATA
(GEOSYNTec CONSULTANTS)**

Date Backfilled (1992)	Date Sampled (1992)	Station	Permeability (cm/sec)
16 July	17 November	0+00	3.0×10^{-8}
16 July	17 November	0+00	7.1×10^{-8}
17 July	17 November	28+00	9.9×10^{-7} (1)
17 July	17 November	28+00	4.9×10^{-8}
<i>TOTAL = 4 TESTS</i>			

Note: (1) The sample was loose in the Shelby tube and the result is not considered representative.



GED SYNTEC CONSULTANTS
GEOMECHANICS AND ENVIRONMENTAL LABORATORY

LABORATORY TEST SUMMARY

(FOR INTERNAL USE ONLY)

PROJECT: WELLSVILLE PROJECT NO.: 6Q3201 LE: NSR PM: R.N.
SOURCE: SLURRY WALL MAT. VISUAL DESC.: Brown GRAVELLY CLAY APPLICATION _____
SHIPPER: FED EX REQUESTED BY: J.F. DATE: 11-23-92 SITE SAMPLE ID: ST-0+00
GEL SAMPLE NO. 92K36

TASK	AS RECEIVED	PERCENT	SPECIFIC	GRAIN SIZE		ATTEBERG LIMITS			SOIL CLASSIFICATION ASTM D 2487	LOI	CARBON CONT.	COMPACTION				HYDRAULIC CONDUCTIVITY			AS PREVIOUSLY USED
	MOISTURE	PASSING	GRAVITY	ASTM D 422		ASTM D 4318						ASTM D 698 ☐ ASTM D 1557 ☐				FHW (ASTM D 5084) ☐ CHRW (ASTM D 2434) ☐			
	CONTENT	NO. 200		SIEVE	HYDROMETER	LL	PL	PI				A	B	C	D	TUBE SAMPLE	REMOVED SAMPLE	DRY	
	ASTM D 2216 (%)	ASTM D 1140 (%)	ASTM D 854 ()			(%)	(%)	()		ASTM C 311 (%)	ASTM D 3042 (%)	UNIT WT. (pcf)	OPT. MOIST. CONT. (%)	DRY UNIT WT. (pcf)	MOIST. CONT. (%)	WT.	WT.	$\sigma_v = \frac{5}{100}$ = 9.66	

DEADLINE																	

PRELIMINARY	VALUE															127.0 pcf	13.23%	3.0 E ⁻⁸
	DATE															12-1-92		

FINAL	VALUE															127.0	13.2	3.0 E ⁻⁸
	DATE															12/2/92		

REMARKS: TUBES PUSHED ON 11/17/92
I REMOVED SOME CLAY IN PLACE OF ROCKS I REMOVED

CHECKED BY: JMS



GEO SYNTEC CONSULTANTS
GEOMECHANICS AND ENVIRONMENTAL LABORATORY

LABORATORY TEST SUMMARY
(FOR INTERNAL USE ONLY)

PROJECT: WELLSVILLE PROJECT NO.: 6Q 3201 LE: NSR PM: RM

SOURCE: SLURRYWALL MAT. VISUAL DESC.: _____ APPLICATION _____

SHIPPER: FED EX REQUESTED BY: J.F DATE: 11-23-92 SITE SAMPLE ID: ST-D+00

GEL SAMPLE NO. 92K37

TASK	AS RECEIVED	PERCENT PASSING	SPECIFIC GRAVITY	GRAIN SIZE ASTM D 422		ATTEBERG LIMITS ASTM D 4318			SOIL CLASSIFICATION ASTM D 2487	LOI ASTM C 311	CARBO CONT. ASTM D 3542	COMPACTION				HYDRAULIC CONDUCTIVITY			AS PREVIOUSLY USED			
	MOISTURE CONTENT	NO. 200	ASTM D 854	SIEVE	HYDROMETER	LL (%)	PL (%)	PI (%)				ASTM D 698 E	ASTM D 1557 E	TUBE SAMPLE				REMOLED SAMPLE				
														ASTM D 698 E ASTM D 1557 E				TUBE SAMPLE REMOLED SAMPLE				
														A	B	C	D	MAX DRY UNIT WT. (pcf)		OPT. MOIST. CONT. (%)	DRY UNIT WT. (pcf)	MOIST. CONT. (%)
	ASTM D 2216 (%)	ASTM D 1140 (%)	ASTM D 854 ()			(%)	(%)	()														

DEADLINE																	

PRELIMINARY	VALUE															128.5	18.4	7.1E-8
	DATE															12-1		

FINAL	VALUE															128.5	18.4	7.1E-8
	DATE															12-4-92		

REMARKS: TUBES POSTED ON 11/17/92

CHECKED BY: BES



GEOMECHANICS AND ENVIRONMENTAL LABORATORY

(FOR INTERNAL USE ONLY)

DEC-02-1993 WED 10:55 10:550307NTEC 59 495 TEL NO:40-543-8823

4151-130

PROJECT: WELLSVILLE PROJECT NO.: GQ 3201 LE: NSR PM: RN.
SOURCE: SLOBBY WALL MAT. VISUAL DESC.: _____ APPLICATION _____
SHIPPER: FED EX REQUESTED BY: J.F. DATE: 11-23-92 SITE SAMPLE ID. ST-118760
GEL SAMPLE NO. 92K39

TASK	AS RECEIVED PERCENT MOISTURE CONTENT		PERCENT PASSING NO. 200	SPECIFIC GRAVITY	GRAIN SIZE ASTM D 422		ATTEBERG LIMITS ASTM D 4318			SOIL CLASSIFICATION ASTM D 2467	LOI	CARBON CONTENT	COMPACTION ASTM D 698 ☐ ASTM D 1557 ☐				HYDRAULIC CONDUCTIVITY FHFW (ASTM D 5084) ☐ CHFW (ASTM D 2434) ☐			AS PREVIOUSLY USED
													A B C D				TUBE SAMPLE REMOLDED SAMPLE ☐			
													$\gamma_d = \frac{\gamma}{1 + w} \times \frac{1}{1 + w_{opt}}$ (pcf)				$\gamma_{dmax} = \frac{\gamma}{1 + w} \times \frac{1}{1 + w_{opt}}$ (pcf)			
													MAX DRY UNIT WT. (pcf)				OPT. MOIST. CONTENT (%)			
	ASTM D 2216 (X)		ASTM D 1140 (X)	ASTM D 854 ()	SIEVE HYDROMETER		LL (X) PL (X) PI ()				ASTM C 311 (X)	ASTM E 3042 (X)	UNIT WT. (pcf)		DRY UNIT WT. (pcf)		MOIST. CONTENT (X)		K (cm/sec) $\alpha = \frac{5}{6 \times 1}$ (psf)	

[illegible][illegible][illegible]

REMARKS: TUBES PUSHED ON 11/7/12; SAMPLE LOOSE IN SHELBY TUBE.
SHIRLEY WALK

CHECKED BY: SW



GEO SYNTEC CONSULTANTS

GEOMECHANICS AND ENVIRONMENTAL LABORATORY

LABORATORY TEST SUMMARY

(FOR INTERNAL USE ONLY)

PROJECT: WELLSVILLE PROJECT NO.: 60320 LE: NSR PM: RN
 SOURCE: SLURRY WALL MAT. VISUAL DESC.: BROWN GRAY CLAY APPLICATION STA 28+00
 SHIPPER: FED EX REQUESTED BY: J.F DATE: 11-23-92 SITE SAMPLE ID: ST-28+00
 GEL SAMPLE NO. 92K35

TASK	AS RECEIVED		SPECIFIC GRAVITY	GRAIN SIZE		ATTENBERG UNITS			SOIL CLASSIFICATION	LO	CAREO CONT.	COMPACTION				HYDRAULIC CONDUCTIVITY			AS PREVIOUSLY USED	
	PERCENT MOISTURE	PASSING NO. 200		ASTM D 422	HYDROMETER	ASTM D 4378						ASTM D 598	ASTM D 1557	TUBE SAMPLE REMOLDED SAMPLE		FFFW (ASTM D 5084)	CHRW (ASTM D 2434)			
	ASTM D 2216	ASTM D 1140	ASTM D 854	REVE	HYDROMETER	LL	PL	PI				ASTM C 311	ASTM D 5042	MAX DRY UNIT WL	OPT. MOIST. CONT.	DRY UNIT WT.	MOIST. CONT.	K (cm/sec)		
	(%)	(%)	()			(%)	(%)	()	(%)	(%)	(=)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)

DEADLINE																			

PRELIMINARY	VALUE																		
	DATE																		

FINAL	VALUE																		
	DATE																		

REMARKS: TUBES PUSHED ON 11/17/92
 1 PAVED CLAY WHERE I REMOVED GRAVEL
 SLURRY WALL

CHECKED BY: JN

**STORMWATER ANALYTICAL DATA
FROM TEMPORARY PONDS IN SLA**

**THE FOLLOWING
IS/ARE THE BEST
IMAGES FROM POOR
QUALITY ORIGINAL(S)**

**IMAGE
DATA**

ALFRED TECHNICAL & ANALYTICAL LABORATORY SCIENCE & ENGINEERING TECHNOLOGY INTERNATIONAL

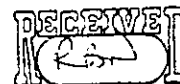
NYS DOH # 11299

PHONE (607) 587-8377 / 9444

FAX # (607) 587-9535

P.O. Box 848,
200 N. Main St.
Alfred, NY 14803

OCT 28 1992



REPORT ON Waste WATER ANALYSIS

Name: Geo-Con, Inc. Phone: (412) 856-7700
Address: 4075 Monroeville Blvd. Monroeville PA 15146

Date SAMPLE RECEIVED: Oct 26, 1992 Date REPORTED: Oct 27, 1992

Sampling address: HP-1...
Sampling POINT: Holding Pond (South end)
Collected By: Fred Mastelero ON Oct 26, 1992 AT 11:00 AM
Sample Characteristics: [] multi-layered [x] none.

A. PHASE LAYERS [] solid [x] 1160 [] other...
B. PHYSICAL STATE at 700 [] solid [x] 1160 [] other...
C. PH RANGE [] >2 [] 2-4 [] 4-6 [] 6-8 [] 8-10 [] 10-12 [] <12

TEST DESIRED: ORGANICS- Volatiles, Base/Neutral Extractables
CONFIRMATORY:

ID#	analyte	method code	result	unit
11346	Benzene	EPA624	<0.5	ug/L
11346	Chlorobenzene	EPA624	<0.5	ug/L
11346	1,1-dichloroethane	EPA624	<0.5	ug/L
11346	Ethylbenzene	EPA624	1.2	ug/L
11346	2-Hexanone	EPA624	<0.5	ug/L
11346	Napthalene	EPA624	0.8	ug/L
11346	1,1,2,2-Tetrachloroethane	EPA624	<0.5	ug/L
11346	Toluene	EPA624	3.1	ug/L
11346	trans-1,2-dichloroethene	EPA624	<0.5	ug/L
11346	1,1,1-trichloroethane	EPA624	<0.5	ug/L
11346	trichloroethene	EPA624	<0.5	ug/L
11346	Total Xylenes	EPA624	1.7	ug/L
11346	Butyl benzyl phthalate	EPA625	<10.0	ug/L
11346	Diethylphthalate	EPA625	<10.0	ug/L
11346	Nitrobenzene	EPA625	<10.0	ug/L
11346	Phenanthrene	EPA625	<10.0	ug/L

Date analyzed: Oct 27, 1992

Remarks: USEPA methods for GC/MS analysis

The provided results are for the exclusive use of the client to whom they are addressed. The provided results and the name of Alfred Technical and Analytical Laboratory in any form may not be used in any circumstance in advertising to the general public without prior written approval from the laboratory director. The results apply specifically to the sample being tested and are not necessarily indicative of the quality of apparently identical or similar products.

Limitation of Liability: Our diligence was used in approving the release of professional results, but in an instance where it should fail, the liability shall be to the extent of that particular fee. By acceptance of this report, the client agrees to hold harmless and release Alfred Technical and Analytical Laboratory from and against all liability, consequential damages, claims and demands of any kind which have any relation with the performance of the work referred to herein.

Roland D. Hale
Laboratory Director

ALFRED TECHNICAL & ANALYTICAL LABORATORY SCIENCE & ENGINEERING TECHNOLOGY INTERNATIONAL

NYSDOL# 11299

PHONE# (607) 587-8377 / 9444

FAX # (607) 587-9535

P. O. Box 848,
200 N. Main St.
Alfred, NY 14802

REPORT ON 11346

TESTING

Client Name: Geo-Con, Inc
Address: 4075 Monroeville Blvd

Phone: (412) 856-7700
Monroeville PA 15146

Date SAMPLE RECEIVED: Oct 26, 1992
Sample Information; Name: Sinclair Refinery

Date REPORTED: Oct 27, 1992

Address: HP-1

Collection Point: Holding Pond (South end)

Collected By: Fred Mastala ON: Oct 26, 1992

AT: 9:00 am

Sample Characteristics;

A. PHASE LAYERS ☐ bilayered ☐ multilayered ☒ none

B. PHYSICAL STATE at 70F ☐ solid ☒ liquid ☐ other.....

C. pH RANGE ☐ <2 ☐ 2-4 ☐ 4-6 ☐ 6-8 ☐ 8-10 ☐ 10-12 ☐ >12

TEST DESIRED: ☒ Metals ☐ Inorganics ☐ Organics

CONFIRMATORY:

CAS#	analyte	method code	method detection limit	result	unit
	Purgeables			S.A.S.	
	Base/Neut/Acids			S.A.S.	
7429-90-5	Aluminum	EPA200.7	0.028	2.92	mg/L
7440-38-2	Arsenic	EPA200.7	0.053	0.087	mg/L
7440-39-3	Barium	EPA200.7	0.0013	0.202	mg/L
7440-41-7	Beryllium	EPA200.7	0.0003	<.0003	mg/L
7440-43-9	Cadmium	EPA200.7	0.0034	<.0034	mg/L
7440-47-3	Chromium	EPA200.7	0.0097	<.009	mg/L
7440-48-4	Cobalt	EPA200.7	0.0070	<.007	mg/L
7440-50-8	Copper	EPA200.7	0.0054	0.019	mg/L
7439-89-6	Iron	EPA200.7	0.0062	1.595	mg/L
7439-92-1	Lead	EPA200.7	0.042	<.042	mg/L
7439-95-4	Magnesium	EPA200.7	0.0002	9.355	mg/L
7439-96-5	Manganese	EPA200.7	0.0014	0.212	mg/L
7439-97-6	Mercury	EPA245.2	0.0002	<.0002	mg/L
7440-22-4	Silver	EPA200.7	0.007	<.007	mg/L
7440-23-5	Sodium	EPA200.7	0.029	11.338	mg/L
7440-62-2	Vanadium	EPA200.7	0.0075	<.0075	mg/L
7440-66-6	Zinc	EPA200.7	0.0075	0.014	mg/L

The provided results are for the exclusive use of the client to whom they are addressed. The provided results and the name of Alfred Technical and Analytical Laboratory in any form may not be used in any circumstance is advertising to the general public without prior written approval from the laboratory director. The results apply specifically to the sample being tested and are not necessarily indicative of the quality of apparently identical or similar products.

Limitations of Liability - Our diligence was used in approving the release of professional results, but in no instance where it should fail, the liability will be to the extent of that particular fee. By acceptance of this report, the client agrees to hold harmless and release Alfred Technical and Analytical Laboratory from and against all liability, consequential damages, claims and demands of any kind which have any relation with the performance of the work referred to herein.

Roland D. Hale
Laboratory Director



ALFRED TECHNICAL & ANALYTICAL LABORATORY SCIENCE & ENGINEERING TECHNOLOGY INTERNATIONAL

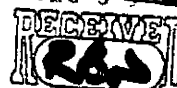
NYSDOH# 11299

PHONE# (607) 587-8377 / 9444

FAX # (607) 587-9535

P. O. Box 648,
200 N. Main St.
Alfred, NY 14802

DEC 08 1992

WATER FROM HOLDING POND #1

REPORT ON 11346

TESTING

Client Name: Geo-Con, Inc
Address: 4075 Monroeville BlvdPhone: (412) 856-7700
Monroeville PA 15146

Date SAMPLE RECEIVED: Oct 26, 1992 Date REPORTED: Oct 27, 1992

Sample Information; Name: Sinclair Refinery

Address: HP-1

Collection Point: Holding Pond (South end)

Collected By: Fred Mastele ON: Oct 26, 1992

AT: 9:00 am

Sample Characteristics;

A. PHASE LAYERS ☐ bilayered ☐ multilayered ☒ noneB. PHYSICAL STATE at 70F ☐ solid ☒ liquid ☐ other.....C. pH RANGE ☐ <2 ☐ 2-4 ☐ 4-6 ☐ 6-8 ☐ 8-10 ☐ 10-12 ☐ >12TEST DESIRED: ☒ Metals ☐ Inorganics ☐ Organics

CONFIRMATORY:

CAS#	analyte	method code	method detection limit	result	unit
	Purgeables			s.a.s.	
	Base/Neut/Acids			s.a.s.	
7429-90-5	Aluminum	EPA200.7	0.028	2.92	mg/L
7440-38-2	Arsenic	EPA200.7	0.053	0.087	mg/L
7440-39-3	Barium	EPA200.7	0.0013	0.202	mg/L
7440-41-7	Beryllium	EPA200.7	0.0003	<.0003	mg/L
7440-43-9	Cadmium	EPA200.7	0.0034	<.0034	mg/L
7440-47-3	Chromium	EPA200.7	0.0097	<.009	mg/L
7440-48-4	Cobalt	EPA200.7	0.0070	<.007	mg/L
7440-50-8	Copper	EPA200.7	0.0054	0.019	mg/L
7439-89-6	Iron	EPA200.7	0.0062	1.595	mg/L
7439-92-1	Lead	EPA200.7	0.042	<.042	mg/L
7439-95-4	Magnesium	EPA200.7	0.0002	9.355	mg/L
7439-96-5	Manganese	EPA200.7	0.0014	0.212	mg/L
7439-97-6	Mercury	EPA245.2	0.0002	<.0002	mg/L
7440-22-4	Silver	EPA200.7	0.007	<.007	mg/L
7440-23-5	Sodium	EPA200.7	0.029	11.338	mg/L
7440-62-2	Vanadium	EPA200.7	0.0075	<.0075	mg/L
7440-66-6	Zinc	EPA200.7	0.0075	0.014	mg/L

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Roland D. Hale
Laboratory Director

ALFRED TECHNICAL & ANALYTICAL LABORATORY SCIENCE & ENGINEERING TECHNOLOGY INTERNATIONAL

NYSDOII# 11299

PHONE# (607) 587-8377 / 9444

FAX # (607) 587-9535

P. O. Box 848,
200 N. Main St
Alfred, NY 14802

REPORT ON Waste WATER ANALYSIS

Name: Geo-Con, Inc Phone: (412) 856-7700
Address: .4075 Monroeville Blvd Monroeville PA15146

Date SAMPLE RECEIVED: Oct 26, 1992 Date REPORTED: Oct 27, 1992

Sampling address: HP-1...

Sampling POINT: Holding Pond (South end)...

Collected By: Fred Mastale .ON: Oct 26, 1992 AT: 9:00 am

Sample Characteristics;

- A. PHASE LAYERS ☐ bilayered ☐ multilayered ☒ none.
B. PHYSICAL STATE at 70OF ☐ solid ☒ liquid ☐ other.....
C. pH RANGE ☐ >2 ☐ 2-4 ☐ 4-6 ☐ 6-8 ☐ 8-10 ☐ 10-12 ☐ <12

TEST DESIRED: ORGANICS- Volatiles, Base/Neutral Extractables
CONFIRMATORY:

ID#	analyte	method code	result	unit
11346	Benzene	EPA624	<0.5	ug/L
11346	Chlorobenzene	EPA624	<0.5	ug/L
11346	1,1-dichloroethane	EPA624	<0.5	ug/L
11346	Ethylbenzene	EPA624	1.2	ug/L
11346	2-Hexanone	EPA624	<0.5	ug/L
11346	Napthalene	EPA624	0.8	ug/L
11346	1,1,2,2-Tetrachloroethane	EPA624	<0.5	ug/L
11346	Toluene	EPA624	3.1	ug/L
11346	trans-1,2-dichloroethene	EPA624	<0.5	ug/L
11346	1,1,1-trichloroethane	EPA624	<0.5	ug/L
11346	trichloroethene	EPA624	<0.5	ug/L
11346	Total Xylenes	EPA624	1.7	ug/L
11346	Butyl benzyl phthalate	EPA625	<10.0	ug/L
11346	Diethylphthalate	EPA625	<10.0	ug/L
11346	Nitrobenzene	EPA625	<10.0	ug/L
11346	Phenanthrene	EPA625	<10.0	ug/L

Date analyzed: Oct 27, 1992

Remarks: USEPA methods for GC/MS analysis

The provided results are for the exclusive use of the client to whom they are addressed. The provided results and the name of Alfred Technical and Analytical Laboratory in any form may not be used in any circumstance in advertising to the general public without prior written approval from the laboratory director. The results apply specifically to the sample being tested and are not necessarily indicative of the quality of apparently identical or similar products.

Limitations of Liability: Due diligence was used in approving the release of professional results, but in an instance where it should fail, the liability will be to the extent of that particular fee. By acceptance of this report, the client agrees to hold harmless and release Alfred Technical and Analytical Laboratory from and against all liability, consequential damages, claims and demands of any kind which have any relation with the performance of the work referred to herein.

Roland D. Hale
Laboratory Director

**THE FOLLOWING
IS/ARE THE BEST
IMAGES FROM POOR
QUALITY ORIGINAL(S)**

**IMAGE
DATA**

ALFRED TECHNICAL & ANALYTICAL LABORATORY SCIENCE & ENGINEERING TECHNOLOGY INTERNATIONAL

NYSDOH 11299

PHONE (607) 587-8377/9444

FAX (607) 587-9555

P.O. Box 84
700 N. 8th St
Alfred, NY 14403

PIT - METALS

REPORT ON 11278

TESTING

Client Name: Geo-Con Inc. ATTN: Chris Bailey Phone: (716) 593-7880
Address: 2448 S Brooks Wellsville, NY 14895

Date SAMPLE RECEIVED: Oct 19, 1992 Date REPORTED: Oct 22, 1992
Sample Information: Name: Geo-Con Inc.
Address: same

Collection Point:

Collected By: Joe Colamartino ON: Oct 19, 1992 AT:

Sample Characteristics:

A. PHASE LAYERS ☐ bilayered ☐ multilayered ☒ none
B. PHYSICAL STATE at 70°F ☐ solid ☒ liquid ☐ other
C. pH RANGE ☐ <2 ☐ 2-4 ☐ 4-6 ☐ 6-8 ☐ 8-10 ☐ 10-12 ☐ >12

TEST DESIRED: ☒ Metals ☐ Inorganics ☐ Organics

CONFIRMATORY:

CAS#	analyte	method code	method detection limit	result	unit
	Purgeables			s.a.s.	
	Base/Neut/Acids			s.a.s.	//
7429-90-5	Aluminum	EPA200.7	0.028	0.458	mg/L
7440-38-2	Arsenic	EPA200.7	0.053	0.081	mg/L
7440-39-3	Barium	EPA200.7	0.0013	0.118	mg/L
7440-41-7	Beryllium	EPA200.7	0.0003	0.006	mg/L
7440-43-9	Cadmium	EPA200.7	0.0034	<0.0034	mg/L
7440-47-3	Chromium	EPA200.7	0.0097	0.013	mg/L
7440-48-4	Cobalt	EPA200.7	0.0070	0.025	mg/L
7440-50-8	Copper	EPA200.7	0.0054	0.024	mg/L
7439-89-6	Iron	EPA200.7	0.0062	0.445	mg/L
7439-92-1	Lead	EPA200.7	0.042	0.080	mg/L
7439-95-4	Magnesium	EPA200.7	0.0002	21.96	mg/L
7439-96-5	Manganese	EPA200.7	0.0014	1.414	mg/L
7439-97-6	Mercury	EPA245.2	0.0002	<0.0002	mg/L
7440-22-4	Silver	EPA200.7	0.007	0.102	mg/L
7440-23-5	Sodium	EPA200.7	0.029	14.80	mg/L
7440-62-2	Vanadium	EPA200.7	0.0075	<0.007	mg/L
7440-66-6	Zinc	EPA200.7	0.0075	0.014	mg/L

*s.a.s. = See attached sheet

X 1000

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The provided results are for the exclusive use of the client to whom they are addressed. The provided results and the name of Alfred Technical and Analytical Laboratory in any form not be used in any circumstance in advertising to the general public without prior written approval from the laboratory director. The results apply specifically to the sample being tested and are not necessarily indicative of the quality of any other material or product.

Limitation of Liability: Our responsibility is to provide the results of professional results, but in no instance where it should fail, the liability will be to the extent of the professional fee. By acceptance of this report, the client agrees to hold the Alfred Technical and Analytical Laboratory from and against all liability, consequential damages, claims and demands of any kind which have any relation with the performance of the work referred to herein.

Roland D. Hale
Laboratory Director

NYS DOH 1299

PHONE (607) 587-4377/9444

FAX (607) 587-9135

P.O. Box 918,
280 N. Main St.
Alfred, NY 14802

PIT - ORGANICS

REPORT ON Waste WATER ANALYSIS

Name: Geo-Con Inc. ATTN: Chris Bailey Phone: (716) 593-7880
Address: 2448 S Brooks Wellsville NY 14895

Date SAMPLE RECEIVED: Oct 19, 1992 Date REPORTED: Oct 22, 1992

Sampling address: same...

Sampling POINT: ...

Collected By: Joe Colamartino ON: Oct 19, 1992 AT:

Sample Characteristics:

A. PHASE LAYERS ☐ bilayered ☐ multilayered ☒ none.
B. PHYSICAL STATE at 70°F ☐ solid ☒ liquid ☐ other.....
C. pH RANGE ☐ >2 ☐ 2-4 ☐ 4-6 ☐ 6-8 ☐ 8-10 ☐ 10-12 ☐ <12TEST DESIRED: ORGANICS- Volatiles, Base/Neutral Extractables
CONFIRMATORY:

ID#	analyte	method code	result	unit
11278	Benzene	EPA624	<0.5	ug/L
11278	Chlorobenzene	EPA624	<0.5	ug/L
11278	1,1-dichloroethane	EPA624	<0.5	ug/L
11278	Ethylbenzene	EPA624	4.7	ug/L
11278	2-Hexanone	EPA624	<0.5	ug/L
11278	Napthalene	EPA624	2.9	ug/L
11278	1,1,2,2-Tetrachloroethane	EPA624	<0.5	ug/L
11278	Toluene	EPA624	1.6	ug/L
11278	trans-1,2-dichloroethene	EPA624	<0.5	ug/L
11278	1,1,1-trichloroethane	EPA624	<0.5	ug/L
11278	trichloroethene	EPA624	<0.5	ug/L
11278	Total Xylenes	EPA624	3.2	ug/L
11278	Butyl benzyl phthalate	EPA625	<10.0	ug/L
11278	Diethylphthalate	EPA625	<10.0	ug/L
11278	Nitrobenzene	EPA625	<10.0	ug/L
11278	Phenanthrene	EPA625	<10.0	ug/L

Date analyzed: Oct 22, 1992

Remarks: USEPA methods for GC/MS analysis

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Limitation of Liability: Due diligence was used in approving the release of professional results, but in an instance where it should fail, the liability will be to the extent of the particular fee. By acceptance of this report, the client agrees to hold harmless and release Allied Technical and Analytical Laboratory from and against all liability, consequential damages, claims and demands of any kind which have any relation with the performance of the work referred to herein.

Roland D. Hale
Laboratory Director

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P. 03

ALFRED TECHNICAL & ANALYTICAL LABORATORY SCIENCE & ENGINEERING TECHNOLOGY INTERNATIONAL

NYSDOH# 11299

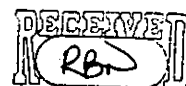
PHONE#(607)587-8377/9444

FAX#(607)587-9652/9535

PO Box 848
200 N. Main St.
Alfred, NY 14802

Pond #1 (North Pond)

DEC 03 1992



REPORT ON 11785

TESTING

Client Name: Geo-Con, Inc./Chris Bailey
Address: 2448 S Brooks

Phone: (716)593-7880
Wellsville NY 14895

Date SAMPLE RECEIVED: Nov 24, 1992

Date REPORTED: Nov 24, 1992

Sample Information; Name: Sinclair Refinery

Address: Sample #1

Collection Point: Sediment Pond

Collected By: Joe Colamartino ON: Nov 24, 1992

AT: 3:00 pm

Sample Characteristics;

A. PHASE LAYERS ☐ bilayered ☐ multilayered ☒ none

B. PHYSICAL STATE at 70F ☐ solid ☒ liquid ☐ other.....

C. pH RANGE ☐ <2 ☐ 2-4 ☐ 4-6 ☐ 6-8 ☐ 8-10 ☐ 10-12 ☐ >12

TEST DESIRED: ☒ Metals ☐ Inorganics ☐ Organics

CONFIRMATORY:

CAS#	analyte	method code	method detection limit	result	unit
7429-90-5	Aluminum	EPA200.7	0.028	0.233	mg/L
7439-92-1	Lead	EPA239.2	0.001	0.005	mg/L

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Roland D. Hale
Laboratory Director

ALFRED TECHNICAL & ANALYTICAL LABORATORY SCIENCE & ENGINEERING TECHNOLOGY INTERNATIONAL

NYSDOH# 11299

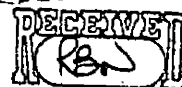
PHONE#(607)587-8377/9444

FAX#(607)587-9652/9535

PO Box 848
200 N. Main St.
Alfred, NY 14802

Pond #2 (South Pond)

DEC 03 1992



REPORT ON 11786

TESTING

Client Name: Geo-Con, Inc./Chris Bailey
Address: 2448 S Brooks

Phone: (716)593-7880
Wellsville NY 14895

Date SAMPLE RECEIVED: Nov 24, 1992

Date REPORTED: Nov 24, 1992

Sample Information; Name: Sinclair Refinery

Address: Sample #2

Collection Point: Sediment Pond

Collected By: Joe Colamartino ON: Nov 24, 1992 AT: 3:00 pm

Sample Characteristics;

A. PHASE LAYERS ☐ bilayered ☐ multilayered ☒ none

B. PHYSICAL STATE at 70F ☐ solid ☒ liquid ☐ other.....

C. pH RANGE ☐ <2 ☐ 2-4 ☐ 4-6 ☐ 6-8 ☐ 8-10 ☐ 10-12 ☐ >12

TEST DESIRED: ☒ Metals ☐ Inorganics ☐ Organics

CONFIRMATORY:

CAS#	analyte	method code	method detection limit	result	unit
7429-90-5	Aluminum	EPA200.7	0.028	9.76	mg/L
7439-92-1	Lead	EPA239.2	0.001	0.004	mg/L

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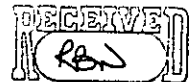
Roland D. Hale
Laboratory Director

**CEIMIC
CORPORATION**

"Analytical Chemistry for Environmental Management"

DEC 03 1992

TOTAL ALUMINUM



Client: Geo-Con, Inc.

Ceimic Project No.: 920626

Date Sample Received: 11/25/92

Date Analysis Completed: 11/25/92 Concentration in: mg/L (ppm)

Client ID	Laboratory ID	Sample Concentration	Method Reporting Limit
Water From Holding Pond 1	920626-01	0.098	0.028
Water From Holding Pond 2	920626-02	2.70	0.028

QA/QC:

Method Blank	PBW	ND	0.028
Laboratory Control Sample	LCSW	99% Recovery	

ND = Not detected

Reported by:

Jimmy Cole

Approved by:

Catherine Marsh