4554

CONSTRUCTION QUALITY ASSURANCE
FINAL REPORT

ON-SITE DISPOSAL FACILITY
PHASE III CELL 1
FINAL COVER CONSTRUCTION

United States Department of Energy
Fernald Environmental Management Project
Fernald, Ohio

prepared by

GEOSYNTEC CONSULTANTS

1100 Lake Hearn Drive, NE
Suite 200
Atlanta, Georgia 30342

under

Fluor Fernald, Inc.
Contract No. 95PS005028
Document No. 20103-CA-0001

REVISION 0
VOLUME IV of VI
MAY 2002

000001

APPENDIX E

MANUFACTURER'S QUALITY CONTROL DOCUMENTATION

FLUOR FERNALD/MANUFACTURER SUBMITTALS

GEOSYNTHETIC CLAY CAP

FDF PRC 20102

SUPPLI[illegible]MENT SUBMITTAL

CONTRACT NO: 1440

FROM:
GSE LINING TECHNOLOGIES

SIGNATURE: [illegible] 6/7/01

SUBMITTAL NO. 1440/1-001 | REV.: 5 | DATE: 6/4/01

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), M[illegible]

RECEIVED BY: Denise Wentz DATE: 6/4[illegible]

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1440-OPT1-001	5						X			SUBMITTAL REGISTER			X	ACR-001	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
~~Chuck Van Arsdale~~	64				
Gregg Johnson	64				
Bill Zebick	64				
Jim Turner	64				
Kwasi Badu Tweneboan	38				

NO COMMENTS: _____ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [illegible] DATE: 6/25/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

000005

FS-F-4955
Rev. 3: 05/14/1999, CT-2.4.2

ORIGINAL

4534

Contract No.: 99SC001440
Contractor Title: Supplier Contractor
Contractor: GSE Lining Technology

ATTACHMENT V

PROJECT 20102, OPTION 1 (CELL 1 CAP)
SUBMITTAL REGISTER
GEOMEMBRANE AND GEOSYNTHETIC CLAY LINER MANUFACTURING AND DELIVERY
Rev. 5, 6/4/01

Submittal No.	Rev. No.	Document No. & Rev.	Rev. No.	CFC	INF	Document Family	Document Title	Section-Paragraph Reference	STATUS Action Code (Date)	Remarks Submittal Due Date
20102-1440/1-001	0 1 2 3 4 5	1440-OPT1-001	0 1 2 3 4 5		X	ENG	SUBMITTAL REGISTER	ACR-001	B 1/16/01 A 1/22/01 A 1/30/01 A 2/14/01 A 3/21/01 A 6/25/01	FLUOR FERNALD WILL UPDATE
20102-1440/1-002	0 1	1440-OPT1-002	0 1		X	H&S	MATERIAL SAFETY DATA SHEETS (GML)	CONTRACT SECTION D	B 1/15/01 A 1/25/01	A & C
20102-1440/1-002A	0	1440-OPT1-002A	0		X	H&S	MATERIAL SAFETY DATA SHEETS (GCL)	CONTRACT SECTION D	A 1/16/01	A & C
20102-1440/1-003	0 1	1440-OPT1-003	0 1		X	PROC	WARRANTY FOR GCL	SECTION A, GENERAL PROVISIONS	B 1/18/01 A 3/01/01	A
20102-1440/1-02770P-001	0	1440-OPT1-02770P-001	0		X	ENG	MANUFACTURING CAPABILITIES	02770P.1.05.A.1	A 1/16/01	A
20102-1440/1-02770P-002	0	1440-OPT1-02770P-002	0	X		ENG	LIST OF 10 COMPLETED FACILITIES	02770P.1.05.A.2	A 1/16/01	A
20102-1440/1-02770P-003	0	1440-OPT1-02770P-003	0	X		ENG	ORIGIN AND IDENTIFICATION OF RESIN	02770P.1.05A.3	A 1/22/01	A
20102-1440/1-02770P-004	0	1440-OPT1-02770P-004	0	X		QA	CERTIFICATION OF WELDING ROD	02770P.1.05.A.4	A 1/16/01	A
20102-1440/1-02770P-005	0	1440-OPT1-02770P-005	0	X		QA	CERTIFICATION OF MINIMUM AVERAGE ROLL VALUES	02770P.1.05.A.5	A 1/16/01	A
20102-1440/1-02770P-006	0	1440-OPT1-02770P-006	0		X	CONST	RECOMMENDED LONG-TERM STORAGE REQUIREMENTS	02770P.1.05.A.6	A 1/16/01	A
20102-1440/1-02770P-007	0	1440-OPT1-02770P-007	0	X		ENG	RECOMMENDED INSTALLATION PROCEDURES	02770P.1.05.A.7	A 1/22/01	A
20102-1440/1-02770P-008	0 1	1440-OPT1-02770P-008	0 1		X	ENG	GEOMEMBRANE WARRANTY	02770P.1.05.A.8	B 1/19/01 A 2/28/01	A & B
20102-1440/1-02770P-009	0 1	1440-OPT1-02770P-009	0 1	X		ENG	COMPLETED FORMS GML 60-S, GML 60-T	02770P.1.05.A.9	B 1/19/01 A 1/22/01	A
20102-1440/1-02770P-010	0	1440-OPT1-02770P-010	0	X		QA	QUALITY CONTROL CERTIFICATES FOR RESIN	02770P.1.05.B.1	A 3/12/01	B
20102-1440/1-02770P-011	0	1440-OPT1-02770P-011	0	X		ENG	TEST REPORTS OF RESIN	02770P.1.05.B.2	A 3/12/01	B
20102-1440/1-02770P-012	0 1	1440-OPT1-02770P-012	0 1	X		QA	CERTIFICATION OF RESIN POLYMER	02770P.1.05.B.3	C 2/28/01 A 3/08/01	B

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [signature] Date: 6/25/01

INFORMATION ONLY

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Contract No.: 99SC001440
Contractor Title: Supplier Contractor
Contractor: GSE Lining Technology

ATTACHMENT V

PROJECT 20102, OPTION 1 (CELL 1 CAP)
SUBMITTAL REGISTER
GEOMEMBRANE AND GEOSYNTHETIC CLAY LINER MANUFACTURING AND DELIVERY
Rev. 5, 6/4/01

Submittal No.	Rev. No.	Document No. & Rev.	Rev. No.	CFC	INF	Document Family	Document Title	Section-Paragraph Reference	STATUS Action Code (Date)	Remarks Submittal Due Date
20102-1440/1-02770P-013	0 1 2	1440-OPT1-02770P-013	0 1 2	X		QA	MANUFACTURING CERTIFICATES PER SHIFT PRODUCTION OF GEOMEMBRANE	02770P.1.05.C	C 3/08/01 C 3/19/01 A 4/2/01	B
20102-1440/1-02772P-001	0	1440-OPT1-02772P-001	0		X	ENG	GCL PRODUCT NAME	02772P.1.04.A.1	A 1/16/01	A
20102-1440/1-02772P-002	0 1	1440-OPT1-02772P-002	0 1		X	ENG	DAILY PRODUCTION CAPACITY	02772P.1.04.A.2	B 1/16/01 A 1/24/01	A
20102-1440/1-02772P-003	0	1440-OPT1-02772P-003	0	X		QA	MANUFACTURER'S QUALITY CONTROL PROCEDURES	02772P.1.04.A.3	A 1/16/01	A
20102-1440/1-02772P-004	0 1 2	1440-OPT1-02772P-004	0 1 2	X		ENG	REQUIREMENTS FOR GEOTEXTILE COMPONENT	02772P.1.04.A.4	A 1/16/01 B 3/08/01 A 3/15/01	A
20102-1440/1-02772P-005	0	1440-OPT1-02772P-005	0	X		QA	CERTIFICATION OF GEOTEXTILE COMPONENT	02772P.1.04.A.5	A 1/16/01	A
20102-1440/1-02772P-006	0	1440-OPT1-02772P-006	0	X		QA	CERTIFICATION OF MINIMUM AVERAGE ROLL VALUES	02772P.1.04.A.7	A 1/16/01	A
20102-1440/1-02772P-007	0	1440-OPT1-02772P-007	0	X		CONST	RECOMMENDED INSTALLATION PROCEDURES	02772P.1.04.A.8	A 1/22/01	A
20102-1440/1-02772P-008	0	1440-OPT1-02772P-008	0		X	CONST	RECOMMENDED LONG-TERM STORAGE REQUIREMENTS	02772P.1.04.A.9	A 1/22/01	A
20102-1440/1-02772P-009	0	1440-OPT1-02772P-009	0	X		CONST	PROJECTED DELIVERY DATES	02772P.1.04.A.10	A 1/22/01	A
20102-1440/1-02772P-010	0 1	1440-OPT1-02772P-010	0 1	X		ENG	COMPLETED FORMS GCL-1	02772P.1.04.A.11	B 1/19/01 A 1/24/01	A
20102-1440/1-02772P-011	0	1440-OPT1-02772P-011	0	X		ENG	MANUFACTURING QUALITY CONTROL TESTS FOR EACH GCL LOT	02772P.1.04.B	A 5/8/01	B
20102-1440/1-02772P-012	0	1440-OPT1-02772P-012	0	X		ENG	INTERNAL AND INTERFACE SHEAR STRENGTH TEST RESULTS FOR EACH GCL LOT	02772P.1.04.B	A 5/8/01	B

A. WITHIN 10 DAYS FROM RELEASE OF CONTRACT
B. AT LEAST 21 DAYS PRIOR TO SHIPMENT
C. WITH SHIPMENT

The supplier shall provide submittals in accordance with Administrative Contractor Requirements ACR-001, attached.

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SUPPLIER DOCUMENT SUBMITTAL

ES 1/11/01

FDF PROJECT [redacted]102	CONTRACT NO: 1440	SUBMITTAL NO. 20102-1440/1-02770P-001	REV: C ~~0~~	DATE: 1/10 [redacted]	Page 4 of __

FROM:
CETCO - COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY

SIGNATURE: John David Tiffin

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
2

RECEIVED BY: Denise Wentz DATE: 1/11/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1440-OPT1-02770P-001 2	0						X			MANUFACTURING CAPABILITY			X				
	2																	
	ES 1/11/01																	
	~~1440-OPT1-02770P-001~~							X			Product Name			X				
	1440-OPT1-02770P-001	0																

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Chuck Van Arsdale	161			RECEIVED	
Gregg Johnson	161			JAN 12 2001	
Bill Zebick	161				
Mike Godber	161				
Kwasi Badu Tweneboah	38				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: Collins P. Sudan DATE: 18 Jan 2001
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

ORIGINAL

000008

FS-F-4955
Rev. 3: 05/14/1999, CT-2.4.2

CETCO LINING TECHNOLOGIES

Certified Properties

BENTOMAT "ST" CERTIFIED PROPERTIES

MATERIAL PROPERTY	TEST METHOD	TEST FREQUENCY, ft2 (m2)	REQUIRED VALUES
Bentonite Swell Index[1]	ASTM D 5890	1 per 50 tonnes	24 mL/2g min.
Bentonite Fluid Loss[1]	ASTM D 5891	1 per 50 tonnes	18 mL max.
Bentonite Mass/Area[2]	ASTM D 5993	40,000 ft^2 (4,000 m^2)	0.75 lb/ft^2 (3.6 kg/m^2) min
GCL Grab Strength[3]	ASTM D 4632	200,000 ft^2 (20,000 m^2)	90 lbs (400 N) MARV
GCL Peel Strength[3]	ASTM D 4632	40,000 ft^2 (4,000 m^2)	15 lbs (65 N) min.
GCL Index Flux[4]	ASTM D 5887	Weekly	1×10^{-8} $m^3/m^2/sec$ max.
GCL Permeability[4]	ASTM D 5084	Weekly	5×10^{-9} cm/sec max.
GCL Hydrated Internal Shear Strength[5]	ASTM D 5321	Periodic	500 psf (24 kPa) typical

Bentomat "ST" is a reinforced GCL consisting of a layer of sodium bentonite between a woven and a non-woven geotextile, which are needlepunched together.

Notes:

1. Bentonite property tests performed at CETCO's bentonite processing facility before shipment to CETCO's GCL production facilities.
2. Bentonite mass/area reported at 0 percent moisture content.
3. All tensile testing is performed in the machine direction, with results as minimum average roll values unless otherwise indicated.
4. Index flux and permeability testing with deaired distilled/deionized water at 80-psi (551 kPa) cell pressure, 77 psi (531 kPa) headwater pressure and 75 psi (517 kPa) tailwater pressure. Reported value is equivalent to 925 gal/acre/day. This flux value is equivalent to a permeability of 5×10^{-9} cm/sec for typical GCL thickness. This flux value should not be used for equivalency calculations unless the gradients used represent field conditions. A flux test using gradients that represent field conditions must be performed to determine equivalency. The last 20 weekly values prior the end of the production date of the supplied GCL may be provided.
5. Peak value measured at 200-psf (30 kPa) normal stress. Site-specific materials, GCL products, and test conditions must be used to verify internal and interface strength of the proposed design.

1500 W. Shure Drive • Arlington Heights, IL 60004 • USA • (847) 392-5800 • FAX (847) 577-5571
A wholly owned subsidiary of AMCOL International

The information and data contained herein are believed to be accurate and reliable. CETCO makes no warranty of any kind and accepts no responsibility for the results obtained through application of this information.

CETCO
COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY

GCL MANUFACTURER'S QUALIFICATIONS

CETCO has been manufacturing reinforced geosynthetic clay liners for over five years. CETCO has manufactured over 250,000,000 square feet of reinforced geosynthetic clay liner.

A partial list of the municipal solid waste landfill (MSWLF) liner projects that CETCO has manufactured are shown on the attached list.

CETCO has two manufacturing plants in the United States. One in Fairmount, Georgia and another in Lovell, Wyoming. They have a combined annual capacity of over 100,000,000 square feet.

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20102	CONTRACT NO: 1440	SUBMITTAL NO.: 20102-1440/1-02772P-004	REV.: 2
DATE: 03/08/01	Page 1 of __		

FROM:
CETCO - Colloid Environmental Technologies Company

SIGNATURE: for J.D. Griffin, GSE

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Erika Jarrett DATE: 3/8/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1440-OPT1-02772P-004	2						X			Manufacturer's requirements for any geotextile component of the GCL		X		02772P, Section 1.04.A.4	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
~~Mike Godber~~ Jim Turner	64				
Chuck Van Arsdale (Approver)	64				
Kwasi Badu-Tweneboah	38				
Bill Zebick	64				
Gregg Johnson	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: Chuck Van Arsdale DATE: 3/15/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4C24

000011

FS-F-4
Rev. 3: 05/14/1999 CT-2.4.2

ORIGINAL

1440-OPT1-027+28-004 Rev 2

Turner, Jim

From: Jim Olsta [jim.olsta@cetco.com]
Sent: Thursday, March 01, 2001 12:01
To: Turner, Jim
Subject: RE: Checklist for March 6 Assessment of CETCO

-- 4554

Dear Mr. Turner:

The grab elongation MARV values for the geotextiles are:
SI 82Tex, 15%
SI650, 90%.

Jim Olsta

-----Original Message-----
From: Turner, Jim [mailto:Jim.Turner@fernald.gov]
Sent: Thursday, March 01, 2001 10:37 AM
To: 'Jim Olsta'; jdgriffin@gseworld.com
Cc: Vanarsdale, Chuck; Godber, Mike; David K. Phillips P. E. (E-mail); Holbrook, Rick; Chuck Hornaday; Bill Urchik
Subject: RE: Checklist for March 6 Assessment of CETCO
Importance: High

Dear Mr. Olsta,

Thanks again for supplying the MARV values for the woven and nonwoven geotextile components for the Bentomat ST that you will manufacture for us beginning March 5th. In preparing the submittal revision, I realized that I still need MARV values for grab elongation for those components. Your assistance in this matter is greatly appreciated.

Mr. Griffin: Unless I hear otherwise, I will assume that I can sign for you in submitting this submittal to ECDC. Please advise me soonest if there is a problem with that.

Regards,

Jim Turner
Quality Assurance
Fluor Fernald

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [signature] Date: 3/15/01

-----Original Message-----
From: Jim Olsta [mailto:jim.olsta@cetco.com]
Sent: Monday, February 26, 2001 15:24
To: Turner, Jim
Cc: jdgriffin@gseworld.com; Vanarsdale, Chuck; Godber, Mike; David K. Phillips P. E. (E-mail); Holbrook, Rick; Chuck Hornaday; Bill Urchik

SUPPLIER DOC SUBMITTAL

PROJECT NO.: 20102	CONTRACT NO: 1440	SUBMITTAL NO. 20102-1440/1-02272P-004	REV: 0	DATE: 1/10/01	Page 6 of ___

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

FROM: TCO - COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY

RECEIVED BY: Erika Jarrett DATE: 1/11/01

SIGNATURE: John David Tiffin

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
1	1440-OPT1-02272P-004							X			REQ. FOR GEOTEXTILE COM.		X		02272P.104.A.4	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Chuck Van Arsdale	164				
Gregg Johnson	164				
Bill Zebick	164				
Mike Godber	164				
Susi Badu Tiernebach	38				

COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE: 1/16/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
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C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

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FS-F-4955

SYNTHETIC INDUSTRIES
Geosynthetic Products Division
Smart Solutions in Synthetics®

1440-OPT1-02772P-0

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GEOTEX™ 650 Nonwoven Geotextile

GEOTEX 650 is a polypropylene, staple fiber, needlepunched nonwoven geotextile manufactured specifically for CETCO at one of Synthetic Industries' facilities that has achieved ISO-9002 certification for its systematic approach to quality. The fibers are needled to form a stable network that retain dimensional stability relative to each other. The geotextile is resistant to ultraviolet degradation and to biological and chemical environments normally found in soils. GEOTEX 650 conforms to the property values listed below[1] which have been derived from quality control testing performed by one of Synthetic Industries' GAI-LAP accredited laboratories:

PROPERTY	TEST METHOD	TYPICAL ROLL VALUES[2] *English*	*Metric*
Mechanical			
Grab Tensile Strength	ASTM D4632	70 lbs	310 N
Grab Elongation	ASTM D4632	100 %	100 %
Puncture Strength	ASTM D4833	65 lbs	285 N
Mullen Burst	ASTM D3786	230 psi	1580 kPa
Trapezoidal Tear	ASTM D4533	40 lbs	175 N
Physical			
Mass Per Unit Area	ASTM D5261	6.5 oz/sy	220 gr/m²
Thickness	ASTM D5199	140 mils	3.5 mm

Standard Roll Size: 192" (4.87 m) x 450 yds (411 m) = 2400 yd² (2006 m²)

NOTES:

1 The property values listed below are effective 12\31\97 and are subject to change without notice.
2 Values shown are in weaker principal direction. Typical indicates mean or average value of all test data.

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 1/16/01

INFORMATION ONLY

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Synthetic Industries, Inc.
4019 Industry Drive • Chattanooga, Tennessee • 37416 • USA
Telephone • 423-899-0444 • Fax • 423-899-7619 • 1-800-621-0444

SYNTHETIC INDUSTRIES
Geosynthetic Products Division
Smart Solutions in Synthetics®

- 4554

GEOTEX™ 82TEX Woven Geotextile

GEOTEX 82TEX is a woven slit film geotextile manufactured specifically for CETCO at one of Synthetic Industries' facilities that has achieved ISO-9002 certification for its systematic approach to quality. The individual slit films are woven together in such a manner as to provide dimensional stability relative to each other. The geotextile is resistant to ultraviolet degradation and to biological and chemical environments normally found in soils. GEOTEX 82TEX conforms to the property values listed below[1] which have been derived from quality control testing performed by one of Synthetic Industries' GAI-LAP accredited laboratories:

PROPERTY	TEST METHOD	TYPICAL ROLL VALUES[2] *English*	*Metric*
Mechanical			
Grab Tensile Strength	ASTM D4632	155 x 155 lbs	685 x 685 N
Grab Elongation	ASTM D4632	20 x 20%	20 x 20%
Puncture Strength	ASTM D4833	80 lbs	355 N
Mullen Burst	ASTM D3786	300 psi	2060 kPa
Trapezoidal Tear	ASTM D4533	65 x 65 lbs	285 x 285 N
Hydraulic			
Apparent Opening Size (AOS)	ASTM D4751	40-50 US Std Sieve	0.425-0.300 mm
Permittivity	ASTM D4491	0.12 sec^{-1}	0.12 sec^{-1}
Water Flow Rate	ASTM D4491	9 gpm/ft^2	365 $l/min/m^2$
Physical			
Mass Per Unit Area	ASTM D5261	3.5 oz/sy	115 gr/m^2
Thickness	ASTM D5199	19 mils	0.4 mm
Endurance			
UV Resistance (% retained after 150 hours)	ASTM D4355	90%	90%

Standard Roll Size: Master Rolls - 184" wide

NOTES:

1 **The property values listed above are effective 12/31/97 and are subject to change without notice.**
2 Values shown are in machine (warp) x cross machine (fill) directions. Typical roll values indicate the mean or average values of all test data.

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT FURNISHED HEREUNDER OTHER THAN AT THE TIME OF DELIVERY IT SHALL BE OF THE QUALITY AND SPECIFICATION STATED HEREIN. ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE IS EXPRESSLY EXCLUDED, AND, TO THE EXTENT THAT IT IS CONTRARY TO THE FOREGOING SENTENCE, ANY IMPLIED WARRANTY OF MERCHANTABILITY IS EXPRESSLY EXCLUDED. ANY RECOMMENDATIONS MADE BY SELLER CONCERNING THE USES OR APPLICATIONS OF SAID PRODUCT ARE BELIEVED RELIABLE AND SELLER MAKES NO WARRANTY OF RESULTS TO BE OBTAINED. IF THE PRODUCT DOES NOT MEET SYNTHETIC INDUSTRIES CURRENT PUBLISHED SPECIFICATIONS, AND THE CUSTOMER GIVES NOTICE TO SYNTHETIC INDUSTRIES BEFORE INSTALLING THE PRODUCT, THEN SYNTHETIC INDUSTRIES WILL REPLACE THE PRODUCT WITHOUT CHARGE OR REFUND THE PURCHASE PRICE.

Synthetic Industries, Inc.
4019 Industry Drive • Chattanooga, Tennessee • 37416 • USA
Telephone • 423-899-0444 • Fax • 423-899-7619 • 1-800-621-0444

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20102	CONTRACT NO: 99SC001440	SUBMITTAL NO.: 20102-1440/1-02772P-005	REV.: 0	DATE: 1/15/01	Page ___ of ___

FROM: Colloid Environmental Technologies Company

SIGNATURE: Chuck Van Arsdale for J.D. Griffin

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Denise Wentz DATE: 1/15/01

000016

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
	1440-OPT1-02772P-005	0							X		Certification of Geotextile Components		X		02772P, 1.04.A.4 JET 1-16-01	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Godber	64				
Chuck Van Arsdale	64				
Kwasi Badu-Tweneboah	38				
Bill Zebick	64				

NO COMMENTS: ✓ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE: 16 January 2001

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

for Michael W. Godber

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ENTERED

ORIGINAL

FS-F-

1440-OPT1
~~20102~~ -02772P-005

4554

CETCO
COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY
1500 W. Shure Drive • Arlington Heights, IL 60004 • USA
(847) 392-5800 • FAX (847) 506-6195 Email: CHORN@CETCO.COM

January 11, 2001

JD Griffin
GSE
19103 Gundle Road
Houston, TX 77073

Re: Fluor Fernald, Inc. – Project 20102 Option 1 Cap - Submittals

Dear JD:

Please consider this letter as CETCO's response to request for submittal information for the above referenced contract.

CETCO certifies that the geotextiles used to make the Bentomat for this project meet the project specifications as outlined in table 02772P-1, and the previously submitted certified ~~properties sheets~~. 1440-OPT1-02772P-004, Rev. 0

Regards,

Chuck Hornaday
Group Manager
Lining Technologies Group

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 16 January 2001

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20102

CONTRACT NO: 1440

SUBMITTAL NO.: 20102-1440/1-02772P-006

REV.: 0

DATE: 1/15/01

Page ___ of ___

FROM: Colloid Environmental Technologies Company

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

SIGNATURE: Chuck C. Van Arsdale for J.D. Griffin

RECEIVED BY: Denise Wentz DATE: 1/15/01

QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
	1440-OPT1-02772P-006								X		Certification of minimum average roll values		X		02772P, 1.04A.7	X		

DOCUMENT FAMILY

SUBMITTAL TYPE

SUBMITTAL ACTION

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Godber	604				
Chuck Van Arsdale	604				
Kwasi Badu-Tweneboah	38				
Bill Zebick	604				

NO COMMENTS: ✓ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE: 16 January 2001

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

for Michael W. Godber

SUBMITTAL TYPE: (BY SUPPLIER)

CFC - CERTIFIED FOR CONSTRUCTION

INF - INFORMATION/RECORD

DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)

A - Conforms to the Subcontract Requirements

B - Minor Comments - Incorporate and Resubmit

C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

4554

0000018

FS-F-4955

1440 -OPT1
~~20102~~-02772P-006

CETCO -- 4554
COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY
1500 W. Shure Drive • Arlington Heights, IL 60004 • USA
(847) 392-5800 • FAX (847) 506-6195 Email: CHORN@CETCO.COM

January 11, 2001

JD Griffin
GSE
19103 Gundle Road
Houston, TX 77073

Re: Fluor Fernald, Inc. – Project 20102 Option 1 Cap - Submittals

Dear JD:

Please consider this letter as CETCO's response to request for submittal information for the above referenced contract.

CETCO certifies that the Bentomat to be supplied for this project will meet the requirements of the specification as described in table 02772P-1.

Regards,

Chuck Hornaday
Group Manager
Lining Technologies Group

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 16 January 2001

INFORMATION ONLY

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20102	CONTRACT NO: 1440	SUBMITTAL NO.: 20102-1440/1-02772P-011	REV.: 0	DATE: 04 May 2001	Page ___ of 2

FROM: ~~Colloid Environmental Technologies Company, Inc. (CETCO)~~ JTT 5-4-01

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 32-7

SIGNATURE: James T. Turner for J.D. Griffin GSE Lining Technology

RECEIVED BY: Denise Wentz DATE: 5/4/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1440-OPT1-02772P-011	0						X			Manufacturing Quality Control Test for Each GCL Lot		X		02772P.1.04.B	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Jim Turner (Approver)	64				
Chuck Van Arsdale	64				
Kwasi Badui-Tweneboah	38				
Bill Zeblck	64				

RECEIVED MAY 7 2001

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE: 5/7/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

ORIGINAL

0000020

FS-F-4955

INSTRUCTIONS FOR COMPLETING THE SUPPLIER DOCUMENT SUBMITTAL:

Supplier Submittal Instructions

1 Enter the FDF project number or CWO number.

2 Enter the Contract number.

3 Enter the Submittal number.

4 Enter Submittal revision number.

5 Enter the date the Submittal was prepared.

6 Enter Page Number(s) of submittal.

7 Enter name and address of the Organization submitting the documents and signature of the individual preparing the Submittal.

8 (FDF) ECDC will verify correctness and sign and date stamp receipt of submittal.

9 Enter the quantity of each document submitted to FDF.

10 Enter unique identification number for each document.

11 Enter the revision of each document listed on submittal.

12 Check the appropriate Document Family identified by the Submittal Register.

13 Enter the title and/or a brief description for each document.

14 Enter an "X" in the appropriate SUBMITTAL TYPE column for each document listed on the submittal.

15 Enter the specification number associated with each document.

16 (FDF) ECDC will check the Submittal Action Code from the sticker attached to the submittal by the reviewer.

17 (FDF) ECDC will enter the Approver and Reviewers of the listed documents per the Master Submittal Distribution List.

18 (FDF) ECDC will enter the mail stop for the personnel listed in block 17 of the submittal.

19 (FDF) If no comments enter (X) in block, OR List any discrepancies: (ie; documents, revision numbers, quantities, missing documents, etc.;) and any other comments deemed necessary and applicable to the submittal.

20 Sign and Date. Return to ECDC, MS 52-7.

000021

4554

CETCO -- 4554
COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY
234 Gordon Street • Fairmount, GA 30139 • USA
(706) 337-5316 • Fax (706) 337-7334

16-Mar-01

Ms. Sheri Sim-Connell
GSE Lining Technology, Inc.
19103 Gundle Road
Houston, TX 77073

Dear Ms. Sim-Connell:

Please find enclosed the MQA/MQC Data Package for Geosynthetic Clay Liner (GCL) pre-certified to GSE Lining Technology/Fluor Daniel Fernald, Harrison, OH.

If you have any questions regarding the enclosed QA/QC information, please contact Ms. Judy Hall @ 1-800-220-2536.

Sincerely,

Alisa Findley

Alisa Findley
Quality Analysis Coordinator
CETCO-Fairmount, Georgia

000022

CETCO - 4554

GEOSYNTHETIC CLAY LINER

MANUFACTURING QA/QC DATA PACKAGE

PROJECT NAME: GSE Lining Technology, Inc.
Fluor Daniel Fernald

PREPARED FOR: Ms. Sheri Sim-Connell
GSE Lining Technology, Inc.
19103 Gundle Road
Houston, TX 77073

PREPARED BY: Alisa Findley
CETCO
234 Gordon St. SE
Fairmount, GA 30139
TELEPHONE: (706) 337-5316
FAX: (706) 337-2215

DAL-LAP
Initials: AF
Date: 3-16-01

000023

CETCO

4554

GEOSYNTHETIC CLAY LINER

DAILY MANUFACTURING QA/QC DATA

FOR ALL GCL MANUFACTURED ON:

GSE LINING TECHNOLOGY, INC.
FLUOR DANIEL FERNALD
HARRISON, OH
CUSTOMER PO# 2925-001-0D
CETCO ORDER(S)# 138155

CONTENTS:

1. DAILY GCL PRODUCTION CERTIFICATION
2. GCL MANUFACTURING CERTIFICATON AND TEST RESULTS
3. GCL MQA TRACKING FORM

000024

CETCO 4554

DAILY GEOSYNTHETIC CLAY LINER PRODUCTION CERTIFICATION

000025

CETCO 4554

GEOSYNTHETIC CLAY LINER MANUFACTURING CERTIFICATION

CETCO JOB:	GSE LINING TECHNOLOGY, INC.
	FLUOR DANIEL FERNALD
DATE:	PRE-CERTIFIED
ORDER(S)#:	138155
PRODUCT:	BENTOMAT ST

Colloid Environmental Technologies Company (CETCO) hereby affirms and certifies that all of the Geosynthetic Clay Liner (GCL) in this lot achieves the physical and chemical criteria listed on the attached analysis sheets.

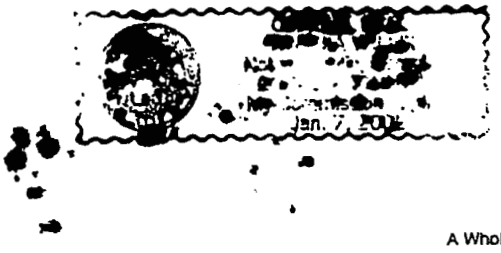
Alisa Findley

Alisa Findley
Quality Analysis Coordinator
CETCO-Fairmount, Georgia

Subscribed and sworn to before me this 16th day of March, 20 01.

Cynthia Willis

Notary Public



000026

CETCO 4554

BENTOMAT ST
MANUFACTURING CERTIFICATION

TO: Ms. Sheri Sim-Connell
GSE Lining Technology, Inc.
19103 Gundle Road
Houston, TX 77073

PROJECT: Fluor Daniel Fernald

ORDER #: Purchase Order #2925-001-0D, Order #6185 SO
CETCO Pre-Certified Order #138155

CETCO hereby affirms and certifies that Bentomat ST material supplied to this project will meet the physical criteria listed below:

PROPERTY	TEST METHOD	REQUIRED VALUE
Bentonite		
Free Swell	ASTM D 5890	24 min.
Fluid Loss	ASTM D 5891	18 max.
Finished Product		
Bentonite Mass/Area	ASTM D 5993*	0.80 lb/sq.ft. min.
Grab Strength	ASTM D 4632	90 lbs. MARV
Index Flux	ASTM D 5887	1 x 10(-8) m3/m2/sec (max.)
Peel Strength	ASTM D 4632(modified)	15 lbs. min.
Permeabilty	ASTM D 5084	max. 5 x 10(-9) cm/sec

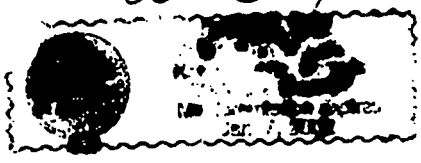
* Reported at 0% moisture content.

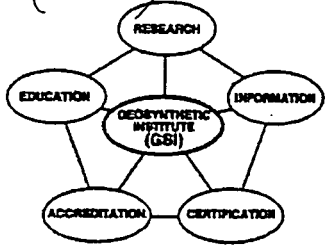
GAI Lab Accredited Test Methods were followed during conformance testing for :
ASTM D 5993 - Bentonite Mass/Area
ASTM D 4632 - Grab Strength and Grab Elongation

Alex Findley
CETCO-Fairmount, Georgia

Subscribed and sworn to before me this 16th day of March, 20 01.

Cynthia W. Oliver
Notary Public





A Wholly Owned Subsidiary of AMCOL International

Printed on recycled paper.

000027

4554

PACKING LIST

FD

TCO
00 WEST SHURE DRIVE
RLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 00136
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
FA-BENTOMAT ST	SFT SF	200110FA3	00000687	150.0	15.0	2250.0	2862.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000688	150.0	15.0	2250.0	2762.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000689	150.0	15.0	2250.0	2745.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000691	150.0	15.0	2250.0	2774.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000692	150.0	15.0	2250.0	2766.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000693	150.0	15.0	2250.0	2755.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000694	150.0	15.0	2250.0	2742.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000695	150.0	15.0	2250.0	2755.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000696	150.0	15.0	2250.0	2838.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000697	150.0	15.0	2250.0	2766.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000698	150.0	15.0	2250.0	2789.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000699	150.0	15.0	2250.0	2785.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000700	150.0	15.0	2250.0	2789.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000701	150.0	15.0	2250.0	2788.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000702	150.0	15.0	2250.0	2776.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000703	150.0	15.0	2250.0	2768.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000704	150.0	15.0	2250.0	2769.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000705	150.0	15.0	2250.0	2815.0
FA-BENTOMAT ST	SFT SF	200110FA3	00000706	150.0	15.0	2250.0	2769.0

000028

4554

PACKING LIST

CETCO
500 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO... 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
FA-BENTOMAT ST		SFT	SF	200110FA3	00000708	150.0	15.0	2250.0	3100.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000710	150.0	15.0	2250.0	2805.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000711	150.0	15.0	2250.0	2761.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000712	150.0	15.0	2250.0	2786.0
BENTOMAT ST		SFT	SF	200110FA3	00000713	150.0	15.0	2250.0	2750.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000714	150.0	15.0	2250.0	2751.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000715	150.0	15.0	2250.0	2961.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000725	150.0	15.0	2250.0	2777.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000726	150.0	15.0	2250.0	2738.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000727	150.0	15.0	2250.0	2740.0
FA BENTOMAT ST		SFT	SF	200110FA3	00000728	150.0	15.0	2250.0	2770.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000729	150.0	15.0	2250.0	2742.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000730	150.0	15.0	2250.0	2758.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000731	150.0	15.0	2250.0	2774.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000732	150.0	15.0	2250.0	2746.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000733	150.0	15.0	2250.0	2846.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000734	150.0	15.0	2250.0	2754.0
BENTOMAT ST		SFT	SF	200110FA3	00000735	150.0	15.0	2250.0	2770.0
BENTOMAT ST		SFT	SF	200110FA3	00000736	150.0	15.0	2250.0	2768.0

GCL-01-01

000029

38

4554

PACKING LIST

CEICO
500 WEST SHORE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138166
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 00136
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-00

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
FA-BENTOMAT ST		SFT	SF	200110FA3	00000737	150.0	15.0	2250.0	2755.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000738	150.0	15.0	2250.0	2760.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000739	150.0	15.0	2250.0	2751.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000740	150.0	15.0	2250.0	2728.0
BENTOMAT ST		SFT	SF	200110FA3	00000741	150.0	15.0	2250.0	2820.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000742	150.0	15.0	2250.0	2794.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000743	150.0	15.0	2250.0	2751.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000744	150.0	15.0	2250.0	2787.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000745	150.0	15.0	2250.0	2778.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000746	150.0	15.0	2250.0	2760.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000747	150.0	15.0	2250.0	2754.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000748	150.0	15.0	2250.0	2744.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000749	150.0	15.0	2250.0	2767.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000750	150.0	15.0	2250.0	2794.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000751	150.0	15.0	2250.0	2741.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000752	150.0	15.0	2250.0	2763.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000753	150.0	15.0	2250.0	2770.0
-BENTOMAT ST		SFT	SF	200110FA3	00000754	150.0	15.0	2250.0	2752.0
BENTOMAT ST		SFT	SF	200110FA3	00000755	150.0	15.0	2250.0	2727.0

000030

- 4554

PACKING LIST

ETCO
00 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSE LINING TECHNOLOGY. INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925 001 OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
FA-BENTOMAT ST		SFT	SF	200110FA3	00000756	150.0	15.0	2250.0	2784.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000757	150.0	15.0	2250.0	2784.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000758	150.0	15.0	2250.0	2793.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000759	150.0	15.0	2250.0	2871.0
BENTOMAT ST		SFT	SF	200110FA3	00000761	150.0	15.0	2250.0	2839.0
FA BENTOMAT ST		SFT	SF	200110FA3	00000762	150.0	15.0	2250.0	2800.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000763	150.0	15.0	2250.0	2851.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000765	150.0	15.0	2250.0	3014.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000766	150.0	15.0	2250.0	3363.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000767	150.0	15.0	2250.0	3265.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000768	150.0	15.0	2250.0	2794.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000769	150.0	15.0	2250.0	2801.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000770	150.0	15.0	2250.0	2828.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000771	150.0	15.0	2250.0	2787.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000772	150.0	15.0	2250.0	2875.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000773	150.0	15.0	2250.0	3024.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000774	150.0	15.0	2250.0	2818.0
BENTOMAT ST		SFT	SF	200110FA3	00000775	150.0	15.0	2250.0	2800.0
BENTOMAT ST		SFT	SF	200110FA3	00000776	150.0	15.0	2250.0	2788.0

GCL-01-02

000031

76

4554

PACKING LIST

ETCO
00 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
FA-BENTOMAT ST		SFT	SF	200110FA3	00000777	150.0	15.0	2250.0	2864.0
FA BENTOMAT ST		SFT	SF	200110FA3	00000779	150.0	15.0	2250.0	2878.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000780	150.0	15.0	2250.0	2948.0
FA BENTOMAT ST		SFT	SF	200110FA3	00000781	150.0	15.0	2250.0	2794.0
BENTOMAT ST		SFT	SF	200110FA3	00000782	150.0	15.0	2250.0	2866.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000783	150.0	15.0	2250.0	2974.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000784	150.0	15.0	2250.0	2765.0
FA BENTOMAT ST		SFT	SF	200110FA3	00000785	150.0	15.0	2250.0	2739.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000787	150.0	15.0	2250.0	2792.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000788	150.0	15.0	2250.0	2801.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000789	150.0	15.0	2250.0	2802.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000790	150.0	15.0	2250.0	2786.0
FA BENTOMAT ST		SFT	SF	200110FA3	00000791	150.0	15.0	2250.0	2829.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000792	150.0	15.0	2250.0	2860.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000793	150.0	15.0	2250.0	2861.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000794	150.0	15.0	2250.0	2844.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000795	150.0	15.0	2250.0	2790.0
BENTOMAT ST		SFT	SF	200110FA3	00000796	150.0	15.0	2250.0	2768.0
BENTOMAT ST		SFT	SF	200110FA3	00000798	150.0	15.0	2250.0	2733.0

000032

4554

PACKING LIST

ETCO
00 WEST SHURE DRIVE
RLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 00136
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
FA-BENTOMAT ST		SFT	SF	200110FA3	00000799	150.0	15.0	2250.0	2759.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000800	150.0	15.0	2250.0	2762.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000801	150.0	15.0	2250.0	2792.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000802	150.0	15.0	2250.0	2745.0
BENTOMAT ST		SFT	SF	200110FA3	00000803	150.0	15.0	2250.0	2851.0
FA BENTOMAT ST		SFT	SF	200110FA3	00000804	150.0	15.0	2250.0	2795.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000805	150.0	15.0	2250.0	2733.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000808	150.0	15.0	2250.0	2460.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000809	150.0	15.0	2250.0	2746.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000810	150.0	15.0	2250.0	2743.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000811	150.0	15.0	2250.0	2819.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000812	150.0	15.0	2250.0	2664.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000813	150.0	15.0	2250.0	2802.0
FA BENTOMAT ST		SFT	SF	200110FA3	00000814	150.0	15.0	2250.0	2803.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000815	150.0	15.0	2250.0	2870.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000816	150.0	15.0	2250.0	2806.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000817	150.0	15.0	2250.0	2825.0
BENTOMAT ST		SFT	SF	200110FA3	00000818	150.0	15.0	2250.0	2826.0
BENTOMAT ST		SFT	SF	200110FA3	00000819	150.0	15.0	2250.0	2830.0

GEL-01-03

000033

-- 4554

PACKING LIST

CEICO
00 WEST SHURE DRIVE
RLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
FA-BENTOMAT ST		SFT	SF	200110FA3	00000820	150.0	15.0	2250.0	2825.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000821	150.0	15.0	2250.0	2844.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000822	150.0	15.0	2250.0	2833.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000823	150.0	15.0	2250.0	2885.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000824	150.0	15.0	2250.0	2823.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000825	150.0	15.0	2250.0	2820.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000826	150.0	15.0	2250.0	2813.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000828	150.0	15.0	2250.0	2895.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000829	150.0	15.0	2250.0	2847.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000830	150.0	15.0	2250.0	2830.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000831	150.0	15.0	2250.0	2814.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000832	150.0	15.0	2250.0	2827.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000833	150.0	15.0	2250.0	2830.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000834	150.0	15.0	2250.0	2831.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000835	150.0	15.0	2250.0	2841.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000836	150.0	15.0	2250.0	2856.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000837	150.0	15.0	2250.0	2825.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000838	150.0	15.0	2250.0	2907.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000839	150.0	15.0	2250.0	2882.0

000034

4554

PACKING LIST

CETCO
500 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
FA BENTOMAT ST		SFT	SF	200110FA3	00000840	150.0	15.0	2250.0	2857.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000841	150.0	15.0	2250.0	2840.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000842	150.0	15.0	2250.0	2908.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000844	150.0	15.0	2250.0	2962.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000845	150.0	15.0	2250.0	2841.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000846	150.0	15.0	2250.0	2860.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000847	150.0	15.0	2250.0	2933.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000849	150.0	15.0	2250.0	3010.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000850	150.0	15.0	2250.0	2927.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000851	150.0	15.0	2250.0	2960.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000852	150.0	15.0	2250.0	2943.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000853	150.0	15.0	2250.0	2925.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000854	150.0	15.0	2250.0	2940.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000855	150.0	15.0	2250.0	2912.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000856	150.0	15.0	2250.0	2893.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000857	150.0	15.0	2250.0	2946.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000858	150.0	15.0	2250.0	3067.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000859	150.0	15.0	2250.0	2894.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000860	150.0	15.0	2250.0	2490.0

000035

4554

PACKING LIST

ETCO
500 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSF LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
FA-BENTOMAT ST		SFT	SF	200110FA3	00000862	150.0	15.0	2250.0	2677.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000863	150.0	15.0	2250.0	2617.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000864	150.0	15.0	2250.0	2780.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000865	150.0	15.0	2250.0	2904.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000866	150.0	15.0	2250.0	2927.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000867	150.0	15.0	2250.0	2815.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000868	150.0	15.0	2250.0	2986.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000869	150.0	15.0	2250.0	2937.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000870	150.0	15.0	2250.0	2873.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000871	150.0	15.0	2250.0	2871.0

GCL-01-04

ORDER TOTALS..... 364500.0 457123.0

TOTAL ITEMS..... 162

162

GCL QUALITY DATA

FAIRMOUNT CETCO

SHIP TO: FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
HARRISON OH

O R D E R # 000138155

MATERIAL	LOT No.	ROLL No	BENTONITE MASS/AREA 0.75 lb/sqft ASTM D 5993	GRAB STRENGTH 90 lbs ASTM D 4632	PEEL STRENGTH 15 lbs ASTM D 4632	FREE SWELL 24 ml/2g ASTM D 5890	FLUID LOSS 18ML MAX., ASTMD 5891
FA-BENTOMAT ST	200110FA3	00000871	.99	113.02	30.70	28.00	14.40
FA-BENTOMAT ST	200110FA3	00000870	.99	113.02	30.70	28.00	14.40
FA-BENTOMAT ST	200110FA3	00000869	.99	113.02	30.70	28.00	14.40
FA-BENTOMAT ST	200110FA3	00000868	.99	113.02	30.70	28.00	14.40
FA-BENTOMAT ST	200110FA3	00000867	.99	113.02	30.70	28.00	14.40
FA-BENTOMAT ST	200110FA3	00000866	.99	113.02	30.70	28.00	14.40
FA-BENTOMAT ST	200110FA3	00000865	.99	113.02	30.70	28.00	14.40
FA-BENTOMAT ST	200110FA3	00000864	.99	113.02	30.70	28.00	14.40
FA-BENTOMAT ST	200110FA3	00000863	.99	113.02	30.70	28.00	14.40
FA-BENTOMAT ST	200110FA3	00000862	.99*	113.02	30.70*	28.00*	14.40*
FA-BENTOMAT ST	200110FA3	00000860	.96	113.02	16.70	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000859	.96	113.02	16.70	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000858	.96	113.02	16.70	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000857	.96	113.02	16.70	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000856	.96	113.02	16.70	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000855	.96	113.02	16.70	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000854	.96	113.02	16.70	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000853	.96*	113.02	16.70*	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000852	.97	113.02	25.00	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000851	.97	113.02	25.00	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000850	.97	113.02	25.00	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000849	.97	113.02	25.00	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000847	.97	113.02	25.00	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000846	.97	113.02	25.00	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000845	.97	113.02	25.00	28.10	15.60
FA-BENTOMAT ST	200110FA3	00000844	.97*	113.02	25.00*	28.10*	15.60*
FA-BENTOMAT ST	200110FA3	00000842	.99	113.02	20.20	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000841	.99	113.02	20.20	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000840	.99	113.02	20.20	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000839	.99	113.02	20.20	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000838	.99	113.02	20.20	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000837	.99*	113.02	20.20*	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000836	.96	113.02	27.10	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000835	.96	113.02	27.10	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000834	.96	113.02	27.10	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000833	.96	113.02	27.10	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000832	.96	113.02	27.10	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000831	.96	113.02	27.10	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000830	.96	113.02	27.10	28.00	14.80

000037

4554

QCG#FT2 QCT#FT2
3/19/01 10:20:35

CETCO

GCL QUALITY DATA

FAIRMOUNT CETCO

SHIP TO: FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
HARRISON OH

O R D E R # 000138155

MATERIAL	LOT No.	ROLL No	BENTONITE MASS/AREA 0.75 lb/sqft ASTM D 5993	GRAB STRENGTH 90 lbs ASTM D 4632	PEEL STRENGTH 15 lbs ASTM D 4632	FREE SWELL 24 ml/2g ASTM D 5890	FLUID LOSS 18ML MAX. ASTMD 5891
FA-BENTOMAT ST	200110FA3	00000829	.96	113.02	27.10	28.00	14.80
FA-BENTOMAT ST	200110FA3	00000828	.96*	113.02	27.10*	28.00*	14.80*
FA-BENTOMAT ST	200110FA3	00000826	.98	113.02	34.00	30.00	14.40
FA-BENTOMAT ST	200110FA3	00000825	.98	113.02	34.00	30.00	14.40
FA-BENTOMAT ST	200110FA3	00000824	.98	113.02	34.00	30.00	14.40
FA-BENTOMAT ST	200110FA3	00000823	.98*	113.02	34.00*	30.00	14.40
FA-BENTOMAT ST	200110FA3	00000822	.92	113.02	35.00	30.00	14.40
FA-BENTOMAT ST	200110FA3	00000821	.92	113.02	35.00	30.00	14.40
FA-BENTOMAT ST	200110FA3	00000820	.92	113.02	35.00	30.00	14.40
FA-BENTOMAT ST	200110FA3	00000819	.92	113.02	35.00	30.00	14.40
FA-BENTOMAT ST	200110FA3	00000818	.92	113.02	35.00	30.00	14.40
FA-BENTOMAT ST	200110FA3	00000817	.92	113.02	35.00	30.00	14.40
FA-BENTOMAT ST	200110FA3	00000816	.92	113.02	35.00	30.00	14.40
FA-BENTOMAT ST	200110FA3	00000815	.92*	113.02	35.00*	30.00*	14.40*
FA-BENTOMAT ST	200110FA3	00000814	.86	113.02	30.80	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000813	.86	113.02	30.80	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000812	.86	113.02	30.80	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000811	.86	113.02	30.80	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000810	.86	113.02	30.80	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000809	.86	113.02	30.80	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000808	.86	113.02	30.80	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000805	.86*	113.02	30.80*	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000804	.92	113.02	28.70	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000803	.92	113.02	28.70	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000802	.92	113.02	28.70	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000801	.92	113.02	28.70	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000800	.92	113.02	28.70	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000799	.92	113.02	28.70	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000798	.92	113.02	28.70	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000796	.92	113.02	28.70	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000795	.92*	113.02*	28.70*	29.00*	14.80*
FA-BENTOMAT ST	200110FA3	00000794	.94	107.74	31.70	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000793	.94	107.74	31.70	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000792	.94	107.74	31.70	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000791	.94	107.74	31.70	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000790	.94	107.74	31.70	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000789	.94	107.74	31.70	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000788	.94	107.74	31.70	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000787	.94*	107.74	31.70*	25.00	14.40

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GCL QUALITY DATA

FAIRMOUNT CETCO

SHIP TO: FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
HARRISON OH

O R D E R # 000138155

MATERIAL	LOT No.	ROLL No	BENTONITE MASS/AREA 0.75 lb/sqft ASTM D 5993	GRAB STRENGTH 90 lbs ASTM D 4632	PEEL STRENGTH 15 lbs ASTM D 4632	FREE SWELL 24 ml/2g ASTM D 5890	FLUID LOSS 18ML MAX. ASTMD 5891
FA-BENTOMAT ST	200110FA3	00000785	.90	107.74	20.10	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000784	.90	107.74	20.10	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000783	.90	107.74	20.10	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000782	.90	107.74	20.10	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000781	.90	107.74	20.10	25.00	14.40
FA-BENTOMAT ST	200110FA3	00000780	.90*	107.74	20.10*	25.00*	14.40*
FA-BENTOMAT ST	200110FA3	00000779	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000777	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000776	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000775	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000774	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000773	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000772	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000771	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000770	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000769	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000768	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000767	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000766	.95	107.74	26.20	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000765	.95*	107.74	26.20*	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000763	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000762	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000761	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000759	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000758	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000757	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000756	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000755	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000754	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000753	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000752	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000751	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000750	.96	107.74	28.60	24.00	14.80
FA-BENTOMAT ST	200110FA3	00000749	.96	107.74	28.60*	24.00*	14.80*
FA-BENTOMAT ST	200110FA3	00000748	.96	107.74	33.80	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000747	.96	107.74	33.80	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000746	.96	107.74	33.80	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000745	.96	107.74	33.80	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000744	.96	107.74	33.80	28.00	14.00

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GCL QUALITY DATA

FAIRMOUNT CETCO

SHIP TO: FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
HARRISON OH

O R D E R # 000136155

MATERIAL	LOT No.	ROLL No	BENTONITE MASS/AREA 0.75 lb/sqft ASTM D 5993	GRAB STRENGTH 90 lbs ASTM D 4632	PEEL STRENGTH 15 lbs ASTM D 4632	FREE SWELL 24 ml/2g ASTM D 5890	FLUID LOSS 18ML MAX. ASTMD 5891
FA-BENTOMAT ST	200110FA3	00000743	.96	107.74	33.80	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000742	.96	107.74	33.80	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000741	.96*	107.74	33.80*	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000740	.87	107.74	33.60	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000739	.87	107.74	33.60	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000738	.87	107.74	33.60	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000737	.87	107.74	33.60	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000736	.87	107.74	33.60	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000735	.87	107.74	33.60	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000734	.87	107.74	33.60	28.00	14.00
FA-BENTOMAT ST	200110FA3	00000733	.87*	107.74	33.60*	28.00*	14.00*
FA-BENTOMAT ST	200110FA3	00000732	.91	107.74	31.00	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000731	.91	107.74	31.00	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000730	.91	107.74	31.00	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000729	.91	107.74	31.00	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000728	.91	107.74	31.00	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000727	.91	107.74	31.00	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000726	.91	107.74	31.00	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000725	.91	107.74	31.00	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000715	.91*	107.74	31.00*	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000714	.84	132.50	21.40	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000713	.84	132.50	21.40	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000712	.84	132.50	21.40	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000711	.84	132.50	21.40	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000710	.84	132.50	21.40	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000708	.84	132.50	21.40	29.00	14.80
FA-BENTOMAT ST	200110FA3	00000706	.84	132.50	21.40*	29.00*	14.80*
FA-BENTOMAT ST	200110FA3	00000705	.84	132.50	19.80	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000704	.84	132.50	19.80	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000703	.84	132.50	19.80	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000702	.84	132.50	19.80	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000701	.84	132.50	19.80	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000700	.84	132.50	19.80	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000699	.84	132.50	19.80	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000698	.84	132.50	19.80	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000697	.84	132.50	19.80	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000696	.84	132.50	19.80	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000695	.84*	132.50*	19.80*	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000694	.89	101.40	25.60	27.00	14.40

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GCL QUALITY DATA

FAIRMOUNT CETCO

SHIP TO: FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
HARRISON OH

O R D E R # 000138155

MATERIAL	LOT No.	ROLL No	BENTONITE MASS/AREA 0.75 lb/sqft ASTM D 5993	GRAB STRENGTH 90 lbs ASTM D 4632	PEEL STRENGTH 15 lbs ASTM D 4632	FREE SWELL 24 ml/2g ASTM D 5890	FLUID LOSS 18ML MAX. ASTMD 5891
FA-BENTOMAT ST	200110FA3	00000693	.89	101.40	25.60	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000692	.89	101.40	25.60	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000691	.89	101.40	25.60	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000689	.89	101.40	25.60	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000688	.89	101.40	25.60	27.00	14.40
FA-BENTOMAT ST	200110FA3	00000687	.89*	101.40	25.60*	27.00*	14.40*

NOTE:

An asterisk indicates the actual test done on the roll and the roll tested.
If an asterisk is not present, test results are based on the previous roll tested.
Mass Area and Moisture content are tested a minimum of every 40,000sf.
Grab Strength is tested a minimum of every 200,000sf.
Bentonite Mass/Area is reported at 0% moisture cont ent.
Grab Elongation is tested a minimum of every 200,000sf.

*** End of Report ***

CETCO -- 4554
COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY
1500 W. Shure Dr. Arlington Heights, Illinois 60004 USA
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www.cetco.com

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FAX
COVER PAGE

To: Sheri Sim Connell
Chuck Van Arsdale
From: Bill Urchik

Company: CETCO

No. Pages: 6– including cover

Date: April 10, 2001

Fax: 1-281-230-5891
1-513-648-4528
Fax: 847-506-6150
Ph: 800-527-9948

Comments:

Attached is the QC analysis with the moisture contents included. I have been informed by Precision laboratories, that the remaining permeability result will be reported later this week.

Best Regards,

Bill Urchik
Product Development Engineer
CETCO
burch@cetco.com

RC	BENTONITE MASS/AREA 0.75 lb/sq/ft ASTM D 5993	GRAB STRENGTH 90 lbs ASTM D 4632	PEEL STRENGTH 15 lbs ASTM D 4632	MOISTURE 25% Typical ASTM D 4643	FREE SWELL 24 ml/2g ASTM D 5890	FLUID LOSS 18ML MAX. ASTMD 5891
000000A7X	.99	113.02	30.70	23.00	28.00	14.40
000000A6X	.99	113.02	30.70	23.00	28.00	14.40
000000A5X	.99	113.02	30.70	23.00	28.00	14.40
000000A4X	.99	113.02	30.70	23.00	28.00	14.40
000000A3X	.99	113.02	30.70	23.00	28.00	14.40
000000A2X	.99	113.02	30.70	23.00	28.00	14.40
000000A1X	.99	113.02	30.70	23.00	28.00	14.40
000000A0X	.99	113.02	30.70	23.00	28.00	14.40
000000A9X	.99	113.02	30.70	23.00	28.00	14.40
000000A8X	.99	113.02	30.70	23.00	28.00	14.40
000000A7X	.99	113.02	30.70	23.00	28.00	14.40
000000A6X	.99	113.02	30.70	23.00	28.00	14.40
000000A5X	.99	113.02	30.70	23.00	28.00	14.40
000000A4X	.99	113.02	30.70	23.00	28.00	14.40
000000A3X	.99	113.02	30.70	23.00	28.00	14.40
000000A2X	.99*	113.02	30.70*	23.00*	28.00*	14.40*
000000A0	.96	113.02	14.70	24.00	28.10	15.60
000000A9	.96	113.02	14.70	24.00	28.10	15.60
000000A8	.96	113.02	14.70	24.00	28.10	15.60
000000A7	.96	113.02	14.70	24.00	28.10	15.60
000000A6	.96	113.02	14.70	24.00	28.10	15.60
000000A5	.96	113.02	14.70	24.00	28.10	15.60
000000A4	.96	113.02	14.70	24.00	28.10	15.60
000000A3	.96	113.02	14.70	24.00	28.10	15.60
000000A2	.96*	113.02	14.70*	24.00*	28.10	15.60
000000A1	.97	113.02	25.00	21.61	28.10	15.60
000000A0	.97	113.02	25.00	21.61	28.10	15.60
000000A9	.97	113.02	25.00	21.61	28.10	15.60
000000A8	.97	113.02	25.00	21.61	28.10	15.60
000000A7	.97	113.02	25.00	21.61	28.10	15.60
000000A6	.97	113.02	25.00	21.61	28.10	15.60
000000A5	.97	113.02	25.00	21.61	28.10	15.60
000000A4	.97	113.02	25.00	21.61	28.10	15.60
000000A3	.97*	113.02	25.00*	21.61*	28.10*	15.60*
000000A2	.99	113.02	20.20	21.60	28.00	14.80
000000A1	.99	113.02	20.20	21.60	28.00	14.80
000000A0	.99	113.02	20.20	21.60	28.00	14.80
000000E9	.99	113.02	20.20	21.60	28.00	14.80
000000E8	.99	113.02	20.20	21.60	28.00	14.80
000000E7	.99	113.02	20.20	21.60	28.00	14.80
000000E6	.99*	113.02	20.20*	21.60*	28.00	14.80
000000E5	.96	113.02	27.10	21.70	28.00	14.80
000000E4	.96	113.02	27.10	21.70	28.00	14.80
000000E3	.96	113.02	27.10	21.70	28.00	14.80
000000E2	.96	113.02	27.10	21.70	28.00	14.80
000000E1	.96	113.02	27.10	21.70	28.00	14.80
000000E0	.96	113.02	27.10	21.70	28.00	14.80
000000D9	.96	113.02	27.10	21.70	28.00	14.80
000000D8	.96	113.02	27.10	21.70	28.00	14.80

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Lot	Roll No.	BENTONITE MASS/AREA 0.75 lb/sqft ASTM D 5993	GRAB STRENGTH 90 lbs ASTM D 4632	PEEL STRENGTH 19 lbs ASTM D 4632	MOISTURE 25% Typical ASTM D 4643	FREE SWELL 24 ml/2g ASTM D 5890	FLUID LOSS 18ML MAX ASTM D 5891
0FA3	00000000	.96	113.02	27.10	21.70	24.00	14.80
0FA3	00000828	.96*	113.02	27.10*	[illegible]	[illegible]	[illegible]
0FA3	00000827	.98	113.02	34.00	22.10	30.00	14.40
0FA3	00000825	.98	113.02	34.00	22.10	30.00	14.40
0FA3	00000824	.98	113.02	34.00	22.10	30.00	14.40
0FA3	00000823	.98*	113.02	34.00*	22.10*	30.00	14.40
0FA3	00000822	.92	113.02	35.00	23.80	30.00	14.40
0FA3	00000821	.92	113.02	35.00	23.80	30.00	14.40
0FA3	00000820	.92	113.02	35.00	23.80	30.00	14.40
0FA3	00000819	.92	113.02	35.00	23.80	30.00	14.40
0FA3	00000818	.92	113.02	35.00	23.80	30.00	14.40
0FA3	00000817	.92	113.02	35.00	23.80	30.00	14.40
0FA3	00000816	.92	113.02	35.00	23.80	30.00	14.40
0FA3	00000815	.92*	113.02	35.00*	23.80*	30.00*	14.40*
0FA3	00000814	.86	113.02	30.80	22.90	29.00	14.80
0FA3	00000813	.86	113.02	30.80	22.90	29.00	14.80
0FA3	00000812	.86	113.02	30.80	22.90	29.00	14.80
0FA3	00000811	.86	113.02	30.80	22.90	29.00	14.80
0FA3	00000810	.86	113.02	30.80	22.90	29.00	14.80
0FA3	00000809	.86	113.02	30.80	22.90	29.00	14.80
0FA3	00000808	.86	113.02	30.80	22.90	29.00	14.80
0FA3	00000807	.86*	113.02	30.80*	22.90*	29.00	14.80
0FA3	00000806	.92	113.02	28.70	22.60	29.00	14.60
0FA3	00000805	.92	113.02	28.70	22.60	29.00	14.60
0FA3	00000804	.92	113.02	28.70	22.60	29.00	14.60
0FA3	00000803	.92	113.02	28.70	22.60	29.00	14.60
0FA3	00000802	.92	113.02	28.70	22.60	29.00	14.60
0FA3	00000801	.92	113.02	28.70	22.60	29.00	14.60
0FA3	00000800	.92	113.02	28.70	22.60	29.00	14.60
0FA3	00000799	.92	113.02	28.70	22.60	29.00	14.60
0FA3	00000798	.92	113.02	28.70	22.60	29.00	14.60
0FA3	00000797	.92	113.02	28.70	22.60	29.00	14.60
0FA3	00000796	.92*	113.02*	28.70*	22.60*	29.00*	14.60*
0FA3	00000795	.94	107.74	31.70	25.00	25.00	14.40
0FA3	00000794	.94	107.74	31.70	25.00	25.00	14.40
0FA3	00000793	.94	107.74	31.70	25.00	25.00	14.40
0FA3	00000792	.94	107.74	31.70	25.00	25.00	14.40
0FA3	00000791	.94	107.74	31.70	25.00	25.00	14.40
0FA3	00000790	.94	107.74	31.70	25.00	25.00	14.40
0FA3	00000789	.94	107.74	31.70	25.00	25.00	14.40
0FA3	00000788	.94	107.74	31.70	25.00	25.00	14.40
0FA3	00000787	.94*	107.74	31.70*	25.00	25.00	14.40

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No.	ROLL No	BENTONITE MASS/AREA 0.75-lb/sq.ft ASTM D 5993	GRAB STRENGTH 90 lbs ASTM D 4632	PEEL STRENGTH 15 lbs ASTM D 4632	MOISTURE 25% Typical ASTM D 4643	FREE SWELL 24 ml/2g ASTM D 5890	FLUID LOSS 18ML MAX. ASTMD 5891
110FA3	00000785	.90	107.74	20.10	25.00	26.00	14.40
110FA3	00000784	.90	107.74	20.10	25.00	25.00	14.40
110FA3	00000783	.90	107.74	20.10	25.00	25.00	14.40
110FA3	00000782	.90	107.74	20.10	25.00	25.00	14.40
110FA3	00000781	.90	107.74	20.10	25.00	25.00	14.40
110FA3	00000780	.90*	107.74	20.10*	25.00*	25.00*	14.40*
110FA3	00000779	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000777	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000776	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000775	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000774	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000773	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000772	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000771	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000770	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000769	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000768	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000767	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000766	.95	107.74	26.20	24.60	24.00	14.80
110FA3	00000765	.95*	107.74	26.20*	24.60*	24.00	14.80
110FA3	00000763	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000762	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000761	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000759	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000758	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000757	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000756	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000755	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000754	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000753	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000752	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000751	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000750	.96	107.74	28.60	22.00	24.00	14.80
110FA3	00000749	.96	107.74	28.60*	22.00	24.00*	14.80*
110FA3	00000748	.96	107.74	33.80	22.00	26.00	14.00
110FA3	00000747	.96	107.74	33.80	28.00	26.00	14.00
110FA3	00000746	.96	107.74	33.80	22.00	26.00	14.00
110FA3	00000745	.96	107.74	33.80	22.00	26.00	14.00
110FA3	00000744	.96	107.74	33.80	22.00	26.00	14.00
110FA3	00000743	.96	107.74	33.80	22.00	26.00	14.00

T-No	ROLL No.	BENTONITE MASS/AREA 0.75 lb/sqft ASTM D 5993	GRAB STRENGTH 90 lbs ASTM D 4632	PEEL STRENGTH 15 lbs ASTM D 4632	MOISTURE 12% Typical ASTM D 4643	FREE SWELL 24 ml/2g ASTM D 5890	FLUID LOSS 14ml MAX ASTMD 5891
110FA3	00000743	.96	107.74	33.60	28.00	26.00	14.00
110FA3	00000742	.96	[illegible]	33.60	28.00	26.00	14.00
110FA3	00000741	.96*	107.74	33.60*	22.00*	28.00	14.00
110FA3	00000740	.87	107.74	33.60	25.00	28.00	14.00
110FA3	00000739	.87	107.74	33.60	25.00	28.00	14.00
110FA3	00000738	.87	107.74	33.60	25.00	28.00	14.00
110FA3	00000737	.87	107.74	33.60	25.00	28.00	14.00
110FA3	00000736	.87	107.74	33.60	25.00	28.00	14.00
110FA3	00000735	.87	107.74	33.60	25.00	28.00	14.00
110FA3	00000734	.87	107.74	33.60	25.00	28.00	14.00
110FA3	00000733	.87*	107.74	33.60*	25.00*	28.00*	14.00*
110FA3	00000732	.91	107.74	31.00	24.90	29.00	14.80
110FA3	00000731	.91	107.74	31.00	24.90	29.00	14.80
110FA3	00000730	.91	107.74	31.00	24.90	29.00	14.80
110FA3	00000729	.91	107.74	31.00	24.90	29.00	14.80
110FA3	00000728	.91	107.74	31.00	24.90	29.00	14.80
110FA3	00000727	.91	107.74	31.00	24.90	29.00	14.80
110FA3	00000726	.91	107.74	31.00	24.90	29.00	14.80
110FA3	00000725	.91*	107.74	31.00*	24.90*	29.00	14.80
110FA3	00000724	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000723	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000722	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000721	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000720	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000719	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000718	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000717	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000716	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000715	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000714	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000713	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000712	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000711	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000710	.84	132.50	21.40	24.20	29.00	14.80
110FA3	00000709	.84	132.50	21.40*	24.20	29.00*	14.80*
110FA3	00000708	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000707	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000706	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000705	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000704	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000703	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000702	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000701	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000700	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000699	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000698	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000697	.84	132.50	19.80	24.20	27.00	14.40
110FA3	00000696	.84*	132.50*	19.80*	24.20*	27.00	14.40
110FA3	00000695	.89	101.40	25.60	25.00	27.00	14.40
110FA3	00000694	.89	101.40	25.60	25.00	27.00	14.40

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TABLE 1.

MATERIAL PROPERTIES

CLIENT: CETCO

PROJECT: FERNALD

Date Received: **3/7/01**
Date Reported: **3/29/01**
Client Sample ID: **Roll 687 Lot 200110FA3**
Material Description: **GCL**

QC'd By:
PGL Job No.: **010185**
PGL Control No.: **69533**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Proj. Specs.
ASTM D5887	Index Flux (cm./sec.) *(Confining Stress = 5 psi)*													
		3.7E-09										3.7E-09	N/A	
ASTM D4595	Wide- width Strip Tensile													
	Tensile Strength (lbs/ in.)													
	MD	71	58	70	61	69	59					65	6	
	TD	85	107	88	109	87	104					97	11	
	Elongation at Break (percent)													
	MD	13	11	13	11	13	11					12	1	
	TD	9	12	12	13	11	13					12	1	

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MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

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TABLE 2.

MATERIAL PROPERTIES

CLIENT: CETCO

PROJECT: FERNALD

Date Received: 3/7/01
Date Reported: 3/29/01
Client Sample ID: Roll 708 Lot 200110FA3
Material Description: GCL

QC'd By: [illegible]
PGL Job No. : 010185
PGL Control No. : 69534

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Proj. Specs.
ASTM D5887	Index Flux (cm./sec.) *(Confining Stress = 5 psi)*													
		3.3E-09										3.3E-09	N/A	
ASTM D4595	Wide- width Strip Tensile													
	Tensile Strength (lbs/ in.)													
	MD	37	32	37	36	35	35					35	2	
	TD	52	44	49	46	50	43					47	4	
	Elongation at Break (percent)													
	MD	8	7	9	8	8	8					8	1	
	TD	7	6	7	6	6	6					6	0	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

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TABLE 3.

MATERIAL PROPERTIES

CLIENT: CETCO

PROJECT: FERNALD

Date Received: 3/8/01
Date Reported: 3/29/01
Client Sample ID: Roll 733 Lot 200110FA3
Material Description: GCL

QC'd By: [illegible]
PGL Job No. : 010185
PGL Control No. : 69542

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Proj. Specs.
ASTM D5887	Index Flux (cm./sec.) *(Confining Stress = 5 psi)*													
		3.7E-09										3.7E-09	N/A	
ASTM D4595	Wide- width Strip Tensile													
	Tensile Strength (lbs/ in.)													
	MD	58	67	56	67	53	63					61	6	
	TD	71	73	70	74	70	72					72	2	
	Elongation at Break (percent)													
	MD	11	13	11	12	11	12					12	1	
	TD	9	10	9	9	9	9					9	0	

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MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

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TABLE 4.

MATERIAL PROPERTIES

CLIENT: CETCO

PROJECT: FERNALD

Date Received: 3/8/01
Date Reported: 3/29/01
Client Sample ID: Roll 750 Lot 200110FA3
Material Description: GCL

QC'd By: [signature]
PGL Job No. : 010185
PGL Control No. : 69543

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Proj. Specs.
ASTM D5887	Index Flux (cm./sec.) *(Confining Stress = 5 psi)*													
		3.4E-09										3.4E-09	N/A	
ASTM D4595	Wide- width Strip Tensile													
	Tensile Strength (lbs/ in.)													
	MD	71	68	72	69	71	66					70	2	
	TD	91	94	96	95	95	94					94	2	
	Elongation at Break (percent)													
	MD	15	13	14	13	13	13					14	1	
	TD	11	11	12	12	12	11					11	0	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

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TABLE 5.

MATERIAL PROPERTIES

CLIENT: CETCO

PROJECT: FERNALD

Date Received: 3/9/01
Date Reported: 3/29/01
Client Sample ID: Roll 780 Lot 200110FA3
Material Description: GCL

QC'd By: [illegible]
PGL Job No. : 010185
PGL Control No. : 69574

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Proj. Specs.
ASTM D5887	Index Flux (cm./sec.) *(Confining Stress = 5 psi)*													
		2.4E-09										2.4E-09	N/A	
ASTM D4595	Wide- width Strip Tensile													
	Tensile Strength (lbs/ in.)													
	MD	55	57	56	56	58	56					56	1	
	TD	68	63	72	67	72	64					67	4	
	Elongation at Break (percent)													
	MD	11	11	11	11	11	11					11	0	
	TD	8	8	9	8	9	8					8	1	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

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TABLE 6.

MATERIAL PROPERTIES

CLIENT: CETCO

PROJECT: FERNALD

Date Received: 3/9/01
Date Reported: 3/29/01
Client Sample ID: Roll 795 Lot 200110FA3
Material Description: GCL

QC'd By: SM
PGL Job No.: 010185
PGL Control No.: 69575

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Proj. Specs.
ASTM D5887	Index Flux (cm./sec.) *(Confining Stress = 5 psi)*													
		3.7E-09										3.7E-09		
ASTM D4595	Wide- width Strip Tensile													
	Tensile Strength (lbs/ in.)													
	MD	45	47	46	46	48	43					46	2	
	TD	67	63	67	60	67	60					64	3	
	Elongation at Break (percent)													
	MD	9	9	9	9	10	9					9	0	
	TD	9	8	8	9	9	9					9	0	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

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TABLE 7.

MATERIAL PROPERTIES

CLIENT: CETCO

PROJECT: FERNALD

Date Received: 3/9/01
Date Reported: 3/29/01
Client Sample ID: Roll 815 Lot 200110FA3
Material Description: GCL

QC'd By: [signature]
PGL Job No. : 010185
PGL Control No. : 69576

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Proj. Specs.
ASTM D5887	Index Flux (cm./sec.) *(Confining Stress = 5 psi)*													
		3.8E-09										3.8E-09		
ASTM D4595	Wide- width Strip Tensile													
	Tensile Strength (lbs/ in.)													
	MD	60	67	60	68	62	69					64	4	
	TD	80	76	78	77	77	72					76	3	
	Elongation at Break (percent)													
	MD	12	13	12	13	12	14					13	1	
	TD	11	11	10	9	10	10					10	1	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

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TABLE 8.

MATERIAL PROPERTIES

CLIENT: CETCO

PROJECT: FERNALD

Date Received: 3/9/01
Date Reported: 3/29/01
Client Sample ID: Roll 828 Lot 200110FA3
Material Description: GCL

QC'd By: [illegible]
PGL Job No. : 010185
PGL Control No. : 69577

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Proj. Specs.
ASTM D5887	Index Flux (cm./sec.) *(Confining Stress = 5 psi)*													
		3.0E-09										3.0E-09		
ASTM D4595	Wide- width Strip Tensile													
	Tensile Strength (lbs/ in.)													
	MD	36	38	39	39	35	37					37	2	
	TD	49	49	46	46	45	47					47	2	
	Elongation at Break (percent)													
	MD	8	9	9	9	9	9					9	0	
	TD	6	7	7	8	8	8					7	1	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

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TABLE 9.

MATERIAL PROPERTIES

CLIENT: CETCO

PROJECT: FERNALD

Date Received: 3/12/01
Date Reported: 3/29/01
Client Sample ID: Roll 844 Lot 200110FA3
Material Description: GCL

QC'd By:
PGL Job No. : 010185
PGL Control No. : 69585

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Proj. Specs.
ASTM D5887	Index Flux (cm./sec.) *(Confining Stress = 5 psi)*													
		2.9E-09										2.9E-09		
ASTM D4595	Wide- width Strip Tensile													
	Tensile Strength (lbs/ in.)													
	MD	61	72	66	72	62	71					67	5	
	TD	80	79	83	78	84	79					81	3	
	Elongation at Break (percent)													
	MD	14	15	14	15	14	14					14	1	
	TD	10	10	10	9	10	10					10	0	

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MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

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GSE

GSE

DATE: 16 APRIL, 2001

NUMBER OF PAGES INCLUDING COVER SHEET 3

TO: JIM TURNER
FLUOR FERNALD, INC.
PHONE: 513 – 648 - 4941
FAX: 513 – 648 - 5767
PROJECT Fluor Fernald, Inc. (S.O. 6185 – 502302)

CC:

FROM: JOHN DAVID GRIFFIN
TECHNICAL SUPERVISOR
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD
HOUSTON, TX 77073
PHONE: 800 – 435 – 2008 EXT. 5851
FAX: 281 – 230 – 8651
E-MAIL: jgriffin@gseworld.com

REMARKS: ☐ URGENT ☒ FOR YOUR REVIEW ☐ REPLY ASAP ☐ PLEASE COMMENT

TABLE 1.
MATERIAL PROPERTIES
CLIENT: CETCO
PROJECT: FERNALD

Date Received: 3/29/01
Date Reported: 4/2/01
Client Sample ID: Roll 860 Lot 200110FA3
Material Description: GCL

QC'd By:
PGL Job No.: 010232
PGL Control No.: 69793

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Proj. Specs.
ASTM D5887	Index Flux (cm./sec.)	(Confining Stress = 5 psi)												
"	4.87E-09											4.87E-09		
ASTM D4595	Wide-width Strip Tensile													
	Tensile Strength (lbs/in.)													
	MD	81	77	81	76	79	77					78	2	
	TD	84	85	86	90	83	88					86	2	
	Elongation at Break (percent)													
	MD	17	16	16	16	18	15					16	1	
	TD	14	14	14	14	14	14					14	0	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

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Precision Geosynthetic Laboratories

RECEIVED APR 17 2001

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TABLE 2.
MATERIAL PROPERTIES
CLIENT: CETCO
PROJECT: FERNALD

Date Received: 3/29/01
Date Reported: 4/2/01
Client Sample ID: Roll 853 Lot 200110FA3
Material Description: GCL

QC'd By: [illegible]
PGL Job No.: 010232
PGL Control No.: 69794

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std Dev	Rpt Spec
ASTM D4595	Wide-width Strip Tensile													
	Tensile Strength (lbs/in.)													
	MD	36	37	35	37	34	37					36	1	
	TD	47	46	32	46	42	45					43	5	
	Elongation at Break (percent)													
	MD	8	8	8	8	8	8					8	0	
	TD	6	6	6	6	6	6					6	0	

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MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

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Wentz, Denise

From: Turner, Jim
Sent: Friday, May 04, 2001 1:03 PM
To: Wentz, Denise
Subject: Please add this to the last submittal package I brought over

Importance: High

-----Original Message-----
From: Bill Urchik [mailto:burch@cetco.com]
Sent: Monday, April 30, 2001 1:58 PM
To: Vanarsdale, Chuck
Cc: JD Griffin
Subject: RE: GCL testing

Chuck,

Per our discussion last week regarding a Moisture Content and Bentonite Content result between rolls #746 and #758, her is the result:

Roll # 756 Bentonite Content : 0.94 lbs/sqft Moisture Content: 24.60 %

I can fax the result if required, however it is very difficult to read because of the small text.

Best Regards,

Bill Urchik

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20102	CONTRACT NO: 1440	SUBMITTAL NO.: 20102-1440/1-02772P-012	REV.: 0	DATE: 04 May 2001	Page ___ of ___

FROM: ~~Colloid Environmental Technologies Company, Inc. (CETCO)~~ JT 5-4-01
GSE Lining Technologies

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

SIGNATURE: James T. Turner for J.D. Griffin GSE Lining Technologies

RECEIVED BY: Denise Wentz DATE: 5/4/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1440-OPT1-02772P-012	0						X			Internal and Interface Shear Strength Test Results for Each GCL Lot		X		02772P.1.04.B	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
[redacted]	[redacted]				
Chuck Van Arsdale	64				
Kwasi Badui-Tweneboah	38				
Bill Zeblck	64				

NO COMMENTS: ✓ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: DATE: 08 May 2001
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

ORIGINAL

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FS-F-4955
Rev. 3: 05/14/1999 CT-2.4.2

INSTRUCTIONS FOR COMPLETING THE SUPPLIER DOCUMENT SUBMITTAL:

Supplier Submittal Instructions

1 Enter the FDF project number or CWO number.

2 Enter the Contract number.

3 Enter the Submittal number.

4 Enter Submittal revision number.

5 Enter the date the Submittal was prepared.

6 Enter Page Number(s) of submittal.

7 Enter name and address of the Organization submitting the documents and signature of the individual preparing the Submittal.

8 (FDF) ECDC will verify correctness and sign and date stamp receipt of submittal.

9 Enter the quantity of each document submitted to FDF.

10 Enter unique identification number for each document.

11 Enter the revision of each document listed on submittal.

12 Check the appropriate Document Family identified by the Submittal Register.

13 Enter the title and/or a brief description for each document.

14 Enter an "X" in the appropriate SUBMITTAL TYPE column for each document listed on the submittal.

15 Enter the specification number associated with each document.

16 (FDF) ECDC will check the Submittal Action Code from the sticker attached to the submittal by the reviewer.

17 (FDF) ECDC will enter the Approver and Reviewers of the listed documents per the Master Submittal Distribution List.

18 (FDF) ECDC will enter the mail stop for the personnel listed in block 17 of the submittal.

19 (FDF) If no comments enter (X) in block, **OR** List any discrepancies: (ie; documents, revision numbers, quantities, missing documents, etc.;) and any other comments deemed necessary and applicable to the submittal.

20 Sign and Date. Return to ECDC, MS 52-7.

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CETCO
COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY
1500 W. Shure Dr. Arlington Heights, Illinois 60004 USA
Phone: +1-847-392-5800 • Fax: +1-847-506-6150
www.cetco.com

Attn: J.D. Griffin – GSE
c.c. Jim Turner

Re: MQC test results for Fernald Project

Date: April 18, 2001

From: William Urchik

Dear Sir,

Enclosed are copies of the original test results received as of April 19th 2001. All MQC testing has been completed for the above noted project and results reported. However, the results enclosed are copies of only those hard copies that I have received to date from Precision Laboratories. When I receive the remaining hard copies, I will forward copies of those results to you.

Yours truly,

William Urchik
Product Development Engineer
CETCO

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 5-9-01

Precision Geosynthetic Laboratories

ISO 9002

CLIENT: CETCO
PROJECT: FERNALD

INTERFACE SHEAR TEST RESULTS
(PGL Job No. 010120)

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER	DATE RECEIVED	ORIGIN OF MATERIAL
Roll #687 L#200110FA3 (Bentomat ST)	69533	3/7/01	CETCO
Roll #708 L#200110FA3 (Bentomat ST)	69534	3/7/01	CETCO
Roll #733 L#200110FA3 (Bentomat ST)	69542	3/8/01	CETCO
Roll #750 L#200110FA3 (Bentomat ST)	69543	3/8/01	CETCO
Roll #780 L#200110FA3 (Bentomat ST)	69574	3/9/01	CETCO
Roll #795 L#200110FA3 (Bentomat ST)	69575	3/9/01	CETCO
Roll #815 L#200110FA3 (Bentomat ST)	69576	3/9/01	CETCO
Roll #828 L#200110FA3 (Bentomat ST)	69577	3/9/01	CETCO
Roll #114110135 L#B62185 Tex HDPE	69301	2/13/01	GSE Lining Tech
Roll #114110050 L#B62185 Tex HDPE	69569	3/9/01	GSE Lining Tech
Roll #114110118 L#B62189 Tex HDPE	69570	3/9/01	GSE Lining Tech
Roll #114110163 L#B62189 Tex HDPE	69571	3/9/01	GSE Lining Tech
Roll #114110177 L#B62189 Tex HDPE	69572	3/9/01	GSE Lining Tech

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
ASTM D6243	Interface Shear
ASTM D6243	Internal Shear Strength

TEST CONDITIONS: The samples were conditioned for a minimum one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS:

The test results is summarized in Tables 1 through 8. The units in which the data are reported are included on the tables.

PRECISION GEOSYNTHETIC LABORATORIES

Initials: [illegible] #: 013
Date: 4/10/01

Edith Pintor
Quality Assurance

Cora B. Queja
Vice President

1160 North Gilbert Street, Anaheim, CA 92801, Tel # 714-520-9631, Fax # 714-520-9637

TABLE 1.

CLIENT: CETCO
PROJECT: FERNALD

- 4554

INTERNAL SHEAR TEST RESULT (ASTM D6243)
(PGL Job No. 010120)

QC'd by: _____
March 19 , 2001

TEST CONFIGURATION #1

TOP BOX
Internal Shear
Bentomat ST Roll #687 L# 200110FA3 / C# 69533
BOTTOM BOX

TEST CONDITIONS:

SAMPLE PREPARATION:

1. Specimens were cut to 20" x 20"
2. The GCL specimens were constrained between two wooden boards with mending plates. The ends of each geotextile were then sandwiched between a second wooden substrate with mending plates .

HYDRATION:

1. GCL specimens were hydrated for 7 days at 3 psi.

CONSOLIDATION:

1. Each set of specimen was consolidated under drained condition for 48 hours at normal load before shearing.

SHEAR TEST:

1. Shear test was conducted at 0.004 in/ min.
2. Sheared at minimum 2.0 inch horizontal displacement.
3. The test specimens were sheared in drained condition.
4. Initial moisture content of the GCL was 15.2 %, and the final moisture content were 127.5 %, 137.75 %, 149.63 % for normal loads of 45psi, 20 psi, and 5 psi respectively.
5. Tests were performed in general accordance with ASTM D6243 using Brainard- Kilman LG-112 Direct Shear machine with effective area of 12 in x 12 in.

TEST RESULTS:

NORMAL STRESS (psi)	NORMAL STRESS (psf)	PEAK STRENGTH: SHEAR STRESS (psf)	PEAK STRENGTH: PEAK SECANT ANGLE	2.0" DISPLACEMENT STRENGTH: SHEAR STRESS (psf)	2.0" DISPLACEMENT STRENGTH: 2.0" DISPLACEMENT SECANT ANGLE
5	720	1862	69	1056	56
20	2880	2192	37	984	19
45	6480	3303	27	1702	15
COHESION (psf):		1592		841	

OBSERVATIONS:

At 5 psi, and 20 psi, 100% of the stiches were still intact, and connected with the woven side of the geotextile. However, at 45 psi, approximately 85% of the stiches were separated from the woven side of the geotextile.

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PERRY JOHNSON REGISTRARS, INC.

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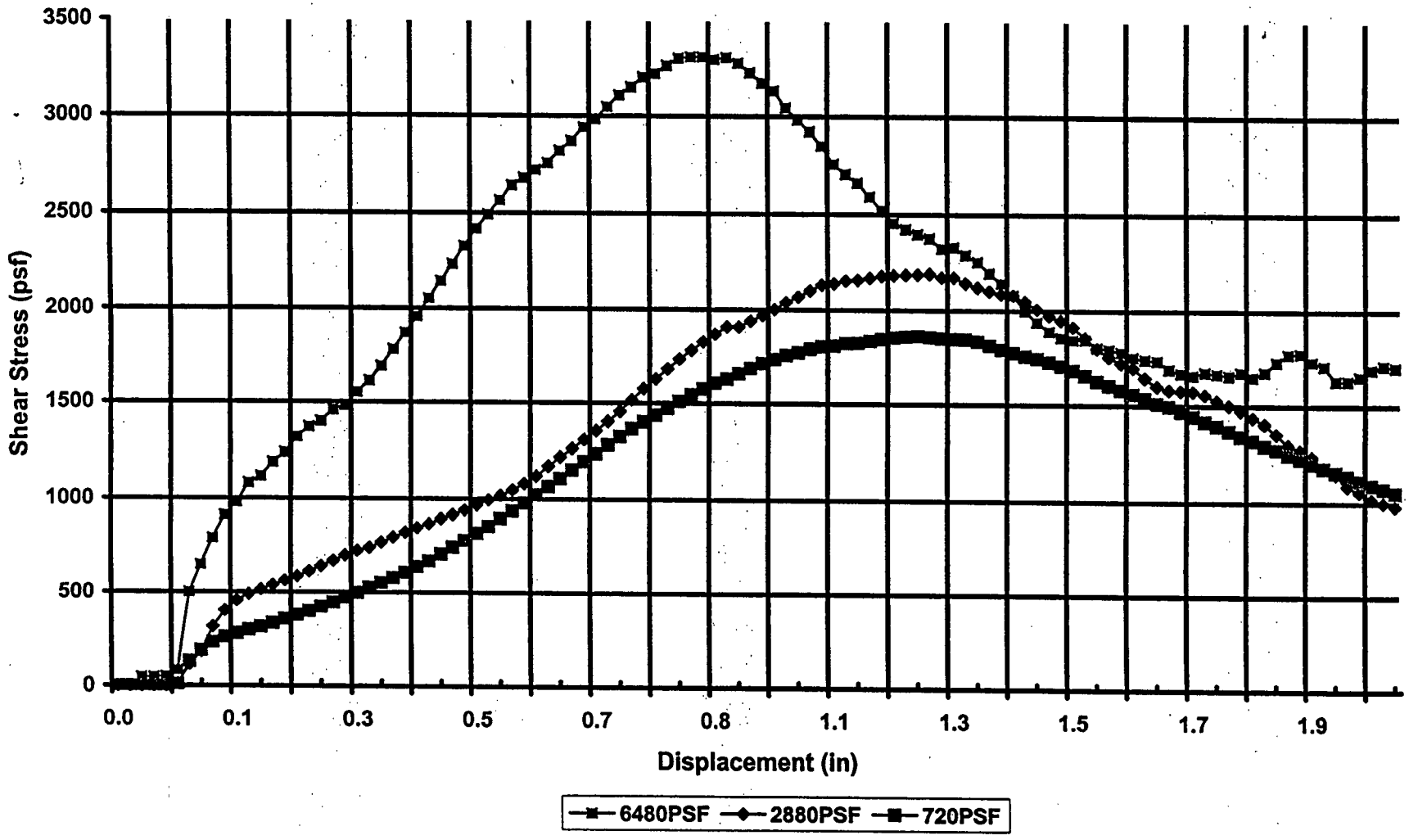
Figure #1
Shear Stress/ Displacement Curve
PGL Job No. 010120_1
INTERNAL SHEAR- GCL Roll#687, C#69533



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ISO 9002

Figure #2
Normal Stress/ Interface Stress
PGL Job No. 010120_1
INTERNAL SHEAR- GCL Roll #687, C#69533

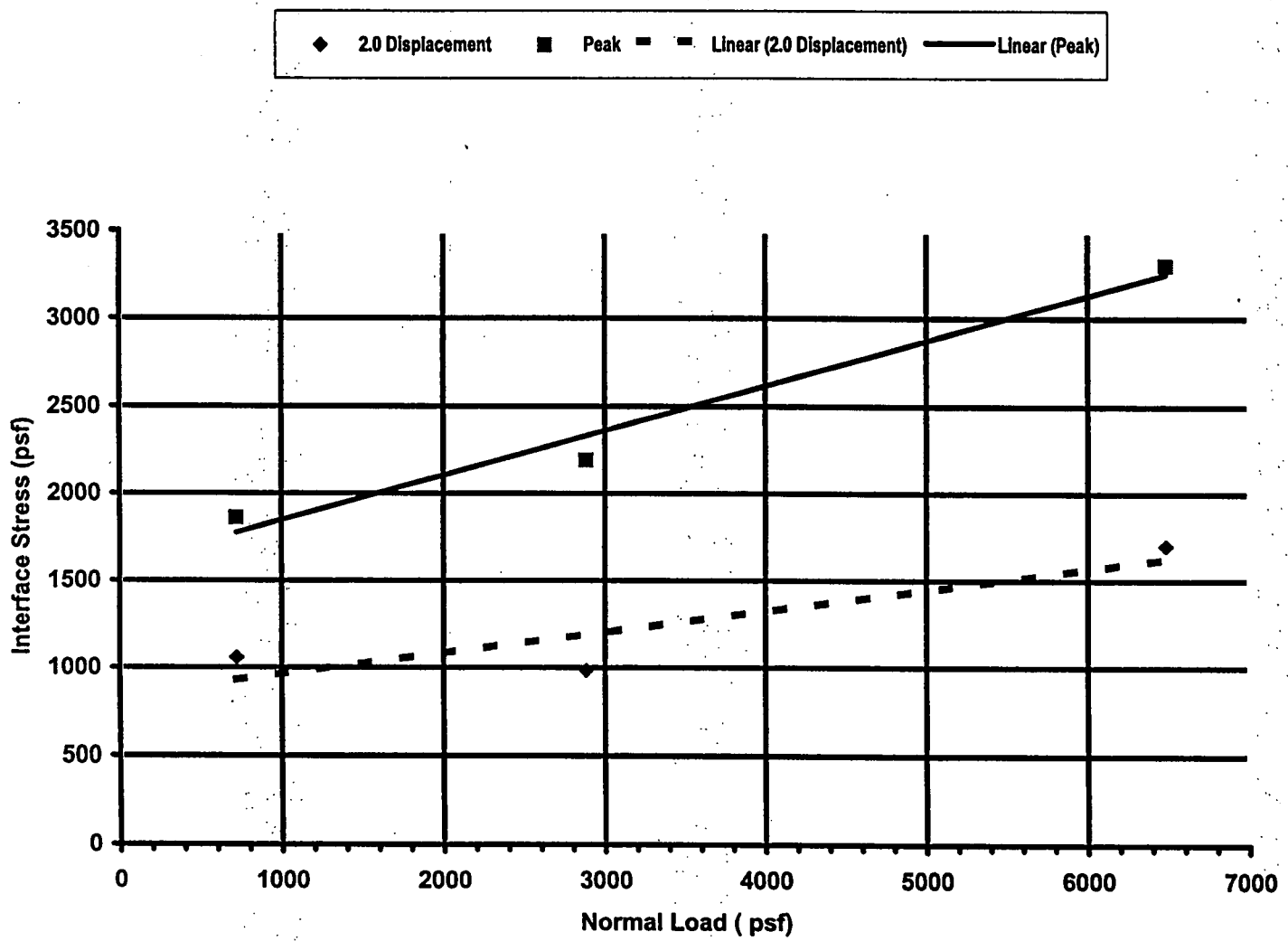

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TABLE 2.

CLIENT: CETCO
PROJECT: FERNALD

INTERFACE SHEAR TEST RESULT (ASTM D6243)
(PGL Job No. 010120)

QC'd by: fm
March 30, 2001

TEST CONFIGURATION #2

TOP BOX
Bentomat ST Roll #708 L#200110FA3 (woven side) / C#69534
Textured HDPE Roll #114110135 L#B62185 / C# 69301
With sand layer BOTTOM BOX

TEST CONDITIONS:

SAMPLE PREPARATION:

1. Specimens were cut to 20" x 20"
2. The woven side of the GCL is in contact with the textured HDPE, and the non-woven side is in contact with a wooden board with mending plates .
3. The textured HDPE is clamped at the bottom box with sand layer underneath.

HYDRATION:

1. GCL specimens were hydrated for 7 days at 3 psi.

CONSOLIDATION:

1. Each set of specimen was consolidated under drained condition for 48 hours at normal load before shearing.

SHEAR TEST:

1. Shear test was conducted at 0.004 in/ min.
2. Sheared at minimum 2.0 inch horizontal displacement.
3. The test specimens were sheared in drained condition.
4. Initial moisture content of the GCL was 16.57 %, and the final moisture content were 134.53 %, 103.12 %, 98.9 % for 5psi, 20 psi, and 45 psi respectively.
5. Tests were performed in general accordance with ASTM D6243 using Brainard- Kilman LG-112 Direct Shear machine with effective area of 12 in x 12 in.

TEST RESULTS:

NORMAL STRESS (psi)	NORMAL STRESS (psf)	PEAK STRENGTH SHEAR STRESS (psf)	PEAK STRENGTH PEAK SECANT ANGLE	2.0" DISPLACEMENT STRENGTH SHEAR STRESS (psf)	2.0" DISPLACEMENT STRENGTH 2.0" DISPLACEMENT SECANT ANGLE
5	720	307	23	258	20
20	2880	931	18	699	14
45	6480	1923	17	1056	9
	COHESION (psf):	113		219	
	FRICTION ANGLE (degrees):	15.6		7.7	
	COEFFICIENT OF FRICTION:	0.28		0.13	

NOTE: The friction angles and cohesion results given here are based on mathematically determined best fit line.

OBSERVATIONS:

Failure occurred along the [illegible] See Figure #1 and #2
Stretching of the GCL was [illegible] at 45 psi, and minor stretching was evident at 20psi. There is,howe[illegible] at 5 psi. Asperity height of the H[illegible] averages 12 mils.

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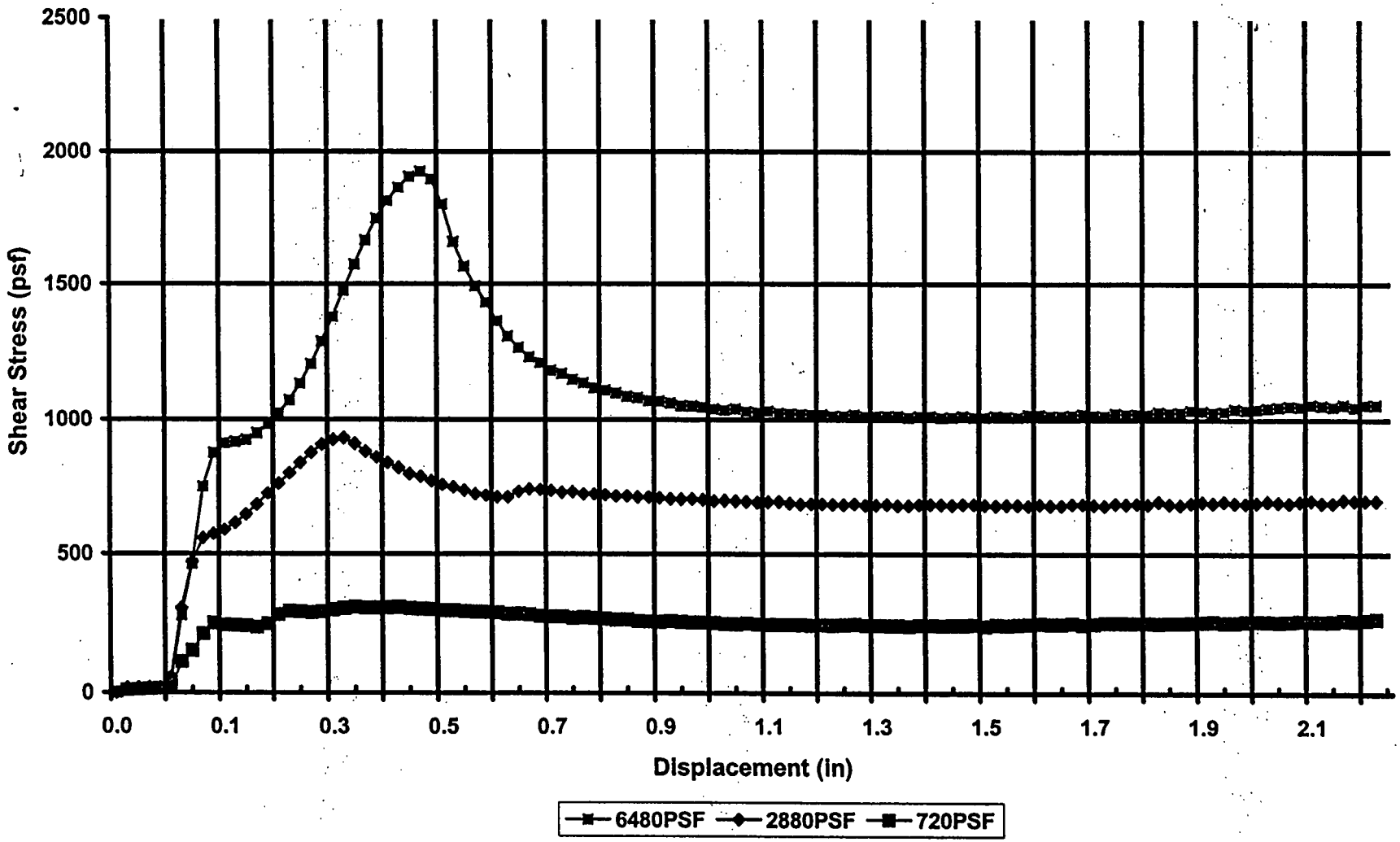
Figure #1
Shear Stress/ Displacement Curve
PGL Job No. 010120_2
GCL Roll#708, C#69534 / HDPE Roll#114110135, C#69301



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ISO 9002

000068

Figure #2
Normal Stress/ Interface Stress
PGL Job No. 010120_2
GCL Roll #708, C#69534 / HDPE Roll#11410135, C#69301

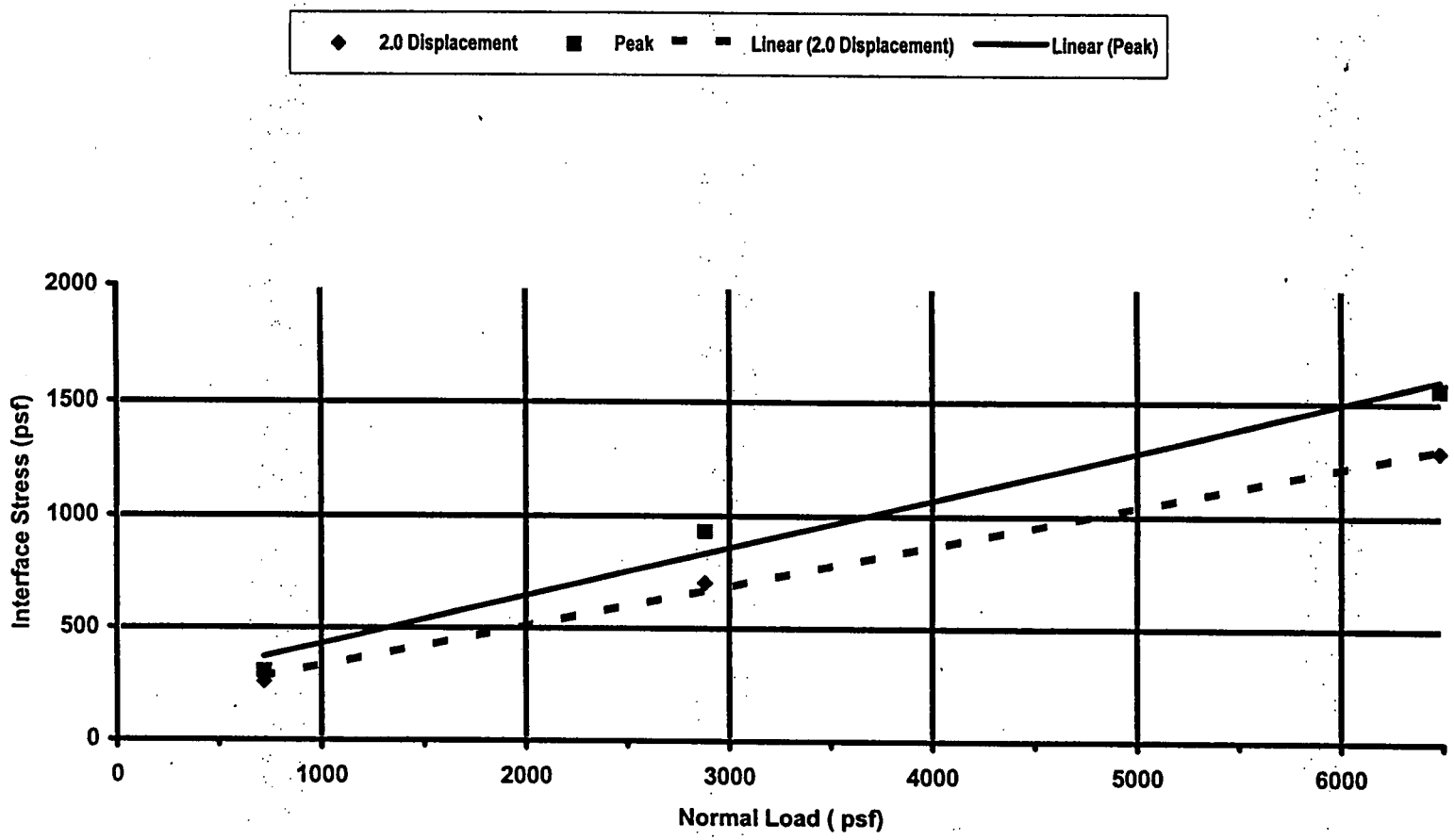

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TABLE 3.

CLIENT: CETCO
PROJECT: FERNALD

- 4554

INTERNAL SHEAR TEST RESULT (ASTM D6243)
(PGL Job No. 010120)

QC'd by: _____
March 25, 2001

TEST CONFIGURATION #3

TOP BOX

Internal Shear

Bentomat ST Roll #815 L# 200110FA3 / C# 69576

BOTTOM BOX

TEST CONDITIONS:

SAMPLE PREPARATION:

1. Specimens were cut to 20" x 20"
2. The GCL specimens were constrained between two wooden boards with mending plates. The ends of each geotextile were then sandwiched between a second wooden substrate with mending plates.

HYDRATION:

1. GCL specimens were hydrated for 7 days at 3 psi.

CONSOLIDATION:

1. Each set of specimen was consolidated under drained condition for 48 hours at normal load before shearing.

SHEAR TEST:

1. Shear test was conducted at 0.004 in/ min.
2. Sheared at minimum 2.0 inch horizontal displacement.
3. The test specimens were sheared in drained condition.
4. Initial moisture content of the GCL was 16.7 %, and the final moisture content were 142.4 %, 133.7 %, 121.6 % for normal loads of 5psi, 20 psi, and 45psi respectively.
5. Tests were performed in general accordance with ASTM D6243 using Brainard- Kilman LG-112 Direct Shear machine with effective area of 12 in x 12 in.

TEST RESULTS:

NORMAL STRESS (psi)	NORMAL STRESS (psf)	PEAK STRENGTH: SHEAR STRESS (psf)	PEAK STRENGTH: PEAK SECANT ANGLE	2.0" DISPLACEMENT STRENGTH: SHEAR STRESS (psf)	2.0" DISPLACEMENT STRENGTH: 2.0" DISPLACEMENT SECANT ANGLE
5	720	1721	67	1169	58
20	2880	2002	35	1001	19
45	6480	3527	29	1689	15
COHESION (psf):		1325		948	

OBSERVATIONS:

At 45 psi, 100% of the stitches were completely separated from the woven side of the geotextile. At 5psi, and 20psi, all stiches were still connected to the woven side of the geotextile.

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PEERY JOHNSON REGISTRARS, INC.

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Figure #1
Shear Stress/ Displacement Curve
PGL Job No. 010120_3
INTERNAL SHEAR- GCL Roll#815, C#69576

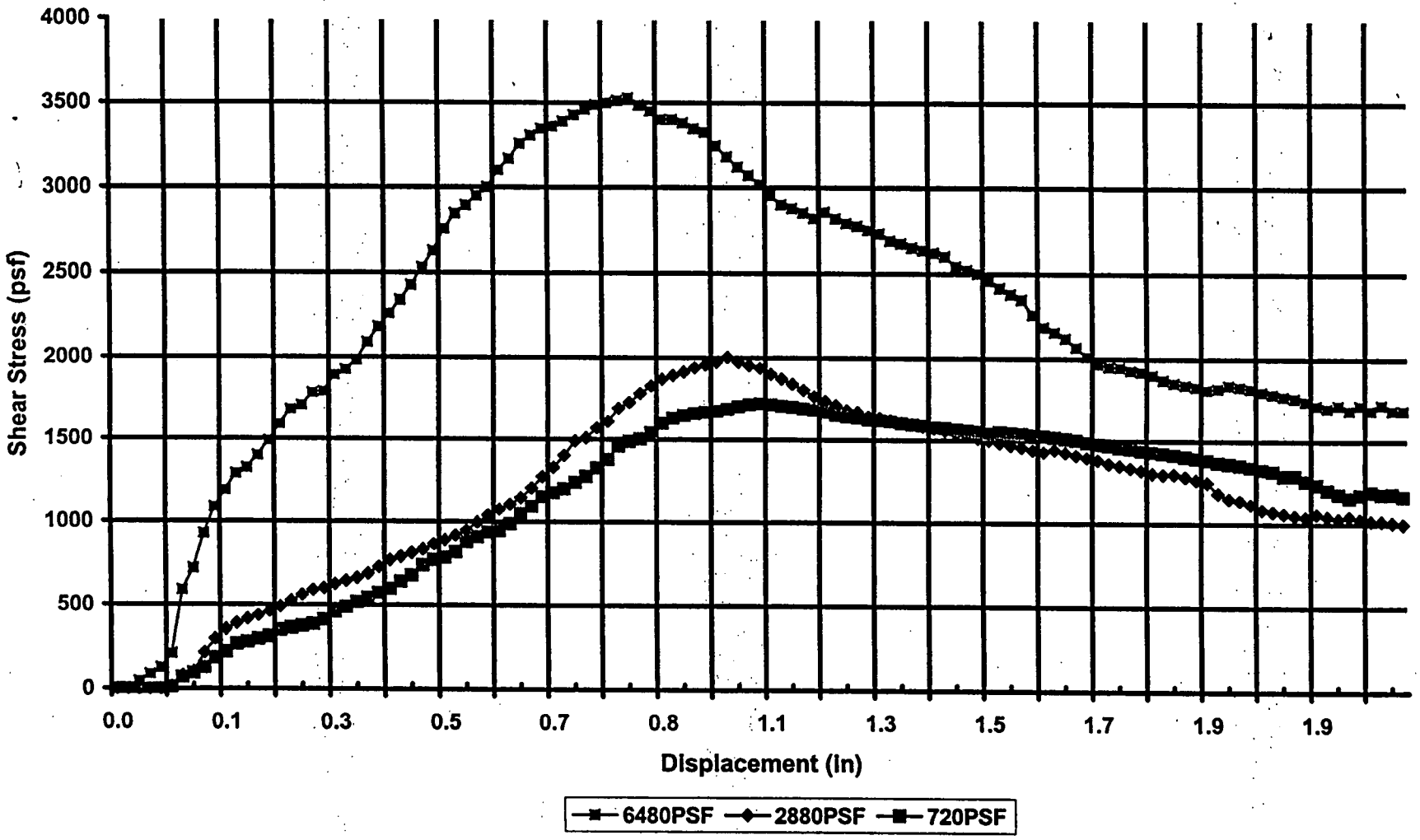

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Figure #2
Normal Stress/ Interface Stress
PGL Job No. 010120_3
INTERNAL SHEAR- GCL Roll#815, C#69576

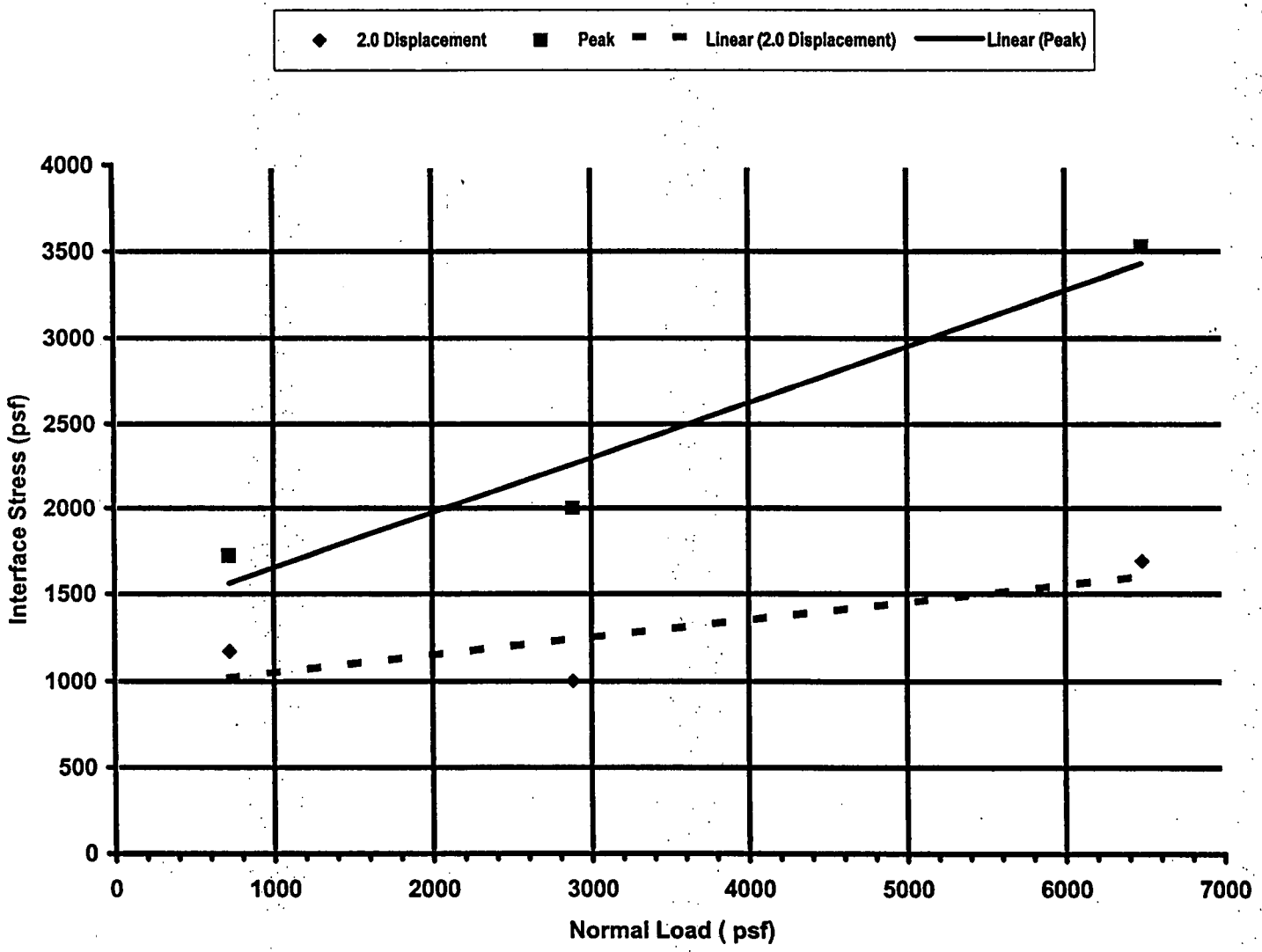

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TABLE 4.

CLIENT: CETCO
PROJECT: FERNALD

- 4554

INTERFACE SHEAR TEST RESULT (ASTM D6243)
(PGL Job No. 010120)

QC'd by: _____
March 28, 2001

TEST CONFIGURATION #4

TOP BOX
Bentomat ST Roll #828 L#200110FA3 (woven side) / C#69577
Textured HDPE Roll #114110050 L#B62185 / C# 69569
With sand layer BOTTOM BOX

TEST CONDITIONS:

SAMPLE PREPARATION:

1. Specimens were cut to 20" x 20"
2. The woven side of the GCL is in contact with the textured HDPE, and the non-woven side is in contact with a wooden board with mending plates .
3. The textured HDPE is clamped at the bottom box with sand layer underneath.

HYDRATION:

1. GCL specimens were hydrated for 7 days at 3 psi.

CONSOLIDATION:

1. Each set of specimen was consolidated under drained condition for 48 hours at normal load before shearing.

SHEAR TEST:

1. Shear test was conducted at 0.004 in/ min.
2. Sheared at minimum 2.0 inch horizontal displacement.
3. The test specimens were sheared in drained condition.
4. Initial moisture content of the GCL was 15.0 %, and the final moisture content were 129.33 %, 112.93 %, 106.17 % for 5psi, 20 psi, and 45 psi respectively.
5. Tests were performed in general accordance with ASTM D6243 using Brainard- Kilman LG-112 Direct Shear machine with effective area of 12 in x 12 in.

TEST RESULTS:

NORMAL STRESS (psi)	NORMAL STRESS (psf)	PEAK STRENGTH SHEAR STRESS (psf)	PEAK STRENGTH PEAK SECANT ANGLE	2.0" DISPLACEMENT STRENGTH SHEAR STRESS (psf)	2.0" DISPLACEMENT STRENGTH 2.0" DISPLACEMENT SECANT ANGLE
5	720	383	28	262	20
20	2880	1020	20	722	14
45	6480	2085	18	1218	11

	PEAK STRENGTH	2.0" DISPLACEMENT STRENGTH
COHESION (psf):	170	186
FRICTION ANGLE (degrees):	16.5	9.3
COEFFICIENT OF FRICTION:	0.3	0.16

NOTE: The friction angles and cohesion results given here are based on mathematically determined best fit line.

OBSERVATIONS:

Failure occurred along the [illegible] See Figure #1 and #2
Minor stretching was obser[illegible]si, and became a little more severe at 20 psi, and 45 psi.
Asperity height of the Text[illegible]HDPE averages 12.1 mils.

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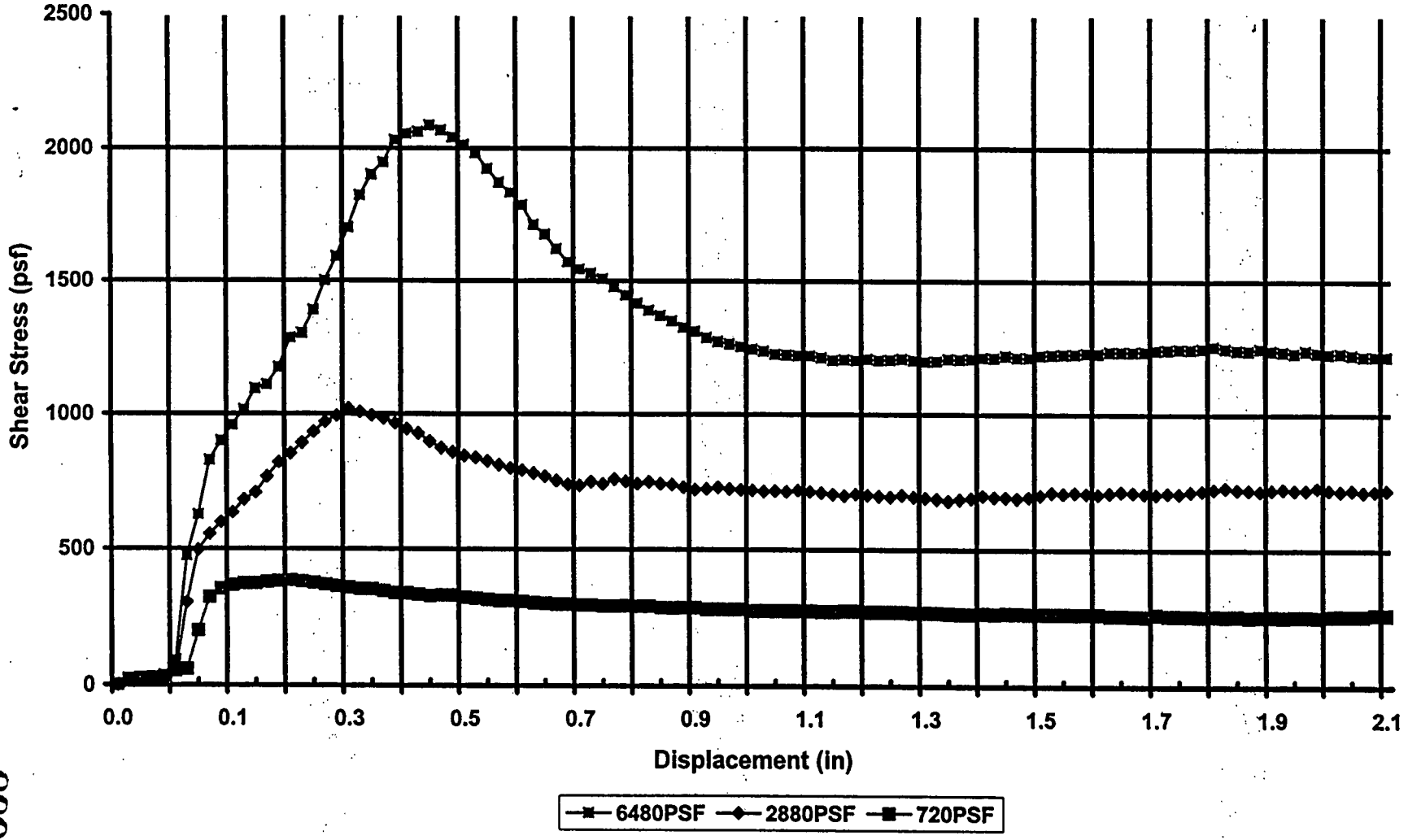
ANSI-RAB QMS ACCREDITED PERRY JOHNSON REGISTRARS, INC.

Figure #1
Shear Stress/ Displacement Curve
PGL Job No. 010120_4
GCL Roll#828, C#69577 / HDPE Roll#114110050, C#69569



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4554

Figure #2
Normal Stress/ Interface Stress
PGL Job No. 010120_4
GCL Roll#828, C#69577 / HDPE Roll #114110050, C#69569

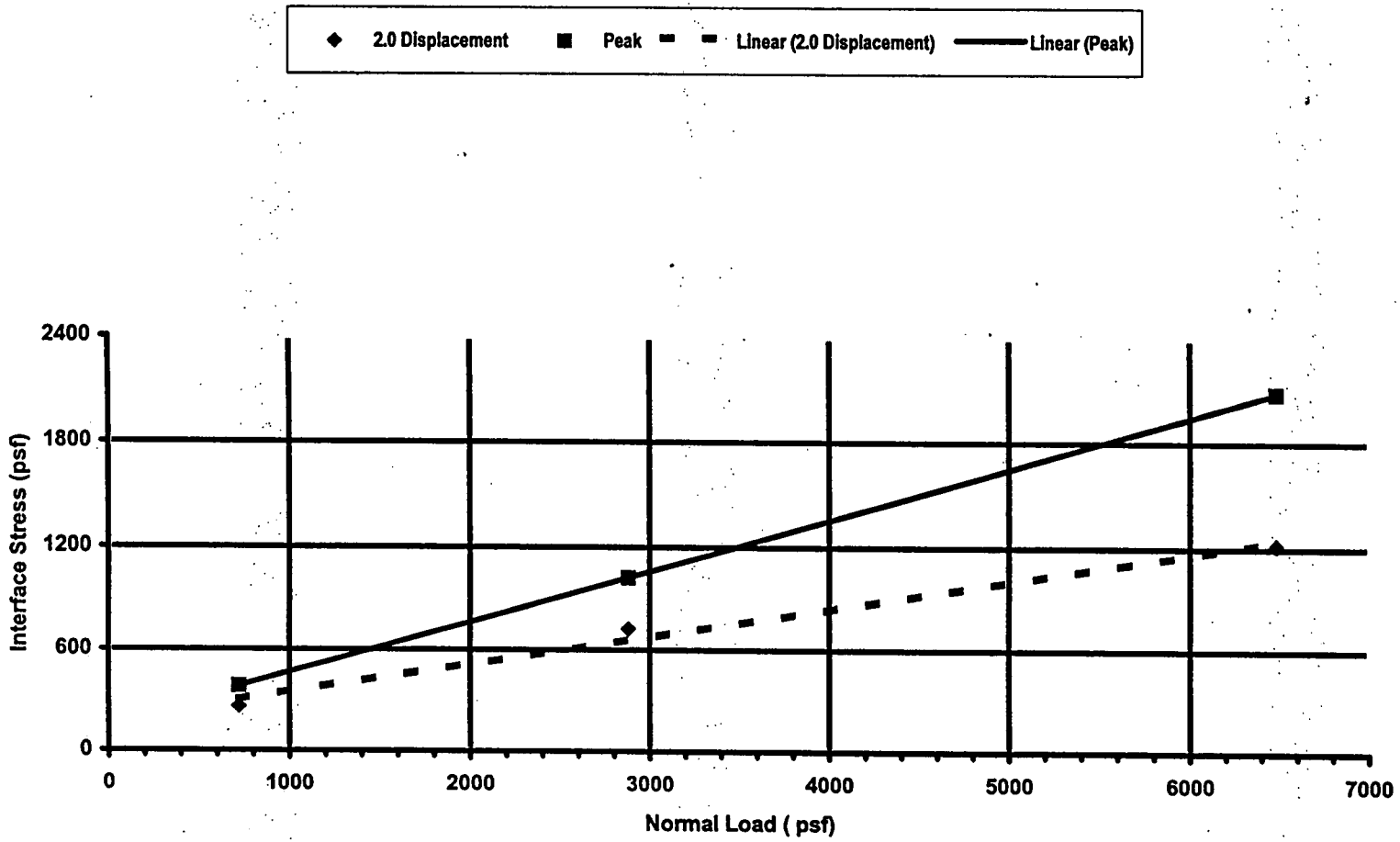

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TABLE 5.

CLIENT: CETCO
PROJECT: FERNALD

INTERNAL SHEAR TEST RESULT (ASTM D6243)
(PGL Job No. 010120)

QC'd by: _____
April 2, 2001

TEST CONFIGURATION #5

TOP BOX

Internal Shear

Bentomat ST Roll #780 L# 200110FA3 / C# 69574

BOTTOM BOX

TEST CONDITIONS:

SAMPLE PREPARATION:

1. Specimens were cut to 20" x 20"
2. The GCL specimens were constrained between two wooden boards with mending plates. The ends of each geotextile were then sandwiched between a second wooden substrate with mending plates.

HYDRATION:

1. GCL specimens were hydrated for 7 days at 3 psi.

CONSOLIDATION:

1. Each set of specimen was consolidated under drained condition for 48 hours at normal load before shearing.

SHEAR TEST:

1. Shear test was conducted at 0.004 in/ min.
   Sheared at minimum 2.0 inch horizontal displacement.
   The test specimens were sheared in drained condition.
   Initial moisture content of the GCL was 10.66 %, and the final moisture content were 136.52 %, 120.98 %, 113.14 % for 5psi, 20 psi, and 45 psi respectively.
5. Tests were performed in general accordance with ASTM D6243 using Brainard- Kilman LG-112 Direct Shear machine with effective area of 12 in x 12 in.

TEST RESULTS:

NORMAL STRESS (psi)	NORMAL STRESS (psf)	PEAK STRENGTH SHEAR STRESS (psf)	PEAK STRENGTH PEAK SECANT ANGLE	2.0" DISPLACEMENT STRENGTH SHEAR STRESS (psf)	2.0" DISPLACEMENT STRENGTH 2.0" DISPLACEMENT SECANT ANGLE
5	720	979	54	311	23
20	2880	1918	34	961	18
45	6480	3507	28	1510	13

	PEAK STRENGTH	2.0" DISPLACEMENT STRENGTH
COHESION (psf):	659	247
FRICTION ANGLE (degrees):	23.7	11.4
COEFFICIENT OF FRICTION:	0.44	0.20

NOTE: The friction angles and cohesion results given here are based on mathematically determined best fit line.

OBSERVATIONS:

At 45 psi, 50% of the stitches were separated from the woven side of the geotextile. The remaining 50% were so loose, that only a light pressure would be able to [illegible] from the woven side of the geotextile. At 5 psi, and 20 psi, the stitches were still connected the woven side of the geotextile.

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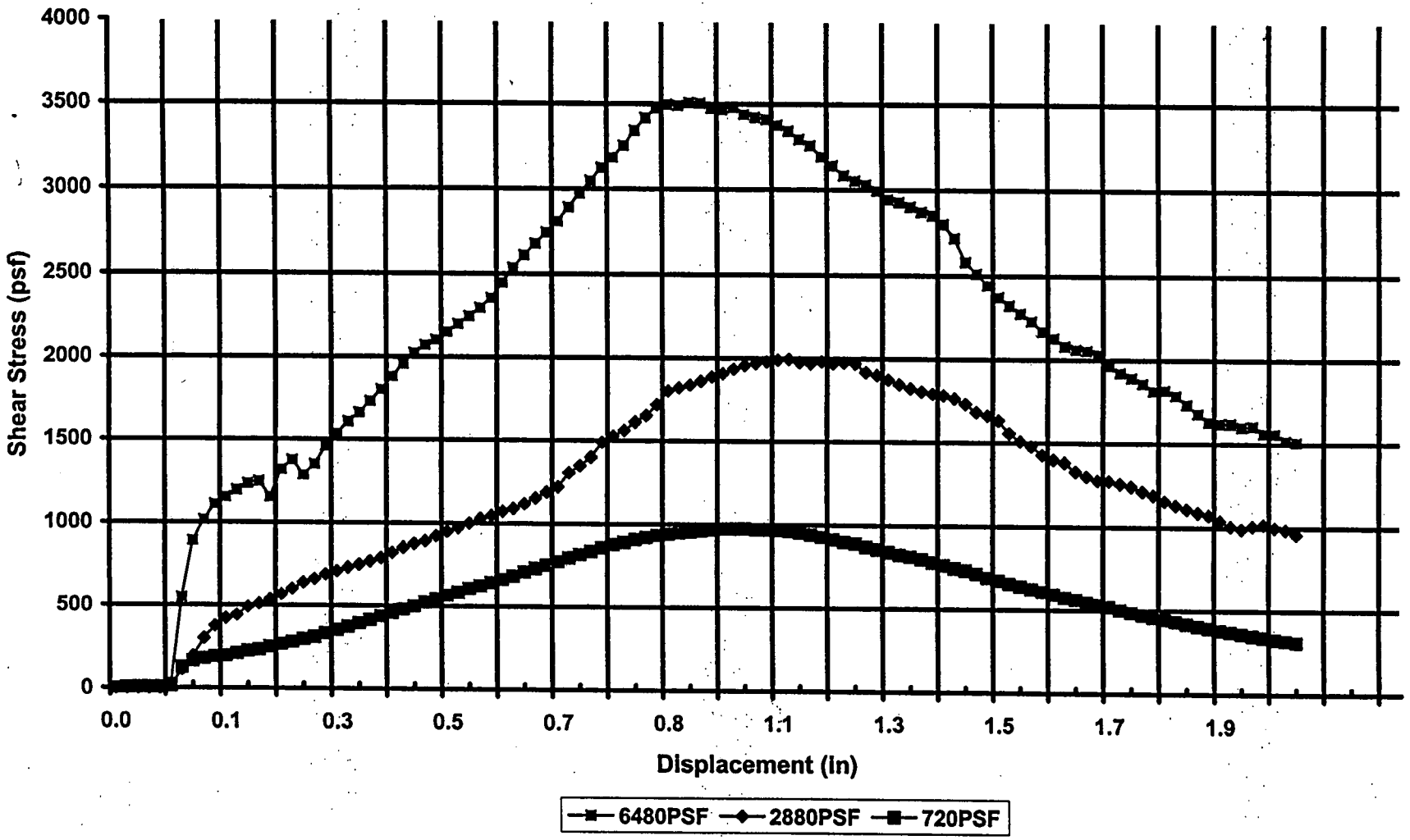
Figure #1
Shear Stress/ Displacement Curve
PGL Job No. 010120_5
Internal Shear, GCL Roll#780, C#69574



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4554

Figure #2
Normal Stress/ Interface Stress
PGL Job No. 010120_5
Internal Shear, GCL Roll#780, C#69574

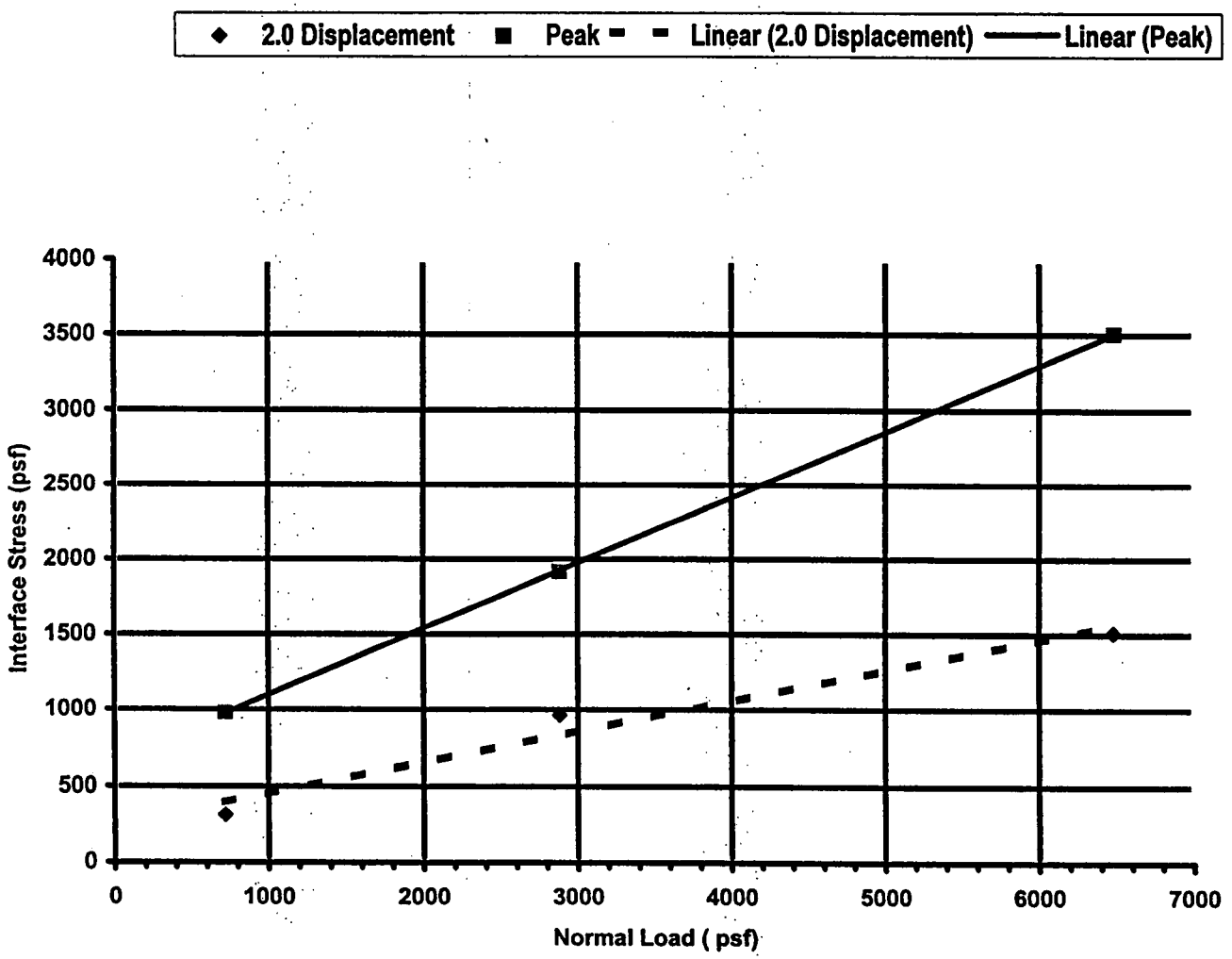

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TABLE 6.

4554

CLIENT: CETCO
PROJECT: FERNALD

INTERFACE SHEAR TEST RESULT (ASTM D6243)
(PGL Job No. 010120)

QC'd by: _____
April 3, 2001

TEST CONFIGURATION #6

TOP BOX

Bentomat ST Roll #750 L#200110FA3 (woven side) / C#69543

Textured HDPE Roll #114110118 L#B62185 / C# 69570

With sand layer BOTTOM BOX

TEST CONDITIONS:

SAMPLE PREPARATION:

1. Specimens were cut to 20" x 20"
2. The woven side of the GCL is in contact with the textured HDPE, and the non-woven side is in contact with a wooden board with mending plates .
3. The textured HDPE is clamped at the bottom box with sand layer underneath.

HYDRATION:

1. GCL specimens were hydrated for 7 days at 3 psi.

CONSOLIDATION:

1. Each set of specimen was consolidated under drained condition for 48 hours at normal load before shearing.

SHEAR TEST:

1. Shear test was conducted at 0.004 in/ min.
2. Sheared at minimum 2.0 inch horizontal displacement.
3. The test specimens were sheared in drained condition.
4. Initial moisture content of the GCL was 14.6 %, and the final moisture content were 126.5 %, 105.67 %, 103.4 % for 5psi, 20 psi, and 45 psi respectively.
5. Tests were performed in general accordance with ASTM D6243 using Brainard- Kilman LG-112 Direct Shear machine with effective area of 12 in x 12 in.

TEST RESULTS:

NORMAL STRESS (psi)	NORMAL STRESS (psf)	PEAK STRENGTH: SHEAR STRESS (psf)	PEAK STRENGTH: PEAK SECANT ANGLE	2.0" DISPLACEMENT STRENGTH: SHEAR STRESS (psf)	2.0" DISPLACEMENT STRENGTH: 2.0" DISPLACEMENT SECANT ANGLE
5	720	289	22	245	19
20	2880	950	18	654	13
45	6480	2001	17	1030	9

COHESION (psf):	83	196
FRICTION ANGLE (degrees):	16.5	7.6
COEFFICIENT OF FRICTION:	0.30	0.13

NOTE: The friction angles and cohesion results given here are based on mathematically determined best fit line.

OBSERVATIONS:

Stretching of the GCL was [illegible] at all normal loads. More stretching is observed, as normal load goes up.
Asperity height of the texture[illegible] averages 12.2 mils.

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ANSI-RAB QMS ACCREDITED
PERRY JOHNSON REGISTRARS, INC.

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Figure #1
Shear Stress/ Displacement Curve
PGL Job No. 010120_6
GCL Roll#750, C#69543 / HDPE Roll#114110118, C#69570

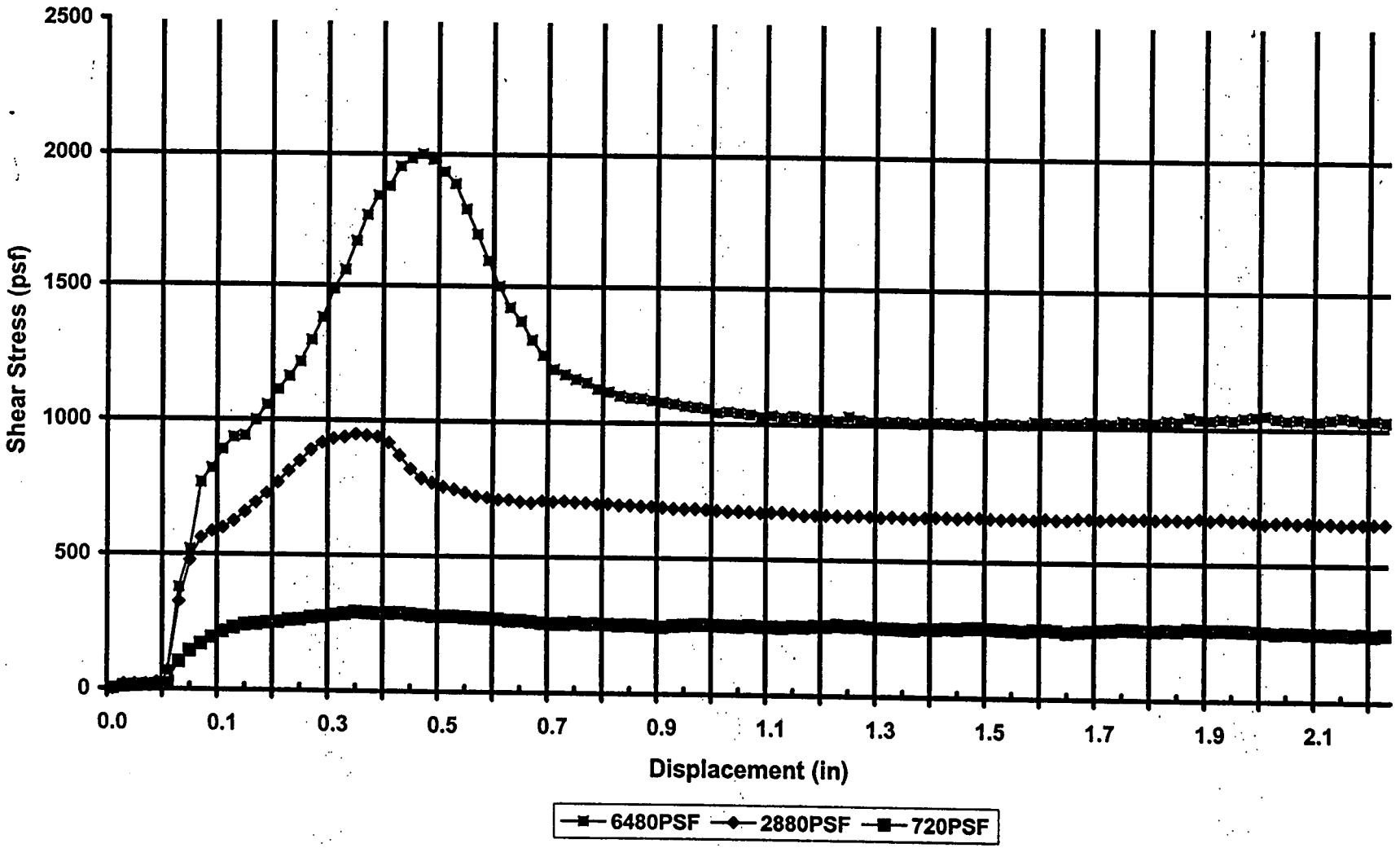

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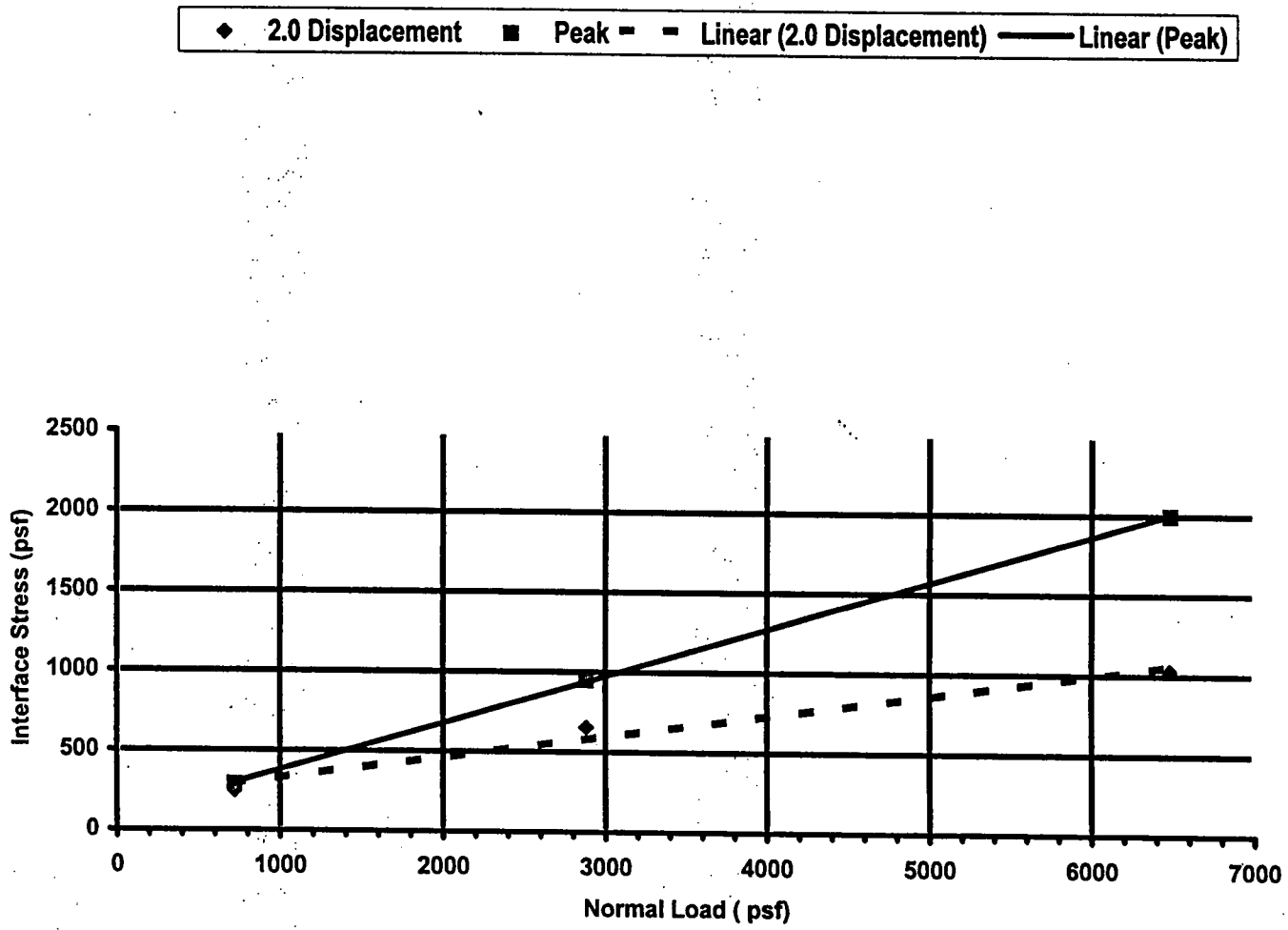
Figure #2
Normal Stress/ Interface Stress
PGL Job No. 010120_6
GCL Roll#750, C#69543 / HDPE Roll#114110118, C#69570



Precision Geosynthetic Laboratories

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TABLE 7.

CLIENT: CETCO
PROJECT: FERNALD

- 4554

INTERNAL SHEAR TEST RESULT (ASTM D6243)
(PGL Job No. 010120)

QC'd by: _____
April 6, 2001

TEST CONFIGURATION #7

TOP BOX

Internal Shear

Bentomat ST Roll #733 L# 200110FA3 / C# 69542

BOTTOM BOX

TEST CONDITIONS:

SAMPLE PREPARATION:

1. Specimens were cut to 20" x 20"
2. The GCL specimens were constrained between two wooden boards with mending plates. The ends of each geotextile were then sandwiched between a second wooden substrate with mending plates.

HYDRATION:

1. GCL specimens were hydrated for 7 days at 3 psi.

CONSOLIDATION:

1. Each set of specimen was consolidated under drained condition for 48 hours at normal load before shearing.

SHEAR TEST:

1. Shear test was conducted at 0.004 in/ min.
2. Sheared at minimum 2.0 inch horizontal displacement.
3. The test specimens were sheared in drained condition.
4. Initial moisture content of the GCL was 14.8 %, and the final moisture content were 140.6 %, 109.7 %, 103.4 % for 5psi, 20 psi, and 45 psi respectively.
5. Tests were performed in general accordance with ASTM D6243 using Brainard- Kilman LG-112 Direct Shear machine with effective area of 12 in x 12 in.

TEST RESULTS:

NORMAL STRESS (psi)	NORMAL STRESS (psf)	PEAK STRENGTH SHEAR STRESS (psf)	PEAK STRENGTH PEAK SECANT ANGLE	2.0" DISPLACEMENT STRENGTH SHEAR STRESS (psf)	2.0" DISPLACEMENT STRENGTH 2.0" DISPLACEMENT SECANT ANGLE
5	720	1362	62	791	48
20	2880	1974	34	922	18
45	6480	3182	26	1463	13

	PEAK STRENGTH	2.0" DISPLACEMENT STRENGTH
COHESION (psf):	1104	655
FRICTION ANGLE (degrees):	17.6	6.8
COEFFICIENT OF FRICTION:	0.32	0.12

NOTE: The friction angles and cohesion results given here are based on mathematically determined best fit line.

OBSERVATIONS:

At 45 psi, 80% of the stitches were separated from the woven side of the geotextile, and the remaining 20% were loosely connected to it. At 5 psi, and 2[illegible]% of the stitches were still connected to the woven side of the geotextile.

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ANSI-RAB QMS ACCREDITED PERRY JOHNSON REGISTRARS, INC.

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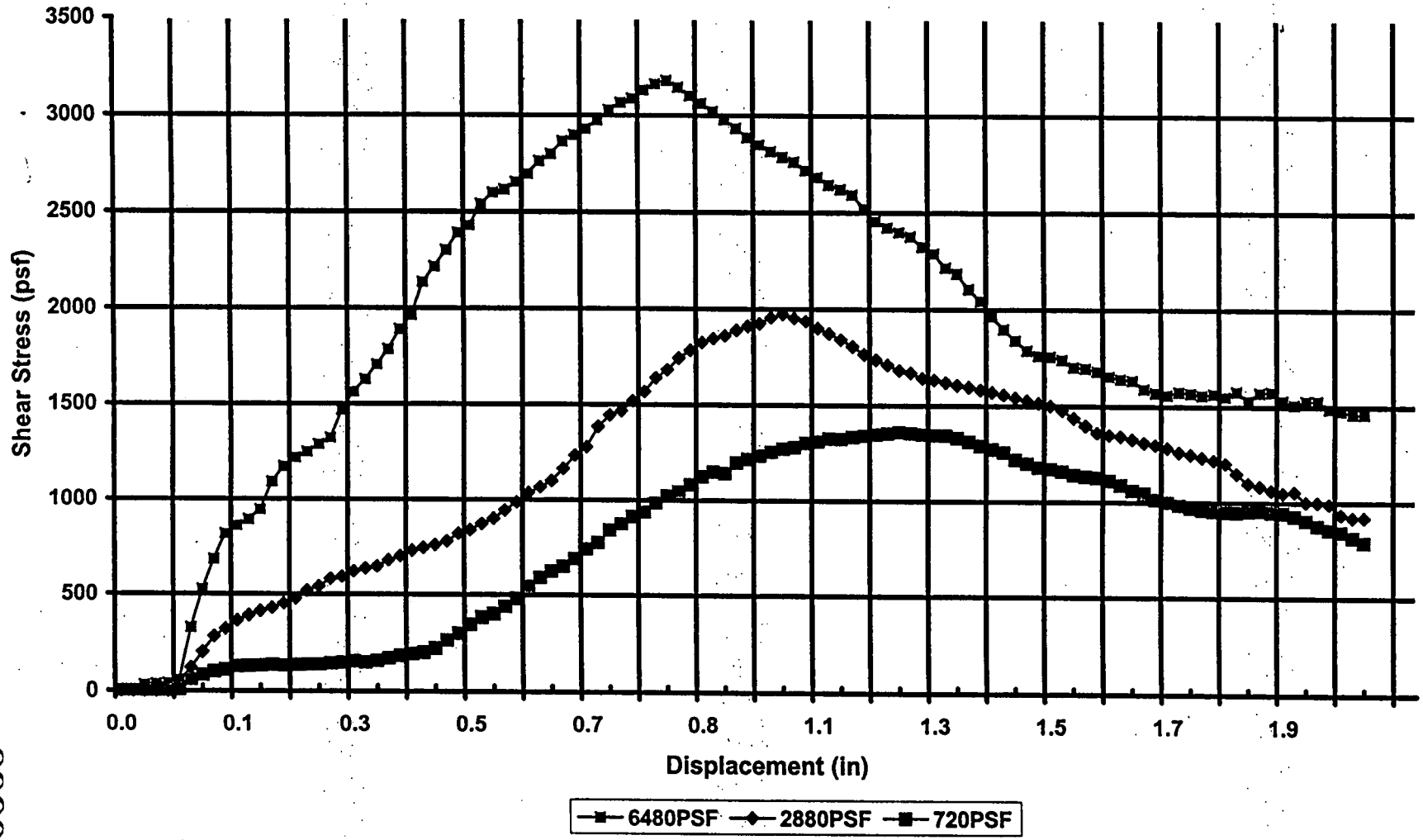
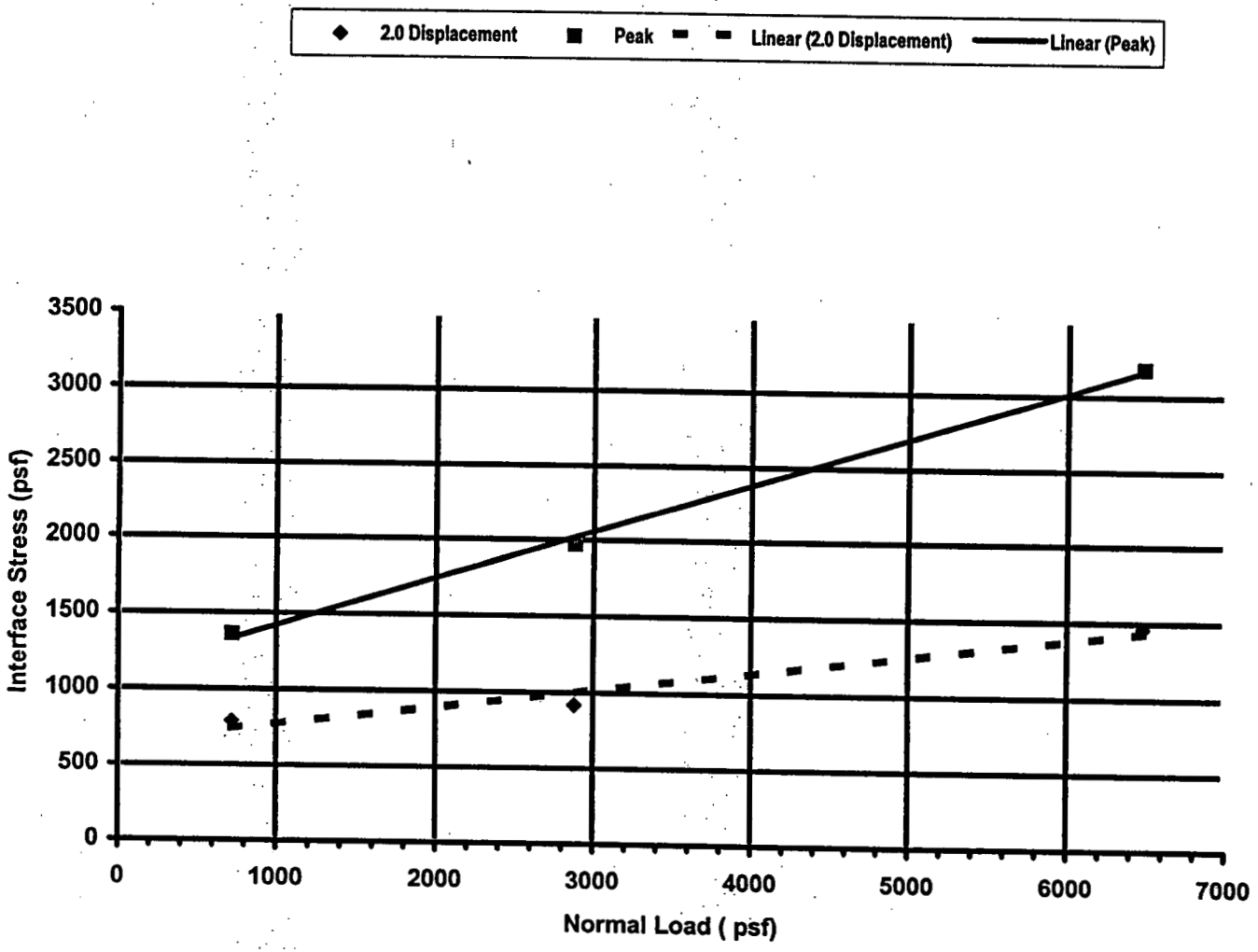
Figure #1
Shear Stress/ Displacement Curve
PGL Job No. 010120_7
Internal Shear, GCL Roll#733, C#69542



Precision Geosynthetic Laboratories

ISO 9002

Figure #2
Normal Stress/ Interface Stress
PGL Job No. 010120_7
Internal Shear, GCL Roll#733, C#69542



Precision Geosynthetic Laboratories

ISO 9002

TABLE 8.

CLIENT: CETCO
PROJECT: FERNALD

- 4554

INTERFACE SHEAR TEST RESULT (ASTM D6243)
(PGL Job No. 010120)

QC'd by: _____
April 6, 2001

TEST CONFIGURATION #8

TOP BOX
Bentomat ST Roll #795 L#200110FA3 (woven side) / C#69575
Textured HDPE Roll #114110177 L#B62185 / C# 69572
With sand layer BOTTOM BOX

TEST CONDITIONS:

SAMPLE PREPARATION:

1. Specimens were cut to 20" x 20"
2. The woven side of the GCL is in contact with the textured HDPE, and the non-woven side is in contact with a wooden board with mending plates .
3. The textured HDPE is clamped at the bottom box with sand layer underneath.

HYDRATION:

1. GCL specimens were hydrated for 7 days at 3 psi.

CONSOLIDATION:

1. Each set of specimen was consolidated under drained condition for 48 hours at normal load before shearing.

SHEAR TEST:

1. Shear test was conducted at 0.004 in/ min.
2. Sheared at minimum 2.0 inch horizontal displacement.
3. The test specimens were sheared in drained condition.
4. Initial moisture content of the GCL was 13.7 %, and the final moisture content were 137.2 %, 122.1 %, 108.7 % for 5psi, 20psi, and 45 psi respectively.
5. Tests were performed in general accordance with ASTM D6243 using Brainard- Kilman LG-112 Direct Shear machine with effective area of 12 in x 12 in.

TEST RESULTS:

NORMAL STRESS (psi)	NORMAL STRESS (psf)	PEAK STRENGTH: SHEAR STRESS (psf)	PEAK STRENGTH: PEAK SECANT ANGLE	2.0" DISPLACEMENT STRENGTH: SHEAR STRESS (psf)	2.0" DISPLACEMENT STRENGTH: 2.0" DISPLACEMENT SECANT ANGLE
5	720	345	26	286	22
20	2880	1042	20	749	15
45	6480	2102	18	1185	10

	PEAK STRENGTH	2.0" DISPLACEMENT STRENGTH
COHESION (psf):	142	228
FRICTION ANGLE (degrees):	16.9	8.7
COEFFICIENT OF FRICTION:	0.30	0.15

NOTE: The friction angles and cohesion results given here are based on mathematically determined best fit line.

OBSERVATIONS:

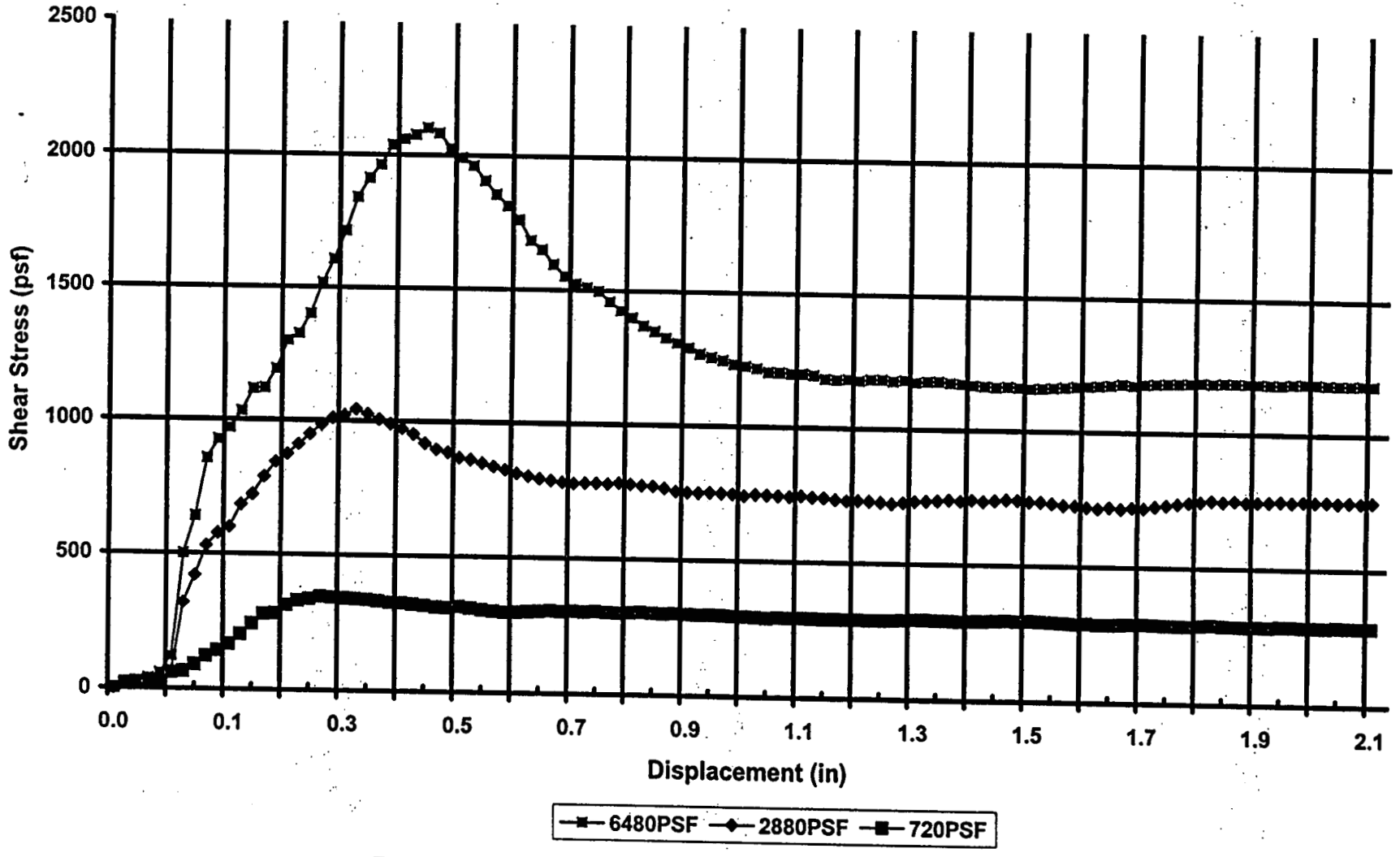
Minor stretching of the GCL was observed at 5 psi, and become more noticeable at higher loads of 20 psi and 45 psi. Asperity height of the textured HDPE averages 12.1mils.

ISO 9002

ANSI-RAB QMS CERTIFIED PERRY JOHNSON REGISTRARS, INC.

Precision Geosynthetic Laboratories

Figure #1
Shear Stress/ Displacement Curve
PGL Job No. 010120_8
GCL Roll#795, C#69575 / HDPE Roll#114110177, C#69572



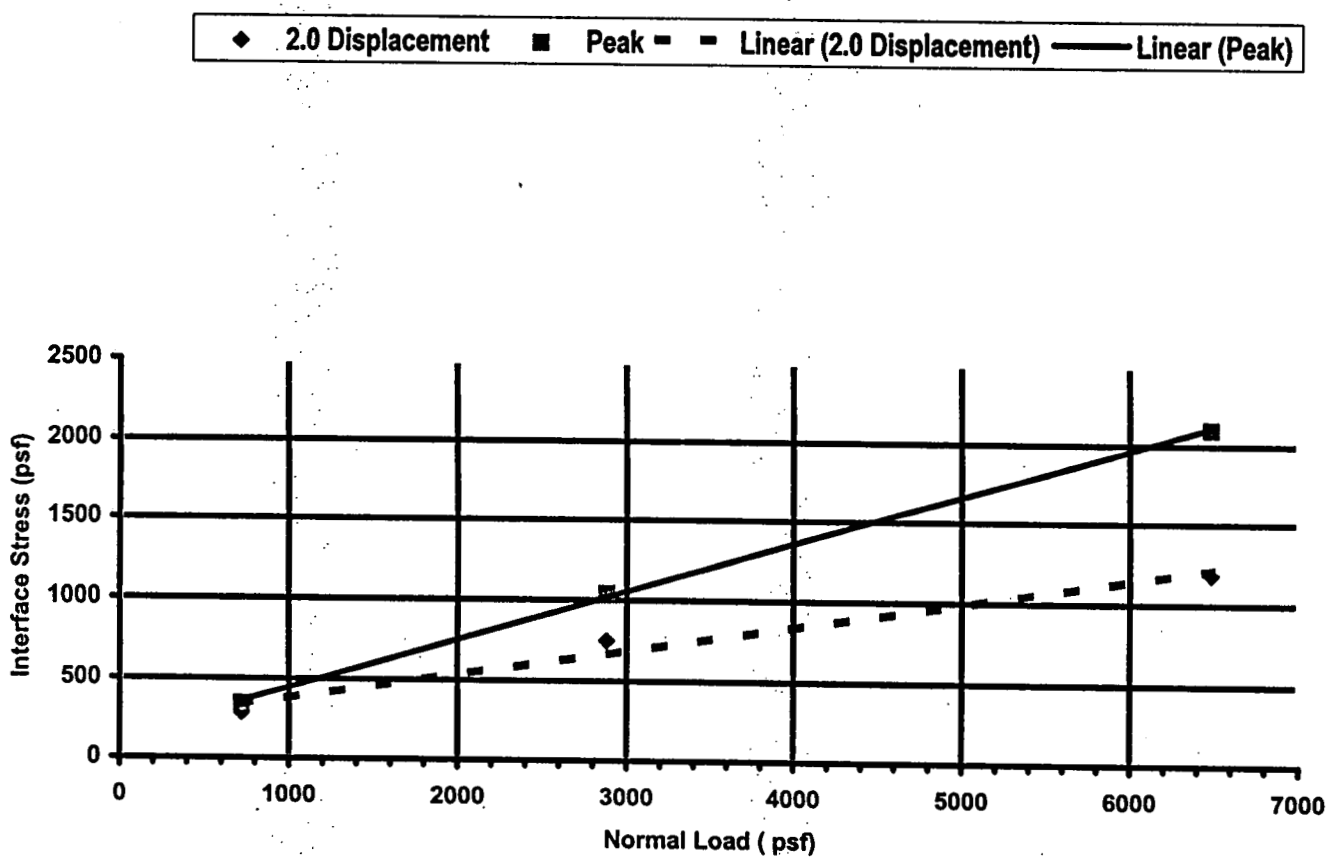
Precision Geosynthetic Laboratories

ISO 9002

980000

4554

Figure #2
Normal Stress/ Interface Stress
PGL Job No. 010120_8
GCL Roll#795, C#69575 / HDPE Roll#114110177, C#69572



Precision Geosynthetic Laboratories

ISO 9002

GEOMEMBRANE CAP

FDF PROJ: [redacted]20102

SUPPLIER D[redacted]MENT SUBMITTAL

CONTRACT NO: 1440

SUBMITTAL NO. 1440/1-001 | REV.: 5 | DATE: 6/4/01

FROM:
GSE LINING TECHNOLOGIES

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

SIGNATURE: Chuck Van Arsdale 6/7/01

RECEIVED BY: Denise Wentz DATE: 6/11/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1440-OPT1-001	5						X			SUBMITTAL REGISTER			X	ACR-001	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
~~Chuck Van Arsdale~~	64				
Gregg Johnson	64				
Bill Zebick	64				
Jim Turner	64				
Kwasi Badu Tweneboah	38				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: Chuck Van Arsdale DATE: 6/25/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

FS-F-4955
Rev. 3: 05/14/1999, CT-2.4.2

ORIGINAL

Contract No.: 99SC001440
Contractor Title: Supplier Contractor
Contractor: GSE Lining Technology

ATTACHMENT V

PROJECT 20102, OPTION 1 (CELL 1 CAP)
SUBMITTAL REGISTER
GEOMEMBRANE AND GEOSYNTHETIC CLAY LINER MANUFACTURING AND DELIVERY
Rev. 5, 6/4/01

Submittal No.	Rev. No.	Document No. & Rev.	Rev. No.	CFC	INF	Document Family	Document Title	Section-Paragraph Reference	STATUS Action Code (Date)	Remarks Submittal Due Date
20102-1440/1-001	0 1 2 3 4 5	1440-OPT1-001	0 1 2 3 4 5		X	ENG	SUBMITTAL REGISTER	ACR-001	B 1/16/01 A 1/22/01 A 1/30/01 A 2/14/01 A 3/21/01 A 6/25/01	FLUOR FERNALD WILL UPDATE
20102-1440/1-002	0 1	1440-OPT1-002	0 1		X	H&S	MATERIAL SAFETY DATA SHEETS (GML)	CONTRACT SECTION D	B 1/15/01 A 1/25/01	A & C
20102-1440/1-002A	0	1440-OPT1-002A	0		X	H&S	MATERIAL SAFETY DATA SHEETS (GCL)	CONTRACT SECTION D	A 1/16/01	A & C
20102-1440/1-003	0 1	1440-OPT1-003	0 1		X	PROC	WARRANTY FOR GCL	SECTION A, GENERAL PROVISIONS	B 1/18/01 A 3/01/01	A
20102-1440/1-02770P-001	0	1440-OPT1-02770P-001	0		X	ENG	MANUFACTURING CAPABILITIES	02770P.1.05.A.1	A 1/16/01	A
20102-1440/1-02770P-002	0	1440-OPT1-02770P-002	0	X		ENG	LIST OF 10 COMPLETED FACILITIES	02770P.1.05.A.2	A 1/16/01	A
20102-1440/1-02770P-003	0	1440-OPT1-02770P-003	0	X		ENG	ORIGIN AND IDENTIFICATION OF RESIN	02770P.1.05A.3	A 1/22/01	A
20102-1440/1-02770P-004	0	1440-OPT1-02770P-004	0	X		QA	CERTIFICATION OF WELDING ROD	02770P.1.05.A.4	A 1/16/01	A
20102-1440/1-02770P-005	0	1440-OPT1-02770P-005	0	X		QA	CERTIFICATION OF MINIMUM AVERAGE ROLL VALUES	02770P.1.05.A.5	A 1/16/01	A
20102-1440/1-02770P-006	0	1440-OPT1-02770P-006	0		X	CONST	RECOMMENDED LONG-TERM STORAGE REQUIREMENTS	02770P.1.05.A.6	A 1/16/01	A
20102-1440/1-02770P-007	0	1440-OPT1-02770P-007	0	X		ENG	RECOMMENDED INSTALLATION PROCEDURES	02770P.1.05.A.7	A 1/22/01	A
20102-1440/1-02770P-008	0 1	1440-OPT1-02770P-008	0 1		X	ENG	GEOMEMBRANE WARRANTY	02770P.1.05.A.8	B 1/19/01 A 2/28/01	A & B
20102-1440/1-02770P-009	0 1	1440-OPT1-02770P-009	0 1	X		ENG	COMPLETED FORMS GML 60-S, GML 60-T	02770P.1.05.A.9	B 1/19/01 A 1/22/01	A
20102-1440/1-02770P-010	0	1440-OPT1-02770P-010	0	X		QA	QUALITY CONTROL CERTIFICATES FOR RESIN	02770P.1.05.B.1	A 3/12/01	B
20102-1440/1-02770P-011	0	1440-OPT1-02770P-011	0	X		ENG	TEST REPORTS OF RESIN	02770P.1.05.B.2	A 3/12/01	B
20102-1440/1-02770P-012	0 1	1440-OPT1-02770P-012	0 1	X		QA	CERTIFICATION OF RESIN POLYMER	02770P.1.05.B.3	C 2/28/01 A 3/08/01	B

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [signature] Date: 6/25/01

060000

GML AND GCL MATERIAL
SUBMITTAL REGISTER
Page 1 of 2

INFORMATION ONLY

4554

Contract No.: 99SC001440
Contractor Title: Supplier Contractor
Contractor: GSE Lining Technology

PROJECT 20102, OPTION 1 (CELL 1 CAP)
SUBMITTAL REGISTER
GEOMEMBRANE AND GEOSYNTHETIC CLAY LINER MANUFACTURING AND DELIVERY
Rev. 5, 6/4/01

Submittal No.	Rev. No.	Document No. & Rev.	Rev. No.	CFC	INF	Document Family	Document Title	Section-Paragraph Reference	STATUS Action Code (Date)	Remarks Submittal Due Date
20102-1440/1-02770P-013	0 1 2	1440-OPT1-02770P-013	0 1 2	X		QA	MANUFACTURING CERTIFICATES PER SHIFT PRODUCTION OF GEOMEMBRANE	02770P.1.05.C	C 3/08/01 C 3/19/01 A 4/2/01	B
20102-1440/1-02772P-001	0	1440-OPT1-02772P-001	0		X	ENG	GCL PRODUCT NAME	02772P.1.04.A.1	A 1/16/01	A
20102-1440/1-02772P-002	0 1	1440-OPT1-02772P-002	0 1		X	ENG	DAILY PRODUCTION CAPACITY	02772P.1.04.A.2	B 1/16/01 A 1/24/01	A
20102-1440/1-02772P-003	0	1440-OPT1-02772P-003	0	X		QA	MANUFACTURER'S QUALITY CONTROL PROCEDURES	02772P.1.04.A.3	A 1/16/01	A
20102-1440/1-02772P-004	0 1 2	1440-OPT1-02772P-004	0 1 2	X		ENG	REQUIREMENTS FOR GEOTEXTILE COMPONENT	02772P.1.04.A.4	A 1/16/01 B 3/08/01 A 3/15/01	A
20102-1440/1-02772P-005	0	1440-OPT1-02772P-005	0	X		QA	CERTIFICATION OF GEOTEXTILE COMPONENT	02772P.1.04.A.5	A 1/16/01	A
20102-1440/1-02772P-006	0	1440-OPT1-02772P-006	0	X		QA	CERTIFICATION OF MINIMUM AVERAGE ROLL VALUES	02772P.1.04.A.7	A 1/16/01	A
20102-1440/1-02772P-007	0	1440-OPT1-02772P-007	0	X		CONST	RECOMMENDED INSTALLATION PROCEDURES	02772P.1.04.A.8	A 1/22/01	A
20102-1440/1-02772P-008	0	1440-OPT1-02772P-008	0		X	CONST	RECOMMENDED LONG-TERM STORAGE REQUIREMENTS	02772P.1.04.A.9	A 1/22/01	A
20102-1440/1-02772P-009	0	1440-OPT1-02772P-009	0	X		CONST	PROJECTED DELIVERY DATES	02772P.1.04.A.10	A 1/22/01	A
20102-1440/1-02772P-010	0 1	1440-OPT1-02772P-010	0 1	X		ENG	COMPLETED FORMS GCL-1	02772P.1.04.A.11	B 1/19/01 A 1/24/01	A
20102-1440/1-02772P-011	0	1440-OPT1-02772P-011	0	X		ENG	MANUFACTURING QUALITY CONTROL TESTS FOR EACH GCL LOT	02772P.1.04.B	A 5/8/01	B
20102-1440/1-02772P-012	0	1440-OPT1-02772P-012	0	X		ENG	INTERNAL AND INTERFACE SHEAR STRENGTH TEST RESULTS FOR EACH GCL LOT	02772P.1.04.B	A 5/8/01	B

A. WITHIN 10 DAYS FROM RELEASE OF CONTRACT
B. AT LEAST 21 DAYS PRIOR TO SHIPMENT
C. WITH SHIPMENT

The supplier shall provide submittals in accordance with Administrative Contractor Requirements ACR-001, attached.

000091

4554

SUPPLIER DOCUMENT SUBMITTAL

DF PROJECT NO.: 20102

CONTRACT NO: 1440

SUBMITTAL NO. 20102-1440/1-02770P-003

REV: 0

DATE: 1/3/01

Page 5 of __

ROM:
SE LINING TECHNOLOGIES

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

IGNATURE: John David Griffin

RECEIVED BY: Erika Jarrett DATE: 1/9/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
	1440-OPT1-02770P-003	0						X			ORIGIN/IDENT. OF RESIN		X			X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Chuck Van Arsdale	64				
Gregg Johnson	64				
Bill Zebick	64				
Mike Godber	64				
Kwasi Badu-Tweneboah	38				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

MOBIL MANUFACTURING PLANT IS IN BEAUMONT, TEXAS

RECEIVED BY: Chuck C. Van Arsdale DATE: 1/22/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

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ES-F-4955

ORIGINAL

STAR... Safety Through Accountability and Recognition

Mobil Polyethylene
Certificate of Analysis

"QUALITY PEOPLE MAKING QUALITY PRODUCTS"

Bill Walling
GSE
19103 Gundle Road
Houston, TX 77073

January 28, 1997

Mobil Chemical, a major supplier of quality polyethylene, has shipped a lot of Material to your facility. The lot identification and analysis are listed below. This data has been supplied by our Quality Control Laboratory located here in Beaumont. If you should need further information or another copy of this report please call your sales office in Irving, TX 214-580-1040.

Resin Identification		Resin Analysis Test	Lot Data
Product Type	HDA-601	Melt Index (gms/10 min) I_2	0.55
Lot Number	W-46090	Density (gms/cc)	0.935
Hopper Car Number	ACFX-57288		
Quantity Shipped	174,850		
Date of Manufacture	26-Dec-96		
P.O. Number			
Location Shipped to		LTB Test ASTM D746	<-90°C
Aldine, TX			

Thank you for your business. If you need additional assistance, please do not hesitate to contact our Sales Representative in your area.

Sincerely,

C. A. Winney
Quality Assurance Specialist

INFORMATION ONLY

cc: MP-DALLAS

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 1/22/01

FAX to 713-843-3685 N. Ivy
FAX to 713-[illegible]-2510 R. Schaefer

PHILLIPS CHEMICAL COMPANY
A DIVISION OF PHILLIPS PETROLEUM COMPANY
BOX 792 • PHONE: 713 475-3666
PASADENA, TEXAS 77501-0792

PHILLIPS PLASTICS RESINS
Houston Chemical Complex

August 03, 1999

KSL# 21906-99

FAX: 281-230-2510

GSE Lining Technology, Inc.
19103 Gundle Road
Houston, TX 77073

Rick Schaefer

This letter will certify that the Marlex* resin shown below, as supplied by Phillips Chemical Company, conforms to our manufacturing specification.

Type:	HHM TR-400GS
Lot Number:	7191120
P.O. Number:	
Date Shipped:	08/02/99
Package:	PSPX 6781
Quantity:	183100 LBS.
Melt Index, ASTM D1238:	.100 G/10 MIN
HLMI Flow Rate,ASTM D1238:	11.5 G/10 MIN
Density, ASTM D1505:	.938 G/CC
HLMI/MI Ratio:	115.
Production Date:	07/23/99
ESCR, F/50, Cond. B:	1500 HOURS **
Brittleness Temperature:	<-70 C **
Color:	139.000

SAMPLE

Karen S. Lively
Quality Assurance Manager

For COA questions call Linda Murray, 713-475-3625

* Reg. U.S. Pat. Off.
** Nominal Value (not tested on each lot)

cc: QA-File-RC

SUPPLIER DOC. SUBMITTAL

PROJECT NO.: 20102	CONTRACT NO: 1440	SUBMITTAL NO. 20102-1440/1-02770P-004	REV: 0	DATE: 1/3/01	Page 6 of __

FROM: LINING TECHNOLOGIES

SIGNATURE: John David Siffin

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Erika Jarrett DATE: 1/9/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
	1440-OPT1-02770P-004	0							X		CERT. OF WELDING ROD		X		02770P, 1.05.A.4	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Godber	61				
Chuck Van Ausdale	61				
Bill Zobick	61				
Kwasi Badu Tweneboah	38				

NO COMMENTS: ✓ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE: 16 January 2001

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

for Michael W. Godber

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

600095

FS-F-4955

ORIGINAL

1440-0177-02170P-004

- 4554

GSE®

GSE Lining Technology, Inc.

19103 Gundle Road
Houston, Texas 77073
800-435-2008
713-443-8564
Fax: 281 - 230 - 8663

03 JANUARY 2001

FLUOR FERNALD, INC.
7400 WILLEY ROAD
HAMILTON, OHIO 45013-9402
ATTN: ECDC, MS52-7 PROJECT 20102

RE: CERTIFICATION FOR WELDING ROD
GSE PROJECT NO. 502302 (S.O. 6185)

CERTIFICATION

The undersigned, being qualified and authorized to do so, hereby certifies that standard GSE 60 mil average HyperFlex® and HyperFrictionFlex® HDPE geomembranes will meet or exceed the following specified property values:

- GSE certifies that the welding extrudate is of the same resin type and has the same properties as the geomembrane to be supplied to the above project.

Sincerely,

John David Griffin
GSE Technical Supervisor

cc: Bob Nantz, GSE Lining Technology, Inc.

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 16 January 2001

INFORMATION ONLY

000096

SUPPLIER DOCUMENT SUBMITTAL

PROJECT NO.: 20102	CONTRACT NO: 1440	SUBMITTAL NO. 20102-1440/1-02770P-005	REV: 0	DATE: 1/3/01	Page 7 of __

FROM: LINING TECHNOLOGIES

SIGNATURE: John David Griffin

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Erika Jarrett DATE: 1/09/01

TY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
	1440-OPTI-02770P-005	0							X		CERT. OF MARV VALUES		X		02770P, 1.05, A.5	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Godber	64				
Chuck Van Arsdale	64				
Kwasi Bodu Tweneboah	38				
Bill Zebick	64				

NO COMMENTS: ✓ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE: 16 January 2001

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

for Michael W. Godber

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

000097

ORIGINAL

1440-OPT1-02770P-005

- 4554

GSE®

GSE Lining Technology, Inc.

19103 Gundle Road
Houston, Texas 77073
800-435-2008
713-443-8564
Fax: 281-230-8663

03 JANUARY 2001

FLUOR FERNALD, INC.
7400 WILLEY ROAD
HAMILTON, OHIO 45013-9402
ATTN: ECDC, MS52-7 PROJECT 20102

RE: CERTIFICATION OF 60 MIL HYPERFLEX & HYPERFRICTIONFLEX MATERIAL PROPERTIES
GSE PROJECT NO. 502302 (S.O. 6185)

CERTIFICATION

The undersigned, being qualified and authorized to do so, hereby certifies that standard GSE 60 mil average HyperFlex® and HyperFrictionFlex® HDPE geomembranes will meet or exceed the following specified property values:

- Minimum Average Roll Value (MARV) – GSE HyperFrictionFlex HPDE geomembrane physical and mechanical properties will meet the properties as listed in Table 02770P-1, Required HDPE Textured Geomembrane Properties with a 95% confidence level.
- GSE certifies that no reclaimed polymer will be used in the production of materials for the referenced project. Recycled material reworked from GSE's manufacturing process may be added, but will not exceed two percent (2%) by weight of the material.

Sincerely,

John David Griffin

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 16 January 2001

John David Griffin
GSE Technical Supervisor

cc: Bob Nantz, GSE Lining Technology, Inc.

INFORMATION ONLY

000098

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJ: 20102

CONTRACT NO: 1440

SUBMITTAL NO. 20102-1440/1-02770P-008

REV: 1

DATE: 2/16/01

FROM:
GSE LINING TECHNOLOGIES

SIGNATURE: Chuck P. Van Arsdale

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Erika Jarrett DATE: 2/20/01

QTY.	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1440-OPT1-02770P-008	1						X			GEOMEMBRANE WARRANTY			X	02770P.1.05.A.8	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Chuck Van Arsdale	64				
Gregg Johnson	64				
Bill Zebick	64				
Mike Godber	64				
Kwasi Badu-Twereboah	38				

NO COMMENTS: ✓ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: Chuck P. Van Arsdale DATE: 2/28/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

000099

FS-F-4955
Rev. 3: 05/14/1999, CT-2.4.2

ORIGINAL

19103 Gundle Rd.
Houston, Texas 77037
Phone: 800 435-2008
Fax: 281 2308660

GSE Project Number: 502302
GSE Customer Number: 40844
GSE Order Number: 6185 SO
Customer Purchase Order: Contract 99SC0014

ORDER ACKNOWLEDGEMENT -- 4554

Sold To: Fluor Daniel Fernald
P.O.Box 538704
Cincinnati OH 45253-8704

Ship To: Fluor Daniel Fernald
Option 1 - Cell 1 Cover System
Department of Energy
7400 Willey Road
Hamilton OH 45013

Phone: 513 6484681
Fax:

Phone:
Fax:

Payment Terms: Default Net 45
Shipping Terms: F.O.B. Jobsite

Delivery Instructions: Contact Kathy Fisher @ (513) 648-3000.

Line No.	Order Date	Requested on Site	Description	Item Number	UoM	Quantity	Unit Price	Extended Price
10.000	02/05/01	04/16/0	Additional Testing Fees Rate Per Each	TEST1000	EA	1	.0000	

Warranty Addition:
"This warranty is in addition to the warranty provisions contained in Subcontract No. 99SC001440 and does not negate any warranty provisions under Fluor Fernald Inc.'s general provisions contained in the subcontract"

Sub Total: 200,768.00
Tax Rate: 6 %
Sales Tax: 12,046.08
Total Order US$ 212,814.08

Order Acceptance Conditions:

Price Escalation: The prices for products are firm for 30 days from the date of this Acknowledgment. A purchase order from the Customer must be received within the 30-day period and Customer must agree to take delivery of products within 30 days of issuance of a GSE Order Acknowledgment, or the prices for those products will escalate according to the following provisions:

a. Prices for GSE resin based products are subject to escalation based on changes in the price for resin as published in *Plastics News On The Web* under volume Thermoplastics HDPE & LLDPE Extrusion-Annual Volumes Greater Than 20 Million Pounds. Quoted prices are based on resin prices at the time of quotation, and are subject to change when *Plastics News* resin prices change. If the above protected period is not met, prices for products will change as published prices in *Plastics News* change. Price changes will be applied proportionally to each product based on that product's standard weight per unit.

b. Prices for non-GSE manufactured materials are subject to price changes based on supplier's increases.

Material Warranty: All products are sold with GSE's Standard Limited Material Warranty. GSE will "pass through" the original manufacturer's warranty for all products not manufactured by GSE.

Material Specifications: Unless otherwise agreed in writing by a GSE authorized representative, GSE's standard property values, quality control testing procedures, and documentation apply to the products supplied.

Shipping Policy: GSE Standard Inventory can be shipped in three (3) to five (5) working days after a GSE Order Acknowledgment is issued to Customer.

Substitution of Products: GSE reserves the right to substitute material manufactured at any of its U.S. plants. If GSE elects to substitute comparable material, it will make reasonable efforts to notify Customer in advance of shipment.

Product Quantity Revisions: Any change in products, specifications, or quantities by Customer will require a revised quotation and Order Acknowledgment. If Customer elects to purchase only a portion of the products acknowledged, GSE shall have the right to adjust its pricing to reflect the impact of such election.

Roll Sizes: All roll sizes are approximate. Invoicing will be based on actual roll lengths shipped.

Taxes: Taxes are calculated separately at the prevailing jurisdiction's rates currently in effect. Properly signed exemption or direct pay permits must be presented to GSE and accepted by the Tax Authority in order to exempt your order from applicable taxes.

Terms and Conditions: GSE General Terms and Conditions of Sale, attached hereto, shall apply to all transactions. Acceptance of your purchase order is expressly made conditional on your acceptance of GSE General Terms and Conditions of Sale.

EEOC: GSE Lining Technology, Inc. is an Equal Employment Opportunity Employer.

Comments:

INFORMATION ONLY

000100

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 2/28/01

CONFIDENTIAL
For environmental solutions... the world comes to GSE
A Gundle/SLT Environmental, Inc. Company

GSE-4.3-010 Rev01 · Date 10/03/00

-- 4554

PRO-RATA LIMITED WARRANTY
FOR GSE LINING TECHNOLOGY, INC.
(GEOSYNTHETIC MANUFACTURED MATERIALS)
(U.S.A.)

Date: _____ Warranty No. SAMPLE

Purchaser Name: _____ Project No.: _____

Address: _____ Effective Date: _____

City, State: _____ Project Name: _____

Product Type/Description: GSE LINER PRODUCTS Project Address: _____

GSE Lining Technology, Inc. ("GSE") warrants each GSE product described above to be free from material manufacturing defects (as described by the contract's material specifications) and to be able to withstand normal weathering for a period of twenty (20) years from the above effective date for "normal use" in approved applications. This limited warranty does not include damages or defects in the GSE product resulting from acts of God, casualty or catastrophe, including but not limited to: earthquakes, floods, piercing hail, tornadoes or force majeure. The term "normal use" does not include, among other things, the exposure of GSE's product to harmful chemicals, abuse by machinery, equipment or people; improper site preparation or placement of cover materials; excessive pressures or stresses from any source. This warranty is intended for commercial use only and is not in effect for the consumer as defined in the Magnuson-Moss Warranty Act.

Should defects or premature loss of use within the scope of this warranty occur, GSE will, at its option, repair or replace the GSE product on a pro-rata basis at the current price in such manner as to charge the Purchaser only for that portion of the warranted life which has elapsed since the purchase of the product. GSE shall have the right to inspect and determine the cause of the alleged defect in the product and to take appropriate steps to repair or replace the product if a defect exists that is covered under this warranty. This limited warranty only extends to the geosynthetic portion of this product manufactured by GSE and does not apply to any third-party manufactured materials attached to GSE's product. The third-party portion of the product will carry the original manufacturer's warranty that will be passed through to the Purchaser.

Any claim for any alleged breach of this warranty must be made in writing, by certified mail or courier, to the President of GSE, within ten (10) days of Purchaser becoming aware of the alleged defect. Should the required notice not be given, the defect and all warranties are waived by the Purchaser, and Purchaser shall not have rights under this warranty. GSE shall not be obligated to perform any inspection or obligated to perform any repair or replacement under this warranty until the area is made available free from all obstructions, water, dirt, sludge, residuals and liquids of any kind. If after inspection it is determined that there is no claim under this warranty, Purchaser shall reimburse GSE for its costs associated with the site inspection.

In the event the exclusive remedy provided herein fails in its essential purpose, and in that event only, the Purchaser shall be entitled to a return of the purchase price for so much of the product as GSE determines to have violated the warranty provided herein. GSE shall not be liable for direct, indirect, special, consequential or incidental damages resulting from a breach of this warranty including, but not limited to: damages for loss of production, lost profits, personal injury or property damage. GSE shall not be obligated to reimburse Purchaser for any repairs, replacement, modifications or alterations made by Purchaser to GSE's product, unless GSE specifically authorized, in writing, said repairs, replacements, modifications or alterations in advance. GSE liability under this warranty shall in no event exceed the replacement cost of the product sold to the Purchaser for the particular installation in which it failed.

GSE neither assumes nor authorizes any person other than an officer of GSE to assume for it any other or additional liability in connection with the GSE product made on the basis of the Limited Warranty. **GSE MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN HEREIN AND HEREBY DISCLAIMS ALL WARRANTIES, INCLUDING BOTH EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, AND BY ACCEPTING DELIVERY OF THE PRODUCT, PURCHASER WAIVES ALL OTHER POSSIBLE WARRANTIES. GSE's WARRANTY BECOMES AN OBLIGATION OF GSE TO PERFORM UNDER THE WARRANTY ONLY UPON RECEIPT OF FINAL PAYMENT**

This warranty is extended to the Purchaser and is non-transferable and non-assignable, i.e. there are no third-party beneficiaries to this warranty.

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.

CONTRACT NO: 1440

SUBMITTAL NO. 20102-1440/1-02770P-010 | REV: 0 | DATE: 2/14/01 | Page 1 of 3

FROM:
GSE LINING TECHNOLOGIES

SIGNATURE: Chuck C. Van Arsdale

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Denise Wentz DATE: 2/28/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1440-OPT1-02770P-010	0							X		QUALITY CONTROL CERTIFICATES FOR RESIN		X		02770P.1.05.B.1	X		
	1440-OPT1-02770P-011	0						X			TEST REPORTS OF RESIN		X		02770P.1.05.B.2	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Chuck Van Arsdale	64				
Gregg Johnson	64				
Bill Zebick	64				
Mike Godber	64				
Kwasi Badu-Tweneboah	38				

D COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

INCLUDE E-MAIL MESSAGE FROM J.D. GRIFFIN 2/21/01 SUBJECT 6185-502302 Floor Formulations CLARIFYING ASTM Designations

CEIVED BY: Chuck C. Van Arsdale DATE: 3/12/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

001102

FS-F-4955
Rev. 3: 05/14/1999, CT-2.4.2

ORIGINAL

CERTIFICATE OF ANALYSIS
QUALITY PEOPLE MAKING QUALITY PRODUCTS

4554

MELISSA
GSE LINING TECH INC
ZONE 14, TRACK 705
ALDINE, TX 77060

INFORMATION ONLY

12/12/2000

ExxonMobil Chemical, a major supplier of quality polyethylene, has shipped a lot of Material to your facility. The lot identification and analysis are listed below. This data has been supplied by our Quality Control Laboratory located here in Beaumont. If you should need further information or another copy of this report please call your customer service representation at 1-800-231-6633 (Film and injection molding) or 800-535-9994 (Blow molding and sheet accounts).

Resin Identification		Resin Analysis Test	Lot Data
Product Type	HDA601	Density (gms/cc)	0.9370
Lot Number	B-62185	Melt Index (gm/10 min) I2	0.61
Hopper Car Number	MBLX-053995		
Quantity Shipped	192,650 LB		
Date Manufactured	09/18/2000		
ExxonMobil Order #	708204K		
PO #	STOCK		

Thank you for your business. If you need additional assistance, please do not hesitate to contact your Customer Service Representative.

Data contained herein was prepared pursuant to ExxonMobil's sampling & testing procedures in effect at time of production. Some values shown may result from interpolation or correlation of other data. Applicable sampling and testing methods are available upon request and are subject to change without notice unless otherwise agreed in writing.

Fax To: (281) 230-8630 MELISSA
CC: (281) 230-8630 DENISE ADAMS

X A - Conforms to the Subcontract Requirements
B - Minor Comment - Incorporate and Resubmit
C - Revise and Resubmit
Sig: [illegible] Date: 3/12/01

000103

EXXONMOBIL CHEMICAL
CERTIFICATE OF ANALYSIS
QUALITY PEOPLE MAKING QUALITY PRODUCTS

- 4554

MELISSA
GSE LINING TECH INC
ZONE 14, TRACK 705
ALDINE, TX 77060

01/03/2001

ExxonMobil Chemical, a major supplier of quality polyethylene, has shipped a lot of Material to your facility. The lot identification and analysis are listed below. This data has been supplied by our Quality Control Laboratory located here in Beaumont. If you should need further information or another copy of this report please call your customer service representation at 1-800-231-6633 (Film and injection molding) or 800-535-9994 (Blow molding and sheet accounts).

Resin Identification		Resin Analysis Test	Lot Data
Product Type	HDA601	Density (gms/cc)	0.9360
Lot Number	B-62189	Melt Index (gm/10 min) I2	0.63
Hopper Car Number	NRLX-057239		
Quantity Shipped	188,150 LB		
Date Manufactured	09/19/2000		
ExxonMobil Order #	728117R		
PO # STOCK			

Thank you for your business. If you need additional assistance, please do not hesitate to contact your Customer Service Representative.

Data contained herein was prepared pursuant to ExxonMobil's sampling & testing procedures in effect at time of production. Some values shown may result from interpolation or correlation of other data. Applicable sampling and testing methods are available upon request and are subject to change without notice unless otherwise agreed in writing.

Fax To: (281) 230-8630 MELISSA
CC: (281) 230-8630 DENISE ADAMS

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 3/12/6

000104

Turner, Jim

From: JD Griffin [jgriffin@gseworld.com]
Sent: Tuesday, February 27, 2001 10:38
To: 'Jim.Turner@femald.gov'
Cc: Boyd Ramsey
Subject: 6185-502302 Fluor Femald, Inc.

Jim,

Thanks for bringing your concerns regarding the Certificate of Analysis (COA) for Exxon / Mobil resin certs to my attention. You are correct. There is no mention of the ASTM test methods used to test for Melt Index and/or Density. The melt index, density, and OIT test methods are as follows:

Melt Index - ASTM D 1238, 190 / 2.16
Density - ASTM D 792 and/or D 1505
OIT - ASTM D 3895

Call me if you have any more questions.

JD

FDF PROJECT NO.:	CONTRACT NO: 1440	SUBMITTAL NO. 20102-1440/1-02770P-012	REV: 1	DATE: 2/28/01	Page 1 of 2

FROM:
GSE LINING TECHNOLOGIES

SIGNATURE: Chuck C. VanAsdale

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Erika Sarrett DATE: 3/5/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1440-OPT1-02770P-012	1							X		CERTIFICATION OF RESIN POLYMER		X		02770P.1.05.B.3	X		
															02770P.2.01.A	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Godber	64				
Chuck Van Arsdale	64				
Kwasi Badu-Twereboah	38				
Bill Zebick	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE: 08 March 2001

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

000106

FS-F-4955
Rev. 3: 05/14/1999, CT-2.4.2

ORIGINAL

1440-OPT1-02770P-012

- 4554

GSE®

GSE Lining Technology, Inc.

19103 Gundle Road
Houston, Texas 77073
800-435-2008
713-443-8564
Fax 281-230-8563

INFORMATION ONLY

03 JANUARY 2001

FLUOR FERNALD, INC.
7400 WILLEY ROAD
HAMILTON, OHIO 45013-9402
ATTN: ECDC, MS52-7 PROJECT 20102

RE: CERTIFICATION OF 60 MIL HYPERFLEX & HYPERFRICTIONFLEX MATERIAL PROPERTIES
GSE PROJECT NO. 502302 (S.O. 6185)

CERTIFICATION

The undersigned, being qualified and authorized to do so, hereby certifies that standard GSE 60 mil average HyperFlex® and HyperFrictionFlex® HDPE geomembranes will meet or exceed the following specified property values:

- Minimum Average Roll Value (MARV) – GSE HyperFrictionFlex HPDE geomembrane physical and mechanical properties will meet the properties as listed in Table 02770P-1, Required HDPE Textured Geomembrane Properties with a 95% confidence level.
- GSE certifies that no reclaimed polymer will be used in the production of materials for the referenced project. Recycled material reworked from GSE's manufacturing process may be added, but will not exceed two percent (2%) by weight of the material.

Sincerely,

John David Griffin

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 08 March 2001

John David Griffin
GSE Technical Supervisor

cc: Bob Nantz, GSE Lining Technology, Inc.

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20102	CONTRACT NO: 1440	SUBMITTAL NO.: 20102-1440/1-02770P-013	REV.: 2	DATE: 03/20/01	Page 1 of __

FROM:
GSE Lining Technologies, Inc.

SIGNATURE: for J. D. Griffin James T. Turner

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Denise Wenz DATE:

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1440-OPT1-02770P-013	2							X		~~Manufacturer's requirements for any geotextile~~		X		02770P, Section	X		
											JTT 28 March 2001 ~~component of the GCL~~ Manufacturing				1.05.C.			
											Certificates per Shift Production of							
											Geomembrane							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
~~Mike Godbe~~ [redacted]	64				
Chuck Van Arsdale	64				
Kwasi Badu-Tweneboah	38				
Bill Zebick	64				
Gregg Johnson	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: DATE: 02 April 2001

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

ORIGINAL

000108

FS-F-4955
Rev 3: 05/14/1999, CT-2.4.2

1440-OPT1-02770P-013

Turner, Jim

Rev 2
4554

From: JD Griffin [jgriffin@gseworld.com]
Sent: Tuesday, March 20, 2001 13:56
To: 'Jim.Turner@fernald.gov'
Cc: Sheri Sim-Connell
Subject: FW: 6185

6185ds01.xls 6185ltb1.xls

Jim,

Here are the missing test results.

-----Original Message-----
From: Jimmy Youngblood
Sent: Tuesday, March 20, 2001 11:52 AM
To: JD Griffin
Subject: 6185

<<6185ds01.xls>> <<6185ltb1.xls>>

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 02 April 2001

000109

1440-OPT1-02770P-013
rev. 2
- 4554

GSE

Quality Assurance Laboratory Test Results

Job Name:	Fluor Fernald, Inc.
Sales Order:	6185
Test:	Brittleness Temperature of Plastics and Elastomers by Impact ASTM D 746
Criteria:	-60° C

Roll Number	Lot Number	Product Code	Test Result
114110050	B62185	HMT060A004	Pass
114110154	B62189	HMT060A004	Pass
115120945	C60242	HME060A004	Pass

1440-OPT1-02770P-013
Rev. 2

- 4554

GSE

Quality Assurance Laboratory Test Results

Job Name: Fluor Fernald, Inc.
Sales Order: 6185
Test: Dimensional Stability
ASTM D 1204 (1 hr 100 C)

Roll Number	Lot Number	Product Code	Project Specification (%)	Result
114110050	B62185	HMT060A004	+/- 2	Pass
114110154	B62189	HMT060A004	+/- 2	Pass
115120945	C60242	HME060A004	+/- 2	Pass

SUPPLIER DO[illegible] SUBMITTAL

FDF PROJECT I[illegible]

CONTRACT NO: 1440

SUBMITTAL NO. 20102-1440/1-02770P-013 | REV: 0 | DATE: 2/14/01

FROM:
GSE LINING TECHNOLOGIES

SIGNATURE: Chuck C. Van Arsdale

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Erika Sarrett DATE: 2/20/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1440-OPT1-02770P-013	0							X		MANUFACTURING CERTIFICATES FOR GEOMEMBRANE		X		02770P.1.05.C		X	

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Godber	64				
Chuck Van Arsdale	64				
Kwasi - Badu Twenebah	38				
Bill Zebick	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

- MISSING LOW TEMPERATURE BRITTLENESS, DIMENSIONAL STABILITY AND NCTL STRESS CRACK RESISTANCE TEST RESULTS — FREQUENCY IS ONE PER 400,000 FT²
- ASPERITY HEIGHT RESULTS SHOULD BE MINIMUM NOT AVERAGE

RECEIVED BY: [illegible] DATE: 2/23/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

0001112

FDF-4955
Rev. 3: 05/14/1999, CT-2.4.2

ORIGINAL

GSE Roll Allocation

4554

Order 6185
Customer FLOUR FERNALD, INC.
Site FLUOR FERNALD, INC.

Roll#	Resin Lot	Product Code	Description	Mfg. Date	Length	width	Area
114110050	B62185	HMT060A004	HMT060A004	1/13/01	474'	23.5'	11,139
114110068	B62185	HMT060A004	HMT060A004	1/14/01	474		
114110079	B62185	HMT060A004	HMT060A004	1/14/01	474		
114110080	B62185	HMT060A004	HMT060A004	1/15/01	471		
114110081	B62185	HMT060A004	HMT060A004	1/15/01	474		
114110082	B62185	HMT060A004	HMT060A004	1/15/01	472		
114110085	B62185	HMT060A004	HMT060A004	1/15/01	474		
114110106	B62185	HMT060A004	HMT060A004	1/16/01	474		
114110117	B62185	HMT060A004	HMT060A004	1/17/01	474		
114110118	B62185	HMT060A004	HMT060A004	1/17/01	474		
114110135	B62185	HMT060A004	HMT060A004	1/18/01	474		
114110136	B62185	HMT060A004	HMT060A004	1/18/01	461		
114110154	B62189	HMT060A004	HMT060A004	1/19/01	474		
114110155	B62189	HMT060A004	HMT060A004	1/19/01	474		
114110156	B62189	HMT060A004	HMT060A004	1/19/01	474		
114110160	B62189	HMT060A004	HMT060A004	1/19/01	474		
114110161	B62189	HMT060A004	HMT060A004	1/19/01	474		
114110162	B62189	HMT060A004	HMT060A004	1/19/01	474		
114110163	B62189	HMT060A004	HMT060A004	1/19/01	474		
114110166	B62189	HMT060A004	HMT060A004	1/19/01	474		
114110168	B62189	HMT060A004	HMT060A004	1/20/01	474		
114110170	B62189	HMT060A004	HMT060A004	1/20/01	474		
114110171	B62189	HMT060A004	HMT060A004	1/20/01	474		
114110172	B62189	HMT060A004	HMT060A004	1/20/01	474		
114110174	B62189	HMT060A004	HMT060A004	1/20/01	474		
114110175	B62189	HMT060A004	HMT060A004	1/20/01	474		
114110176	B62189	HMT060A004	HMT060A004	1/20/01	474		
114110177	B62189	HMT060A004	HMT060A004	1/21/01	474		
114110178	B62189	HMT060A004	HMT060A004	1/21/01	474		
114110179	B62189	HMT060A004	HMT060A004	1/21/01	474		
114110180	B62189	HMT060A004	HMT060A004	1/21/01	474		
114110181	B62189	HMT060A004	HMT060A004	1/21/01	474		

000113

08:38 AM

GSE Manufacturing Quality Assurance/Quality Control Specification Sheet

Page 1 - Smooth Geomembrane Specification

- 4554

Version:	1.00
Date:	02/01/01
By:	JD GRIFFIN

Part 1: Project Information

Sales Order:	6185	Project Name:	FLUOR FERNALD, INC.	Purchaser:	FLUOR FERNALD, INC.	By:	JD GRIFFIN
[illegible] To:	502302	Site Location:	HARRISON, OHIO	CSR:	SIM-CONNELL	Date:	01/03/01
[illegible] MQC:		Approved MQC:	YES	Approval Given By (name):	JD GRIFFIN	Date:	2/1/01
[illegible] Name:	60 MIL AVE HYPERFLEX						
[illegible]uct Code:	HMED60A004						
Quantity:	4,000 FT2						

Classification:	Tech Rev.	E. REED
CUSTOM	Date	2/12/99
	Revision	

Part 2A: GRI GM13 (GSE) Standard Testing Values and Frequencies for Sheet

Property	Units	Test Method	GSE Frequency	Custom Frequency	HDE	LLD	HME	Preliminary Spec	Final Spec
Thickness	mils	ASTM D 5994	Every Roll		+/- 10%	+/- 10%	+/- 10%		58 MIN / 60 AVE
Tensile @ Yield	ppi	D 638	Every Roll						130
Tensile @ Break	ppi	Type IV, 2 ipm	Every Roll						243
Elong. @ Yield	%	2.0" brk. gauge	Every Roll		13	NA	13		13
Elong. @ Break	%		Every Roll		700	850	700		700
Tear Res.	lb.	D 1004	Every Roll						42
Puncture Res.	lb.	D 4833	Every Roll						108
Carbon Blk %	%	D 1603	Every 5th Roll	1 / 40,000 FT2	2-3	2-3	2-3		STD
C. B. Dispersion	category	D 5596	Every 5th Roll	1 / 40,000 FT2	1 or 2	1 or 2	1 or 2		STD
Density	g/cc	D 1505 / D 792	Every 5th Roll	1 / 40,000 FT2	0.940 min	0.92 min	0.940 min		STD
OIT (sheet)	min	D 3895 @ 200C	1 / Resin Lot		> 100	> 100	> 100		100
NCTL (sheet)	hours	D 5397	1 / Resin Lot	SEE BELOW	> 400 hrs	NA	> 400 hrs		500
Other Tests					[redacted]				

Part 2B: Old GSE Testing Values and Frequencies for Sheet

Puncture Res.	lbs	FTMS 101 / 2065	Every 5th Roll		1800 ppi		1800 ppi		
C. B Dispersion	rating	D 3015	Every 5th Roll		A1, A2, B1	A1, A2, B1	A1, A2, B1		
ESCR	hours	D 1693, Cond. B	1 / Resin Lot		1500	1500	1500		

Part 2C: Additional Testing Values and Frequencies for Sheet

Dimensional	%	D 1204 (1 hr100C)	Upon Request	1 / 400,000 FT2	± 2	± 2	± 2		+/- 2
LTB (In House)	°C	D 746 Cond B	Upon Request	1 / 400,000 FT2	-70	-70	-70		-60 C
Melt Index (sheet)	g/10 min	D 1238	Upon Request		< 1.0	< 1.0	< 1.0		
[illegible]s	psi	D 638	Upon Request		80 Kpsi min	45 Kpsi max	80 Kpsi min		
[illegible]	% Elongation	D 5617	Upon Request		20 min		20 min		
[illegible]ar	degrees	D 5321	Not Tested		-	-	-		
[illegible] Shore	rating	D 2240	Upon Request		40	NA	40		

N/A = Not Applicable

Part 3: Special Instructions

(1) MANUFACTURING: MINIMIZE NO. OF RESIN LOTS USED: RESIN LOTS MUST BE A MINIMUM OF 100,000 FT2. (2) LAB: TEST NCTL AT A FREQUENCY OF 1 / 400,000 FT2 OR 1 / RESIN LOT WHICHEVER IS GREATER.

Part 4: Standard Test Values & Frequencies for Resin

			GSE	Customer	HDE	LLD	HME	Prelim. Spec	Final Spec
Density	g/cc	D 1505	4 / RESIN LOT		> 0.932	> 0.915	> 0.932		0.935
Melt Index	g/10 min	D 1238 - 190/2.16	4 / RESIN LOT		< 1.0	< 1.0	< 1.0		< 1.0
OIT (on resin)	min	D 3895 - 200C	1 / RESIN LOT		> 100	> 100	> 100		
NCTL (on resin)	hours	ASTM D 5397	1 / RESIN LOT		Not Tested	Not Tested	Not Tested		

Part 4A: Manufacturing Resin Specifications

Material regrind / rework spec?	YES / NO	If yes, then GSE std 2% or other?	STD / OTHER	If other, then what percentage allowed?	%
One resin supplier?	YES - MOBIL	Is welding rod identical to liner resin?	YES / NO	Does regrind have to be identical to the sheet?	YES / NO

Part 5: Liner Weld Specifications

Product Type	Units	Test Method	MINIMUM REQUIREMENTS						
			Peel			Shear			
			Ext.	Fusion	% Elong	Ext.	Fusion	Yld	Brk
HME060A004	ppi	ASTM D 6392							
	ppi	ASTM D 6392							
	ppi	ASTM D 6392							

Part 6: Conformance Sampling

Sample Type		3rd Party Test:	IN-PLANT
[illegible] Size	3 FT X ROLL WIDTH	CONTACT:	GEOTESTING EXPRESS — PHONE
[illegible] Frequency	1 / 100,000 FT2 OR 1 / LOT		2004 E. RANDOL MILL RD. — 817
Sp[illegible]			ARLINGTON, TX 76011 — 261
Ins[illegible]s			9090

000114

Part 7: Shipping Restrictions

Do rolls need to be pre-QC'd?	YES - 14 DAYS	Engineer Approval required prior to shipping rolls?	YES
Do rolls need to be pre-Cert?	YES / NO	Standard roll length unless otherwise stated?	YES / NO

GSE Manufacturing Quality Assurance/Quality Control Specification Sheet

Page 2 - Textured Geomembrane Specification

4554

Date: 02/01/01
By: JD GRIFFIN

Part 1: Project Information

Sales Order:	6185	Project Name:	FLUOR FERNALD, INC.	Purchaser:	FLUOR FERNALD, INC.	By:	JD GRIFFIN
Ship To:	502302	Site Location:	HARRISON, OHIO	CSR:	SIM-CONNELL	Date:	01/03/01
Pre-MQC:		Approved MQC:	YES	Approval Given By (name):	JD GRIFFIN	Date:	2/1/01
Product Name:	60 MIL AVE HYPERFRICTIONFLEX						
Product Code:	HMT060A004						
Quantity:	350,000 FT2						

Classification: CUSTOM

Tech Rev. E. REED
Date 2/12/99
Revision

Part 2A: GRI GM13 (GSE) Standard Testing Values and Frequencies for Sheet

Property	Units	Test Method	GSE Frequency	Custom Frequency	HDT	LUT / LLT	HMT	Preliminary Spec	Final Spec
Thickness	mils	D 5994	Every Roll		+/- 10%	+/- 10%	+/- 10%		58 MIN / 60 AVE
Tensile @ Yield	ppi	D 638	Every Roll			NA			126
Tensile @ Break	ppi	Type IV, 2 ipm	Every Roll		[redacted]				98
Elong. @ Yield	%	2.0" brk. gauge	Every Roll		13	NA	13		[redacted]
Elong. @ Break	%		Every Roll		150	500 / 700*	600		[redacted]
Tear Res.	lb.	D 1004	Every Roll						42
Puncture Res.	lb.	D 4833	Every Roll						98
Carbon Blk %	%	D 1603	Every 5th Roll	1 / 40,000 FT2	2-3	2-3	2-3		STD
C. B. Dispersion	Category	D 5596	Every 5th Roll	1 / 40,000 FT2	1 or 2	1 or 2	1 or 2		STD
Density	g/cc	D 1505 / D 792	Every 5th Roll	1 / 40,000 FT2	0.940 min	0.92 min	0.940 min		STD
OIT (sheet)	min	D 3895 @ 200C	1 / Resin Lot		> 100	> 100	> 100		
NCTL (sheet)	hours	D 5397	1 / Resin Lot	SEE BELOW	> 400 hrs	NA	> 400 hrs		500
Asperity Height	mils	GRI GM12	1 / 2 Rolls	1 / 40,000 FT2	10	10	10		[redacted]
Other Tests					[redacted]				

* 600% elongation for 40 mil LLT

Part 2B: Old GSE Testing Values and Frequencies for Sheet

Puncture Res.	lbs	FTMS 101 / 2065	Every 5th Roll		1800 ppi		1800 ppi		
C. B. Dispersion	rating	D 3015	Every 5th Roll		A1, A2, B1	A1, A2, B1	A1, A2, B1		
ESCR	hours	D 1693, Cond. B	1 / Resin Lot		1500	1500	1500		

Part 2C: Additional Testing Values and Frequencies for Sheet

Dimensional	%	D 1204 (1 hr100C)	Upon Request	1 / 400,000 FT2	± 2	± 2	± 2		+/- 3
LTB (In House)	°C	D 746 Cond B	Upon Request	1 / 400,000 FT2	-70	-70	-70		-60 C
Melt Index (sheet)	g/10 min	D 1238	Upon Request		< 1.0	< 1.0	< 1.0		
Modulus	psi	D 638	Upon Request		80 Kpsi min	45 Kpsi max	80 Kpsi min		
Yield	% Elongation	D 5617	Upon Request		13 min		13 min		
Tear	degrees	D 5321	Not Tested		-	-	-		
Hardness Shore	rating	D 2240	Upon Request		40	NA	40		

N/A = Not Applicable

Part 3: Special Instructions

(1) MANUFACTURING: MINIMIZE NO. OF RESIN LOTS USED; RESIN LOTS MUST BE A MINIMUM OF 100,000 FT2; MINIMUM ROLL LENGTH OF 390 FT. (2) LAB: TEST NCTL AT A FREQUENCY OF 1 / 400,000 FT2 OR 1 / RESIN LOT WHICHEVER IS GREATER.

Part 4: Standard Test Values & Frequencies for Resin

			GSE	Customer	HDE	LLD	HME	Prelim. Spec	Final Spec
Density	g/cc	D 1505	4 / RESIN LOT		> 0.932	> 0.915	> 0.932		0.935
Melt Index	g/10 min	D 1238 - 190/2.16	4 / RESIN LOT		< 1.0	< 1.0	< 1.0		< 1.0
OIT (on resin)	min	D 3895 - 200 C	1 / RESIN LOT		> 100	> 100	> 100		
NCTL (on resin)	hours	ASTM D 5397	1 / RESIN LOT		> 200	Not Tested	> 200		

Part 4A: Manufacturing Resin Specifications

Material regrind / rework spec?	YES / NO	If yes, then GSE std 3% or other?	STD / OTHER	If other, then what percentage allowed?	%
One resin supplier?	YES - MOBIL	Is welding rod identical to liner resin?	YES / NO	Does regrind have to be identical to the sheet?	YES / NO

Part 5: Liner Weld Specifications

Product Type	Units	Test Method	MINIMUM REQUIREMENTS						
			Peel			Shear			
			Ext.	Fusion	%Elong	Ext.	Fusion	Yld	Brk
HMT060A004	ppi	ASTM D 6392							
	ppi	ASTM D 6392							
	ppi	ASTM D 6392							

Part 6: Conformance Sampling

Sample Type		3rd Party Test:	IN-PLANT
Sample Size	3 FT X ROLL WIDTH	CONTACT:	GEOTESTING EXPRESS — PHONE
Sample Frequency	1 / 100,000 FT2 OR 1 / LOT		1004 E. RANDOL MILL RD. — 817
Comments			ARLINGTON, TX 76011 — 861 9090

000115

Part 7: Shipping Restrictions

Do rolls need to be pre-QC'd?	YES - 14 DAYS	Engineer Approval required prior to shipping rolls?	YES
Do rolls need to be pre-Cert?	YES / NO	Standard roll length unless otherwise stated?	YES / NO

GSE

Quality Assurance Laboratory Test Results

Job Name: Fluor Fernald, Inc.
Sales Order Number: 6185
Criteria: Between 2.00% and 3.00% Carbon Black
> .940 g/cc Density
Cat. 1 & 2 = 10
Test: ASTM D1603 - Method for Carbon Black in Plastics
ASTM D1505 - Density
ASTM D 5596 - Microscopic evaluation of the dispersion of Carbon Black in Polyolefin Geosynthetics

Roll Number	Carbon Black (%)	Density (g/cc)	Carbon Dispersion Cat. 1 & 2
114110050	2.6	0.942	10
114110080	2.4	0.942	10
114110085	2.5	0.943	10
114110118	2.5	0.943	10
114110154	2.6	0.942	10
114110160	2.6	0.940	10
114110163	2.6	0.940	10
114110170	2.5	0.941	10
114110174	2.5	0.942	10
114110177	2.5	0.942	10
114110180	2.6	0.941	10

Roll numbers listed meet the minimum interval of one test for each 40,000 ft² manufactured. missing QA stamp or initial on this page.
LAB T
2/22/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110050

ROLL IDENTIFICATION

Roll Number	114110050
Product Name	HMT060A004
Production Date	1/13/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,518 1,596	pounds kilograms

RESIN INFORMATION

Lot Number	862185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505 ✓	0.937
Melt index, g/10 min.	ASTM D 1238 (190/2.16) ✓	0.61

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994 ✓					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV ✓					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	152	(266)
- MD		every roll	126	(221)	154	(269)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	328	(574)
- MD		every roll	90	(158)	298	(522)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		20	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		935	
- MD	(51 mm)	every roll	100		823	
Tear Resistance, lb. (N)	ASTM D 1004* ✓					
- TD		every roll	42	(187)	52	(229)
- MD		every roll	42	(187)	52	(233)
Puncture Resistance, lb. (N)	ASTM D 4833 ✓					
		every roll	90	(398)	149	(664)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(358)	99	(440)
Density, g/cc	ASTM D 1505 ✓					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603* ✓					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596 ✓					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height ?	GRI GM 12 ✓					
Average (mils)		every 2nd	10		16	

mid.

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000117

APPROVED M.C. 1/15/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110068

ROLL IDENTIFICATION

Roll Number	114110068
Product Name	HMT060A004
Production Date	1/14/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,542 1,607	pounds kilograms

RESIN INFORMATION

Lot Number	B62185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.937
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.61

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	149	(262)
- MD		every roll	126	(221)	155	(271)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	338	(591)
- MD		every roll	90	(158)	337	(589)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		23	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		922	
- MD	(51 mm)	every roll	100		887	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	50	(221)
- MD		every roll	42	(187)	54	(240)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	151	(672)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	88	(391)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.941	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		17	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/15/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110079

ROLL IDENTIFICATION

Roll Number	114110079
Product Name	HMT060A004
Production Date	1/14/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,533 1,603	pounds kilograms

RESIN INFORMATION

Lot Number	B62185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.937
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.61

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	154	(270)
- MD		every roll	126	(221)	163	(286)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	312	(547)
- MD		every roll	90	(158)	339	(594)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		22	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		864	
- MD	(51 mm)	every roll	100		921	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	52	(232)
- MD		every roll	42	(187)	58	(256)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	148	(658)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	83	(367)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.4	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		15	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/15/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110080

ROLL IDENTIFICATION

Roll Number	114110080
Product Name	HMT060A004
Production Date	1/15/01

Length ≈(+/- 1%)	471 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,069 1,028	sq. feet sq. meters
Weight	3,519 1,596	pounds kilograms

RESIN INFORMATION

Lot Number	B62185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.937
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.61

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	155	(272)
- MD		every roll	126	(221)	161	(281)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	335	(586)
- MD		every roll	90	(158)	318	(557)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		919	
- MD	(51 mm)	every roll	100		827	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	51	(228)
- MD		every roll	42	(187)	55	(246)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	149	(665)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	83	(367)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.4	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		15	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000120

APPROVED M.C. 1/15/01

GSE Lining Technology, Inc.

Roll Test Data Report

-- 4554

Roll No. 114110081

ROLL IDENTIFICATION

Roll Number	114110081
Product Name	HMT060A004
Production Date	1/15/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,578 1,623	pounds kilograms

RESIN INFORMATION

Lot Number	B82185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.937
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.61

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	155	(272)
- MD		every roll	126	(221)	162	(284)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	340	(594)
- MD		every roll	90	(158)	344	(602)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		19	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		930	
- MD	(51 mm)	every roll	100		921	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	53	(234)
- MD		every roll	42	(187)	55	(244)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	146	(650)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	89	(395)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.943	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		15	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/15/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110082

ROLL IDENTIFICATION

Roll Number	114110082
Product Name	HMT060A004
Production Date	1/15/01

Length ≈(+/- 1%)	472 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,092 1,030	sq. feet sq. meters
Weight	3,515 1,594	pounds kilograms

RESIN INFORMATION

Lot Number	B62185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.937
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.61

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	153	(267)
- MD		every roll	126	(221)	165	(289)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	315	(551)
- MD		every roll	90	(158)	325	(569)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		20	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		878	
- MD	(51 mm)	every roll	100		849	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	50	(224)
- MD		every roll	42	(187)	56	(251)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	149	(662)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	89	(395)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.943	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		16	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000122

APPROVED M.C. 1/15/01

GSE Lining Technology, Inc.

Roll Test Data Report

-- 4554

Roll No. 114110085

ROLL IDENTIFICATION

Roll Number	114110085
Product Name	HMT080A004
Production Date	1/15/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,536 1,604	pounds kilograms

RESIN INFORMATION

Lot Number	B62185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.937
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.61

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	148	(255)
- MD		every roll	126	(221)	148	(258)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	302	(528)
- MD		every roll	90	(158)	344	(602)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		23	
- MD	(33 mm)	every roll	12		21	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		827	
- MD	(51 mm)	every roll	100		913	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	47	(211)
- MD		every roll	42	(187)	53	(236)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	152	(678)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	89	(395)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.943	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		16	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000123

APPROVED M.C. 1/16/01

GSE Lining Technology, Inc.

Roll Test Data Report

-- 4554

Roll No. 114110106

ROLL IDENTIFICATION

Roll Number	114110106
Product Name	HMT060A004
Production Date	1/16/01

Length ≈(+/- 1%)	474	feet
	144	meters
Width (Nominal)	23.5	feet
	7.2	meters
Sheet Area	11,139	sq. feet
	1,035	sq. meters
Weight	3,508	pounds
	1,591	kilograms

RESIN INFORMATION

Lot Number	862185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.937
Melt Index, g/10 min.	ASTM D 1238 (190/2.16)	0.61

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	151	(265)
- MD		every roll	126	(221)	153	(268)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	319	(558)
- MD		every roll	90	(158)	319	(559)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		909	
- MD	(51 mm)	every roll	100		872	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	51	(227)
- MD		every roll	42	(187)	53	(234)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	152	(676)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	84	(376)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		12	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000124

APPROVED
M.C.
1/17/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110117

ROLL IDENTIFICATION

Roll Number	114110117
Product Name	HMT080A004
Production Date	1/17/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,519 1,598	pounds kilograms

RESIN INFORMATION

Lot Number	862185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.937
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.61

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	150	(263)
- MD		every roll	126	(221)	154	(270)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	288	(504)
- MD		every roll	90	(158)	319	(558)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		18	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		827	
- MD	(51 mm)	every roll	100		868	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	51	(228)
- MD		every roll	42	(187)	53	(237)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	152	(677)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	89	(395)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.943	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		16	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/17/01

GSE-4 10-007 Rev. 07/00

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110118

ROLL IDENTIFICATION

Roll Number	114110118
Product Name	HMT060A004
Production Date	1/17/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.6 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,510 1,592	pounds kilograms

RESIN INFORMATION

Lot Number	B62185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.937
Melt Index, g/10 min.	ASTM D 1238 (190/2.16)	0.81

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	147	(257)
- MD		every roll	126	(221)	148	(259)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	316	(554)
- MD		every roll	90	(158)	314	(549)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		22	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		870	
- MD	(51 mm)	every roll	100		845	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	52	(230)
- MD		every roll	42	(187)	53	(235)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	150	(668)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	89	(395)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.943	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		16	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000126

APPROVED M.C. 1/17/01

GSE Lining Technology, Inc.

Roll Test Data Report

-- 4554

Roll No. 114110135

ROLL IDENTIFICATION

Roll Number	114110135
Product Name	HMT060A004
Production Date	1/18/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,520 1,597	pounds kilograms

RESIN INFORMATION

Lot Number	862185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.937
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.61

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	152	(266)
- MD		every roll	126	(221)	157	(275)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	332	(582)
- MD		every roll	90	(158)	308	(539)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		20	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		924	
- MD	(51 mm)	every roll	100		801	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	51	(227)
- MD		every roll	42	(187)	55	(246)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	143	(637)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	88	(391)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.941	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		17	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/18/01

GSE-4.10-007 Rev - - 07/00

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110178

ROLL IDENTIFICATION

Roll Number	114110178
Product Name	HMT060A004
Production Date	1/21/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,522 1,598	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	153	(268)
- MD		every roll	126	(221)	143	(251)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	310	(542)
- MD		every roll	90	(158)	331	(580)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		850	
- MD	(51 mm)	every roll	100		909	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	54	(241)
- MD		every roll	42	(187)	51	(226)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	150	(666)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	83	(368)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		17	

Order No. 6185
Customer Name FLOUR FERNALD, INC.
Location HARRISON, OHIO
*Modified

000128

APPROVED M.C. 1/22/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110179

ROLL IDENTIFICATION

Roll Number	114110179
Product Name	HMT060A004
Production Date	1/21/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,510 1,592	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	155	(271)
- MD		every roll	126	(221)	145	(253)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	313	(547)
- MD		every roll	90	(158)	322	(563)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		22	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		841	
- MD	(51 mm)	every roll	100		867	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	52	(230)
- MD		every roll	42	(187)	52	(233)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	152	(676)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	83	(368)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		17	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000179

APPROVED M.C. 1/22/01

GSE-4.10-007 Rev. - 07/00

GSE Lining Technology, Inc.

Roll Test Data Report

4554

Roll No. 114110180

ROLL IDENTIFICATION

Roll Number	114110180
Product Name	HMT060A004
Production Date	1/21/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,505 1,590	pounds kilograms

RESIN INFORMATION

Lot Number	862189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	155	(271)
- MD		every roll	126	(221)	151	(265)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	318	(557)
- MD		every roll	90	(158)	335	(586)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		18	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		880	
- MD	(51 mm)	every roll	100		896	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	55	(244)
- MD		every roll	42	(187)	51	(229)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	150	(669)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	92	(410)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.941	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		17	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000130

APPROVED M.C. 1/22/01

GSE-4.10-007 Rev - - 07/00

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110179

ROLL IDENTIFICATION

Roll Number	114110179
Product Name	HMT060A004
Production Date	1/21/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,510 1,592	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	155	(271)
- MD		every roll	126	(221)	145	(253)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	313	(547)
- MD		every roll	90	(158)	322	(563)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		22	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		841	
- MD	(51 mm)	every roll	100		867	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	52	(230)
- MD		every roll	42	(187)	52	(233)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	152	(676)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	83	(368)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		17	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/22/01

GSE-4.10-002 Rev. 07/00

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110180

ROLL IDENTIFICATION

Roll Number	114110180
Product Name	HMT060A004
Production Date	1/21/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,505 1,590	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	155	(271)
- MD		every roll	126	(221)	151	(265)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	318	(557)
- MD		every roll	90	(158)	335	(586)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		18	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		880	
- MD	(51 mm)	every roll	100		896	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	55	(244)
- MD		every roll	42	(187)	51	(229)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	150	(669)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	92	(410)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.941	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		17	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/22/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110181

ROLL IDENTIFICATION

Roll Number	114110181
Product Name	HMT060A004
Production Date	1/21/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,530 1,601	pounds kilograms

RESIN INFORMATION

Lot Number	B82189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5 -)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	158	(277)
- MD		every roll	126	(221)	157	(274)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	346	(605)
- MD		every roll	90	(158)	316	(552)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		938	
- MD	(51 mm)	every roll	100		856	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	54	(239)
- MD		every roll	42	(187)	52	(231)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	150	(669)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	92	(410)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.941	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		10	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

GSE-4.10-007 Rev. 07/00

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APPROVED M.C. 1/22/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110168

ROLL IDENTIFICATION

Roll Number	114110168
Product Name	HMT060A004
Production Date	1/20/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,518 1,598	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	149	(260)
- MD		every roll	126	(221)	149	(261)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	312	(547)
- MD		every roll	90	(158)	317	(554)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		22	
- MD	(33 mm)	every roll	12		18	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		862	
- MD	(51 mm)	every roll	100		871	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	50	(222)
- MD		every roll	42	(187)	52	(229)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	145	(645)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	88	(392)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.941	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		15	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/22/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110170

ROLL IDENTIFICATION

Roll Number	114110170
Product Name	HMT060A004
Production Date	1/20/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,497 1,586	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	151	(264)
- MD		every roll	126	(221)	146	(255)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	325	(569)
- MD		every roll	90	(158)	311	(545)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		20	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		901	
- MD	(51 mm)	every roll	100		855	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	51	(226)
- MD		every roll	42	(187)	51	(228)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	149	(664)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	88	(392)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.941	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		12	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/22/01

4554

GSE Lining Technology, Inc.

Roll Test Data Report

Roll No. 114110171

ROLL IDENTIFICATION

Roll Number	114110171
Product Name	HMT060A004
Production Date	1/20/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,525 1,599	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA801
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.938
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	148	(258)
- MD		every roll	126	(221)	145	(254)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	307	(537)
- MD		every roll	90	(158)	302	(529)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		23	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		883	
- MD	(51 mm)	every roll	100		852	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	51	(227)
- MD		every roll	42	(187)	52	(231)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	151	(670)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	88	(392)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.941	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		14	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/22/01

GSE Lining Technology, Inc.

Roll Test Data Report

4554

Roll No. 114110172

ROLL IDENTIFICATION

Roll Number	114110172
Product Name	HMT060A004
Production Date	1/20/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,496 1,586	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	153	(267)
- MD		every roll	126	(221)	146	(255)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	327	(573)
- MD		every roll	90	(158)	316	(554)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		928	
- MD	(51 mm)	every roll	100		886	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	53	(234)
- MD		every roll	42	(187)	52	(230)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	151	(670)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	88	(392)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.941	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		14	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/22/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110174

ROLL IDENTIFICATION

Roll Number	114110174
Product Name	HMT060A004
Production Date	1/20/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,505 1,590	pounds kilograms

RESIN INFORMATION

Lot Number	862189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	152	(266)
- MD		every roll	126	(221)	142	(249)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	336	(589)
- MD		every roll	90	(158)	322	(563)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		936	
- MD	(51 mm)	every roll	100		892	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	51	(228)
- MD		every roll	42	(187)	50	(223)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	148	(658)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	83	(388)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		13	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000138

APPROVED M.C. 1/22/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110175

ROLL IDENTIFICATION

Roll Number	114110175
Product Name	HMT060A004
Production Date	1/20/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,514 1,594	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt Index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	148	(259)
- MD		every roll	126	(221)	144	(252)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	325	(569)
- MD		every roll	90	(158)	321	(561)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		18	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		910	
- MD	(51 mm)	every roll	100		878	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	52	(230)
- MD		every roll	42	(187)	50	(222)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	146	(649)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	83	(368)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		13	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/22/01

GSE-4.10-007 Rev. 07/00

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110176

ROLL IDENTIFICATION

Roll Number	114110176
Product Name	HMT060A004
Production Date	1/20/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,504 1,589	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	157	(274)
- MD		every roll	126	(221)	139	(243)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	311	(543)
- MD		every roll	90	(158)	306	(536)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		22	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		840	
- MD	(51 mm)	every roll	100		861	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	55	(244)
- MD		every roll	42	(187)	50	(221)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	154	(684)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	87	(386)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		16	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000140

APPROVED M.C. 1/22/01

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110177

ROLL IDENTIFICATION

Roll Number	114110177
Product Name	HMT060A004
Production Date	1/21/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,574 1,621	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	153	(268)
- MD		every roll	126	(221)	148	(259)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	329	(576)
- MD		every roll	90	(158)	333	(583)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		22	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		924	
- MD	(51 mm)	every roll	100		918	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	52	(230)
- MD		every roll	42	(187)	52	(232)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	149	(664)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	87	(386)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		16	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000141

APPROVED M.C. 1/22/01

GSE-4.10-007 Rev. - 07/00

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110136

ROLL IDENTIFICATION

Roll Number	114110136
Product Name	HMT060A004
Production Date	1/18/01

Length ≈(+/- 1%)	461 141	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	10,834 1,006	sq. feet sq. meters
Weight	3,417 1,550	pounds kilograms

RESIN INFORMATION

Lot Number	B62185
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.937
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.61

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	146	(255)
- MD		every roll	126	(221)	156	(273)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	309	(540)
- MD		every roll	90	(158)	327	(572)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		20	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		816	
- MD	(51 mm)	every roll	100		874	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	49	(220)
- MD		every roll	42	(187)	55	(244)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	146	(648)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	88	(391)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.941	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		17	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000142

APPROVED M.C. 1/18/01

GSE Lining Technology, Inc.

Roll Test Data Report

-- 4554

Roll No. 114110154

ROLL IDENTIFICATION

Roll Number	114110154
Product Name	HMT060A004
Production Date	1/19/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,552 1,611	pounds kilograms

RESIN INFORMATION

Lot Number	B82189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	153	(267)
- MD		every roll	126	(221)	150	(263)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	311	(543)
- MD		every roll	90	(158)	315	(552)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		853	
- MD	(51 mm)	every roll	100		880	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	52	(232)
- MD		every roll	42	(187)	57	(253)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	143	(637)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	92	(410)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.950	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		15	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/19/01

GSE-4 10-007 Rev. 07/00

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110155

ROLL IDENTIFICATION

Roll Number	114110155
Product Name	HMT060A004
Production Date	1/19/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,572 1,620	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt Index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	154	(270)
- MD		every roll	126	(221)	149	(261)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	305	(534)
- MD		every roll	90	(158)	326	(570)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		845	
- MD	(51 mm)	every roll	100		882	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	52	(229)
- MD		every roll	42	(187)	53	(234)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	145	(646)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	92	(410)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.950	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		15	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/19/01

GSE-4.10.003 Rev. 07/00

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110156

ROLL IDENTIFICATION

Roll Number	114110156
Product Name	HMT060A004
Production Date	1/19/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,559 1,614	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	59	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	150	(263)
- MD		every roll	126	(221)	152	(266)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	321	(563)
- MD		every roll	90	(158)	310	(542)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		22	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		893	
- MD	(51 mm)	every roll	100		855	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	51	(227)
- MD		every roll	42	(187)	52	(233)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	144	(640)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	92	(410)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.950	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		15	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/19/01

GSE Lining Technology, Inc.

Roll Test Data Report

-- 4554

Roll No. 114110160

ROLL IDENTIFICATION

Roll Number	114110160
Product Name	HMT060A004
Production Date	1/19/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,526 1,599	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt Index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	141	(247)
- MD		every roll	126	(221)	138	(242)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	303	(531)
- MD		every roll	90	(158)	311	(544)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		22	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		870	
- MD	(51 mm)	every roll	100		880	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	51	(226)
- MD		every roll	42	(187)	51	(227)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	149	(665)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	92	(408)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.940	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		13	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/22/01

GSE-4.10-002

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110161

ROLL IDENTIFICATION

Roll Number	114110161
Product Name	HMT060A004
Production Date	1/19/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,518 1,596	pounds kilograms

RESIN INFORMATION

Lot Number	862189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt Index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	141	(247)
- MD		every roll	126	(221)	137	(240)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	308	(539)
- MD		every roll	90	(158)	320	(560)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		23	
- MD	(33 mm)	every roll	12		19	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		886	
- MD	(51 mm)	every roll	100		918	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	50	(221)
- MD		every roll	42	(187)	51	(228)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	151	(671)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	92	(408)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.940	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		14	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

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APPROVED M.C. 1/22/01

GSE-4.10.007 Rev. 07/00

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110162

ROLL IDENTIFICATION

Roll Number	114110162
Product Name	HMT060A004
Production Date	1/19/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,522 1,598	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.938
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	137	(239)
- MD		every roll	126	(221)	140	(245)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	314	(550)
- MD		every roll	90	(158)	305	(533)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		21	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		923	
- MD	(51 mm)	every roll	100		857	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	49	(217)
- MD		every roll	42	(187)	52	(230)
Puncture Resistance, lb. (N)	ASTM D 4833	every roll	90	(398)	149	(664)
Puncture Resistance, lb. (N)	FTMS 101C/2065	every 5th	80	(356)	92	(408)
Density, g/cc	ASTM D 1505	every 5th	0.940		0.940	
Carbon Black Content, %	ASTM D 1603*	every 5th	2.0		2.8	
Carbon Black Dispersion	ASTM D 3015	every 5th	A2		A2	
Carbon Black Dispersion Views in Cat1 - Cat2	ASTM D 5596	every 5th	9		10	
Asperity Height Average (mils)	GRI GM 12	every 2nd	10		18	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000148

APPROVED M.C. 1/22/01

GSE Lining Technology, Inc.

Roll Test Data Report

-- 4554

Roll No. 114110163

ROLL IDENTIFICATION

Roll Number	114110163
Product Name	HMT060A004
Production Date	1/19/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,545 1,608	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	141	(247)
- MD		every roll	126	(221)	140	(246)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	318	(556)
- MD		every roll	90	(158)	305	(533)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		20	
- MD	(33 mm)	every roll	12		20	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		923	
- MD	(51 mm)	every roll	100		849	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	51	(226)
- MD		every roll	42	(187)	52	(231)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	145	(645)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	92	(408)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.940	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		18	

Order No.	6185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000149

APPROVED M.C. 1/22/01

GSE-4.10-007 Rev -- 07/00

GSE Lining Technology, Inc.

Roll Test Data Report

- 4554

Roll No. 114110166

ROLL IDENTIFICATION

Roll Number	114110166
Product Name	HMT060A004
Production Date	1/19/01

Length ≈(+/- 1%)	474 144	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,139 1,035	sq. feet sq. meters
Weight	3,510 1,592	pounds kilograms

RESIN INFORMATION

Lot Number	B62189
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.936
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.63

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5994					
Average		every roll	60	(1.5)	60	(1.5)
Minimum		every roll	58	(1.5)	58	(1.5)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	126	(221)	142	(248)
- MD		every roll	126	(221)	143	(251)
Break Strength, ppi (N/cm) - TD		every roll	90	(158)	294	(515)
- MD		every roll	90	(158)	325	(568)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	12		23	
- MD	(33 mm)	every roll	12		22	
Break Elongation, % - TD	gauge length = 2.0"	every roll	100		831	
- MD	(51 mm)	every roll	100		893	
Tear Resistance, lb. (N)	ASTM D 1004*					
- TD		every roll	42	(187)	48	(216)
- MD		every roll	42	(187)	51	(225)
Puncture Resistance, lb. (N)	ASTM D 4833					
		every roll	90	(398)	148	(658)
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	80	(356)	83	(368)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603*					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
Carbon Black Dispersion	ASTM D 5596					
Views in Cat1 - Cat2		every 5th	9		10	
Asperity Height	GRI GM 12					
Average (mils)		every 2nd	10		15	

Order No.	8185
Customer Name	FLOUR FERNALD, INC.
Location	HARRISON, OHIO

*Modified

000150

APPROVED M.C. 1/22/01

GEOTEXTILE

FDF PROJ: 20102

SUPPLIER DOCUMENT SUBMITTAL

FROM: Fluor Fernald, Inc.

CONTRACT NO: 1441

SUBMITTAL NO. 1441/1-001 | REV.: 3 | DATE: 6/4/01

Page 1 of 2

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

SIGNATURE: Chuck L. Van Arsdale 6/7/01

RECEIVED BY: Denise Wentz DATE: 6/11/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	1441-OPT1-001	3						X			SUBMITTAL REGISTER			X	ACR-001	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
~~Chuck Van Arsdale~~	64				
Gregg Johnson	64				
Bill Zebick	64				
Jim Turner	64				
Kwasi Boadu-Tweneboah	38				

NO COMMENTS: _____ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: Chuck L. Van Arsdale DATE: 6/25/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

0001552

4554

ORIGINAL

Contract No.: 99SC001441
Contractor Title: Supplier Contractor
Contractor: TNS Advanced Technologies

ATTACHMENT V

PROJECT 20102, OPTION 1 (CELL 1 CAP)
SUBMITTAL REGISTER
GEOTEXTILE MANUFACTURING AND DELIVERY
Rev. 3, 6/7/01

Submittal No.	Rev. No.	Document No. & Rev.	Rev. No.	CFC	INF	Document Family	Document Title	Section-Paragraph Reference	STATUS Action Code (Date)	Remarks Submittal Due Date
20102-1441/1-001	0 1 2 3	1441-OPT1-001	0 1 2 3		X	ENG	SUBMITTAL REGISTER	ACR-001	A 1/24/01 A 2/14/01 A 2/28/01 A 6/25/01	FLUOR FERNALD WILL UPDATE
20102-1441/1-002	0	1441-OPT1-002	0		X	H&S	MATERIAL SAFETY DATA SHEETS	CONTRACT SECTION D	A 1/17/01	A & C
20102-1441/1-003	0 1	1441-OPT1-003	0 1		X	PROC	WARRANTY FOR GEOTEXTILE	SECTION A, GENERAL PROVISIONS	B 1/18/01 A 1/31/01	A
20102-1441/1-02714P-001	0	1441-OPT1-02714P-001	0		X	ENG	PRODUCT NAME	02714P.1.04.A.1	A 2/6/01	A
20102-1441/1-02714P-002	0 1 2	1441-OPT1-02714P-002	0 1 2		X	ENG	MANUFACTURING CAPABILITIES	02714P.1.04.A.2	C 1/19/01 C 2/6/01 A 2/16/01	A
20102-1441/1-02714P-003	0 1	1441-OPT1-02714P-003	0 1	X		QA	CERTIFICATION OF MINIMUM AVERAGE ROLL VALUES	02714P.1.04.A.3	B 1/24/01 A 2/6/01	A
20102-1441/1-02714P-004	0 1	1441-OPT1-02714P-004	0 1	X		CONST	PROJECTED DELIVERY DATES	02714P.1.04.A.4	B 1/22/01 A 1/30/01	A
20102-1441/1-02714P-005	0	1441-OPT1-02714P-005	0		X	CONST	RECOMMENDED LONG-TERM STORAGE REQUIREMENTS	02714P.1.04.A.5	A 1/22/01	A
20102-1441/1-02714P-006	0	1441-OPT1-02714P-006	0	X		ENG	COMPLETED FORM GT-8 AND GT-16	02714P.1.04.A.6	A 1/19/01	A
20102-1441/1-02714P-007	0 1 2	1441-OPT1-02714P-007A	0 1 2	X		QA	QUALITY CONTROL CERTIFICATES (8 oz. GEOTEXTILE)	02714P.1.04.B	C 4/2/01 B 4/20/01 A 5/4/01	B
20102-1441/1-02714P-007	0 1 2	1441-OPT1-02714P-007B	0 1 2	X		QA	QUALITY CONTROL CERTIFICATES (16 oz. GEOTEXTILE)	02714P.1.04.B	C 4/2/01 B 4/20/01 A 5/4/01	B

A. WITHIN 10 DAYS FROM RELEASE OF CONTRACT
B. AT LEAST 21 DAYS PRIOR TO SHIPMENT
C. WITH SHIPMENT

The supplier shall provide submittals in accordance with Administrative Contractor Requirements ACR-001, attached.

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [signature] Date: 6/25/01

GEOTEXTILE MATERIAL
SUBMITTAL REGISTER
Page 1 of 1

000153

4554

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT	CONTRACT NO:	SUBMITTAL NO.:	REV.:	DATE:	Page ___ of ___
20102	99SC001441	20102-1441/1-0002	0	1/15/01	

FROM: TNS Advanced Technologies, Inc.

SIGNATURE: [illegible] for Richard J. Franklin

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Denise Wentz DATE: 1/15/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
	1441-OPT1-002	0		X							MAT'L SAFETY DATA SHEETS			X		X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Gregg Johnson	64				
Chuck Van Arsdale	64				
Kwasi Badu-Tweneboah	38				
Bill Zebick	64				
Debra Grant	31				

NO COMMENTS: ____ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE: 1/22/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

ORIGINAL

000154

FS-F-4955

~~1441-002~~ DW 1/15/01
1441-OPT1-002

-- 4554

TNS Advanced Technologies, Inc.

Material Safety Data Sheet

Reference: TNS E070, E100, E160 Nonwoven Geotextiles

Fluor Daniel Fernald
Fernald, OH

Section 1 – Product Identification

INFORMATION ONLY

Manufacturer's Name:

TNS Advanced Technologies, Inc.
681 DeYoung Road
Greer, South Carolina 29651

Emergency Phone Number: (800) 867-5181 (864) 986-0592

Date Prepared: May 5, 1999

Section 2 – Hazardous Ingredients

No hazardous components in geotextile fabrics at or above threshold limit values.

Section 3 – Physical / Chemical Characteristics

Boiling Point:	Not Applicable
Vapor Pressure:	Not Applicable
Specific Gravity:	0.90 – 0.905
Melting Point:	120 – 170 degrees (C)
Vapor Density:	Not Applicable
Evaporation Rate:	Not Applicable
Solubility in Water:	Not Applicable
Appearance and Odor:	Essentially Odorless

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [signature] Date: 1/22/01

Section 4 – Fire and Explosion Hazard Data

Flash Point:	>600 degrees (F)
Extinguishing Media:	Dry Chemical, CO2, Foam, Water, Halon
Special Fire Fighting Procedures:	Avoid inhalation of vapors, use self contained breathing Apparatus when fire fighting in confined areas.
Unusual Fire and Explosion Hazards:	Treat as a solid that can burn. Generally burns slowly with low smoke density and flaming drips. Burns with high smoke density under certain conditions.

Section 5 – Reactivity Data

Material is stable:

Hazardous Polymcrization will not occur.

Section 6 – Health Hazard Data

Primary Routes of Entry:	Inhalation – Negligible Skin Contact – Negligible Indigestion – Not Applicable
Carcinogen:	Not a carcinogen
Emergency and First Aid Procedure:	Eye Contact: flush with water Skin Contact: treat as thermal burn if contact with molten.

Section 7 – Precautions for Handling and Use

Practice reasonable care and caution in handling.

Waste Disposal:	Place in appropriate disposal facility in compliance with local regulations.
Storage:	In cool, dry location away from oxidizing materials.

Section 8 – Control Measures

Use NIQSIH respirators when hot/molten product.

Protective Gloves: Required when handling molten product.

Practice general hygiene by washing hands and clothes after handling.

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20102

CONTRACT NO: 99SC001441

SUBMITTAL NO.: 20102-1441/1-003

REV.: 0

DATE: 1/15/01

Page ___ of ___

FROM: TNS Advanced Technologies, Inc.

SIGNATURE: [signature] for Richard J. Franklin

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Denise Wentz DATE: 1/15/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
	1441-OPT1-003	0	X								WARRANTY FOR GEOTEXTILE			X			✓	

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Rick Holbrook	5				
Bill Zebick	64				
Chuck Van Arsdale	104				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

VENDOR TO ADD THE FOLLOWING LANGUAGE TO WARRANTY: "THIS WARRANTY IS IN ADDITION TO THE WARRANTY PROVISIONS CONTAINED IN SUBCONTRACT NO. 99SC001441 AND DOES NOT NEGATE ANY WARRANTY PROVISIONS UNDER FLUOR FERNALD INC'S GENERAL PROVISIONS CONTAINED IN THE SUBCONTRACT.

RECEIVED BY: [signature] DATE: 1-18-01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

000158

FS-F-4955

ORIGINAL

ENTERED

TNS Advanced Technologies

405 Hood Rd.
Lilburn, GA 30047
Phone: 770/564-1857 Fax: 770/564-1818

1441-OPT1-003

- 4554

January 9, 2001

Twenty Year Material Warranty Only
MATERIAL: TNS E080-TNS E160
Project 20102, Option 1 (Cell 1 Cap)
ECDC Fernald, Ohio

T.N.S. Advanced Technologies hereby warrants that, at the time of installation completion, all T.N.S. Advanced Technologies manufactured materials will conform to the respective T.N.S. Advanced Technologies published material specifications for such materials. Excluded from the warranty given herein shall be any damage to or failure of the material caused by, but not limited to: acts of God; casualty; catastrophe or severe weather conditions, such as earthquakes, tornadoes, hurricanes, floods, high winds, piercing hail, lightening and fire; the exposure of the material to sharp objects, chemical acids, gases or vapors, either known or unknown, or combinations, or specified by the manufacturer as being harmful thereto; physical abuse to the material caused by vandalism, sabotage, machinery, equipment, people and animals; damage to the material during the transportation, unloading, handling, storage or installation thereof by parties other than T.N.S. Advanced Technologies; excessive pressure or stress from any source, both above and below the material; after installation; subsidence or subgrade settlement; improper site preparation and engineering, and any use of the material which the manufacturer never intended. As used throughout this warranty, the term "sale" shall mean the date on which the material is shipped from T.N.S. Advanced Technologies' manufacturing facility.

Should any significant deterioration or premature loss in use of the material occur during the term hereof which is believed to be covered by this warranty, then T.N.S. Advanced Technologies shall be given prompt written notice of the alleged claim within 30 days after such facts are first observed. Said notice shall be sent by registered or certified mail, return receipt requested, and addressed to T.N.S. Advanced Technologies, 681 DeYoung Road, Greer, South Carolina, 29651, Attention: Contracts Administrator.

The warranty described above is strictly limited to sales of the material for commercial or industrial uses only in accordance with T.N.S. Advanced Technologies' published material specifications. Said warranty also is the sole and exclusive warranty given for such material and all other warranties, either express or implied, including but not limited to any warranty of merchantability or fitness for a particular purpose, are hereby disclaimed. In no event shall T.N.S. Advanced Technologies be liable for any direct, indirect, incidental, specific or consequential damages of any kind or any loss of profits resulting from failure of the material or the breach of this warranty; it being further understood that should said warranty fail in its essential purpose, and in that event only, T.N.S. Advanced Technologies' liability hereunder shall in no event exceed the sales price of the material actually received from T.N.S. by the Original Purchaser thereof.

Said warranty is not effective until all payments due to TNS Advanced Technologies, Inc., for materials shipped, are paid in full.

Sincerely,

Melissa Keller

Melissa Keller
TNS Advanced Technologies

INFORMATION ONLY

[ ] A - Conforms to the Subcontract Requirements
[X] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 1-18-01

000159

SUPPLIER DOCUMENT SUBMITTAL 20102-1441/1-02714P-001

FDF PROJECT NO.: 20102

CONTRACT NO: 1441

SUBMITTAL NO. ES ~~20102-1441-001~~

REV.: 0

DATE: 1-24-01

Page ___ of ___

FROM: TPS ADVANCED TECHNOLOGIES, INC.

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

SIGNATURE: Richard J. Frankl

RECEIVED BY: Erika Sarrel DATE: 1/29/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
9	1441/1-02714P.001	0						X			PRODUCT NAMES			X	—	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Chuck Van Arsdale	64				
Gregg Johnson	64				
Bill Zebick	64				
Mike Godber	64				
Kwasi Badu-Tweneboah	38				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: Chuck C. Van Arsdale DATE: 2/6/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4594

000160

FS-F-4955
Rev. 3: 05/14/1999, CT-2.4.2

ORIGINAL

144/CPT1-027148-00

TNS ADVANCED TECHNOLOGIES, INC.

9855 GREENVILLE HIGHWAY
BUILDING F
SPARTANBURG, SC 29301

- 4554

PRODUCT NAMES:

TNS E160

INFORMATION ONLY

TNS E080

A - Conforms to the Subcontract Requirements
B - Minor Comment - Incorporate and Resubmit
C - Revise and Resubmit
Sig: Date: 7/6/01

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20102

CONTRACT NO: 1441

SUBMITTAL NO. 20102-1441/1-02714P-003 ES

REV.: 1

DATE: 1-24-01

Page ___ of ___

FROM: TPS ADVANCED TECHNOLOGIES, INC.

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC) MS 52-7

SIGNATURE: Richard J. Franklin

RECEIVED BY: Erika Jarrett DATE: 1/29/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B
9	~~1441-FT-02714P-003~~ ES	.							X		CERTIFICATIONS		X	.	02714P, LOY.A.3	X	
	1441-OPT1-02714P-003	1															

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Godber	1d				
Chuck Van Arsdale	64				
Kwasi Badu-Twenebeah	38				
Bill Zebick	64				

NO COMMENTS: ✓

COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE: 06 February 2001

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

for Michael W. Godber

SUBMITTAL TYPE: (BY SUPPLIER)

CFC - CERTIFIED FOR CONSTRUCTION

INF - INFORMATION/RECORD

DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)

A - Conforms to the Subcontract Requirements

B - Minor Comments - Incorporate and Resubmit

C - Revise and Resubmit (SEE COMMENTS)

4554

0001162

FS-F-4955

Rev. 3: 05/14/1999, CT-2.4.2

ORIGINAL

144111-027170-003

TNS ADVANCED TECHNOLOGIES

681 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0592
Fax: (864) 879-4639
Toll Free: (800) 867-5181

-- 4554

January 2, 2001

Dear Sir/Madam:

This is to certify that TNS E160 is a superior quality, nonwoven geotextile produced by needlepunching together 100% polypropylene staple fibers in a random network to form a high strength dimensionally stable fabric. The polypropylene fibers are specially formulated to resist ultraviolet light deterioration, and are inert to commonly encountered soil chemicals. The fabric will not rot or mildew, is non-biodegradable, and is resistant to damage from insects and rodents. Polypropylene is stable within a ph range of 2 to 13. TNS E160 conforms to the physical property values listed below:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V. Minimum Average Roll Value
Weight	ASTM D5261	oz/sq yd	16
Grab Tensile	ASTM D4632	lbs	425
Grab Elongation	ASTM D4632	%	50
Trap Tear	ASTM D4533	lbs	150
Puncture	ASTM D4833	lbs	240
Permittivity	ASTM D4491	1/sec	.57
Permeability	ASTM D4491	cm/sec	.25
Water Flow Rate	ASTM D4491	gpm/ft^2	45
Mullen Burst	ASTM D3786	psi	800
AOS	ASTM D4751	US Sieve	100
UV Resistance, after 500 hrs	ASTM D4355	% Strength Retained	70

Sincerely,

Marshall Gaddy
QA/QC Manager
TNS Advanced Technologies

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: A Statuz Date: 06 February 2001

INFORMATION ONLY

1441/1-027148-003

TNS
ADVANCED TECHNOLOGIES

681 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0592
Fax: (864) 879-4639
Toll Free: (800) 867-5181

January 2, 2001

-- 4554

Dear Sir/Madam:

This is to certify that TNS E080 is a superior quality, nonwoven geotextile produced by needlepunching together 100% polypropylene staple fibers in a random network to form a high strength dimensionally stable fabric. The polypropylene fibers are specially formulated to resist ultraviolet light deterioration, and are inert to commonly encountered soil chemicals. The fabric will not rot or mildew, is non-biodegradable, and is resistant to damage from insects and rodents. Polypropylene is stable within a ph range of 2 to 13. TNS E080 conforms to the physical property values listed below:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V. Minimum Average Roll Value
Weight	ASTM D5261	oz/sq yd	8.0
Thickness	ASTM D1777	mils	100
Grab Tensile	ASTM D4632	lbs	200
Grab Elongation	ASTM D4632	%	50
Trap Tear	ASTM D4533	lbs	75
Puncture	ASTM D4833	lbs	90
Permittivity	ASTM D4491	1/sec	1.26
AOS	ASTM D 4751	US Sieve	80
Permeability	ASTM D4491	cm/sec	.30
Mullen Burst	ASTM D3786	psi	350
Water Flow	ASTM D4491	gpm/sq ft	100
UV Resistance after 500 hours	ASTM D4355	% Strength Retained	70

Sincerely,

Marshall Gaddy
QA/QC Manager
TNS Advanced Technologies

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20102

CONTRACT NO: 1441

SUBMITTAL NO. 20102-1441/A-02714P-007 2 REV: 0 DATE: 4-28-01 Page ___ of ___

FROM: TDS ADVANCED TECHNOLOGIES, INC.

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

SIGNATURE: Richard J. Frankl

RECEIVED BY: Denise Wentz DATE: 4/23/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
9	1441/OPTI-02714P-007A/02 (now 4/28/01)								X		QUALITY CONTROL CERTIFICATES (8oz Material)		X		02714P-1.04B	X		
	1441-OPTI-02714P-007B	2							X		Quality Control Certs (16oz Material)		X		02714P.1.04B	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Jim Turner	64				
Chuck Van-Arsdale	64				
Kwasi Badu-Tweneboah	38				
Bill Zebick	64				

NO COMMENTS: ✓ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

4554

RECEIVED BY: [signature] DATE: 04 May 2001

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

000165

FS-F-4955
Rev. 3: 05/14/1999, CT-2.4.2

ORIGINAL

TNS
ADVANCED TECHNOLOGIES

681 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0592
Fax: (864) 879-4639
Toll Free: (800) 867-5181

- 4554

April 11, 2001

REF: TNS E160
TNS E080

U.S. DOE c/o Fluor Daniel Fernald
P.O. Box 538704
Cincinnati, OH 45253

Dear Sir/Madam:

Please be advised, the enclosed TNS Quality Control Certificates with the corresponding roll numbers will be the exact material shipped to this site upon your approval. The fiber utilized in the manufacture is also enclosed. The TNS lot number for these materials is #132.

Sincerely,

J. Melissa Keller
TNS Advanced Technologies

TNS ADVANCED TECHNOLOGIES

681 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0592
Fax: (864) 879-4639
Toll Free: (800) 867-5181

4554

May 1, 2001

Mr. Jim Turner
Fluor Fernald
Fernald, Ohio

Via Fax: (513) 648-5767

Jim,

This letter certifies that TNS's nonwoven geotextiles are needle free. TNS has positioned metal detectors on the production line to detect needles or other contaminates. If needles are detected, the line automatically shuts down and needles are located and removed.

If I can be of further assistance, please do not hesitate to call.

Best regards,

Richard J. Franklin
TNS Advanced Technologies, Inc.

1441-OPT1-02714P-0014

TNS ADVANCED TECHNOLOGIES

9855 Greenville Highway
Building F
Spartanburg, SC 29301
800-867-5181
fax: 864-949-6222

4554

March 16, 2001
REF: TNS E080
Quantity Shipped: 58 rolls

U.S. DOE c/o Fluor Daniel Fenald
PO Box 538704
Cincinnati OH 45253

Dear Sir/Madam:

This is to certify that TNS E080 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS E080 is resistant to degradation due to ultraviolet exposure and resists commonly encountered soil chemicals, insects, mildew, and is non-biodegradable. Polypropylene is stable within a pH range of 2 to 13. TNS E080 conforms to the physical properties listed in the following table:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V
Weight	ASTM D 5261	oz/sy	8.0
Thickness	ASTM D 1777	mils	100
Grab Tensile	ASTM D 4632	lbs	225
Grab Elongation	ASTM D 4632	%	50
Trap Tear	ASTM D 4533	lbs	95
Puncture	ASTM D 4833	lbs	135
Mullen Burst	ASTM D 3786	psi	450
A.O.S.	ASTM D 4751	U.S. Sieve	80
Permitivity	ASTM D 4491	1/sec	1.26
Water Flow	ASTM D 4491	gpm/sq.ft.	100
U.V. Resistance	ASTM D 4355	% retained	70
Permeability	ASTM D 4491	cm/sec	[illegible]

INFORMATION ONLY

Sincerely,

C. Robyn Howell

C. Robyn Howell
TNS Advanced Technologies

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 04 May 2001

000168

TNS

Advanced Technologies

Nonwoven Quality Data

BOL#: 800270 Date 4/16

Roll #'s	Style	Weight	Thck	Grab Tensile MD	Grab Tensile XMD	Elng MD	Elng XMD	Trap MD	Trap XMD	Punc Rest	Brst Strg	Water Flow	Perm-abl	Permi-tivity	AOS
200081120	E080	10.6	126.0	305	379	77	78	128	179	171	501	105	0.47	1.64	100
*200081121	E080	10.6	126.0	305	379	77	78	128	179	171	501	105	0.47	1.64	100
200081122	E080	10.6	126.0	305	379	77	78	128	179	171	501	105	0.47	1.64	100
200081123	E080	10.6	126.0	305	379	77	78	128	179	171	501	105	0.47	1.64	100
200081124	E080	10.6	126.0	305	379	77	78	128	179	171	501	105	0.47	1.64	100
200081125	E080	10.6	126.0	305	379	77	78	128	179	171	501	105	0.47	1.64	100
*200081126	E080	8.6	105.0	248	299	79	81	100	132	128	415	128	0.52	2.01	100
200081127	E080	8.6	105.0	248	299	79	81	100	132	128	415	128	0.52	2.01	100
200081128	E080	8.6	105.0	248	299	79	81	100	132	128	415	128	0.52	2.01	100
200081129	E080	8.6	105.0	248	299	79	81	100	132	128	415	128	0.52	2.01	100
200081130	E080	8.6	105.0	248	299	79	81	100	132	128	415	128	0.52	2.01	100
200081131	E080	8.6	105.0	248	299	79	81	100	132	128	415	128	0.52	2.01	100
200081132	E080	8.6	105.0	248	299	79	81	100	132	128	415	128	0.52	2.01	100
*200081133	E080	9.3	108.0	252	322	78	78	107	131	132	435	116	0.53	1.82	100
200081134	E080	9.3	108.0	252	322	78	78	107	131	132	435	116	0.53	1.82	100
200081135	E080	9.3	108.0	252	322	78	78	107	131	132	435	116	0.53	1.82	100
200081136	E080	9.3	108.0	252	322	78	78	107	131	132	435	116	0.53	1.82	100
200081137	E080	9.3	108.0	252	322	78	78	107	131	132	435	116	0.53	1.82	100
200081138	E080	9.3	108.0	252	322	78	78	107	131	132	435	116	0.53	1.82	100
200081139	E080	9.3	108.0	252	322	78	78	107	131	132	435	116	0.53	1.82	100
*200081140	E080	8.1	101.0	233	267	72	74	91	123	128	400	132	0.51	2.07	100
200081141	E080	8.1	101.0	233	267	72	74	91	123	128	400	132	0.51	2.07	100
200081142	E080	8.1	101.0	233	267	72	74	91	123	128	400	132	0.51	2.07	100
200081143	E080	8.1	101.0	233	267	72	74	91	123	128	400	132	0.51	2.07	100

Roll #'s	Style	Weight	Thck	Grab Tensile MD	Grab Tensile XMD	Elng MD	Elng XMD	Trap MD	Trap XMD	Punc Rest	Brst Strg	Water Flow	Perm-abl	Permi-tivity	AOS
200081144	E080	8.1	101.0	233	267	72	74	91	123	128	400	132	0.51	2.07	100
200081145	E080	8.1	101.0	233	267	72	74	91	123	128	400	132	0.51	2.07	100
200081146	E080	8.1	101.0	233	267	72	74	91	123	128	400	132	0.51	2.07	100
*200081147	E080	8.2	102.0	234	269	78	78	97	133	128	387	132	0.57	2.07	100
200081148	E080	8.2	102.0	234	269	78	78	97	133	128	387	132	0.57	2.07	100
200081149	E080	8.2	102.0	234	269	78	78	97	133	128	387	132	0.57	2.07	100
200081150	E080	8.2	102.0	234	269	78	78	97	133	128	387	132	0.57	2.07	100
200081151	E080	8.2	102.0	234	269	78	78	97	133	128	387	132	0.57	2.07	100
200081152	E080	8.2	102.0	234	269	78	78	97	133	128	387	132	0.57	2.07	100
200081153	E080	8.2	102.0	234	269	78	78	97	133	128	387	132	0.57	2.07	100
*200081154	E080	8.3	100.0	234	278	80	81	100	143	132	428	143	0.58	2.25	100
200081155	E080	8.3	100.0	234	278	80	81	100	143	132	428	143	0.58	2.25	100
200081156	E080	8.3	100.0	234	278	80	81	100	143	132	428	143	0.58	2.25	100
200081157	E080	8.3	100.0	234	278	80	81	100	143	132	428	143	0.58	2.25	100
200081158	E080	8.3	100.0	234	278	80	81	100	143	132	428	143	0.58	2.25	100
200081159	E080	8.3	100.0	234	278	80	81	100	143	132	428	143	0.58	2.25	100
200081160	E080	8.3	100.0	234	278	80	81	100	143	132	428	143	0.58	2.25	100
*200081161	E080	8.6	101.0	224	308	79	85	97	134	133	405	130	0.53	2.04	100
200081162	E080	8.6	101.0	224	308	79	85	97	134	133	405	130	0.53	2.04	100
200081163	E080	8.6	101.0	224	308	79	85	97	134	133	405	130	0.53	2.04	100
200081164	E080	8.6	101.0	224	308	79	85	97	134	133	405	130	0.53	2.04	100
200081165	E080	8.6	101.0	224	308	79	85	97	134	133	405	130	0.53	2.04	100
200081166	E080	8.6	101.0	224	308	79	85	97	134	133	405	130	0.53	2.04	100
200081167	E080	8.6	101.0	224	308	79	85	97	134	133	405	130	0.53	2.04	100
200081168	E080	8.6	101.0	224	308	79	85	97	134	133	405	130	0.53	2.04	100
*200081169	E080	8.1	100.0	226	267	76	74	97	122	119	403	147	0.57	2.3	100
200081170	E080	8.1	100.0	226	267	76	74	97	122	119	403	147	0.57	2.3	100
200081171	E080	8.1	100.0	226	267	76	74	97	122	119	403	147	0.57	2.3	100
200081172	E080	8.1	100.0	226	267	76	74	97	122	119	403	147	0.57	2.3	100
200081174	E080	8.1	100.0	226	267	76	74	97	122	119	403	147	0.57	2.3	100

Roll #'s	Style	Weight	Thck	Grab Tensile MD	Grab Tensile XMD	Elng MD	Elng XMD	Trap MD	Trap XMD	Punc Rest	Brst Strg	Water Flow	Perm-abl	Permi-tivity	AOS
200081175	E080	8.1	100.0	226	267	76	74	97	122	119	403	147	0.57	2.3	100
200081176	E080	8.1	100.0	226	267	76	74	97	122	119	403	147	0.57	2.3	100
*200081177	E080	8.3	103.0	238	279	78	80	93	130	135	418	146	0.58	2.28	100
200081178	E080	8.3	103.0	238	279	78	80	93	130	135	418	146	0.58	2.28	100

58 roll

TNS
ADVANCED TECHNOLOGIES

9855 Greenville Highway
Building F
Spartanburg, SC 29301
800-867-5181
fax: 864-949-6222

4554

March 16, 2001
REF: TNS E160
Quantity Shipped: 9 rolls

U.S. DOE c/o Fluor Daniel Fernald
P.O. Box 538704
Cincinnati, OH 45253

Dear Sir/Madam:

This is to certify that TNS E160 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS E160 meets or exceeds the project specifications for the above referenced project. TNS E160 is resistant to degradation due to ultraviolet exposure and resists commonly encountered soil chemicals, insects, mildew, and is non-biodegradable. Polypropylene is stable within a pH range of 2 to 13. TNS E160 conforms to the physical properties listed in the following table:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V
Weight	ASTM D 5261	oz/sy	16.0
Grab Tensile	ASTM D 4632	lbs	425
Grab Elongation	ASTM D 4632	%	50
Trap Tear	ASTM D 4533	lbs	150
Puncture	ASTM D 4833	lbs.	240
Permitivity	ASTM D 4491	1/sec	0.57
A.O.S.	ASTM D 4751	U.S. Sieve	100
Permeability	ASTM D 4491	cm/sec	.25
Mullen Burst	ASTM D 3786	psi	800
Water Flow	ASTM D 4491	gpm/sq ft.	45
U.V. Resistance	ASTM D 4355	%	70

INFORMATION ONLY

Sincerely,

J. Melissa Keller
TNS Advanced Technologies

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: _____ Date: 04 May 2001

000172

DATE: 01

MILLS, INC.
NONWOVEN QUALITY DATA
FOR ROLL# 200081181 THROUGH 200081181

INQD(

ROLL #	STYL	WDT	LNG	FABR WGHT	THCK	GRAB MD	GRAB XMD	ELNG MD	ELNG XMD	TRAP MD	TRAP XMD	PUNC RESI	BRST STRG	FLOW RATE	PERM -ABL	PERM -ITY	AOS
200081181	E160	180	450	16.9	155	456	567	82	73	150	150	242	800	60	.550	.94	120
200081184	E160	180	450	16.9	155	456	567	82	73	150	150	242	800	60	.550	.94	120
200081186	E160	180	450	16.9	155	456	567	82	73	150	150	242	800	60	.550	.94	120
200081187	E160	180	450	16.9	155	456	567	82	73	150	150	242	800	60	.550	.94	120
200081188	E160	180	450	16.9	155	456	567	82	73	150	150	242	800	60	.550	.94	120
200081189	E160	180	450	16.9	155	456	567	82	73	150	150	242	800	60	.550	.94	120
200081190	E160	180	450	16.4	148	467	487	70	79	171	190	248	800	60	.550	.94	120
200081191	E160	180	450	16.4	148	467	487	70	79	171	190	248	800	60	.550	.94	120
200081192	E160	180	450	16.4	148	467	487	70	79	171	190	248	800	60	.550	.94	120
200081193	E160	180	450	16.4	148	467	487	70	79	171	190	248	800	60	.550	.94	120

10-16

4554

000173

SUPPLIER DO[illegible]T SUBMITTAL

FDF PROJECT NO.: 20103

CONTRACT NO: FSC-642

SUBMITTAL NO.: 20103-642-02230-002 REV.: 0 DATE: 11/13/01

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061

SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7

RECEIVED BY: [illegible] DATE: 11/15/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	642-C.7.6	0						X			ROAD CONSTRUCTION GEOTEXTILE		X		02230-1.04	X		
		0									PRODUCT INFORMATION							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7				
GEOSYNTEC	38				
FRANK FLACK	64				
SAM WOLINSKY (APPROVER) SW	64				
GREGG JOHNSON	64				
9D 11/15/01 DON GOETZ	64				
MARY ELETON	64				
Lee McDaniel	60				
Fred Wilson	60				
Tom Carr	60				
Kevin Harbin	64				

NO COMMENTS: ~~X~~ SW COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

SUPERSEDES SUBMITTAL NO. 20103-642-02714-002

ORIGINAL

000174

RECEIVED BY: [illegible] DATE:

FS-F-4955 (SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)
Rev. 3: 05/14/1999 SH WOLINSKY

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

- 4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

ROAD CONSTRUCTION GEOTEXTILE PRODUCT INFORMATION

2230 1.04
REVISION 2

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2230-002

***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

November 13, 2001

INFORMATION ONLY

000175

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 11/19/01

the IT group

Project No. 820045

ON SITE DISPOSAL FACILITY PHASE III – CELL ONE FINAL COVER CONSTRUCTION
FLUOR FERNALD SUBCONTRACT 20103-642
****
ROAD CONSTRUCTION GEOTEXTILE
***

Attached is submittal 20103-642-02230-002, -003 documentation. The source of the material is:

Valley Asphalt Corporation
1901 Dryden Road
Dayton, Ohio 45439

IT will be receiving approximately 3200 square yards of material in 8 rolls.

- 4554

Amoco Fabrics and Fibers Company

260 The Bluffs
Austell, Georgia 30168
(770) 944-4569

November 5, 2001

Valley Asphalt Corp.
11641 Mosteller Road
Cincinnati OH 45251-1520

Job Reference:

B/L # 124823
Shipper # 950566

Amoco Fabrics and Fibers Company hereby certifies that CEF Style 4553 shipped to you November 2, 2001, on AFFC order # 727-01, meets the following minimum average roll values:

Property	Test Method	Minimum Average Roll Value (English)	Minimum Average Roll Value (Metric)
Grab Tensile	ASTM-D-4632	203 lb	.900 kN
Grab Elongation	ASTM-D-4632	50 %	50 %
Mullen Burst	ASTM-D-3786	400 psi	2750 kPa
Puncture	ASTM-D-4833	130 lb	.575 kN
Trapezoidal Tear	ASTM-D-4533	80 lb	.355 kN
UV Resistance	ASTM-D-4355	70 % at 500 hr	70 % at 500 hr
AOS	ASTM-D-4751	100 sieve	0.150 mm
Permittivity	ASTM-D-4491	1.5 sec^{-1}	1.5 sec^{-1}
Flow Rate	ASTM-D-4491	110 $gal/min/ft^2$	4470 $L/min/m^2$

Amoco Fabrics and Fibers Company manufactures all the nonwoven geotextile fabric certified above. The values are a result of testing conducted in on-site laboratories at the time of production. All test methods used are ASTM or industry standards. Test data is retained in the Quality Control files at Amoco's production facility.

Kay W. Williams
Production Analyst/Quality Assurance Manager
Amoco Fabrics and Fibers Company

ckb

PROGRAM: OE90129C
DATE : 11/02/01
TIME : 13:30

AMOCO FABRICS AND FIBERS COMPANY
PACKING LIST
HAZLEHURST MILLS DIVISION
P.O. BOX 836 PHONE 912-375-2561
HAZLEHURST GA. 31539

SHIP TO: VALLEY ASPHALT CORP
1901 DRYDEN RD
DAYTON, OH 45439

CUST NO: 50671

SOLD TO: VALLEY ASPHALT CORP
11641 MOSTELLER RD
CINCINNATI, OH 45241

CUST NO: 50672

GROSS WEIGHT: 3345
VIA: 0080218247-LAKEWAY TRUCKING
TRAILER NO: 5468
B/L NO: 124823
DELIVERY NOTE: 0080950566
SHIP DATE: 01/11/02
STOP NO: 00

ITEM #	PCCT	STYLE	WIDTH	GRD	COLOR	PB	BATCH	UNITS	P O NUMBER	AFFC MATERIAL	CUST SKU
10-3290418	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290419	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290420	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290421	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290422	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290423	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290584	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290585	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290586	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444512	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444515	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444516	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444532	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444533	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444534	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
TOTALS							15 ITEMS *	1,200	YD *	6,000	YD2 *
							15 ITEMS **	1,200	YD **	6,000	YD2 **

000178

-- 4554

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02230-003	REV.: 2 / 1	DATE: 11/13/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: [signature] DATE: 11/15/01

			DOCUMENT FAMILY										SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
8	642-C.4.41	1							X		ROAD CONSTRUCTION GEOTEXTILE		X		02230-1.04	X		
		2									QC CERTIFICATION							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7				
GEOSYNTEC	38				
FRANK FLACK	64				
SAM WOLINSKY	64				
MIKE GODBER (APPROVER)	64				
11/15/01 ~~DON GOETZ~~	~~64~~				
MARY ELETON	64				
Lee McDaniel	60				
Fred Wilson	60				
Tom Carr	60				
Kevin Harbin	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

SUPERCEDES SUBMITTAL # 20103-642-2714-003

ORIGINAL

RECEIVED BY: [signature] DATE: 11/17/01

FS-F-4955 (SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

Rev. 2: 06/14/1999

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

1 of 1 DRAFT/PRELIMINARY

000419

-- 4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

ROAD CONSTRUCTION GEOTEXTILE QC CERTIFICATION

2230 1.04
REVISION 2

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2230-003

***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

November 13, 2001

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 11/27/01

Amoco Fabrics and Fibers Company

260 The Bluffs
Austell, Georgia 30168
(770) 944-4569

November 5, 2001

Valley Asphalt Corp.
11641 Mosteller Road
Cincinnati OH 45251-1520

Job Reference:

B/L # 124823
Shipper # 950566

Amoco Fabrics and Fibers Company hereby certifies that CEF Style 4553 shipped to you November 2, 2001, on AFFC order # 727-01, meets the following minimum average roll values:

Property	Test Method	Minimum Average Roll Value (English)	Minimum Average Roll Value (Metric)
Grab Tensile	ASTM-D-4632	203 lb	.900 kN
Grab Elongation	ASTM-D-4632	50 %	50 %
Mullen Burst	ASTM-D-3786	400 psi	2750 kPa
Puncture	ASTM-D-4833	130 lb	.575 kN
Trapezoidal Tear	ASTM-D-4533	80 lb	.355 kN
UV Resistance	ASTM-D-4355	70 % at 500 hr	70 % at 500 hr
AOS	ASTM-D-4751	100 sieve	0.150 mm
Permittivity	ASTM-D-4491	1.5 sec^{-1}	1.5 sec^{-1}
Flow Rate	ASTM-D-4491	110 $gal/min/ft^2$	4470 $L/min/m^2$

Amoco Fabrics and Fibers Company manufactures all the nonwoven geotextile fabric certified above. The values are a result of testing conducted in on-site laboratories at the time of production. All test methods used are ASTM or industry standards. Test data is retained in the Quality Control files at Amoco's production facility.

Kay W. Williams
Production Analyst/Quality Assurance Manager
Amoco Fabrics and Fibers Company

ckb

PROGRAM: OE90129C
DATE : 11/02/01
TIME : 13:30

AMOCO FABRICS AND FIBERS COMPANY
PACKING LIST
HAZLEHURST MILLS DIVISION
P.O. BOX 836 PHONE 912-375-2561
HAZLEHURST GA. 31539

SHIP TO: VALLEY ASPHALT CORP
1901 DRYDEN RD
DAYTON, OH 45439

CUST NO: 50671

SOLD TO: VALLEY ASPHALT CORP
11641 MOSTELLER RD
CINCINNATI, OH 45241

CUST NO: 50672

GROSS WEIGHT: 3345
VIA: 0080218247-LAKEWAY TRUCKING
TRAILER NO: 5468
B/L NO: 124823
DELIVERY NOTE: 0080950566
SHIP DATE: 01/11/02
STOP NO: 00

ITEM #	PCCT	STYLE	WIDTH	GRD	COLOR	PB	BATCH	UNITS	P O NUMBER	AFFC MATERIAL	CUST SKU
10-3290418	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290419	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290420	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290421	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290422	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290423	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290584	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290585	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3290586	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444512	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444515	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444516	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444532	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444533	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
10-3444534	00.00	4553	180.0000	10	0007	00		80	727-01	42899	
TOTALS							15 ITEMS *	1,200	YD *	6,000	YD2 *
							15 ITEMS **	1,200	YD **	6,000	YD2 **

000182

4554

CONTRACTOR/INSTALLER'S SUBMITTALS

INSTALLER'S QUALIFICATIONS AND RESUMES

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02770-008	REV.: 1	DATE: 5/24/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: Denise Wentz DATE: 5/24/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	642-C.4.27	1						X			~~SURVEYOR'S NOTES & DRAWINGS~~		X		02770-1.04	X		
											~~CONTOURING LAYER AS-BUILT~~							
											LIST OF 10 COMPLETED							
											FACILITIES GEOMEMBRANE							
											LINER							
											A.S.D. 05/29/2001							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7				
GEOSYNTEC	38				
GREGG JOHNSON	64				
FRANK FLACK	60				
SAM WOLINSKY Approver	64				
SH					

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

WAIVER APPROVED.

RECEIVED BY: [signature] DATE: 5/29/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)
SH WOLINSKY
RECEIVED SHW 5/24/01

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

0001185

1-4554

FS-F-4955
Rev. 3: 05/14/1999

4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

GEOMEMBRANE LINER INSTALLATION
List of 10 Completed Facilities
2770 1.04 B – 5
REVISION 1

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2770-008

***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

May 24, 2001

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: _____ Date: 5/29/01

000186

the IT group

Project No. 820045

ON SITE DISPOSAL FACILITY PHASE III – CELL ONE FINAL COVER CONSTRUCTION
FLUOR FERNALD SUBCONTRACT FSC – 642
****

GEOMEMBRANE LINER INSTALLATION
LIST OF 10 COMPLETED FACILITIES
REQUEST FOR WAIVER
***

IT Corporation is requesting a waiver from the List of 10 Completed Facilities for the liner installation sub-contractor. The sub-contractor is The Istre Co., Inc. This company successfully installed the geomembrane liner in OSDF Cells 2 and 3. Based on the vendor's site specific experience, and having been previously approved for similar activities on the OSDF project, The Istre Co., Inc. meets the requirements of Specification 2770 1.04 B-5.

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103

CONTRACT NO: FSC-642

SUBMITTAL NO.: 20103-642-02770-009 | REV.: 1 | DATE: 9/20/01 | Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061

SIGNATURE: [illegible] for Dave Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7

RECEIVED BY: [illegible] DATE: 9/20/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	642-C.4.28	1						X			GEOMEMBRANE LINER INSTALLATION			X	02770-1.04	X		
											RESUMES OF INSTAL. SUPT. & QA INSP.							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	TOM CARR	60		
GEOSYNTEC	38	KEVIN HARBIN	64		
GREGG JOHNSON	64				
FRANK FLACK	64				
SAM WOLINSKY (APPROVER)	64				
LEE MCDANIELS	64				
FRED WILSON	60				

RECEIVED SEP 24

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

000188

4554

RECEIVED BY: [illegible] DATE: 9/25/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

FS-F-4955
Rev. 3: 05/14/1999

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

GEOMEMBRANE LINER INSTALLATION
Resumes of Installer Superintendent And QA Inspector
2770 1.04 B – 6
REVISION 1

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2770-009

***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

September 20, 2001

The Istre Company

4554

RESUME Jerry P. Istre

The Istre Company
Owner Jan. 97 to Present
Sub-Contract to Liner Companies, Working as Consultant, Supervisor, and Masterseamer. To install geomembrane systems, Piping systems, train Supervisors, Quality Control techs, and welding techs.

Gyr Pipe & Lining Systems Inc.
Partner-Owner Jan. 92 to Dec 96
General Contractor
Contract to N W T Canadian Government for the purpose of building Tank farms in the Artic. My position was President. My function was to purchase equipment, purchase construction materials, schedule shipments, and production schedules. To ensure that specifications were maintained and the quality of work would exceed the specifications. The scope of work entailed Earthworks, Geomembrane Systems, Tank Building, Pipe Work, and Concrete. Each Tank farm was bid at 3.2 Million. When I was not working on tank farms, I would subcontract to Terrafix of Toronto Canada. I would work as Project Manager. Their work would consist of earthworks, leache collection, and geomembrane systems.

Geo-Con- Pittsburgh, PA.
Field Superintendent Jan. 90 to Dec 91
To run day to day field activities for earthworks, geomembrane systems, methane systems, leache collection systems, and Haz-Waste clean-up. I was appointed QC OFFICER for the Bruin Lagoon Pa. Project, for The Corps of Engineers Haz Waste Clean up.

Industrial Environmental Liners- Baton Rouge La.
Construction Manager Sept. 88 to Dec 89
My responsibilities were to manage three field crews. Train field personal in areas of safety to welding. To bid projects, attend field pre-construction and construction meetings. To purchase equipment,

13811 S. Poplar Pl.
Glenpool, Ok. 74033
Tele. & Fax (918) 291-2318

materials, schedule projects, and finalize Quality Control Documents.

The Gagle Co. Inc. Tulsa, OK.
Field Superintendent Jan. 85 to Sept. 88
My responsibilities were to run the day to day activities of a field crew. Manage QC, Layout, welding of geomembrane systems.

Blattner & Assc. Inc. Reno NV.
Field Superintendent Jan. 83 to Dec. 84
To run day to day activities of a field crew, building gold mines. Earthworks, HDPE pipe systems, blasting, and moving rock to crusher, then placed on leach pad for gold extraction.

Ely Energy Systems Tulsa, Ok.
Superintendent Jan. 80 to Dec. 82
To manage field crews in the Propane Industry. To Install Propane Stand By Systems. Work entailed earthworks, concrete piers, 50,000 gal. tanks, pipe work, and electrical. Licensed Oklahoma and Texas.

Education

Assc. Degree Business Management
Cochise College 71

High School Grad
Jennings La. 66

Welding and Pipe fitting
Crowley, La. 72

29 CFR 1910-20 40 Hour
OSHA 29 CFR 1910-120 8 Hour Material Handling
Health & Safety Supervisory 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response 8 Hour
Hazardous Waste Operations 29 CFR 1910.120 {E} 8 Hour
Florida Phosphate Council Safety Program 24 Hour
Bay Area Safety Program 10 Hours
Fernald-GET-8 Hour

THE ISTRE COMPANY
Liner Specialists
13811 S. Poplar Pl
Glenpool, Ok 74033

4554

Tracy Marker
Q C Manager
Resume

ODOS Maryville, Ohio
Solmax 60 Mill Smooth
19,800 Sq. Ft. Hwy Drainage - April 2000

Petro Environmental - Reily Tar - Dover, Ohio
Solmax 60 Mill Textured
50,000 Sq. Ft. - May, 2000

DOE - Piketon, Ohio
Solmax 80 Mill Smooth
300,000 Sq. Ft. - September 2000

Petro Environmental - DOE - Piketon, Ohio
GSE 40 Mill Smooth
500,250 Sq. Ft. - May 2000

Envirocon
U. S. Steel - Clairton, PA.
Solmax 40 Mill Textured
695,000 Sq. Ft. - December 2000

Phone/Fax: 918-291-2318
Cell: 918-688-9241

SUPPLIER DOCUMENT SUBMITTAL

KBT

FDF PROJECT NO.: 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-~~02270~~ 02270-010	REV.: 0	DATE: 4/20/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: Erika Varnell DATE: 4/20/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	642-C.4.29	0						X			GEOMEMBRANE LINER INSTALLATION			X	02270-010	X		
											Resumes of Seaming Personnel							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7				
GEOSYNTEC	38				
GREGG JOHNSON	64				
BRUCE SCHWEITZER	64				
SAM WOLINSKY Approver	64				

RECEIVED
APR 23 2001

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

000183

RECEIVED BY: [signature] DATE: 4/27/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

FS-F-4955
Rev. 3: 05/14/1999

ORIGINAL

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

GEOMEMBRANE LINER INSTALLATION
Resumes of Seaming Personnel
2770 1.04 B – 7
REVISION 0

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2770-010

***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

April 17, 2001

THE ISTRE CO., INC.

13811 S. Poplar Pl.
Glenpool, Ok. 74033

-- 4554

Joesph Beebout
Master Seamer – Weld Tech

Project

1. Wright Patterson AF Base, Ohio GSE Smooth 60 Mil. 350,000 s.f. Feb, 1996
2. R.E.M. Consulting Grand Forks, NE GSE Smooth 60 Mil. 350,000 s.f. Aug. 1996
3. Leominster MA. GSE Smooth 40 Mil. 65,000 s.f. Oct. 1996
4. Hillsvale, VA. GSE Smooth 60 Mil. 68,000 s.f. 40 Mil. Textured 78,000 s.f. Dec. 1996
5. U.S. Steel Gary, Ind. GSE Smooth 60 Mil. 758,000 s.f. April, 1997
6. Wadena City, IL. GSE Smooth 40 Mil. Smooth 560,000 s.f. Sept. 1997
7. Chicago Police Chicago, IL. GSE Textured 201,000 s.f. June 1998
8. General Mitchel IAP, WI. GSE Smooth 60 Mil. 60,000 s.f. Aug. 1998
9. Fernald – Ross, Ohio – GSE Textured 80 Mil. 750,000 s.f. Landfill Cell; Cell # 3 OSDF Aug. 1999
10. City of Indian Lake, NY – GSE Textured 60 Mil. 300,000 s.f. Landfill Cap Sept. 1999
11. DOE Piketon, Ohio – GSE Smooth 40 Mil. 500,250 s.f. Landfill Cap May 2000
12. DOE Piketon, Ohio – Solmax Smooth 80 Mil. 300,000 s.f. Landfill Cap Sept. 2000
13. U.S. Steel Clairton, Pa. Solmax Textured 40 Mil. 695,000 s.f. Landfill Cap Dec. 2000

TELE & FAX (918) 291-2318
Cell (918) [illegible]

THE ISTRE CO., INC.

6384 S. Poplar Pl.
Glenpool, Ok. 74033

- 4554

Alvin Corey
Weld Tech

Project

1. City of Indian Lake, NY – GSE Textured 60 Mil. 300,000 s.f. Landfill Cap Sept. 1999
2. DOE Piketon, Ohio – GSE Smooth 40 Mil. 500,250 s.f. Landfill Cap May, 2000
3. Doe Piketon, Ohio – Solmax Smooth 80 Mil. 300,000 s.f. Sept. 2000
4. U.S. Steel Clairton, Pa. Solmax Textured 40 Mil. 695,000 s.f. December 2000

TELE & FAX (918) 251-2318
Cell (918) 688-1224

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-~~02270~~ 02272-011 (KB7)	REV.: 0	DATE: 4/20/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: Erika Jarrett DATE: 4/20/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	642-C.4.30	0						X			GEOMEMBRANE LINER INSTALLATION		X		02270-011	X		
											Installation Experience							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7				
GEOSYNTEC	38				
GREGG JOHNSON	64				
BRUCE SCHWEITZER	64				
SAM WOLINSKY Approver	64				

RECEIVED
APR 23 2001

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE: 4/27/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

000197

FS-F-4955
Rev. 3: 05/14/1999

ORIGINAL

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

GEOMEMBRANE LINER INSTALLATION
Installation Experience
2770 1.04 B – 8
REVISION 0

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2770-011

***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

April 17, 2001

Jerry Istre -Personal Resume

.City of Dayton -Dayton, WY -12 Mil. Phillips; 50,000 s.f ; Sewage Lagoon .BFI -Atlantic, NJ 40 Mil. Poly America; 1,000,000 s.f ; Landfill Cell
.FT. Howard Paper -Savannah, GA. 40 & 60 Mil. Poly America; 3,000,000 s.f.; Sludge Ponds
.Kaiser Aluminum -New Orleans, LA. 40 Mil. Poly America; 1,000,000 s.f; Landfill Cap
.Inspiration Copper -Claypool, AZ. 40 & 80 Mil. Poly America; 100,000 s.f; Acid Ponds
.Hycroft Mine Winnamucca, NV. 40 Mil. Poly America; 1,000,000 s.f; Leach Pad .Perry Eng. - Leesburg, V A. -30 Mil. Poly America; 1,000,000 s.f; Landfill Cell .U.S. Corps of Eng. - Fayettville, NC. -12 Mil. Phillips; 150,000 s.f; Fuel Tank Storage
.Summitville Mine -Summitville, CO. -60 Mil. Poly America; 1,000,000 s.f; Side Slopes Leach Pad .Gilt Edge -Deadwood, SD. -60 Mil. Poly America; 1,370,000 s.f; Leach Pad .Rollins Envir. Service -Baton Rouge, LA. -80 Mil. National Seal; 1,000,000 s.f; Landfill Cell
.Wolverine Tube -Decator, AL. -40 Mil. National Seal; 100,000 s.f; Acid pond .American Cyanamid -Leplace, LA 20 Mil. National Seal; 290,000 s.f Landfill Cap
.Builders Transport -Dallas, TX. -XR-National Seal; 1,000,000 s.f Tank Containment
.Manada Construction -Newburg, P A. 40 Mil. National Seal; 211,000 s.f Sludge Ponds
.Chevem St. James, LA. -100 Mil. National Seal; 40,000 s.f; Tank Containment .Ethal Corp. - Baton Rouge, LA. -30 Mil. National Seal; 500,00 s.f; Landfill Cell .Manada Construction - Newburg, PA. 60 Mil. Poly America; 3,000,000 s.f Sludge Ponds
.Sun Times -Aurora IL. 20 Mil. Poly America; 200,000 s.f Landscape Pond .Peters Const. -Granite City, IL. 60 Mil. Poly America; 1,200,000 s.f; Landfill Cap .Viet Const. -Grove, MN. 40 Mil. Poly America; 250,000 s.f; Storm Drainage Lagoon
.IL. State -West Chicago, IL. 30 Mil. VL Poly America; 70,000 s.f HWY Containment
.Wyne Disposal -Belleville MI. 80 Mil. National Seal 650,000 s.f Medical Waste Landfill Cell
.N.B Power -New Castle, New Brunswick, Canada 60 Mil. GSE 500,000 s.f; Tank Farm
.Sydney Steel Sydney, Nova Scotia, Canada 60 Mil. GSE 50,000 s.f Product Pond

-- 4554

THE ISTRE CO., INC.

13811 S. Poplar Pl.
Glenpool, Ok. 74033

Jimmy Beebout
Weld Tech

Project

1. Wright Patterson AF Base, Ohio GSE Smooth 60 Mil. 350,000 s.f. Feb, 1996
2. R.E.M. Consulting Grand Forks, NE GSE Smooth 60 Mil. 350,000 s.f. Aug. 1996
3. Leominster MA. GSE Smooth 40 Mil. 65,000 s.f. Oct. 1996
4. Hillsvale, VA. GSE Smooth 60 Mil. 68,000 s.f. 40 Mil. Textured 78,000 s.f. Dec. 1996
5. U.S. Steel Gary, Ind. GSE Smooth 60 Mil. 758,000 s.f. April, 1997
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8. General Mitchel IAP, WI. GSE Smooth 60 Mil. 60,000 s.f. Aug. 1998
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12. DOE Piketon, Ohio – Solmax Smooth 80 Mil. 300,000 s.f. Landfill Cap Sept. 2000
13. U.S. Steel Clairton, Pa. Solmax Textured 40 Mil. 695,000 s.f. Landfill Cap Dec. 2000

TELE & FAX. (918) 291-2318
Cell (918) 688-9291

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02770-006	REV.: 1	DATE: 5/18/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: Denise Wentz DATE: 5/21/01

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
8	642-C.4.25	1						X			GEOMEMBRANE LINER INSTALLATION		X		02770-006	X		
											LAYOUT PLAN							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7				
GEOSYNTEC	38				
GREGG JOHNSON	64				
FRANK FLACK	60				
SAM WOLINSKY - Approver	64				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

Reviewed: a. r. Smith for Sam Wolinsky
RECEIVED BY: DATE: 05/29/2001
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
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INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

002201

FS-F-4955
Rev. 3: 05/14/1999

RECEIVED 5/21/01

ORIGINAL

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

GEOMEMBRANE LINER INSTALLATION
Layout Plan

2770 1.04 B – 1
REVISION 1

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2770-006

[X] A - Conforms to the Subcontract Requirements***
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: a.c. Smith for Sam Wolinsky Date: 05/29/2001

INFORMATION ONLY

Submitted By:

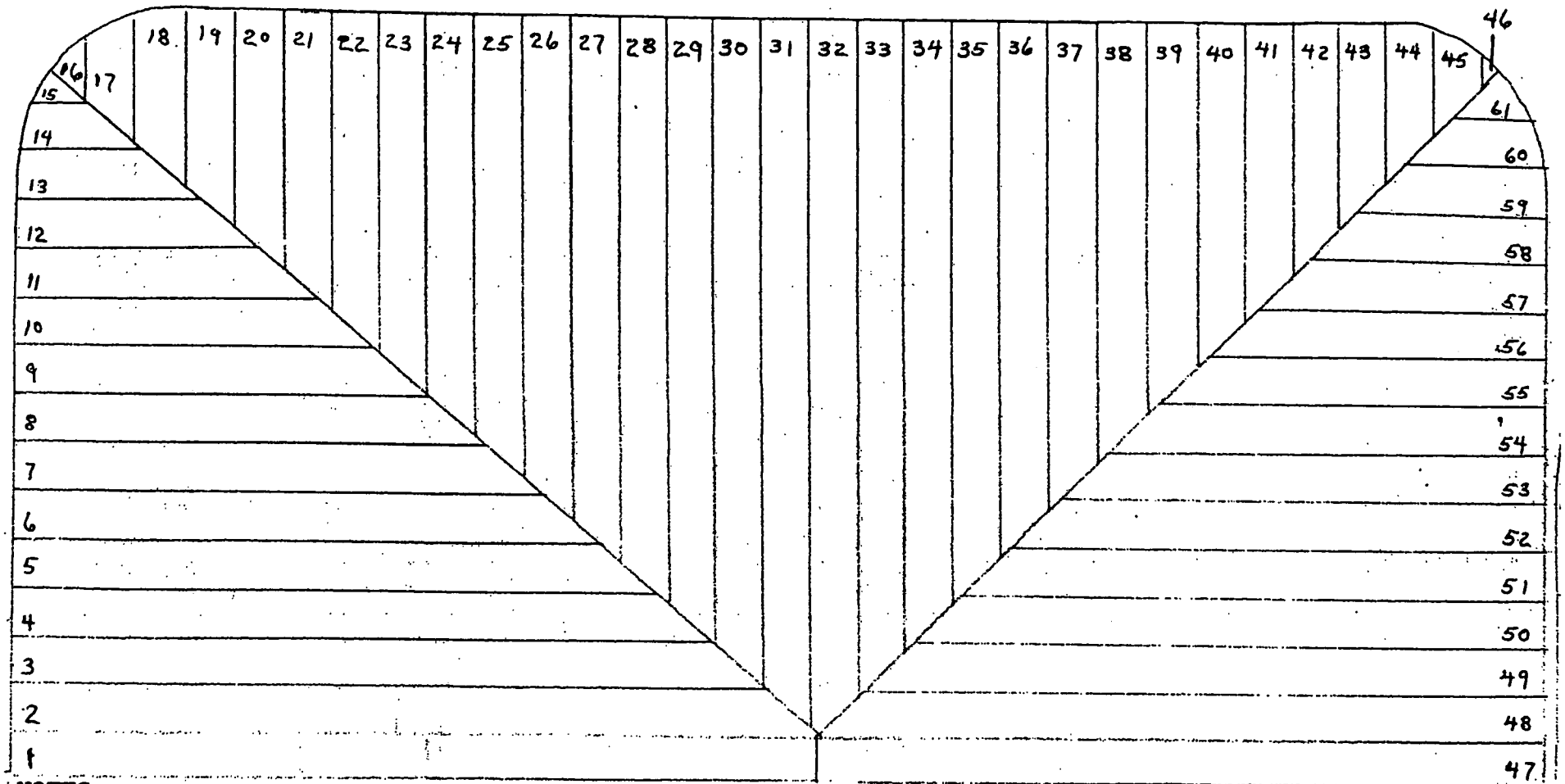
IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

May 18, 2001

THE ISTRE COMPANY



OSDF-CELL #1- CAP PRE-BUILT

NOTES:

1. ACTUAL PANEL LAYOUT AND SEAMS MAY VARY IN ORDER TO ACCOMODATE FIELD CONDITIONS.

2. Each panel will be given an identification code to be agreed upon by with the CQC Consultant at the time of installation.

HDPE PIPE

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT [illegible]103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02605-001	REV.: 1	DATE: 12/[illegible]	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Locke

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: [signature] DATE: 12/20/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
1	642-C.4.53	1						X			DETAILED SHOP DRAWINGS		X		02605-1.04	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	LEE MCDANIEL	60		
GEOSYNTEC	38	FRED WILSON	60		
FRANK FLACK	64	TOM CARR	60		
SAM WOLINSKY (APPROVER)	64				
DON GOETZ	64				
MARY ELETON	64				
GREGG JOHNSON	64				
KEVIN HARBIN	64				

NO COMMENTS: (X) COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

RECEIVED BY: [signature] DATE: 12/20/01

FS-F-4955 (SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)
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SUBMITTAL TYPE: (BY SUPPLIER)
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SUBMITTAL ACTION CODE: (BY FDF)
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B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

000205

-- 4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

HORIZONTAL MONITORING WELL, LEACHATE COLLECTION SYSTEM, REDUNDANT LEACHATE COLLECTION SYSTEM, AND LEACHATE DETECTION SYSTEM

CELLS 4 AND 5

DETAILED SHOP DRAWINGS

2605 1.04
REVISION 1

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2605-001

IT Document No. C.4.53
***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 829686

***

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: SHWolinsky Date: 12/20/01

December 19, 2001

ECDC CONTROLLED
COPY NO. C- 011

000206

the i group

ON SITE DISPOSAL FACILITY PHASE III – CELL ONE FINAL COVER CONSTRUCTION
FLUOR FERNALD SUBCONTRACT FSC – 642
****

Horizontal Monitoring Well, Leachate Collection System, Redundant Leachate Collection System, and Leachate Detection System

Cells 4 and 5

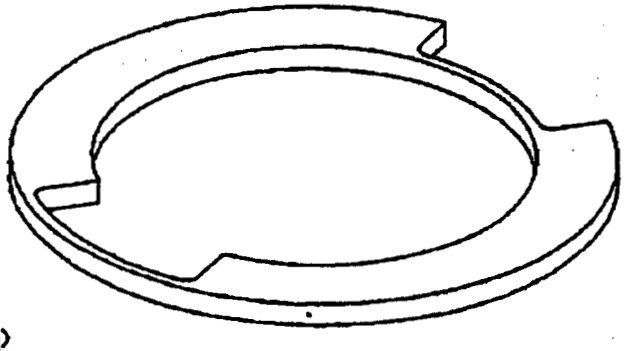
Detailed Shop Drawings
***

Attached is the shop drawings for the above referenced project. A field check was conducted and confirmed the centralizers on the 6-inch carrier pipe are 4-feet apart.

45 54

KEYHOLE CENTRALIZER

APPLIED TO MIDDLE AREAS OF LENGTH PIPE THAT IS TO HAVE LEAK DETECTION CABLE INSTALLED

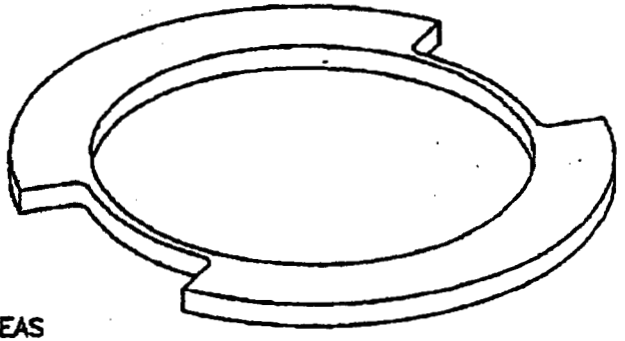


NOTE:

ARCH ADDED TO SUPPLY SUPPORT AND ALIGN LEAK DETECTION CABLE (without snagging)

NOTE:

DESIGNED TO BE STRONG SIMPLE AND VERSATILE.



REGULAR CENTRALIZER

APPLIED TO FITTINGS AND PIPE ENDS AND MIDDLE AREAS OF PIPE THAT IS NOT TO HAVE LEAK DETECTION CABLE INSTALLED

THIS DRAWING/DESIGN PROVIDED BY AND PROPERTY OF "FLUID CONTROLS INC." IT IS INTENDED FOR MANUFACTURE, INSTALLATION AND IDENTIFICATION USES OF PRODUCT DEPICTED AND SHALL NOT BE CIRCULATED OR REPRODUCED WITHOUT SPECIFIC PERMISSION FROM MANAGEMENT OF "FLUID CONTROLS INC." ALL RIGHTS RESERVED

DRAWING NUMBER OR NAME: CENTS

APPROVED BY:

SUBMITTAL

FCI CENTRALIZERS FOR DUAL CONTAINED PIPING

CUSTOMER

ORDER #

LOCATION :

FLUID CONTROLS INCORPORATED

1-800-462-0860

DRAWN BY:	DATE:	CHECKED BY:	DATE:
MPS	09/28/98		

000208

DRISCOPIPE

4554

Figure 9: Pipe Support Spacing for DR32.5

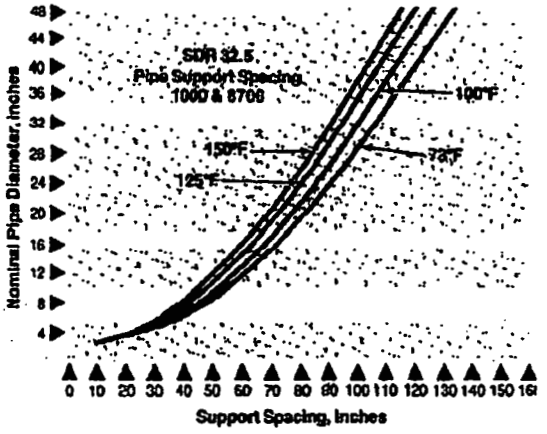


Figure 10: Pipe Support Spacing for DR26

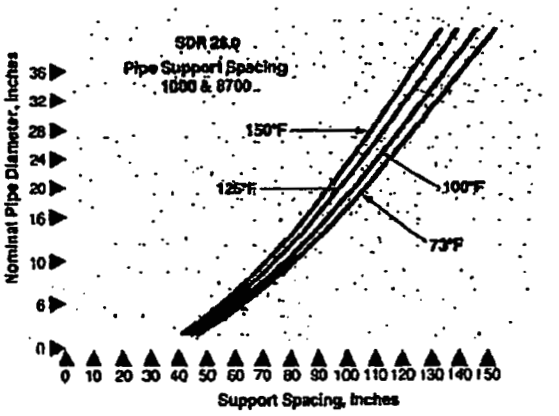


Figure 11: Pipe Support Spacing for DR17

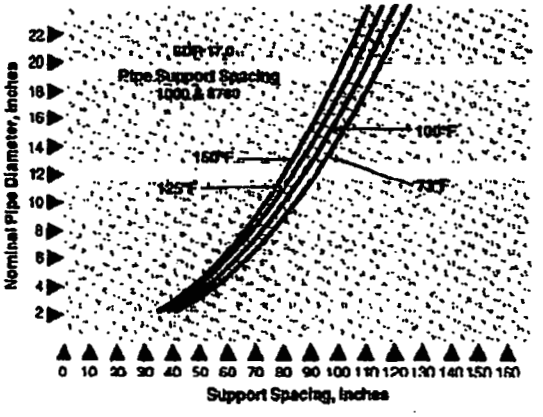


Figure 12: Pipe Support Spacing for DR11

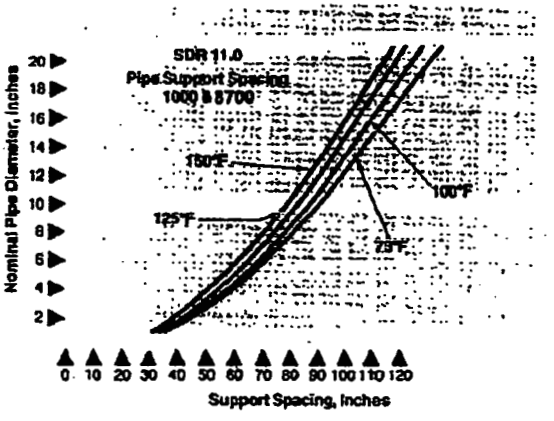
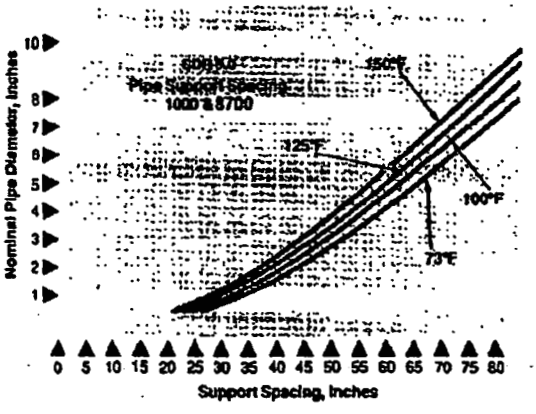


Figure 13: Pipe Support Spacing for DR9



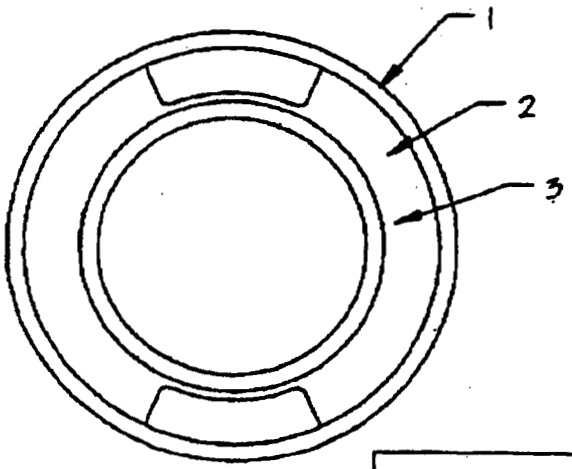
TYPICAL DUAL- CONTAINED PIPING SYSTEM DETAIL

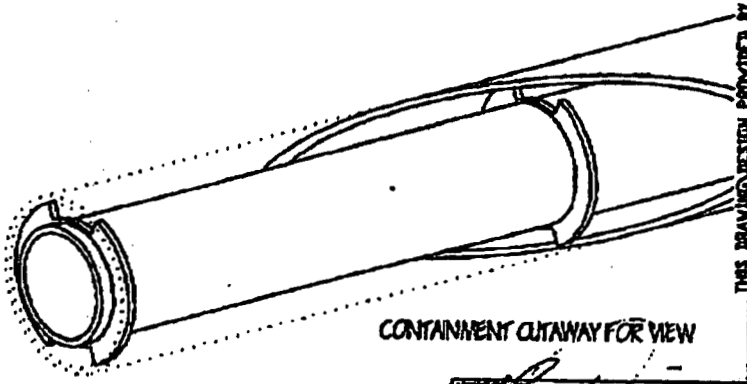
4554

Bill Of Materials

ITEM	QTY	UNITS	DESCRIPTION	CLASS	SIZE	PART / DWG #
1		ft	CONTAINMENT , HDPE M1000 PIPE			
2		ea.	FCI REGULAR CENTRALIZERS , HDPE			
3		ft	CARRIER , HDPE M1000 PIPE			

* CONSULT SALESPERSON FOR RECOMMENDED CONFIGURATIONS





CONTAINMENT CUTAWAY FOR VIEW

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SUBMITTAL

DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED
LINEAR TOLERANCE = 1/4"
ANGULAR TOLERANCE = 2

SCALE:

DO NOT SCALE DRAWING

FLUID CONTROLS INCORPORATED

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT [illegible]103

CONTRACT NO: FSC-642

SUBMITTAL NO.: 20103-642-02605-002

REV.: 0

DATE: 12/1[illegible]

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061

SIGNATURE: David Bokerd

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7

RECEIVED BY: [illegible] DATE: 12/18/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
1	642-C.7.27	0					X				LIST OF MATERIALS		X		02605-1.04	X		

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SAM WOLINSKY	64	BILL ZEBICK	64		
DON GOETZ	64				
MARY ELETON	64				
GREGG JOHNSON	64				
KEVIN HARBIN	64				

NO COMMENTS:

COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

0002211

454

RECEIVED BY: [illegible] DATE: 12/20/01

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FS-F-4955
Rev. 3: 05/14/1999

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DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
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C - Revise and Resubmit (SEE COMMENTS)

-- 4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

HORIZONTAL MONITORING WELL, LEACHATE COLLECTION SYSTEM, REDUNDANT LEACHATE COLLECTION SYSTEM, AND LEACHATE DETECTION SYSTEM

CELLS 4 AND 5

LIST OF MATERIALS

2605 1.04
REVISION 0

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2605-002

IT Document No. C.2.27
***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 829686

***

INFORMATION ONLY

December 18, 2001

000212

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 12/20/01

the i group

ON SITE DISPOSAL FACILITY PHASE III – CELL ONE FINAL COVER CONSTRUCTION
FLUOR FERNALD SUBCONTRACT FSC – 642
****

Horizontal Monitoring Well, Leachate Collection System, Redundant Leachate Collection System, and Leachate Detection System

Cells 4 and 5

List of Materials
***

The following material will be provided for the above-referenced project:

- 1200 feet of 6-inch/10-inch Dual Containment HDPE SDR 11 Piping
- 360 feet of 6-inch HDPE SDR11 pipe
- 120 feet of Perforated HDPE pipe

Materials will be delivered on December 11, 2001.

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02605-003	REV.: 0	DATE: 12/18/01	Page 1 OF 1
0103					

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: [illegible] DATE: 12/18/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
1	642-C.7.18	0							X		HYDROSTATIC, PNEUMATIC, AND BENT STRAP TESTING PROCEDURES		X		02605-1.04	X		

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SAM WOLINSKY	64				
DON GOETZ	64				
MARY ELETON	64				
MIKE GODBER (APPROVER)	64				
KEVIN HARBIN	64				

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Rev. 3: 05/14/1999

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CFC - CERTIFIED FOR CONSTRUCTION
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SUBMITTAL ACTION CODE: (BY FDF)
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C - Revise and Resubmit (SEE COMMENTS)

000214

4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

HORIZONTAL MONITORING WELL, LEACHATE COLLECTION SYSTEM, REDUNDANT LEACHATE COLLECTION SYSTEM, AND LEACHATE DETECTION SYSTEM

CELLS 4 AND 5

HYDROSTATIC, PNEUMATIC, AND BENT STRAP TESTING PROCEDURES

2605 1.04
REVISION 0

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2605-003

IT Document No. C.7.18
***

INFORMATION ONLY

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 829686

***

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 12/18/01

December 18, 2001

HYDROSTATIC TEST PROCEDURE FOR HDPE PIPING

1. System is to be flanged off at all but one opening to allow for filling of system with water. Once system is filled with water, fill flange valve will be closed. The flange on the upstream (high point) side will have a vent to release trapped air.

2. A hydrostatic pump will be connected to inlet side (low side) of fill flange and power applied to create hydrostatic pressure on a calibrated gauge of proper resolution within the boundary of the system test. The gauge assembly will include a pressure relief valve. Flanges are rated to 150 psi. The gauges will be rated to a minimum of 0 to 150 psi. The pressure relief valve will be rated to the test pressure plus 10% psi, or 50 psi, which ever is lower.

3. Test will be performed in the presence of the CQC Consultant. Containment pipe testing shall not proceed until the carrier pipe has been successfully tested.

4. HDPE solid wall carrier pipe will be tested at 60 psi internal pressure. Containment pipe shall be at atmospheric pressure when testing carrier pipe.

5. HDPE containment pipe will be tested at 15 psi internal pressure. Carrier pipe shall be at atmospheric pressure when testing containment pipe.

6. Initial expansion phase: Piping shall stand at the specified internal pressure until stabilization has been reached. Sufficient make-up water will be added to the pipe four times at one-hour intervals to return to the test pressure. Stabilization will be achieved if there is no further change in pressure over a one-hour period. The initial expansion phase shall not exceed 4 hours.

7. Actual test phase: Testing will start after the fourth addition of make-up water in the initial expansion phase. Testing will be performed for 1 hour. Make-up water will be added to return the pipe pressure to the test pressure. A passing test will require less make-up water than the attached table shows (adjusted for actual test pressure & ambient temperature). A failing test will require identification of any leaks and if leaks exist, repair and retest.

8. Alternative test: Initial expansion phase test will be performed at 70 psi internal pressure for carrier pipe and 25 psi internal pressure for containment pipe. Test pressure will be maintained over a 4-hour period as specified. The pressure will be dropped by 10 psi in accordance with recommendations of AWWA (1999). If the pressure remains steady (i.e., within 5 percent of the target value) for an hour, with no visible leaks, passing results are achieved.

9. Once the testing is finalized, a pipe test report will be completed.

10. Upon completion of the test, the piping will be drained.

TEST PROCEDURE FOR PNEUMATIC ABOVE GROUND HDPE PIPING

1. A safety relief valve set at approximately 20 psi will be installed in the test system to limit overpressure of the test specimen. Sand bags will also be installed around the flange ends to control movement.

2. System is to be flanged off at all but one opening to allow for filling the system with air. Once system is filled with air, fill flange valve will be closed.

3. Air compressor will be connected to inlet side of fill flange and power applied to create pressure on a calibrated gauge within the boundaries of the system.

4. Pressure will be gradually increased to one-half of the full pneumatic test pressure. We will pause for 15 minutes to allow the pipe strains to become somewhat equalized and to detect any possible major leaks by means of soap bubbles or monitoring of test gauge.

5. Pressure will be gradually increased to the full pneumatic test pressure of 10 psi. Close valve. Pressure will be held for 15 minutes.

6. This will be above ground, low-pressure air test (no greater than 10 psi) which includes soaping of joints, for all HDPE piping prior to placement in the trench. If the gauge pressure does not drop below full pneumatic test pressure and no leaks are found, the test is considered passing.

7. Once the above testing is finalized, a pipe test report will be completed.

BENT STRAP TESTING PROCEDURE

The trial fusion joints that will be produced at the beginning of each work day will be performed in conformance with the specification 2605 and DCN 20103-040.

1. A trial fusion joint will be performed for each machine and operator to be used that day.

2. Joint will be allowed to cool for at least 18-minutes on the 6-inch and 30-minutes on the 10-inch.

3. Sample will be cut through the joint area, lengthwise on the pipe. Length of the straps shall be at least 6-inch or 15 pipe wall thickness long on each side of the fusion. Straps shall be a minimum of 1-inch in width and a maximum of 2-feet (approximately) in length.

4. Visually inspect the cut surface of the pipe wall at the joint for voids or unbonded areas.

5. The sample will be bent 180 degrees until the ends of the strap touch. Any disbondment at the fusion is unacceptable, and indicates poor fusion quality. If failure occurs, fusion procedures and/or machine set-up should be changed, and a new trial fusion and bent strap test specimen shall be prepared arid tested. The bending test station shall be setup by the field personnel and accepted by the CQC Consultant who is responsible for the final observation and approval of the test joint. Proper PPE shall be utilized during this test. Remove all personnel from the bending path of travel of the specimen to avoid injury due to "spring back" motion of the test ends.

6. After the trial fusion joint has been prepared, tested, and accepted, the contractor is ready to perform field production joints for that work day.

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJ. [redacted]0103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02605-004	REV.: 0	DATE: 12/[illegible]/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockud

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7

RECEIVED BY: [illegible] DATE: 12/13/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
1	642-C.4.54	0						X			ORIGIN & IDENTIFICATION OF RESIN		X		02605-1.04	X		

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DON GOETZ	64				
MARY ELETON	64				
GREGG JOHNSON	64				
KEVIN HARBIN	64				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

000219

RECEIVED BY: [illegible] DATE: 12/19/01

FS-F-4955 (SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)
Rev. 3: 05/14/1999

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

454

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

HORIZONTAL MONITORING WELL, LEACHATE COLLECTION SYSTEM, REDUNDANT LEACHATE COLLECTION SYSTEM, AND LEACHATE DETECTION SYSTEM

CELLS 4 AND 5

RESIN ORIGIN & IDENTIFICATION

2605 1.04
REVISION 0

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2605-004

IT Document No. C.4.54
***

INFORMATION ONLY

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 829686

***

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: SH Wolinsky Date: 12/19/01

December 13, 2001

-- 4554

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

PERFORMANCE PIPE
P.O.BOX 1060
BROWNWOOD TEXAS 76804

December 17, 2001

DriscoPlex™ 1000 PRODUCT QUALITY CERTIFICATION

CUSTOMER: ISCO INDUSTRIES
PO BOX 4545
LOUISVILLE KY 40204

ATTENTION: ANN SHOWALTER

PRODUCT: 10"DR11-1000

This letter is being written at your request concerning DriscoPlex™ 1000 series pipe. DriscoPlex™ 1000 series pipe is manufactured from a PE Resin having a cell class of 345464 according to ASTM D3350. This is a high density, high molecular weight polyethylene resin that meets the criteria for a Type III, Grade PE34 piping material in accordance with ASTM D3350. DriscoPlex™ 1000 pipe has a Plastic Pipe Institute recommended hydrostatic design basis of 1600 psi at 23°C and 800 psi at 60°C based on TR/3 as derived from a stress regression analysis per ASTM D2837 test methodology.

The dimensional characteristics and pressure capabilities of DriscoPlex™ 1000 are established in accordance with the guidelines set forth in ASTM F714 for sizes 3" IPS and larger and D3035 for sizes smaller than 3" IPS. These standards are referenced in the print line, and repeated every two feet along the entire length of pipe. While we are making effort to convert to product printed "DRISCOPLEX™", you may receive product printed with either DRISCOPIPE or PLEXCO. Please be assured this product is certified as stated above.

Sincerely,

Denny Johnson
QA Supervisor

CHEVRON PHILLIPS PERFORMANCE PIPE

PAGE 1

PLANT Product Description: 10P 10.00" DR 11.00 0040' JT

PRINT OUT DATE: 12/17/2001

PRODUCTION ORDER NUMBER 100093097 Start Date 04/29/2000 End Date 5/8/2000

Minimum Wall (IN):	0.977	Minimum Toe-In (%):	0.455
Maximum Wall (IN):	1.075	Maximum Toe-In (%):	1.403
Minimum OD (IN):	10.739	Minimum Hoop Stress (PSI):	3089
Maximum OD (IN):	10.760	Maximum Hoop Stress (PSI):	3549
Minimum ID (IN):	8.636	Minimum Density:	0.956
Maximum ID (IN):	8.808	Maximum Density:	0.956
Minimum Eccentricity (%):	1.809	Minimum Carbon Black (%):	
Maximum Eccentricity (%):	5.228	Maximum Carbon Black (%):	
Minimum Out of Round (IN):	0.188	Minimum Melt Index:	0.060
Maximum Out of Round (IN):	0.392	Maximum Melt Index:	0.070
Minimum Ovality (%):	1.749	Resin	16
Maximum Ovality (%):	3.650	Lot	C00303P02
Number of Samples:	19		

— 4554

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

SOLVAY POLYMERS

CERTIFICATE OF ANALYSIS
Batch: C000303P02

Information Provided to:	Shipped To:
PHILLIPS DRISCOPIPE - BROWNWOOD 1400 DRISCO DR - TRACK 411 BROWNWOOD, TX 76801 Contact: BUD MCCORKLE Fax: 915-643-4102	PHILLIPS DRISCOPIPE - BROWNWOOD 1400 DRISCO DR - TRACK 411 BROWNWOOD TX 76801

Order Information on Shipment of:	Sold-To:
FORTIFLEX™ K44-08-223 PE PELLETS	PHILLIPS DRISCOPIPE

Customer Purchase Order No.:	Material Code:	Dry Short Tons:	Solvay Delivery / BOL No.:
REL. 5	60621		80167992

Shipping Date:	Shipping Vehicle No.:	Net Weight:	Number and Type of Package:
04/18/2000	ELTX001128	193,800 LB	1 RAIL CAR

Comment(s):

CUSTOMER SPECIFICATION

ANALYSIS	METHOD	RESULT	UNIT	MIN	MAX
MI 21.6 (HLMI)	ASTM D1238-95	6.10	g/10min		
DENSITY (NATURAL RESIN)	ASTM D4883-96	0.9434	g/cm3		
DENSITY (BLACK)	CALCULATED	0.9543	g/cm3		

P.O. # 4501748758
10 # 5000337956
32 # 4901252865

Released 5-3-00
OK

Rec 4-28-00
Tested 5-3-00
OK

SUPPLIER:	APPROVED BY:
SOLVAY POLYMERS, INC. 3333 RICHMOND AVE HOUSTON, TX 77098-3099 Phone: 800-827-5818	Dr. John Buckfelder Quality Assurance Manager SOLVAY POLYMERS, INC. PO BOX 1000 DEER PARK, TX 77536-1000 Phone: 713-307-3740

THIS REPORT CANNOT BE COPIED OR REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN APPROVAL OF THE SOLVAY POLYMERS ANALYTICAL AND QUALITY SERVICES DEPARTMENT. RESULTS APPLY ONLY TO THE ITEMS TESTED.

Certificate Run Date: 04/19/2000 Time: 08:07:36 Page 1 of 1

CHEVRON PHILLIPS PERFORMANCE PIPE

PRINT OUT DATE: 12/17/2001

End Date 4/22/2001

SNT

Product Description: 10P 10.00" SDR 11.00 0050' JT

DDUCTION ORDER NUMBER 100133443

Start Date 03/22/2001

Minimum Wall (IN):	0.979	Minimum Toe-In (%):	0.392
Maximum Wall (IN):	1.158	Maximum Toe-In (%):	0.838
Minimum OD (IN):	10.711	Minimum Hoop Stress (PSI):	3049
Maximum OD (IN):	10.788	Maximum Hoop Stress (PSI):	3395
Minimum ID (IN):	8.447	Minimum Ring Tensile (PSI):	
Maximum ID (IN):	8.757	Maximum Ring Tensile (PSI):	
Minimum Eccentricity (%):	1.866	Minimum Carbon Black (%):	2.185
Maximum Eccentricity (%):	12.903	Maximum Carbon Black (%):	3.035
Minimum Out of Round (IN):	0.125	Minimum Melt Index:	0.040
Maximum Out of Round (IN):	0.250	Maximum Melt Index:	0.080
Minimum Ovality (%):	1.159	Resin	TR480Z-01
Maximum Ovality (%):	2.330	Lot	82-1-0256
Number of Samples:	156		

Chevron Phillips Chemical Company LP

- 4554

Houston Chemical Complex
P.O. Box 792, Pasadena, TX 77501

April 02, 2001

PSN# 8106-01

FAX: 864-439-7918

Phillips Driscopipe
Startex Plant
2950 Nazareth Road
Wellford, SC 29385

Quality Control

This letter will certify that the Marlex* resin shown below, as supplied by Chevron Phillips Chemical Company, conforms to our manufacturing specification.

Type:	HHM TR-480Z-01
Lot Number:	8210256
P.O. Number:	REL 38
Date Shipped:	04/02/01
Package:	PSPX 6717
Quantity:	187700 LBS.
Melt Index, ASTM D1238:	.08 G/10 MIN
Density, ASTM D1505:	.944 G/CC
ESCR, F/20:	>192 HOURS **

Silo #5
4-17-01

Paul S. Newbold
Sr. Certification Systems Specialist

For COA questions call Carol Meza, 713-475-3625

* Reg. U.S. Pat. Off.
** Nominal Value (not tested on each lot)

cc: QA-File-RC

Date Sampled 4-14-01
A .07 -.08 .944 .943
B .08 .07 .943 .944
Tap Date 4-17-01
PO # 4502082220
G/R # 5000051500
Date Pow... 4-19-01
4900245112 - 4900245117

LANT

CHEVRON PHILLIPS PERFORMANCE PIPE

PAGE 1

Product Description: 10P 06.00" SDR 11.00 0040' JT

PRINT OUT DATE: 12/17/2001

RODUCTION ORDER NUMBER 100180570

Start Date 10/20/2001

End Date 10/25/2001

Minimum Wall (IN):	0.622	Minimum Toe-In (%):	0.378
Maximum Wall (IN):	0.680	Maximum Toe-In (%):	0.529
Minimum OD (IN):	6.608	Minimum Hoop Stress (PSI):	3239
Maximum OD (IN):	6.634	Maximum Hoop Stress (PSI):	3358
Minimum ID (IN):	5.291	Minimum Ring Tensile (PSI):	
Maximum ID (IN):	5.359	Maximum Ring Tensile (PSI):	
Minimum Eccentricity (%):	1.268	Minimum Carbon Black (%):	2.614
Maximum Eccentricity (%):	5.735	Maximum Carbon Black (%):	2.741
Minimum Out of Round (IN):	0.125	Minimum Melt Index:	11.200
Maximum Out of Round (IN):	0.155	Maximum Melt Index:	11.900
Minimum Ovality (%):	1.891	Resin	9346
Maximum Ovality (%):	2.344	Lot	M091245
Number of Samples:	12		

4554

000226

4554

Chevron Phillips Chemical Company LP

October 8, 2001

Receiving Dept
CHEVRON PHILLIPS CHEMICAL CO
STARTEX PLANT
C/O PERFORMANCE PIPE
SPARTANBURG
STARTEX, SC 29377

CERTIFICATE OF ANALYSIS

Product:	PE 1 9346 BK	Lot Number:	M091348
Chevron Phillips Order #:	85974322 - 1	Destination:	STARTEX
Package:	CHVX096536	Weight (lbs):	185,100
Customer Order #:	REL 29	Ship Date:	10/4/01

Following is the data on the subject material as determined by the Quality Control Department:

Property	Value	Units	Customer Specifications Minimum	Target	Maximum
HLMI	12.3	gm/10 min	8.0		14.0
Density	0.9489	gm/cc	0.944		0.947
Pellet Count	38	pellets/gm	35		65
Thermal Stability	269	degrees C	250		
MIS	0.45	gm/10 min			
OIT	48.7				

The data set forth herein has been carefully compiled by Chevron Phillips Chemical Company LP. However, there is no warranty of any kind, either expressed or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

Gary MacMurtrie
Supervisor
Quality Control

Date Sampled 10-19-01
A 10-9-945 10-4-945
B 11-2-945 10-4-945
Tap Date 4502141748
PO # 10-21-01
G/R # 5000154189
Date Posted 10-22-01
4900591308 - 4900591372

Customer Fax: 864-439-7918

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJE[redacted]0103

CONTRACT NO: FSC-642

SUBMITTAL NO.: 20103-642-02605-005

REV.: 0

DATE: 12/[redacted]

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061

SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7

RECEIVED BY: [illegible] DATE: 12/18/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
1	642-C.4.55	0						X			MINIMUM MANUFACTURER'S CERTIFIABLE VALUES & TEST PROCEDURES		X		02605-1.04	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	LEE MCDANIEL	60		
GEOSYNTEC	38	FRED WILSON	60		
FRANK FLACK	64	TOM CARR	60		
SAM WOLINSKY (APPROVAL)	64				
DON GOETZ	64				
MARY ELETON	64				
GREGG JOHNSON	64				
KEVIN HARBIN	64				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

000228

RECEIVED BY: [illegible] DATE: 12/19/01

FS-F-4955 (SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)
Rev. 3: 05/14/1999

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

454

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

HORIZONTAL MONITORING WELL, LEACHATE COLLECTION SYSTEM, REDUNDANT LEACHATE COLLECTION SYSTEM, AND LEACHATE DETECTION SYSTEM

CELLS 4 AND 5

MINIMUM MANUFACTURER'S CERTIFIABLE VALUES & CORRESPONDING TEST PROCEDURES

2605 1.04
REVISION 0

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2605-005

IT Document No. C.4.55
***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 829686

***

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: SHWozinsky Date: 12/19/01

December 13, 2001

-- 4554

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

PERFORMANCE PIPE
P.O.BOX 1060
BROWNWOOD TEXAS 76804

December 17, 2001

DriscoPlex™ 1000 PRODUCT QUALITY CERTIFICATION

CUSTOMER: ISCO INDUSTRIES
PO BOX 454
LOUISVILLE KY 40204

ATTENTION: ANN SHOWALTER

PRODUCT: 10"DR11-1000

This letter is being written at your request concerning DriscoPlex™ 1000 series pipe. DriscoPlex™ 1000 series pipe is manufactured from a PE Resin having a cell class of 345464 according to ASTM D3350. This is a high density, high molecular weight polyethylene resin that meets the criteria for a Type III, Grade PE34 piping material in accordance with ASTM D3350. DriscoPlex™ 1000 pipe has a Plastic Pipe Institute recommended hydrostatic design basis of 1600 psi at 23°C and 800 psi at 60°C based on TR/3 as derived from a stress regression analysis per ASTM D2837 test methodology.

The dimensional characteristics and pressure capabilities of DriscoPlex™ 1000 are established in accordance with the guidelines set forth in ASTM F714 for sizes 3" IPS and larger and D3035 for sizes smaller than 3" IPS. These standards are referenced in the print line, and repeated every two feet along the entire length of pipe. While we are making effort to convert to product printed "DRISCOPLEX™", you may receive product printed with either DRISCOPIPE or PLEXCO. Please be assured this product is certified as stated above.

Sincerely,

Denny Johnson
QA Supervisor

- 4554

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

Performance Pipe
2950 Nazareth Road
Wellford, S.C. 29385

December 13, 2001

DriscoPlex™ 1000 PRODUCT QUALITY CERTIFICATION

CUSTOMER: ISCO Industries
PO Box 4545
Louisville KY 40204

ATTENTION: Hank Dobson

QUANTITY: N/A
EXTRUSION DATE(S): 05/01

PRODUCT: 10" DR 11 1000

This letter is being written at your request concerning DriscoPlex™ 1000 series pipe. DriscoPlex™ 1000 series pipe is manufactured from a PE Resin having a cell class of 345464 according to ASTM D3350. This is a high density, high molecular weight polyethylene resin that meets the criteria for a Type III, Grade PE34 piping material in accordance with ASTM D3350. DriscoPlex™ 1000 pipe has a Plastic Pipe Institute recommended hydrostatic design basis of 1600 psi at 23°C and 800 psi at 60°C based on TR/3 as derived from a stress regression analysis per ASTM D2837 test methodology.

The dimensional characteristics and pressure capabilities of DriscoPlex™ 1000 are established in accordance with the guidelines set forth in ASTM F714 for sizes 3" IPS and larger and D3035 for sizes smaller than 3" IPS. These standards are referenced in the print line, and repeated every two feet along the entire length of pipe. While we are making effort to convert to product printed "DRISCOPLEX™", you may receive product printed with either DRISCOPIPE or FLEXCO. Please be assured this product is certified as stated above.

Sincerely,

Carolyn Rogers
Quality Assurance Supervisor

864-439-3066

4554

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

Performance Pipe
2950 Nazareth Road
Wellford, S.C. 29385

December 3, 2001

DriscoPlex™ 1000 PRODUCT QUALITY CERTIFICATION

CUSTOMER: ISCO Industries
PO Box 4545
Louisville KY 40204

ATTENTION: Rick Hint

QUANTITY: N/A
EXTRUSION DATE(S): 10/21/01

PRODUCT: 6" DR 11 1000

This letter is being written at your request concerning DriscoPlex™ 1000 series pipe. DriscoPlex™ 1000 series pipe is manufactured from a PE Resin having a cell class of 345464 according to ASTM D3350. This is a high density, high molecular weight polyethylene resin that meets the criteria for a Type III, Grade PE34 piping material in accordance with ASTM D3350. DriscoPlex™ 1000 pipe has a Plastic Pipe Institute recommended hydrostatic design basis of 1600 psi at 23°C and 800 psi at 60°C based on TRD as derived from a stress regression analysis per ASTM D2837 test methodology.

The dimensional characteristics and pressure capabilities of DriscoPlex™ 1000 are established in accordance with the guidelines set forth in ASTM F714 for sizes 3" IPS and larger and D3035 for sizes smaller than 3" IPS. These standards are referenced in the print line, and repeated every two feet along the entire length of pipe. While we are making effort to convert to product printed "DRISCOPLEX™", you may receive product printed with either DRISCOPIPE or PLEXCO. Please be assured this product is certified as stated above.

Sincerely,

Carolyn Rogers 107
Quality Assurance Supervisor

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02605-006	REV.: 1	DATE: 01/30/02	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: [signature] DATE: 1/31/02

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
	642-C.7.19	1							X		PIPE JOINING EQUIPMENT ID & PROCEDURES FOR BUTT-FUSION WELDING		X		02605-1.04	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	LEE MCDANIEL	60		
GEOSYNTEC	38	FRED WILSON	60		
FRANK FLACK	64	TOM CARR	60		
SAM WOLINSKY	64				
MIKE GODBER (APPROVER)	64				
MARY ELETON	64				
KEVIN HARBIN	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

000233

ORIGINAL

4554

RECEIVED BY: [signature] DATE: 2/8/02
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

FS-F-4955
Rev. 3: 05/14/1999

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

HORIZONTAL MONITORING WELL, LEACHATE COLLECTION SYSTEM, REDUNDANT LEACHATE COLLECTION SYSTEM, AND LEACHATE DETECTION SYSTEM

CELLS 4 AND 5

PIPE JOINING EQUIPMENT ID & PROCEDURES FOR BUTT-FUSION WELDING

2605 1.04
REVISION 1

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2605-006

IT Document No. C.7.19
***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 829686

***

January 30, 2001

(X) A - Conforms to the Subcontract Requirements
( ) B - Minor Comment - Incorporate and Resubmit
( ) C - Revise and Resubmit
Sig: ____ Date: 2/12/02

ECDC CONTROLLED
COPY NO. C- 011

PROCEDURE FOR TRAINING & CERTIFYING JOINERS IN BUTT-FUSION OF HDPE PIPE, TUBING & FITTINGS

Welders of HDPE Pipe will be trained to perform Butt-Fusion welding on the MCElroy No. 412, Fusion Machine. The 412 Fusion Machine is capable of Butt-Fusing Pipe in the 4-inch IPS to 12-inch IPS range. Each joiner will be instructed according to the following criteria.

Make trial butt-fusion joints to verify that joining conditions are adequate. Conduct trial joints on the same material to be installed and under similar field conditions as production joints. Conduct trial joints for each fusion apparatus used that day. Each joiner shall make at least one trial joint per day. Trial joining shall be conducted under the same conditions as the actual joining. Prepare trial joint that are at least 2 feet long.

1. Verify that there are no obstructions inside of the pipe.

2. Clean that pipe with a clean oil free rag prior to facing. Cleaning should extend approximately one inch beyond the face of the pipe. Observe that the joint is free of moisture, dust, dirt, and debris of any kind.

3. Face the pipe properly. The wheel pressure for facing shall be approximately 50 to 80 psi. Facing is considered complete when approximately 5 ribbons have been cut from the pipe. After 5 full ribbons have been cut., the wheel pressure should be dropped to 0 psi and the cutting wheel shall continue to rotate to cut the ribbons from the pipe face. NOTE: After the pipe has been faced there shall be no further alignment. If there is realignment, the pipe shall be refaced.

4. Remove all shavings from the facing and the pipe to assure that the shavings are not part of the joint. The operator shall use clean gloves when removing the shavings.

5. Properly align the pipe prior to joining. Adjust the jaws if necessary to achieve proper alignment. NOTE: If there is realignment the pipe shall be refaced.

6. The heater plate should be between 400° and 425° F not to exceed 500° F. NOTE: The heater plate shall be cleaned with a clean oil free cloth.

7. Insert the heater plate into the machine and bring the pipe ends into firm contact with the plate. The pipe should be under 0 pressure when being heated.

8. Heat pipe long enough to achieve a 1/8 to ¼ inch high melt bead prior to removing the plate.

9. The pressure settings for the McElroy 412 Standard machine are as follows: 10-inch SDR 11 pipe will be fused at approximately 435 psi. 6-inch SDR 11 pipe will be fused at 165 psi.

10. Allow the weld to cool to the touch before removing clamps.

11. Perform bent strap test according to approved test plan.

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJE [redacted] 20103

CONTRACT NO: FSC-642

SUBMITTAL NO.: 20103-642-02605-009

REV.: 0

DATE: 12/[redacted]

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061

SIGNATURE: David Lockerd

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7

RECEIVED BY: [signature] DATE: 12/18/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
1	642-C.7.20	0							X		QC CERTIFICATES ISSUED BY RESIN SUPPLIER		X		02605-1.04	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	LEE MCDANIEL	60		
GEOSYNTEC	38	FRED WILSON	60		
FRANK FLACK	64	TOM CARR	60		
SAM WOLINSKY	64				
DON GOETZ	64				
MARY ELETON	64				
MIKE GODBER (APPROVER)	64				
KEVIN HARBIN	64				

NO COMMENTS:

COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

000239

RECEIVED BY: [signature] DATE: 12/27/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

FS-F-4955
Rev. 3: 05/14/1999

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

454

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

HORIZONTAL MONITORING WELL, LEACHATE COLLECTION SYSTEM, REDUNDANT LEACHATE COLLECTION SYSTEM, AND LEACHATE DETECTION SYSTEM

CELLS 4 AND 5

RESULTS OF MANUFACTURER'S RESIN QUALITY TESTS

2605 1.04
REVISION 0

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2605-010

IT Document No. C.7.21
***

Submitted By:

INFORMATION ONLY

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 829686

***

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 01/03/02

December 13, 2001

4554

SOLVAY POLYMERS

CERTIFICATE OF ANALYSIS

Batch: C000303P02

Information Provided to:	Shipped To:
PHILLIPS DRISCOPIPE - BROWNWOOD 1400 DRISCO DR - TRACK 411 BROWNWOOD, TX 76801 Contact: BUD MCCORKLE Fax: 915-643-4102	PHILLIPS DRISCOPIPE - BROWNWOOD 1400 DRISCO DR - TRACK 411 BROWNWOOD TX 76801

Order Information on Shipment of:	Sold-To:
FORTIFLEX™ B44-03-193 PE PELLETS	PHILLIPS DRISCOPIPE

Customer Purchase Order No.:	Material Code:	Dry Short Tons:	Solvay Delivery / BOL No.:
REL. 5	60621		80187992

Shipping Date:	Shipping Vehicle No.:	Net Weight:	Number and Type of Package:
04/18/2000	ELTX001128	193,800 LB	1 RAIL CAR

Comment(s):

CUSTOMER SPECIFICATION

ANALYSIS	METHOD	RESULT	UNIT	MIN	MAX
MI 21.6 (HLMI)	ASTM D1238-95	6.10	g/10min		
DENSITY (NATURAL RESIN)	ASTM D1505-96	0.9434	g/cm3		
DENSITY (BLACK)	CALCULATED	0.9543	g/cm3		

P.O. # 4501748758
10 # 5000337956
32 # 4901252865

Released 5-3-00
OK

Rec 4-28-00
Tested 5-3-00
OK

SUPPLIER:	APPROVED BY:
SOLVAY POLYMERS, INC. 3333 RICHMOND AVE HOUSTON, TX 77098-3099 Phone: 800-527-6219	Dr. John Buckfelder Quality Assurance Manager SOLVAY POLYMERS, INC. PO BOX 1000 DEER PARK, TX 77536-1000 Phone: 713-307-3740

THIS REPORT CANNOT BE COPIED OR REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN APPROVAL OF THE SOLVAY POLYMERS ANALYTICAL AND QUALITY SERVICES DEPARTMENT. RESULTS APPLY ONLY TO THE ITEMS TESTED.

Certificate Run Date: 04/19/2000 Time: 08:07:36 Page 1 of 1

4554

Chevron Phillips Chemical Company LP

Houston Chemical Complex
P.O. Box 792, Pasadena, TX 77501

April 02, 2001

PSN# 8106-01

FAX: 864-439-7918

Phillips Driscopipe
Startex Plant
2950 Nazareth Road
Wellford, SC 29385

Quality Control

This letter will certify that the Marlex* resin shown below, as supplied by Chevron Phillips Chemical Company, conforms to our manufacturing specification.

Type:	HHM TR-480Z-01
Lot Number:	8210256
P.O. Number:	REL 38
Date Shipped:	04/02/01
Package:	PSPX 6717
Quantity:	187700 LBS.
Melt Index, ASTM D1238:	.08 G/10 MIN
Density, ASTM D1505:	.944 G/CC
ESCR, P/20:	>192 HOURS **

Silo #5
4-17-01

Paul S. Newbold
Sr. Certification Systems Specialist

For COA questions call Carol Mesa, 713-475-3625

* Reg. U.S. Pat. Off.
** Nominal Value (not tested on each lot)

cc: QA-File-RC

Date Sampled 4-14-01
A .07 -.08 .944 .943
B .08 .09 .943 .944
Tap Date 4-17-01
PO # 4502082220
G/R # 5000051500
Date Rec'd 4-19-01
4900245112 - 4900245117

Chevron Phillips
Chemical Company LP

October 8, 2001

Receiving Dept
CHEVRON PHILLIPS CHEMICAL CO
STARTEX PLANT
C/O PERFORMANCE PIPE
SPARTANBURG
STARTEX, SC 29377

CERTIFICATE OF ANALYSIS

Product:	PE 1 9346 BK	Lot Number:	M091348
Chevron Phillips Order #:	85974322 - 1	Destination:	STARTEX
Package:	CHVX896536	Weight (lbs):	185,100
Customer Order #:	REL 29	Ship Date:	10/4/01

Following is the data on the subject material as determined by the Quality Control Department:

			Customer Specifications		
Property	Value	Units	Minimum	Target	Maximum
HLMI	12.3	gms/10 min	8.0		14.0
Density	0.9489	gms/cc	0.944		0.947
Pellet Count	38	pellets/gm	35		65
Thermal Stability	269	degrees C	250		
MIS	0.45	gms/10 min			
OIT	48.7				

The data set forth herein has been carefully compiled by Chevron Phillips Chemical Company LP. However, there is no warranty of any kind, either expressed or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

Gary MacMurrie
Supervisor
Quality Control

Date Sampled 10-19-01
A 10-9-945 10-4-945
B 11-7-945 10-4-945
Tap Date 4502141748
PO # 10-21-01
G/R # 5000154189
Date Posted 10-22-01
4900591308 - 4900591372

Customer Fax: 864-439-7918

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT: 20103

CONTRACT NO: FSC-642

SUBMITTAL NO.: 20103-642-02605-010

REV.: 0

DATE: 12/1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061

SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7

RECEIVED BY: Jennifer Hott DATE: 12/18/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
1	642-C.7.21	0							X		RESULTS OF RESIN QUALITY TESTS		X		02605-1.04	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	LEE MCDANIEL	60		
GEOSYNTEC	38	FRED WILSON	60		
FRANK FLACK	64	TOM CARR	60		
SAM WOLINSKY	64				
DON GOETZ	64				
MARY ELETON	64				
MIKE GODBER (APPROVER)	64				
KEVIN HARBIN	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

000241

4554

RECEIVED BY: Michael Godber DATE: 11/03/02

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

FS-F-4955
Rev. 3: 05/14/1999

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

HORIZONTAL MONITORING WELL, LEACHATE COLLECTION SYSTEM, REDUNDANT LEACHATE COLLECTION SYSTEM, AND LEACHATE DETECTION SYSTEM

CELLS 4 AND 5

QC CERTIFICATES ISSUED BY RESIN SUPPLIER

2605 1.04
REVISION 0

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2605-009

IT Document No. C.7.20
***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 829686

***

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: _____ Date: 01/23/02

December 13, 2001

4554

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

PERFORMANCE PIPE
P.O.BOX 1060
BROWNWOOD TEXAS 76804

December 17, 2001

DriscoPlex™ 1000 PRODUCT QUALITY CERTIFICATION

CUSTOMER: ISCO INDUSTRIES
PO BOX 4545
LOUISVILLE KY 40204

ATTENTION: ANN SHOWALTER

PRODUCT: 10"DR11-1000

This letter is being written at your request concerning DriscoPlex™ 1000 series pipe. DriscoPlex™ 1000 series pipe is manufactured from a PE Resin having a cell class of 345464 according to ASTM D3350. This is a high density, high molecular weight polyethylene resin that meets the criteria for a Type III, Grade PE34 piping material in accordance with ASTM D3350. DriscoPlex™ 1000 pipe has a Plastic Pipe Institute recommended hydrostatic design basis of 1600 psi at 23°C and 800 psi at 60°C based on TR/3 as derived from a stress regression analysis per ASTM D2837 test methodology.

The dimensional characteristics and pressure capabilities of DriscoPlex™ 1000 are established in accordance with the guidelines set forth in ASTM F714 for sizes 3" IPS and larger and D3035 for sizes smaller than 3" IPS. These standards are referenced in the print line, and repeated every two feet along the entire length of pipe. While we are making effort to convert to product printed "DRISCOPLEX™", you may receive product printed with either DRISCOPIPE or PLEXCO. Please be assured this product is certified as stated above.

Sincerely,

Donny Johnson
QA Supervisor

- 4554

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

Performance Pipe
2950 Nazareth Road
Wellford, S.C. 29385

December 13, 2001

DriscoPlex™ 1000 PRODUCT QUALITY CERTIFICATION

CUSTOMER: ECO Industries
PO Box 4545
Louisville KY 40204

ATTENTION: Hank Dobson

QUANTITY: N/A
EXTRUSION DATE(S): 03/01

PRODUCT: 10" DR 11 1000

This letter is being written at your request concerning DriscoPlex™ 1000 series pipe. DriscoPlex™ 1000 series pipe is manufactured from a PE Resin having a cell class of 345464 according to ASTM D3350. This is a high density, high molecular weight polyethylene resin that meets the criteria for a Type III, Grade PE34 piping material in accordance with ASTM D3350. DriscoPlex™ 1000 pipe has a Plastic Pipe Institute recommended hydrostatic design basis of 1600 psi at 23°C and 800 psi at 60°C based on TR/3 as derived from a stress regression analysis per ASTM D2837 test methodology.

The dimensional characteristics and pressure capabilities of DriscoPlex™ 1000 are established in accordance with the guidelines set forth in ASTM F714 for sizes 3" IPS and larger and D3035 for sizes smaller than 3" IPS. These standards are referenced in the print line, and repeated every two feet along the entire length of pipe. While we are making effort to convert to product printed "DRISCOFLEX™", you may receive product printed with either DRISCOPIPE or FLEXCO. Please be assured this product is certified as stated above.

Sincerely,

Carolyn Rogers
Quality Assurance Supervisor

864-439-3066

4554

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

Performance Pipe
2950 Nazareth Road
Wellford, S.C. 29385

December 3, 2001

DriscoPlex™ 1000 PRODUCT QUALITY CERTIFICATION

CUSTOMER: ISCO Industries
PO Box 4545
Louisville KY 40204

ATTENTION: Rick Hart

QUANTITY: N/A
EXTRUSION DATE(S): 10/21/01

PRODUCT: 6" DR 11 1000

This letter is being written at your request concerning DriscoPlex™ 1000 series pipe. DriscoPlex™ 1000 series pipe is manufactured from a PE Resin having a cell class of 345464 according to ASTM D3350. This is a high density, high molecular weight polyethylene resin that meets the criteria for a Type III, Grade PE34 piping material in accordance with ASTM D3350. DriscoPlex™ 1000 pipe has a Plastic Pipe Institute recommended hydrostatic design basis of 1600 psi at 23°C and 800 psi at 60°C based on TRD as derived from a stress regression analysis per ASTM D2837 test methodology.

The dimensional characteristics and pressure capabilities of DriscoPlex™ 1000 are established in accordance with the guidelines set forth in ASTM F714 for sizes 3" IPS and larger and D3035 for sizes smaller than 3" IPS. These standards are referenced in the print line, and repeated every two feet along the entire length of pipe. While we are making effort to convert to product printed "DRISCOPLEX™", you may receive product printed with either DRISCOPIPE or PLEXCO. Please be assured this product is certified as stated above.

Sincerely,

Carolyn Rogers 107
Quality Assurance Supervisor

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJE[illegible]0103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02605-011	REV.: 0	DATE: 12/13/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7

RECEIVED BY: [illegible] DATE: 12/18/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
1	642-C.7.22	0							X		MANUFACTURER'S WRITTEN CERTIFICATION OF COMPLIANCE		X		02605-1.04	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	LEE MCDANIEL	60		
GEOSYNTEC	38	FRED WILSON	60		
FRANK FLACK	64	TOM CARR	60		
SAM WOLINSKY	64				
DON GOETZ	64				
MARY ELETON	64				
MIKE GODBER (APPROVER)	64				
KEVIN HARBIN	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

THE SPEC CALLS FOR A 345434C CELL CLASSIFICATION. THE CERTIFICATIONS DESIGNATE THE DELIVERED PIPE HAS A 345464 CLASSIFICATION WHICH IS ACCEPTABLE. THIS CLASSIFICATION IMPROVES ENVIRONMENTAL STRESS CRACK TESTING REQUIREMENTS.

ORIGINAL

RECEIVED BY: [illegible] DATE: 01/03/02

FS-F-4955 (SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)
Rev. 3: 05/14/1999

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

00024

4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

HORIZONTAL MONITORING WELL, LEACHATE COLLECTION SYSTEM, REDUNDANT LEACHATE COLLECTION SYSTEM, AND LEACHATE DETECTION SYSTEM

CELLS 4 AND 5

MANUFACTURER'SWRITTEN CERTIFICATOIN OF COMPLIANCE

2605 1.04
REVISION 0

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2605-011

IT Document No. C.7.22
***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

INFORMATION ONLY

IT Project No. 829686

***

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 12/18/01

December 13, 2001

864-439-3066

-- 4554

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

Performance Pipe
2950 Nanatch Road
Wellford, S.C. 29385

December 3, 2001

DriscoPlex™ 1000 PRODUCT QUALITY CERTIFICATION

CUSTOMER: ISCO Industries
PO Box 4545
Louisville KY 40204

ATTENTION: Rick Hart

QUANTITY: N/A
EXTRUSION DATE(S): 10/21/01

PRODUCT: 6" DR 11 1000

This letter is being written at your request concerning DriscoPlex™ 1000 series pipe. DriscoPlex™ 1000 series pipe is manufactured from a PE Resin having a cell class of 345464 according to ASTM D3350. This is a high density, high molecular weight polyethylene resin that meets the criteria for a Type III, Grade PE34 piping material in accordance with ASTM D3350. DriscoPlex™ 1000 pipe has a Plastic Pipe Institute recommended hydrostatic design basis of 1600 psi at 23°C and 800 psi at 60°C based on TRI as derived from a stress regression analysis per ASTM D2837 test methodology.

The dimensional characteristics and pressure capabilities of DriscoPlex™ 1000 are established in accordance with the guidelines set forth in ASTM F714 for sizes 3" IPS and larger and D3035 for sizes smaller than 3" IPS. These standards are referenced in the print line, and repeated every two feet along the entire length of pipe. While we are making effort to convert to product printed "DRISCOPLEX™", you may receive product printed with either DRISCOPIPE or PLEXCO. Please be assured this product is certified as stated above.

Sincerely,

Carolyn Rogers 107
Quality Assurance Supervisor

-- 4554

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

Performance Pipe
2950 Nazareth Road
Wellford, S.C. 29385

December 13, 2001

DriscoPlex™ 1000 PRODUCT QUALITY CERTIFICATION

CUSTOMER: ECO Industries
PO Box 4545
Louisville KY 40204

ATTENTION: Hank Dubose

QUANTITY: N/A
EXTRUSION DATE(S): 05/01

PRODUCT: 10" DR 11 1000

This letter is being written at your request concerning DriscoPlex™ 1000 series pipe. DriscoPlex™ 1000 series pipe is manufactured from a PE Resin having a cell class of 345464 according to ASTM D3350. This is a high density, high molecular weight polyethylene resin that meets the criteria for a Type III, Grade PE34 piping material in accordance with ASTM D3350. DriscoPlex™ 1000 pipe has a Plastic Pipe Institute recommended hydrostatic design basis of 1600 psi at 23°C and 800 psi at 60°C based on TR/3 as derived from a stress regression analysis per ASTM D2837 test methodology.

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Sincerely,

Carolyn Rogers
Quality Assurance Supervisor

-- 4554

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

PERFORMANCE PIPE
P.O.BOX 1060
BROWNWOOD TEXAS 76804

December 17, 2001

DriscoPlex™ 1000 PRODUCT QUALITY CERTIFICATION

CUSTOMER: ISCO INDUSTRIES
PO BOX 4545
LOUISVILLE KY 40204

ATTENTION: ANN SHOWALTER

PRODUCT: 10"DR11-1000

This letter is being written at your request concerning DriscoPlex™ 1000 series pipe. DriscoPlex™ 1000 series pipe is manufactured from a PE Resin having a cell class of 345464 according to ASTM D3350. This is a high density, high molecular weight polyethylene resin that meets the criteria for a Type III, Grade PE34 piping material in accordance with ASTM D3350. DriscoPlex™ 1000 pipe has a Plastic Pipe Institute recommended hydrostatic design basis of 1600 psi at 23°C and 800 psi at 60°C based on TR/3 as derived from a stress regression analysis per ASTM D2837 test methodology.

The dimensional characteristics and pressure capabilities of DriscoPlex™ 1000 are established in accordance with the guidelines set forth in ASTM F714 for sizes 3" IPS and larger and D3035 for sizes smaller than 3" IPS. These standards are referenced in the print line, and repeated every two feet along the entire length of pipe. While we are making effort to convert to product printed "DRISCOPLEX™", you may receive product printed with either DRISCOPIPE or PLEXCO. Please be assured this product is certified as stated above.

Sincerely,

Donny Johnson
QA Supervisor

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT: 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02605-012	REV.: 1	DATE: 01/07/02	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: Jennifer L. Short DATE: 1/7/02

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
1	642-C.7.23	1							X		DOCUMENT OF TRAINING AND		X		02605-1.04	X		
											CERTIFICATION OF HDPE PIPE							
											JOINING PERSONNEL							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	LEE MCDANIEL	60		
GEOSYNTEC	38	FRED WILSON	60		
FRANK FLACK	64	TOM CARR	60		
SAM WOLINSKY	64				
~~DON GOETZ~~	~~64~~	1/7/02			
MARY ELETON	64				
MIKE GODBER (APPROVER)	64				
KEVIN HARBIN	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

RECEIVED BY: Michael W. Godber DATE: 1/07/02
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

FS-F-4955
Rev. 3: 05/14/1999

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

000251

4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

HORIZONTAL MONITORING WELL, LEACHATE COLLECTION SYSTEM, REDUNDANT LEACHATE COLLECTION SYSTEM, AND LEACHATE DETECTION SYSTEM

CELLS 4 AND 5

DOCUMENTATION OF TRAINING AND CERTIFICATION OF HDPE PIPE JOINING PERSONNEL

2605 1.04
REVISION 1

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2605-012

IT Document No. C.7.23
***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 829686

***

INFORMATION ONLY

January 3, 2002

(X) A - Conforms to the Subcontract Requirements
( ) B - Minor Comment - Incorporate and Resubmit
( ) C - Revise and Resubmit
Sig: Date: 01/07/02

4554

January 2, 2002

Jeff Johnson
Fred DeBra Company
4914 Ridge Avenue
Cincinnati, OH 45209
Fax 513-648-5080

Dear Mr. Johnson

On January 2, 2002 a fusion training class was held at your job site. The Performance Pipe fusion procedure was demonstrated to the attendees listed below. Each of the attendees successfully performed a 6" and 10" SDR 11 fusion while being observed. The McElroy 412 was used.

Please feel free to call if you have any question or if additional training is required.

Attendees:

McElroy 412 Fusion Machine
Barry Brinkman
Mark Huber

Sincerely Yours

Richard J. Hart
Regional Sales Manager

ISCO INDUSTRIES, LLC / P.O. BOX 4545 / 926 BAXTER AVENUE / LOUISVILLE, KY 40204
(800) 345-ISCO / (502) 583-6591 / FAX (502) 584-9713 / WWW.ISCO-PIPE.COM

TEST EQUIPMENT CALIBRATION

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJ: [redacted]20103

CONTRACT NO: FSC-642

SUBMITTAL NO.: 20103-642-02605-014 | REV.: 0 | DATE: 12[redacted]1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061

SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7

RECEIVED BY: [signature] DATE: 12/18/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
1	642-C.7.24	0							X		CERTIFICATE OF CALIBRATION FOR HYDRAULIC PRESSURE GAUGES		X		02605-1.04	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	LEE MCDANIEL	60		
GEOSYNTEC	38	FRED WILSON	60		
FRANK FLACK	64	TOM CARR	60		
SAM WOLINSKY	64				
DON GOETZ	64				
MARY ELETON	64				
MIKE GODBER (APPROVER)	64				
KEVIN HARBIN	64				

NO COMMENTS:

COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

000255

RECEIVED BY: [signature] DATE: 12/18/01

FS-F-4955 (SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)
Rev. 3: 05/14/1999

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4954

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

HORIZONTAL MONITORING WELL, LEACHATE COLLECTION SYSTEM, REDUNDANT LEACHATE COLLECTION SYSTEM, AND LEACHATE DETECTION SYSTEM

CELLS 4 AND 5

CERTIFICATE OF CALIBRATION FOR PRESSURE GAUGES USED FOR HYDRAULIC TESTING

2605 1.04
REVISION 0

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2605-014

IT Document No. C.7.24
***

INFORMATION ONLY

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 829686

***

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 12/18/01

December 13, 2001

4554

The Jay Industrial Technologies Group, Inc.

Certificate of Accuracy

Customer	FRED B. DEBRA
Address	4914 RIDGE ROAD
City, State, Zip	CINCINNATI, OHIO 45209

Certification Number

00-65893

	Standard	Standard	Standard	Instrument Certified
NIST Number	821/257176-96			
Description	DWT			PRESSURE GAUGE
Manufacturer	Ashcroft			TRERICE
Model Number	1305-B			4" DIA. - 1/2" L.
Range	10000 PSI			0 - 600 PSI
Accuracy	.05%			1 % FULL SCALE
Serial Number	50730			N / A
Date Certified	11/6/00			JULY 30, 2001

Notes: EST. = ESTIMATE

Value Applied	Value Indicated Before	Value Indicated After	Deviation Before	Deviation After
PSI	PSIG	PSIG		
0	0	0	No Readable Error	No Readable Error
50	55	50	+ 5	No Readable Error
100	105	105	+ 5	No Readable Error
150	155	150	+ 5	No Readable Error
200	205	200	+ 5	No Readable Error
250	255	250	+ 5	No Readable Error
300	305	300	+ 5	No Readable Error
350	355	350	+ 5	No Readable Error
400	405	400	+ 5	No Readable Error
450	455	450	+ 5	No Readable Error
500	505	500	+ 5	No Readable Error
550	555	550	+ 5	No Readable Error
600	605 EST.	600	+ 5 EST.	No Readable Error

Minor Division	5 PSI
Ambient Temperature	72 ° F.
Barometric Pressure	30.07 IN. HG.
Relative Humidity	51 %

Sales Order Number

J 188786

Customer Purchase Order Number

D 46823

This instrument is certified using standards traceable to N.I.S.T.

We further certify that our calibration system complies with MIL. STD. 45662-A.

Certified By Bob Utz **Date** 7/30/01

Signature

000257

The Jay Industrial Technologies Group, Inc.

Certificate of Accuracy

Customer	FRED B. DEBRA COMPANY
Address	4914 RIDGE ROAD
City, State, Zip	CINCINNATI, OHIO 45209

Certification Number
00-65874

	Standard	Standard	Standard	Instrument Certified
NIST Number	821/257176-96			
Description	DWT			PRESSURE GAUGE
Manufacturer	Ashcroft			ASHCROFT
Model Number	1305-B			45 1279 AS 02 L.
Range	10000 PSI			0 - 400 PSI
Accuracy	.05%			.5 % FULL SCALE
Serial Number	50730			N / A
Date Certified	11/6/00			JULY 13, 2001

Notes:

Value Applied	Value Indicated Before	Value Indicated After	Deviation Before	Deviation After
PSI	PSIG	PSIG		
0	0	0	No Readable Error	No Readable Error
50	50	50	No Readable Error	No Readable Error
100	95	100	- 5	No Readable Error
150	145	150	- 5	No Readable Error
200	195	200	- 5	No Readable Error
250	245	250	- 5	No Readable Error
300	295	300	- 5	No Readable Error
350	345	350	- 5	No Readable Error
400	395	400	- 5	No Readable Error

Minor Division	5 PSI
Ambient Temperature	71 ° F.
Barometric Pressure	30.03 IN. HG.
Relative Humidity	43 %

Sales Order Number
J 187341

Customer Purchase Order Number
D 46653

This instrument is certified using standards traceable to N.I.S.T.
We further certify that our calibration system complies with MIL. STD. 45662-A.

Certified By Bob Utz **Date** 7/13/01

Signature

EROSION MAT

SUPPLIER DO[illegible]T SUBMITTAL

FDF PROJEC. [illegible]0103

CONTRACT NO: FSC-642

SUBMITTAL NO.: 20103-642-02270-002 | REV.: 1 | DATE: 11/13/01 | Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: Jennifer L. Short DATE: 11/14/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	642-C.4.3.1	0						X			SWM&EC PRODUCT DATA		X		02270-1.04	X		
											EROSION MAT							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	LEE MCDANIEL	60		
GEOSYNTEC	38	FRED WILSON	60		
FRANK FLACK	64	TOM CARR	60		
SAM WOLINSKY (APPROVER) SH	64	KEVIN HARBIN	64		
DON GOETZ	64				
MARY ELETON	64				
GREGG JOHNSON	64				

NO COMMENTS: (X) COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

RECEIVED BY: [signature] DATE: 11/14/01

FS-F-4955 (SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)
Rev. 3: 05/14/1999 SH WOLINSKY

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

000260

4554

-- 4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

SURFACE WATER MANAGEMENT & EROSION CONTROL MANUFACTURER'S PRODUCT DATA EROSION MAT

2270 1.04
REVISION 0

IT DOC. No. 642-C.4.3.1

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2270-002

***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

November 13, 2001

000261

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig. SH WOLINSKY Date: 11/14/01

BonTerra® America

4554

MATERIAL SPECIFICATIONS
BonTerra™ High Strength Organic Geotextile Mats

MATERIALS:

100 % high Strength Coir (Coconut) Fiber

Tensile Strength Per Yarn: Dry 55 lb., Wet 49 lb.

Elongation Per Yarn: Dry 29%, Wet 35%

SIZE:

Length: 165 ft.	Width: 78.7"	Coverage: 120 SY
Length: 165 ft.	Width: 118"	Coverage: 180 SY

DESCRIPTION:

BonTerra® CF Mats are 100% cleaned and wheel spun coconut fiber strands, uniformly twisted and woven into a flexible matrix. Coconut fiber is 100% mattress grade, 45% Lignin, with a low elongation factor and high fabric tearing strength. BonTerra® CF Mats biodegrade in approximately five to ten years.

PHYSICAL PROPERTIES:		BonTerra®-CF4	BonTerra®-CF7	BonTerra® CF9
Thickness:	ASTM D1777	.30 in.	.30 in.	.30 in.
Flexibility:	ASTM D1388	19920 (mg-cm) X 16790 (mg-cm)	65030 (mg-cm) X 29590 (mg-cm)	89270 (mg-cm) X 39360 (mg-cm)
Tensile Strength:	ASTM D4595	432 (lb./ft.) X 138 (lb./ft.)	1348 (lb./ft.) X 626 (lb./ft.)	1648 (lb./ft.) X 670 (lb./ft.)
Elongation:	ASTM D4595	26% X 32%	34% X 38%	42% X 32%
Weight	ASTM D3776	11.8 oz./SY 400g/SM	20 oz./SY 700 g/SM	26 oz./SY 900 g/SM
Open Area:	Measured	65%	50%	39%
Water Flow Velocity	Observed	9 ft./sec.	11 ft/sec.	16 ft./sec.

*All values are average values

mesh opening size for CF4 is .5"

Corporate Office: 255 W. Chestnut Street, Geneva, IL 60134 Telephone: (208) 285-0701 Telefax: (208) 285-0201 Email: bonterra@[illegible]
Eastern Regional Office: P.O. Box [illegible], Michigan City, IN 46360 Telephone: (219) 879-3685 Telefax: (219) 879-3693 1-800-882-9489

Dayton Bag and Burlap

Drawer 8
Dayton, Ohio 454001
Bob Couch
800-543-3400
cell 888-490-8373
bcouch@daybag.com

November 12, 2001

IT Corporation
Attn: Dave Locherd
Fax #513-648-4028

Dave:

Please find your spec sheet as you requested

SPECIFICATIONS FOR JUTE MATTING

STRUCTURE:	WOVEN
YARN:	JUTE, UNDYED, UNBLEACHED
FABRIC WIDTH:	48"
WEIGHT:	.92LBS PER SQUARE YARD
YARN COUNT-WARP:	78 PER WIDTH MINIMUM
WEFT:	42 PER LINEAR YARD
ABSORPTION:	>450% OF FABRIC WEIGHT
OPEN AREA:	60-65%
LIFE:	1-2 YEARS
COVERAGE:	50 ROLLS PER ACRE(APPROX, USING 100 SQ YD ROLLS)
PERMISSABLE VELOCITY MINIMUM:	7 FT/SECOND
ROLL SIZE:	48"X225'

Dave, if you need to verify these stats, you can call the rep for India. He is located in Boston. His name is Iswar Agarwalla and his phone number is 781-477-0800. Please let me know if I can be of further assistance.
Regards, Bob Couch

BIOINTRUSION BARRIER
CHOKE STONE

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103

CONTRACT NO: FSC-642

SUBMITTAL NO.: 20103-642-~~2280-002~~ 02280-002 9A

REV.: 3

DATE: 9/04/01

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061

SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7

RECEIVED BY: Jennifer Short DATE: 9/6/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	642-C.7.7	3							X		BIOINTRUSION BARRIER		X		02280-1.04	X		
											CHOKE STONE CERTIFICATION							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7				
GEOSYNTEC	38				
FRANK FLACK	64				
SAM WOLINSKY	64				
MIKE GODBER (Approver)	64				
Lee McDaniel	60				
Fred Wilson	60				
Tom Carr	60				
Kevin Harbin	64				

NO COMMENTS:

COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

000265

RECEIVED BY: Michael W. Godber DATE: 9/5/01

FS-F-4955 (SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)
Rev. 3: 05/14/1999

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

— 4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

BIOINTRUSION BARRIER CHOKE STONE

2271 1.04 B
REVISION 3

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2280-002

***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

ECDC CONTROLLED
COPY NO. C- 011

September 4, 2001

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [signature] Date: 9/05/01

000266

the i group

Project No. 820045

ON SITE DISPOSAL FACILITY PHASE III – CELL ONE FINAL COVER CONSTRUCTION
FLUOR FERNALD SUBCONTRACT 20103-642
****

BIOINTRUSION BARRIER CHOKE STONE
***

Attached is submittal 20103-642-02280-002 documentation. As indicated, the #57 limestone from the Eagle Quarry meets the requirements of specifications 2280 1.04 B. Approximately 3000 cubic yards will be placed.

Hanson

Hanson Aggregates
Midwest, Inc.
209 Old Harrods Creek Road
P.O. Box 436329
Louisville
KY 40253-6329
Tel (502) 244-7550
Fax (502) 244-7555

September 4, 2001

Mr. Dave Lockerd
I T Corporation
P. O. Box 547
Ross, Ohio 45061

Re: Type C Rip Rap and #57 Limestone for the OSDF Project at Fernald

Dear Dave:

The test method for Absorption and Specific Gravity is ASTM C-127-88 (Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate). The resultant data on Absorption and Specific Gravity shown on the H. C. Nutting Report enclosed, is completed using this method and would cover the Type C Rip Rap produced at Plum Run Stone.

ASTM C – 136 is the Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates. The #57 Limestone produced at Eagle Quarry is tested in accordance with this method and we certify that the #57 Limestone at our Eagle Quarry is produced to meet gradation requirements under this method.

If anything further is required, let me know.

Yours truly,

Robert R. Backer

Robert R. Backer
Sales Representative for
Hanson Aggregates Midwest – Davon, Inc.

Plum Run Stone
Order No. 01645.030

-- 4554

GRADATION ANALYSIS

No. 57 Crushed Limestone (Eagle Stone)
Lab No. 942

Sieve Size	Percent Passing	ASTM C-33 Specifications
1 ½"	100.0	100
1"	100.0	95 - 100
½"	25.3	25 - 60
No. 4	0.2	0 - 10
No. 8	0.2	0 - 5

AGGREGATE CHARACTERISTICS

Item	Results	ASTM C-33 Specifications
Loss Angeles Abrasion, % Loss (Grade B)	22.2	50 Max.
Sodium Sulfate Soundness, % Loss	1.83	12 Max.
Unit Weight, PCF	99.6	70 Min.
Coal & Lignite, %	0.0	1.0 Max.
Chert, %	0.0	
Clay Lumps ,%	0.0	10.0 (all other classes of concrete)
Soft Pieces, %	0.0	
Shale & Shaley Mat'l, %	0.0	
Lightweight Particles (Sp. Gr. Of 2.40)	0.0	
Mat'l Finer Than No. 200 Sieve	0.0	
Specific Gravity		
Bulk Dry	2.64	
SSD	2.67	
Apparent	2.74	
Absorption	1.3	

H.C. NUTTING COMPANY

Robert L. House

Robert L. House,
Vice President/Lab. Director

H. C. NUTTING COMPANY

VEGETATION

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02930-002	REV.: 0	DATE: 11/14/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: [signature] DATE: 11/14/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
1	642-C.4.5	0						X			VEGETATION		X		02930-1.04	X		
											MIXES AND APPLICATION RATES							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	LEE MCDANIEL	60		
GEOSYNTEC	38	FRED WILSON	60		
FRANK FLACK	64	TOM CARR	60		
~~SAM WOLINSKY (APPROVER)~~ SH	64	KEVIN HARBIN	64		
DON GOETZ	64				
MARY ELETON	64				
	64				

NO COMMENTS (X) COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

RECEIVED BY: [signature] DATE: 11/14/01

FS-F-4955 (SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)
Rev. 3: 05/14/1999 SH WOLINSKY

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

F-4554

000277

4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

VEGETATION
MIXES AND APPLICATION RATES FOR SEED

2930 1.04
REVISION 0

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2930-002
IT Document No. 642-C.4.5

***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

November 14, 2001

000272

ECDC CONTROLLED
COPY NO. C- 011

10/11/11

SHWOEINSIGN

[X] A - Conforms to the subcontract requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Rejected Resubmit

the i group

Project No. 820045

ON SITE DISPOSAL FACILITY PHASE III – CELL ONE FINAL COVER CONSTRUCTION
FLUOR FERNALD SUBCONTRACT 20103-642
****

VEGETATION

Mixes and Application Rates
***

Attached are the permanent seed mix and application rates. The actual applied rate will be adjusted for seed purity so that the actual application will be equivalent to the requirement.

TABLE 02930-1C

SEED MIX FOR CELL FINAL COVER PERMANENT VEGETATION

GRASSES Species (Scientific Name)	Pounds Per Acre (lb/ac)
Big Bluestem (*Andropogen gerardi*)	0.5
Little Bluestem (*Andropogen scoparius*)	3
Side-Oats Grama (*Bouteloua curtipendula*)	5
Buffalo Grass (*Buchloe dactyloides*)	1
Indian Grass (Sorghastrum nutans)	0.5
Canada Wild-Rye (*Elymus canadensis*)	25
Annual Rye (*Lolium multiflorum*)	10
Prarie Dropseed (*Sporobulus heterolepis*)	1.5
WILDFLOWERS (FORBS) Species (Scientific Name)	**Ounces Per Acre (oz/ac)**
Butterflyweed (*Asclepias tuberosa*)	3.125
Smooth Aster (*Aster laevis*)	0.25
Ox-eye Sunflower (*Heliopsis helianthoides*)	1.75
Bergamot (*Monadara fistulosa*)	0.25
Purple Coneflower (*Echinacea purpurea*)	2.0
Pale Purple Coneflower (*Echinacea pallida*)	2.0
Yellow Coneflower (*Ratibida pinnata*)	0.375
Black-Eyed Susan (*Rudbeckia hirta*)	1.0
Spiderwort (*Tradescantia ohioensis*)	1.25
Hoary Vervain (*Verbena stricta*)	0.50
Beardtongue (*Penstemon grandiflorus*)	1.0
Sweet Joe Pye-Weed (*Eupatorium purpureum*)	0.25
White False Indigo (*Baptisia leucantha*)	4.25
Blue False Indigo (*Baptisia australis*)	4.25
Partridge Pea (*Cassia fasciculata*)	32
Round-headed Bush Clover (*Lespedea Capitata*)	1.0
Stiff Goldenrod (*Solidago risida*)	0.75

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103 - OSDF PH III - CONSTRUCTION LAYDOWN AREA ACCESS ROAD	CONTRACT NO: 599/TASK ORDER NO. 475	SUBMITTAL NO.: 20103-599/475-02930-002	REV.: 0	DATE: 12/14/00	Page ___ of ___

FROM: FLUOR FERNALD CONSTRUCTION
ERNST CONSERVATION SEEDS

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

SIGNATURE: R McGuire

RECEIVED BY: Rita Jarrett DATE: 12/20/00

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
4	599/475-02930-002	0							X		MANUFACTURER'S CERTIFICATES FOR SEED MIXTURE, GUARANTEED PERCENTAGES OF WEED CONTENT, GERMINATION OF SEED, SEED SELLER'S NAME, SEED TEST DATE		X		02930-1.04	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Godber (Approver)	64				
Chuck Van Arsdale	64				
Rick McGuire	64				
OSDF File Station	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: Michael W. Godber DATE: 1/10/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

000275

FS-F-4955
Rev. 3: 05/14/1999

ORIGINAL

599/475-02930-002

CORPORATE OFFICE
P.O. Box 1549 Port Orchard, WA 98366
1 (800) 828-8873

SHIPPING AND RECEIVING OFFICE
1404 - 4th St. Davenport, WA 99122
(509) 725-1235 Fax: (509) 725-7015

PACKING SLIP

— 4554

ORDER 4442

DATE 07/11/2000

599/469-02930-002a
Pg 3 of 3
REV.

CUSTOMER: 3305

BILL TO: Fluor Daniel Fernald
P.O. Box 538704
Cincinnati, OH 45253

SHIP TO: Fluor Fernald
ATTN: Don/CSDF
7400 Willey Rd.
Hamilton, OH 45013

SHIP VIA	SHIP DATE	DELIVERY DATE	ORDERED BY	SALESPERSON
Federal Express	07/12/2000		Louisa Fove	Karen R. Krych

ORDERED	UM	ACTUAL	DESCRIPTION	REMARKS
500	L		Regreen, Hybrid Source Lot: 030-509-90A, Botanical: Triticum aestivum x elytrigia elongata, Germ: 93%, Purity: 99%, Test: 03/20/00, Packed: 50Lb Bag:	

INFORMATION ONLY

[ ] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 07/10/01

000276

COMMENTS

PO # PC46676

4554

CLIENT.
Fluor Fernald, Inc.
Fluor Global Services
Craig Straub
P.O. Box 538704
Cincinnati, OH 45253-8704
PHONE: (513) 648-6298
FAX: (513) 648-5273

DATE PREPARED: October 19, 2000
PREPARED BY: Jennifer L. Baker
Consulting Ecologist
Prairie Nursery, Inc.
P.O. Box 306
Westfield, WI 53964
PHONE: (800) 476-9453
FAX: (608) 296-4205

WET AREAS SEED MIX FOR PERMANENT VEGETATION
Contract #DE-AC24-96OR21972

AREA: 1.5 Acres

WILDFLOWERS *(in house germ tests)*

LATIN NAME	COMMON NAME	AMT	UNIT	% PURITY	% GERMINATION
Angelica atropurpurea	Angelica	3.00	oz	99.00	N/A
Asclepias incarnata	Marsh Milkweed	5.00	oz	99.00	55.00
Aster novae-angliae	New England Aster	3.00	oz	99.00	65.00
Cassia hebecarpa	Wild Senna	4.00	oz	99.00	25.00
Desmodium canadense	Canada Tick Trefoil	3.00	oz	99.00	98.00
Eupatorium maculatum	Joe Pye Weed	3.00	oz	99.00	35.00
Iris versicolor	Blue Flag Iris	4.00	oz	99.00	37.00
Liatris pycnostachya	Prairie Blazingstar	6.00	oz	99.00	42.00
Lobelia siphilitica	Great Blue Lobelia	1.00	oz	99.00	30.00
Mimulus ringens	Monkey Flower	1.00	oz	95.00	65.00
Ratibida pinnata	Yellow Coneflower	1.00	oz	99.00	91.00
Rudbeckia hirta	Black-Eyed Susan	2.00	oz	99.00	100.00
WILDFLOWER TOTAL		2.25	lb		

SEDGES & GRASSES *(Hulsey tests)*

LATIN NAME	COMMON NAME	AMT	UNIT	% PURITY	% GERMINATION
Andropogon gerardi	Big Bluestem	4.50	lb	93.71	92.00
Elymus canadensis	Canada Wild Rye	4.50	lb	93.00	87.00
Panicum virgatum	Switchgrass	0.75	lb	98.74	93.00
Calamagrostis canadensis	Bluejoint Grass	0.75	lb	95.00	75.00
Carex hystricina	Porcupine Sedge	0.09	lb	72.36	45.00
Carex vulpinoidea	Fox Sedge	0.09	lb	95.37	62.00
Scirpus atrovirens	Dark Green Bulrush	0.09	lb	79.20	75.00
Spartina pectinata	Prairie Cordgrass	1.50	lb	70.90	53.00
SEDGE & GRASS TOTAL		12.28	lb		
SEED TOTAL		14.53	lb		

Post-it® brand fax transmittal memo 7671 | # of pages ▸

To: Frank	From: Craig Straub
Co.	Co.
Dept.	Phone # 5278
Fax # 5767	Fax #

000277

ERNST Conservation Seeds
9006 Mercer Pike, Meadville, PA 16335 (814) 336-2404 fax: (814) 336-5191
e-mail: ernst@ernstseed.com (800) 873-3321 web: www.ernstseed.com

4554

Annual Ryegrass
Lolium multiflorum

NET WEIGHT: 50 lb	PURE SEED: 99.08%
LOT NUMBER: 1104-9-400	OTHER CROP: 0.60%
DATE TESTED: June 2000	INERT MATTER: 0.16%
ORIGIN: OR	WEED SEED: 0.16%

GERMINATION: 96.00% HARD SEED: 0.00% DORMANT: 0.00%
NOXIOUS WEED: 18 Poa annua

Seeds for Conservation Use.

ERNST Conservation Seeds
9006 Mercer Pike, Meadville, PA 16335 (814) 336-2404 fax: (814) 336-5191
e-mail: ernst@ernstseed.com (800) 873-3321 web: www.ernstseed.com

Annual Ryegrass
Lolium multiflorum

NET WEIGHT: 50 lb	PURE SEED: 99.08%
LOT NUMBER: 1104-9-400	OTHER CROP: 0.60%
DATE TESTED: June 2000	INERT MATTER: 0.16%
ORIGIN: OR	WEED SEED: 0.16%

GERMINATION: 96.00% HARD SEED: 0.00% DORMANT: 0.00%
NOXIOUS WEED: 18 Poa annua

ERNST Conservation Seeds
9006 Mercer Pike, Meadville, PA 16335 (814) 336-2404 fax: (814) 336-5191
e-mail: ernst@ernstseed.com (800) 873-3321 web: www.ernstseed.co

— 4554

Annual Ryegrass
Lolium multiflorum

NET WEIGHT: 50 lb
LOT NUMBER: 1104-3-40G
DATE TESTED: June 2000
ORIGIN: OR

PURE SEED: 99.08%
OTHER CROP: 0.60%
INERT MATTER: 0.16%
WEED SEED: 0.16%

GERMINATION: 96.00% HARD SEED: 0.00% DORMANT: 0.00%
NOXIOUS WEED: 13 Poa annua

Seeds for Conservation Use.

ERNST Conservation Seeds
9006 Mercer Pike, Meadville, PA 16335 (814) 336-2404 fax: (814) 33
e-mail: ernst@ernstseed.com (800) 873-3321 web: www.ernstsee

Annual Ryegrass
Lolium multiflorum

NET WEIGHT: 50 lb
LOT NUMBER: 1104-3-40G
DATE TESTED: June 2000
ORIGIN: OR

PURE SEED: 99.08%
OTHER CROP: 0.60%
INERT MATTER: 0.16%
WEED SEED: 0.16%

GERMINATION: 96.00% HARD SEED: 0.00% DORMANT: 0.00%
NOXIOUS WEED: 13 Poa annua

ERNST Conservation Seeds
9006 Mercer Pike, Meadville, PA 16335 (814) 336-2404 fax: (814) 336-5191
e-mail: ernst@ernstseed.com (800) 873-3321 web: www.ernstseed.com

— 4554

000280

[illegible] Wade Pea
[illegible] fasciculata

NET WEIGHT:	40 lb	PURE SEED:	99.92%
LOT NUMBER:	CHAFAS01-9	OTHER CROP:	0.00%
DATE TESTED:	July 2000	INERT MATTER:	0.08%
ORIGIN:	PA	WEED SEED:	0.00%

GERMINATION: 61.50% HARD SEED: 21.00% DORMANT: 0.00%

NOXIOUS WEED: None

Seeds for Conservation Use.

ERNST Conservation Seeds
9006 Mercer Pike, Meadville, PA 16335 (814) 336-2404 fax: (814) 336-5191
e-mail: ernst@ernstseed.com (800) 873-3321 web: www.ernstseed.com

— 4554

Canada Wild Rye
Elymus canadensis

NET WEIGHT:	50 lb	PURE SEED:	97.42%
LOT NUMBER:	993021	OTHER CROP:	0.00%
DATE TESTED:	April 2000	INERT MATTER:	2.58%
ORIGIN:	CAN	WEED SEED:	0.00%

GERMINATION: 83.00% HARD SEED: 0.00% DORMANT: 0.00%

Seeds for Conservation Use.

ERNST Conservation Seeds
9006 Mercer Pike, Meadville, PA 16335 (814) 336-2404 fax: (814) 336-5191
e-mail: ernst@ernstseed.com (800) 873-3321 web: www.ernstseed.com

Canada Wild Rye
Elymus canadensis

NET WEIGHT:	50 lb	PURE SEED:	97.42%
LOT NUMBER:	993021	OTHER CROP:	0.00%
DATE TESTED:	April 2000	INERT MATTER:	2.58%
ORIGIN:	CAN	WEED SEED:	0.00%

GERMINATION: 83.00% HARD SEED: 0.00% DORMANT: 0.00%

RIPRAP

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642 -02~~771-005~~ 001	REV.: ~~1~~ 2	DATE: 9/17/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: Dave Kendall for Dave Lockers

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: Jennifer Elliott DATE: 9/17/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	642-C.2.20	02					X				TYPE D RIP RAP		X		02771-1.04	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	Kevin Harbin	64		
GEOSYNTEC	38	Lee McDaniel	60		
DON GOETZ	64	Fred Wilson	60		
GREGG JOHNSON	64	Tom Carr	60		
FRANK FLACK - Approver	64				
SAM WOLINSKY	64				
BILL ZEBICK	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

000283

RECEIVED BY: [signature] DATE: 9/27/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

FS-F-4955
Rev. 3: 05/14/1999

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

TYPE D RIP RAP

2271 1.04
REVISION 2

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2271-001, ~~002~~ 002

***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

September 13, 2001

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [signature] Date: 9/27/01

ECDC CONTROLLED
COPY NO. C011

the i group

Project No. 820045

ON SITE DISPOSAL FACILITY PHASE III – CELL ONE FINAL COVER CONSTRUCTION
FLUOR FERNALD SUBCONTRACT 20103-642
****

TYPE D RIP RAP
***

Attached is submittal 20103-642-02271-001, -002 documentation. The source of the material is:

Eagle Crushed Stone
Overstake Road
Winchester, OH

Or

Highland Stone
Roush Road
Hillsboro, OH

IT will be receiving approximately 1000 cubic yards.

— 4554

Hanson

Hanson Aggregates Midwest, Inc.
209 Old Harrods Creek Road
P.O. Box 436329
Louisville
KY 40253-6329
Tel (502) 244-7550
Fax (502) 244-7555

September 8, 2001

Mr. Dave Lockerd
I T Corporation
P. O. Box 547
Ross, Ohio 45061

Re: Additional Type D Rip Rap for Cell 1, OSDF Project at Fernald

Dear Dave:

LETTER OF CERTIFICATION

This letter is to certify that Eagle Quarry and Highland Quarry will furnish ODOT Type D rock fill (rip rap) meeting the requirements of Type D dumped rock fill specified in Item 601.07 and 703.04(3) of the State of Ohio, Department of Transportation Construction and Material Specifications dated January 1, 1997.

ODOT does not test rip rap for gradation but does a visual approval. If this is needed at this time please advise me when Geosyntec would be coming to our two sites to look at the stone. As you know this is the same Type D that has been delivered to Fluor Fernald that your firm is placing on the cell as the Biointrusion Layer

Yours truly,

Robert R. Backer

Robert R. Backer
Sales Representative for
Hanson Aggregates Midwest
Davon, Inc.

Enclosure

Plum Run Stone
Order No. 01645.030

GRADATION ANALYSIS

No. 57 Crushed Limestone (Eagle Stone)
Lab No. 942

Sieve Size	Percent Passing	ASTM C-33 Specifications
1 ½"	100.0	100
1"	100.0	95 - 100
½"	25.3	25 - 60
No. 4	0.2	0 - 10
No. 8	0.2	0 - 5

AGGREGATE CHARACTERISTICS

Item	Results	ASTM C-33 Specifications
Loss Angeles Abrasion, % Loss (Grade B)	22.2	50 Max.
Sodium Sulfate Soundness, % Loss	1.83	12 Max.
Unit Weight, PCF	99.6	70 Min.
Coal & Lignite, %	0.0	1.0 Max.
Chert, %	0.0	
Clay Lumps ,%	0.0	10.0 (all other classes of concrete)
Soft Pieces, %	0.0	
Shale & Shaley Mat'l, %	0.0	
Lightweight Particles (Sp. Gr. Of 2.40)	0.0	
Mat'l Finer Than No. 200 Sieve	0.0	
Specific Gravity		
Bulk Dry	2.64	
SSD	2.67	
Apparent	2.74	
Absorption	1.3	

H.C. NUTTING COMPANY

Robert L. House

Robert L. House,
Vice President/Lab. Director

3/1/00

Order No. 01645.030 — 4554

GRADATION ANALYSIS

No. 57 Crushed Limestone (Highland Stone)
Lab No. 941

Sieve Size	Percent Passing	ASTM C-33 Specifications
1 ½"	100.0	100 ✓
1"	100.0	95 - 100 ✓
½"	38.3	25 - 60 ✓
No. 4	0.3	0 - 10 ✓
No. 8	0.2	0 - 5 ✓

AGGREGATE CHARACTERISTICS

Item	Results	ASTM C-33 Specifications
Loss Angeles Abrasion, % Loss (Grade B)	28.5	50 Max.
Sodium Sulfate Soundness, % Loss	1.77	12 Max.
Unit Weight, PCF	99.5	70 Min.
Coal & Lignite, %	0.0	1.0 Max.
Clay Lumps, %	0.0	10.0 (all other classes of concrete)
Soft Pieces, %	0.0	
Shale & Shaley Mat'l, %	0.0	
Lightweight Particles (Sp. Gr. 0 [illegible])	0.1	
Material Finer than No. 200 Sieve	0.4	
Specific Gravity	[illegible]	
Bulk Dry	2.90	
SSD	2.95	
Apparent	2.94	
Absorption	[illegible]	

H.S. NUTTING COMPANY

Robert L. Hoons
Vice President/Lab. Director

000288

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02271-004	REV.: 1	DATE: 9/11/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45961
SIGNATURE: Sam Kowalski for Dave Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7

RECEIVED BY: Jennifer L. Scott DATE: 9/12/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	642-C.2.19	0					X				Type C RipRap		X		02771-1.04	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	Kevin Harbin	64		
GEOSYNTEC	38	Lee McDaniel	60		
DON GOETZ	64	Fred Wilson	60		
GREGG JOHNSON	64	Tom Carr	60		
FRANK FLACK - Approver	64				
SAM WOLINSKY	64				
BILL ZEBICK	64				

NO COMMENTS: _____ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

000289

RECEIVED BY: [signature] DATE: 9/17/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

#554

FS-F-4955
Rev. 3: 05/14/1999

4554

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

TYPE C RIP RAP

2271 1.04
REVISION 1

***

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2271-001, -002

***

Submitted By:

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

September 10, 2001

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 9/17/01

ECDC CONTROLLED
COPY NO. C-011

000290

the IT group

Project No. 820045

ON SITE DISPOSAL FACILITY PHASE III – CELL ONE FINAL COVER CONSTRUCTION
FLUOR FERNALD SUBCONTRACT 20103-642
****
TYPE C RIP RAP
***

Attached is submittal 20103-642-02271-001, -002 documentation. The source of the material is:

New Point Stone Co., Inc
992 S County Road 800 E
Greensburg, IN 47240.

IT will be receiving approximately 3200 cubic yards.

NEW POINT STONE CO., INC.
992 S COUNTY ROAD 800 E
GREENSBURG, IN 47240
PHONE (812) 663-2021 FAX (812) 662-6088

September 7, 2001

IT Corporation
ATTN: David Lockerd

RE: Flour Daniel Fernald
Type C Rip Rap Submittals

Dear David,

We submit the following information with regard to above mentioned project:

1. SOURCE- The source of the Rip Rap is New Point Stone Co., Inc.992 S County Road 800 E, Greensburg, IN 47240. This quarry is located in Decatur County in Southeastern Indiana just North of the Interstate 74 Exit no 143. The Rip Rap will be processed from ledges 1-5 as designated by the Indiana Department of transportation. The New Point Quarry is designated as source #2536 by INDOT and is a Certified Aggregate Producer (Q95).
2. METHOD-Gradation of the type C Rip Rap will be achieved by processing the stone through a Jaw Crusher with an open side setting to restrict the largest sizes to under 18 inches. This material will then be screened over a heavy-duty screen to remove fines and approximately 10 inch and smaller material. In this manner the material smaller than 6 inches will consist predominantly of rock spalls
3. RESULTS- Attached are test results for specific gravity and absorption conducted in accordance with ASTM C127
4. CERTIFICATION- Attached is certification that material meets requirements.

I hope that these submittals meet your approval.

Sincerely,

John R. Wanstrath

John R. Wanstrath, Sec./Treas.
New Point Stone Co., Inc.

Attachments:

MATERIAL CERTIFICATION

The type C Limestone Rip Rap from the New Point Quarry, New Point Stone Co., Inc. meets the material requirements as specified by Fluor Daniel Fernald. In Particular those requirements are:

1. Bulk Specific Gravity of at least 2.60
2. Maximum absorption of 0.83 per cent.
3. Gradation of ODOT Type C Rip Rap, per section 601.07

September 7, 2001

Ric Fullenkamp
INDOT Certified Aggregate Technician

September 7, 2001

John R. Wanstrath, Sec-Treas.
New Point Stone Co., Inc.

DMTE - 5
SOURCE
FIELD OFFICE (3) Q6/18

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS AND TESTS
SUMMARY OF PRODUCTION QUALITY RESULTS

JUNE 12, 2001

4554

000294

SOURCE NEW POINT STONE COMPANY 2536 Q952002
992 S CR RD 800 E GREENSBURG, IN 47240

LAB NUMBER	DATE SAMPLED	SIZE NUMBER	REMARKS	BULK SP.G.	LA WEAR PCT	BRINE LOSS PCT	SS LOSS PCT	FT LOSS PCT	QUAL RTNG
01-7-0870-01282	01-05-01	8 STONE	LED 1-3	2.675	24.66			2.31	A1
01-7-0870-01280	01-05-01	8 STONE	LED 1-5	2.651	29.57			6.32	A1
01-7-0870-01287	01-05-01	53 STONE	LED 1-5	2.642	30.97			5.11	D1

THIS IS A CATEGORY II SOURCE, SUBCATEGORY A. SOURCE INACTIVE DATE IS 04-05-02.

FOR LEDGE QUALITY TEST RESULTS SEE SUMMARY LETTER DATED AUGUST 5, 1985.

SOURCE IS APPROVED TO SUPPLY AGGREGATES TO CONTRACTS SPECIFYING TYPE AP FROM LEDGES 1-3; EXCLUSIVELY. RE-TEST DATE IS 09-09-03.

THIS REPORT IS NOT INTENDED
TO BE USED FOR ADVERTISING.

MKP

David H. Andrusk 6/15/01
for CHIEF, DIVISION OF MATERIALS AND TESTS
By _____

RECEIVED
JUN 19 2001

JIM
TOM
DAVE

GLEN
PRODUCER

MATERIAL TEST RESULTS

DATE: September 7, 2001
SOURCE: New Point Quarry Source #2536
LEDGES 1-5

TEST PERFORMED: ASTM C127 Absorption
PROJECT- Fluor Daniel Fernald

	A (DRY)	B (WET)
SUBSAMPLE 1 WEIGHT	4,195.3	4,201.2
SUBSAMPLE 2 WEIGHT	7,492.0	7,507.3
SUBSAMPLE 3 WEIGHT	8,137.5	8,155.6
SUBSAMPLE 4 WEIGHT	10,438.7	10,561.9
SUBSAMPLE 5 WEIGHT	8,205.8	8,214.1
SUBSAMPLE 6 WEIGHT	7,324.2	7,331.1
SUBSAMPLE 7 WEIGHT	10,530.0	10,610.3
TOTAL SAMPLE	56,323.5	56,581.5

ABSORPTION, % = (B-A) / A X 100

$$\text{ABSORPTION } .458\% = \frac{56{,}581.5 - 56{,}323.5}{56{,}323.5} \times 100$$

Ric Fullenkamp
INDOT Certified Aggregate Technician

AGGREGATE BASE

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02230-001, ~~002~~	REV.: 0	DATE: 9/17/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: Sam Kendall for Dave Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: [signature] DATE: 9/17/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	642-C.4.10 ~~642-C.4.42~~	0						X			ROAD CONSTRUCTION		X		02230-1.04	X		
											NO. 304 STONE							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7	Tom Carr	60		
GEOSYNTEC	38	Kevin Harbin	64		
GREGG JOHNSON	64				
FRANK FLACK	64				
SAM WOLINSKY – Approver	64				
Lee McDaniel	60				
Fred Wilson	60				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

RECEIVED BY: [signature] DATE: 9/27/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)
SH WOLINSKY

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

FS-F-4955
Rev. 3: 05/14/1999

SH REGISTERED 9/19/01

262000

454

4554

ON-SITE DISPOSAL FACILITY (OSDF) PHASE III - CELL 1 FINAL COVER CONSTRUCTION

Road Construction
No. 304 STONE

02230 - 1.04
Revision 1

Fluor Fernald, Inc.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-2230-001, ~~002~~

***

Fluor Fernald, Inc.
Fernald, Ohio

***

Submitted By:
IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

***

September 17, 2001

ECDC CONTROLLED
COPY NO. C 011

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit

Sig: Date: 9/27/01

000298

the IT group

Project No. 820045

ON SITE DISPOSAL FACILITY PHASE III – CELL ONE FINAL COVER CONSTRUCTION
FLUOR FERNALD SUBCONTRACT 20103-642
****
No. 304 STONE
***

Attached is submittal 20103-642-02271-001, -002 documentation. The source of the material is:

Welch Sand and Gravel, Inc.
8953 East Miami River Road
Cincinnati, OH 45247

IT will be receiving approximately 950 cubic yards.

- 4554

WELCH

SAND & GRAVEL, INC.
10217 COLUMBIA STREET, HARRISON, OHIO 45030-9751

PHONE (513) 353-3220
FAX (513) 353-3225

September 13, 2001

I.T. Corporation
P.O. Box 547
Ross, OH 45061

Attn: Dave Lockerd

Dear Dave:

Please be advised that Welch Sand & Gravel's submittal given to your company on September 13, 2001, for the Fernald OSFDF Cell #1 Project is a gradation analysis for ODOT 304 aggregate. Welch will be supplying this 304 product from our Ross location to this cell project.

If there are any questions on this ODOT gradation, please call as soon as possible.

Sincerely,

Gene Gillespie
Manager, Aggregate Sales

WELCH SAND & GRAVEL, INC.

AGGREGATE TEST DATA AND RESULTS

4554

PROJECT NO. OSDF CELL #1 FERNALD

COUNTY HAMILTON

Date 09/13/01

Contractor I.T. Corp.

Plant Location Ross

Coarse Agg. Size/Type 304

Source STOCKPILE

Sample No.

Fine Agg. Size/Type

Source

Sample No.

COARSE AGGREGATE SIEVE ANALYSIS

*Sieve Sizes	Grams Retained	Percent Retained	Percent Passing
2 1/2"			
2"	0	0	100
1 1/2"			
1"	444.5	7.28	92.72
3/4"	592.3	9.70	83.02
1/2"			
3/8"			
No. 4	2703.1	44.27	38.75
No. 8			
No. 30	1538.3	25.19	13.56
No. 200	531.3	8.70	4.86
PAN	297.0	4.86	xxxxx
TOTAL	6106.5	100.0	xxxxx

FINE AGGREGATE SIEVE ANALYSIS

*Sieve Sizes	Grams Retained	Percent Retained	Percent Passing
3/8"			
No. 4			
No. 8			
No. 16			
No. 30			
No. 50			
No. 100			
No. 200			
PAN			xxxxx
TOTAL			xxxxx

FINENESS MODULUS (F.M.) =

OTHER TESTS OR REMARKS:

Sample Tested by [signature]

Certification No. 977

*Note: Other sieve sizes may be written in if needed.

EMBEDMENT FILL

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103	CONTRACT NO: FSC-642	SUBMITTAL NO.: 20103-642-02215-001	REV.: 1	DATE: 3/29/01	Page 1 OF 1

FROM: IT CORPORATION
Mail Stop MS39
P.O. BOX 547
ROSS, OH 45061
SIGNATURE: David Lockard

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC)
MS52-7
RECEIVED BY: Lita Sarrel DATE: 3/29/01

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
8	642-C.4.8	1						X			EMBEDMENT FILL MATERIAL		X		02215-1.04.A	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
ECDC	52-7				
GEOSYNTEC	38				
GREGG JOHNSON	64				
BRUCE SCHWEITZER	64				
SAM WOLINSKY Approver	64				

NO COMMENTS: _____ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RESULTS FOR THE #50 SIEVE DIFFER SIGNIFICANTLY FROM THOSE OBTAINED BY GEOSYNTEC ON THE 50-LB REP. SAMPLE.

REVIEWED ~~RECEIVED~~ BY: A.C. Smith for Sam Wolinsky DATE: 04/02/2001
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

4554

0000303

FS-F-4955
Rev. 3: 0 1999

RECEIVED BY: A.C. Smith for Sam Wolinsky 04/02/2001

ORIGINAL

ON-SITE DISPOSAL FACILITY (OSDF) (PHASE III) CELL 1 FINAL COVER CONSTRUCTION PROJECT

***

CELL 1 FINAL COVER CONSTRUCTION

Supplier Submittal

Embedment Fill Material
Sections 02215-1.04.A

REVISION 1

***

INFORMATION ONLY

FLUOR FERNALD, INC.
Fernald, Ohio

FF Subcontract No. FSC-642
Submittal No. 20103-642-02215-001, -002

***

Submitted By:

IT
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 820045

March 29, 2001

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: A. C. Sidle Date: 04/02/2001
for
Sam Wolinsky

- 4554

WELCH

SAND & GRAVEL, INC.
10217 COLUMBIA STREET, HARRISON, OHIO 45030-9751

PHONE (513) 353-3220
FAX (513) 353-3225

March 29, 2001

I.T. Corporation
P.O. Box 547
Ross, OH 45061

Attn: Mr. Dave Lockerd

Dear Dave:

Please be advised that Welch Sand & Gravel's submittal given to your company on February 8, 2001, for the Fernald OSDF Cell #1 Project was a gradation analysis for 703.06 aggregate. This sand has also been tested in accordance with ASTMC136 procedures. Please find the results enclosed.

Welch will be supplying the sand cover from our Ross location to this cell project.

Sincerely,

Gene Gillespie
Manager, Aggregate Sales

Encl.

WELCH SAND & GRAVEL, INC.

AGGREGATE TEST DATA AND RESULTS

4554

PROJECT NO. Fernald (culvert)

COUNTY Hamilton Date 02/28/01

Contractor IT Corp Plant Location Ross

Coarse Agg. Size/Type _____ Source _____ Sample No. _____

Fine Agg. Size/Type 703.06 Source Stockpile Sample No. _____

COARSE AGGREGATE SIEVE ANALYSIS

*Sieve Sizes	Grams Retained	Percent Retained	Percent Passing
2 1/2"			
2"			
1 1/2"			
1"			
3/4"			
1/2"			
3/8"			
No. 4			
No. 8			
No. 16			
No. 100			
PAN			xxxxx
TOTAL			xxxxx

FINE AGGREGATE SIEVE ANALYSIS

*Sieve Sizes	Grams Retained	Percent Retained	Percent Passing
3/8"			
No. 4	158	5.8	94.2
No. 8			
No. 16			
No. 30			
No. 50	1681	61.9	32.3
No. 100			
No. 200	842	31.0	1.3
PAN	31	1.3	xxxxx
TOTAL	2712	100.0	xxxxx

FINENESS MODULUS (F.M.) =

OTHER TESTS OR REMARKS:

Sample Tested by: Dave Gillespie

Certification No. 977

*Note: Other sieve sizes may be written in if needed.

INTERNATIONAL TECHNOLOGY CORPORATION

4554

IT CORPORATION
Fernald WPRAP Field Office
P. O. Box 547
Ross, Ohio 45061
Phone: (513) 648-4974 FAX: (513) 648-4886

TO: Geosyntec

LETTER OF TRANSMITTAL

DATE: 3/8/01	No:
ATTENTION:	
SUBJECT:	
IT CORPORATION JOB #: 773481	
FDF SUBCONTRACT #: 98SC000001	

WE ARE SENDING YOU:

Attached — Under separate cover via _____ the following items:

Flow Sheets — P & ID

Shop Drawings — Prints — Plans — Diskette — Specifications

Copy of Letter

COPIES	DATE	NUMBER	DESCRIPTION
		1 bag	Welsh Co sand 703.06 aggregate
		1 bag	Highland #57 Stone

THESE ARE TRANSMITTED as checked below:

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Signed: Collin P. Gibson

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

ARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM C 136) 4554

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)
LOCATION: FERNALD, OHIO
DESCRIPTION: PHASE III
MATERIAL TYPE: Embedment Sand

PROJECT NO: GO1029 TASK NO.: 04.1
DATE: 28 day March month 2001 year
SAMPLE NO.: Sand Submittal

SOIL SAMPLE SIZE

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	55

	BEFORE WASH	AFTER WASH
TARE NO.	Mixing Bowl	Mixing Bowl
WT. OF DRY SAMPLE PLUS TARE (grams)	2555.50	2545.28
WT. OF TARE (grams)	292.30	292.30
WT. OF DRY SAMPLE (grams)	2263.20	2252.98

SIEVE ANALYSIS

CALC: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER	PROJECT SPECIFICATIONS
2"	50.0	Ø			100
1½"	37.50	Ø			
1"	25.00	Ø			
3/4"	19.00	Ø			
1/2"	12.50	Ø			
3/8"	9.50	Ø			
#4	4.75	Ø	0	100	90 To 100
#8	2.36	170.20	7.5	92.5	
#16	1.18	743.80	32.9	67.1	
#30	0.60	1484.10	65.6	34.4	
#50	0.30	2099.70	92.8	7.2	7 To 40
#100	0.15	2240.55	99.0	1.0	
#200	0.75	2251.67	99.5	~~0.5~~ 0.5	0 To 10
PAN		2252.25			

% FINER 100 - Σ % RETAINED

GEOSYNTEC CONSULTANTS FILE No. 2-14-PMS CHECKED BY: [illegible] SHEET No. 1 of 2

000308

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO.: 20103

CONTRACT NO: 599/469

SUBMITTAL NO.: 20103-599/469 02215-001

REV.: 1

DATE: 08/29/00

Page 1 of 1

FROM: WELCH GRAVEL, INC PO. BOX 277 ROSS, OH 45061

SIGNATURE:

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Denise Wentz DATE: 8/30/00

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
5	599/469-02215-001	1							X		EMBEDMENT FILL MAT'L 'TEST RESULTS'		X		02215	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Godber	64				
Sam Wolinsky	64				
Don Goetz	64				
Kwasi Badu-Tucquoah	38				
DSDF File Station	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: Michael M Godber DATE: 10/3/00

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to the Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

000309

ORIGINAL

4554

INSTRUCTIONS FOR COMPLETING THE SUPPLIER DOCUMENT SUBMITTAL:

FS-F-4955
Supplier Submittal Instructions

Watson Gravel Inc.
Lab Testing for 2000
Order No. 08947.016

— 4554

GRADATION ANALYSIS

Source: Ross (Sand)
Lab No. 104

Sieve Size	Percent Passing	ODOT 703.02 Specifications
3/8"	100.0	100
No. 4	100.0	95 - 100
No. 8	94.2	70 - 100
No. 16	74.0	38 - 80
No. 30	40.7	18 - 60
No. 50	8.4	5 - 30
No. 100	1.0	1 - 10
No. 200	0.6	0 - 5

AGGREGATE CHARACTERISTICS

Item	Results	ODOT 703 Specifications
Sodium Sulfate Soundness, % Loss	2.41	12 Max.
Organic Impurities	Plate <1	Plate III
Silt, % (Finer than #200 Sieve)	0.6	
Specific Gravity		
Bulk Dry	2.60	
SSD	2.65	
Apparent	2.72	
Absorption	1.6	

INFORMATION ONLY

H.C. NUTTING COMPANY

Robert L. House,
Vice President/Lab. Director

[N] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: Date: 10/3/00

000310

APPENDIX F

FIELD MOISTURE/DENSITY TEST RESULTS

CONTOURING LAYER

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG (ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III Cap DATE: 6 day April month 2001 year

SPECIFICATION REQUIREMENTS

SOURCE: OSD-004 Stockpile MATERIAL TYPE: (CIRCLE ONE) (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: Contouring Layer LIFT THICKNESS (LOOSE/COMPACTED): ____

% COMPACTION: 95% MOISTURE RANGE: ±3% ASTM D 698: (CIRCLE ONE) (A) B C / ASTM D 1557: A B C ____

NUCLEAR GAUGE TYPE: 3440 NUCLEAR GAUGE SERIAL NO. 20979 COR. FACTOR: N/A QA ID: [illegible]

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
A-1	See Map location	4"/1	CF01-02	18.0	107.2	~~122~~ 20.1	122.8	102.2	95.4	✓				

COMMENTS:

4554

000313

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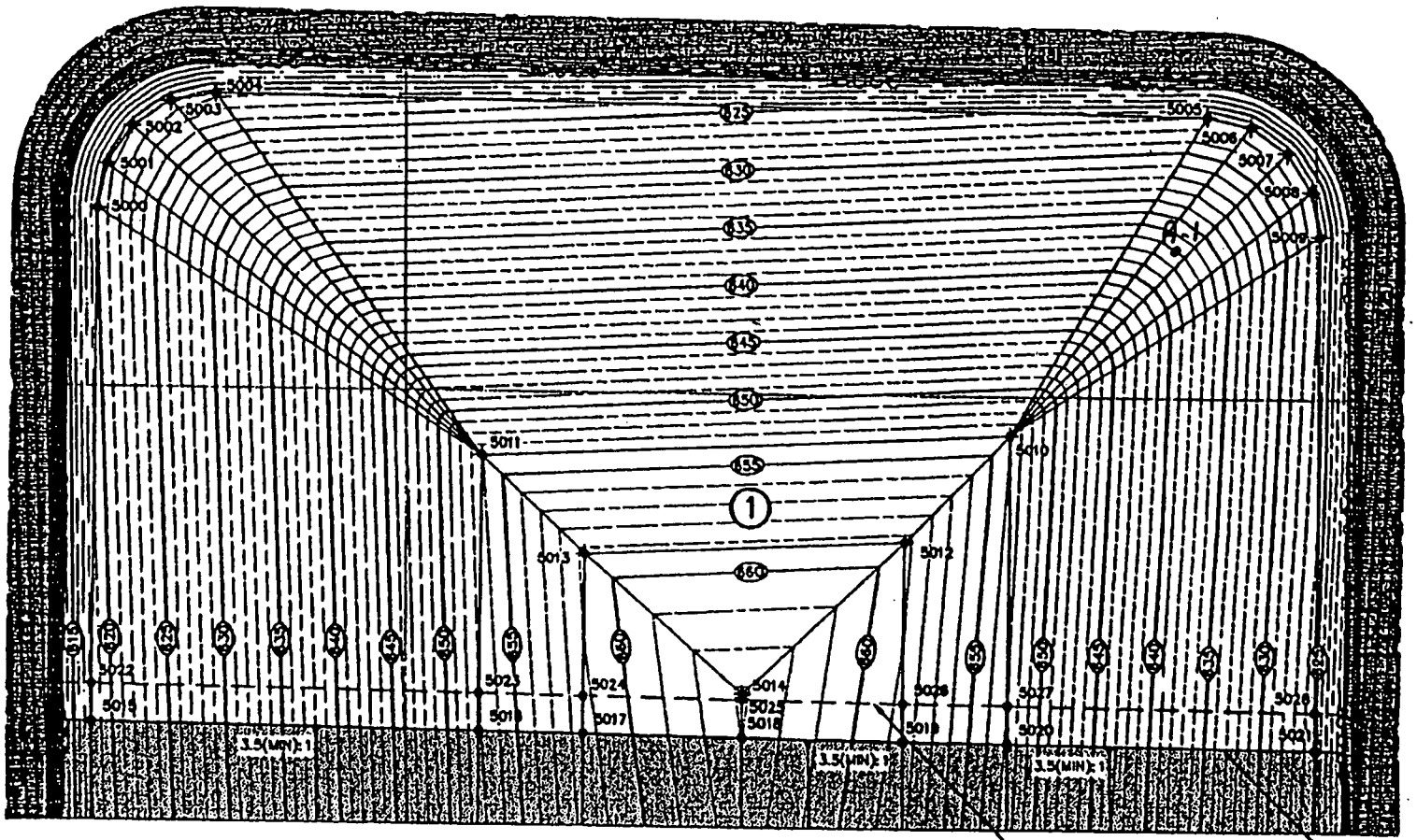
CELL #1 - FINAL COVER

GQ1341 TASK 04.1



000314

4554

DATE: 6 DAY April MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG (ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: OSDF - Phase III DATE: 9 day April month 01 year

SPECIFICATION REQUIREMENTS

SOURCE: Stockpile OSD-004 MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: _____ LIFT THICKNESS (LOOSE/COMPACTED): 16
(CIRCLE ONE)

% COMPACTION: 95. MOISTURE RANGE: 18.0 ±3 ASTM D 698: A (B) C / ASTM D 1557: A B C _____
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 NUCLEAR GAUGE SERIAL NO. 20979 COR. FACTOR: N/A QA ID: TD

	TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
1	A2	~~B1~~ KS See Sketch	6"/2	LCS 2/CF01-02	18.0	107.2	21.2	124.3	102.6	95.7	✓	✓	A3		✓
2	A3	~~B2~~ KS See Sketch	6"/2	LCS 2/CF01-02	18.0	107.2	19.6	119.4	99.9	93.2	✓	—	A5	✓	✓
3	A4	~~A2~~ KS See Sketch	4"/1	LCS 2/CF01-02	18.0	107.2	18.3	122.2	103.2	96.3	✓				
4	A5	~~B3~~ KS See Sketch	6"/2	LCS 2/CF01-02	18.0	107.2	19.6	124.0	103.7	96.7	✓		~~A1/B2~~ A1/A2 KS	✓	

COMMENTS:

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000345

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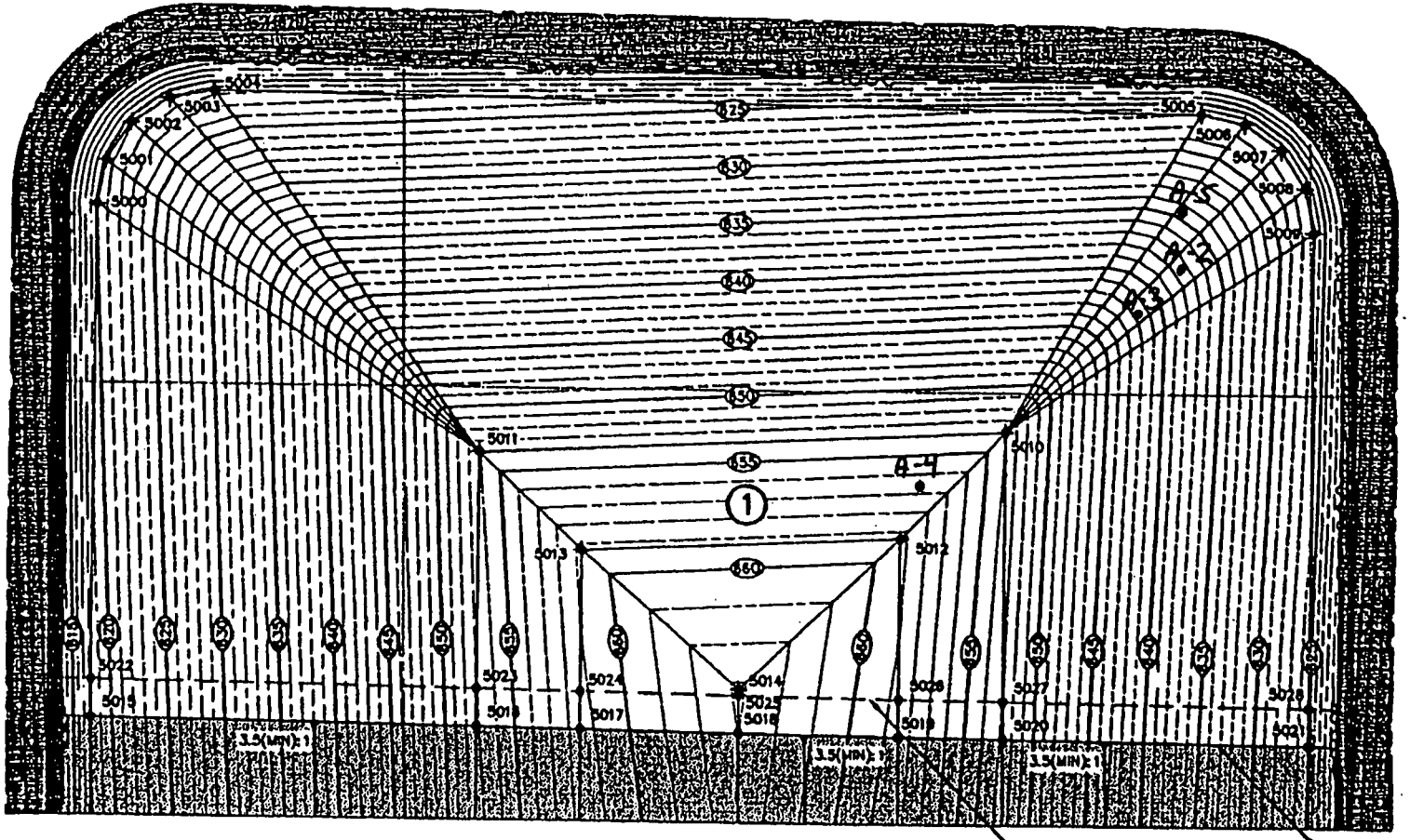
GQ1341 TASK 04.1



- 4554

000316

DATE: 9 DAY April MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG (ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 13 day April month 2001 year

SPECIFICATION REQUIREMENTS

SOURCE: On-Site MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: _____ LIFT THICKNESS (LOOSE / COMPACTED): 8"

(CIRCLE ONE)

% COMPACTION: 95 MOISTURE RANGE: ± 3% ASTM D 698: A (B) C / ASTM D 1557: A B C

(CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 NUCLEAR GAUGE SERIAL NO. 20979 COR. FACTOR: N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
A-6	See Sketch	4"/1	CF01-02	18.0	107.2	15.7	121.1	104.6	97.6	✓				
A-7	See Sketch	4"/1	CF01-04	12.1	121.5	15.6	131.8	114.1	93.9		✓	A-37	✓	
A-8	See Sketch	4"/1	CF01-04	12.1	121.5	15.4	133.6	115.7	95.2	✓	✓	A-32	✓	
A-9	See Sketch	4"/1	CF01-04	12.1	121.5	15.3	131.7	114.2	94.0		✓	A-36	✓	
A-10	See Sketch	4"/1	CF01-04	12.1	121.5	17.0	131.1	112.0	92.2		✓	A15	✓	

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COMMENTS:

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000317

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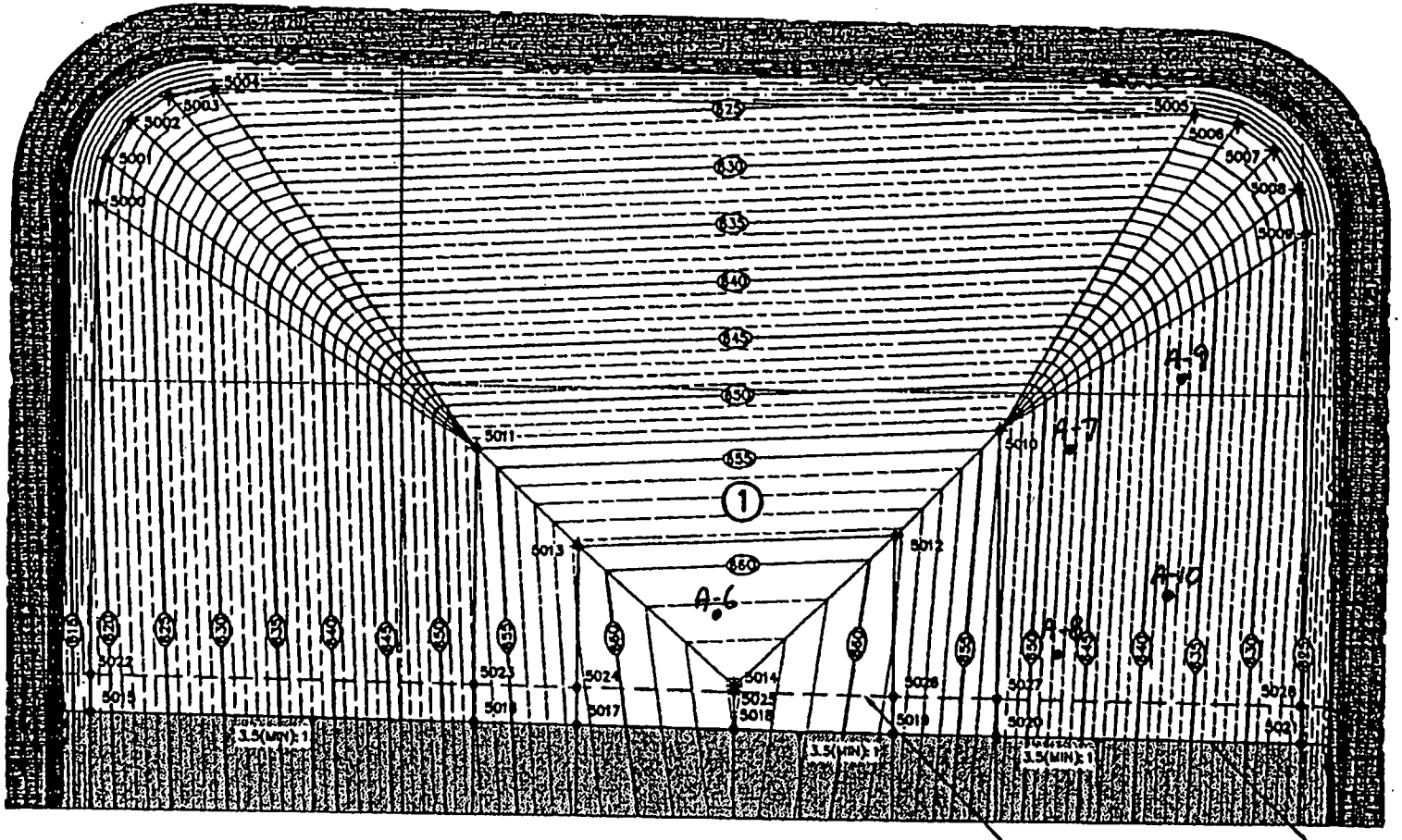
GQ1341 TASK 04.1



DATE: 13 DAY April MONTH 2001 YEAR

000218

-- 4554

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG (ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 16 day April month 2001 year

SPECIFICATION REQUIREMENTS

SOURCE: On-Site MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: _____ (CIRCLE ONE) LIFT THICKNESS (LOOSE/COMPACTED): 8"

% COMPACTION: 95 MOISTURE RANGE: ±3% ASTM D 698: A (B) C / ASTM D 1557: A B C (CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 NUCLEAR GAUGE SERIAL NO. 20979 COR. FACTOR: N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
A-11	See Sketch	4"/1	CF01-04	12.1	121.5	15.7	121.3	104.8	86.3		✓	A-12		✓
A-12	See Sketch	4"/1	CF01-04	12.1	121.5	16.1	131.8	113.5	93.4	~~✓~~ 12	✓	A-33	✓	
A-13	See Sketch	4"/1	CF01-04	12.1	121.5	16.9	132.1	113.0	93.0	~~✓~~ 16	✓	A-35	✓	
A-14	See Sketch	4"/1	CF01-04	12.1	121.5	15.5	131.2	113.6	93.5	~~✓~~ 15	✓	A-34	✓	

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0000319

COMMENTS:

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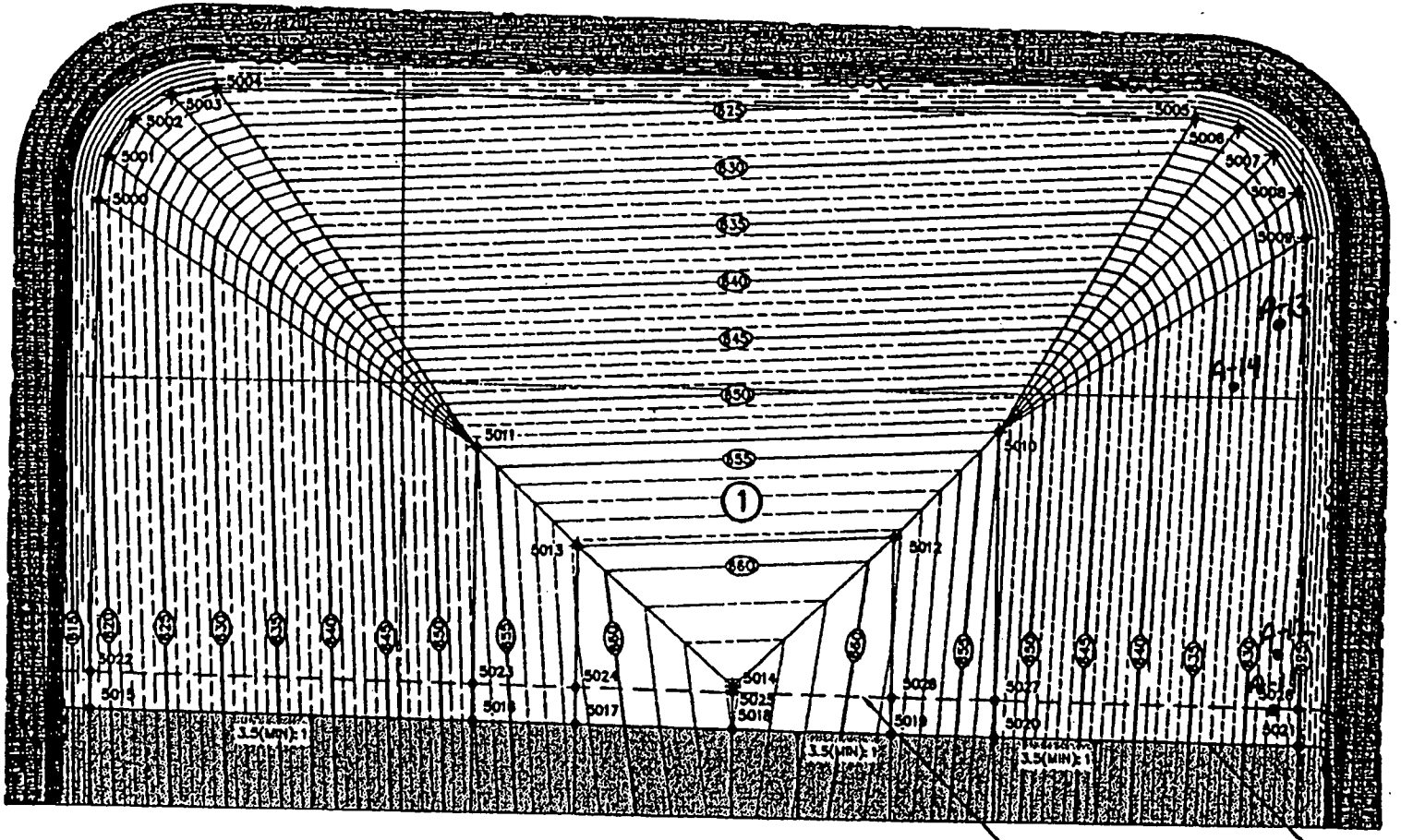
CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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000320

DATE: 16 DAY April MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG (ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 17 day April month 2001 year

SPECIFICATION REQUIREMENTS

SOURCE: on-site MATERIAL TYPE: (CIRCLE ONE) (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: _____ LIFT THICKNESS (LOOSE / COMPACTED): 8"

% COMPACTION: 95 MOISTURE RANGE: ± 3% ASTM D 698: A (B) C / ASTM D 1557: A B C (CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 NUCLEAR GAUGE SERIAL NO. 20979 COR. FACTOR: N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST PASS	RETEST FAIL
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL			
A-15	See Sketch	4"/1	CF01-04	12.1	121.5	13.1	135.1	119.4	98.3	✓		RA-10		
A-16	See Sketch	4"/1	CF01-04	12.1	121.5	11.6	137.1	122.8	101.1	✓				

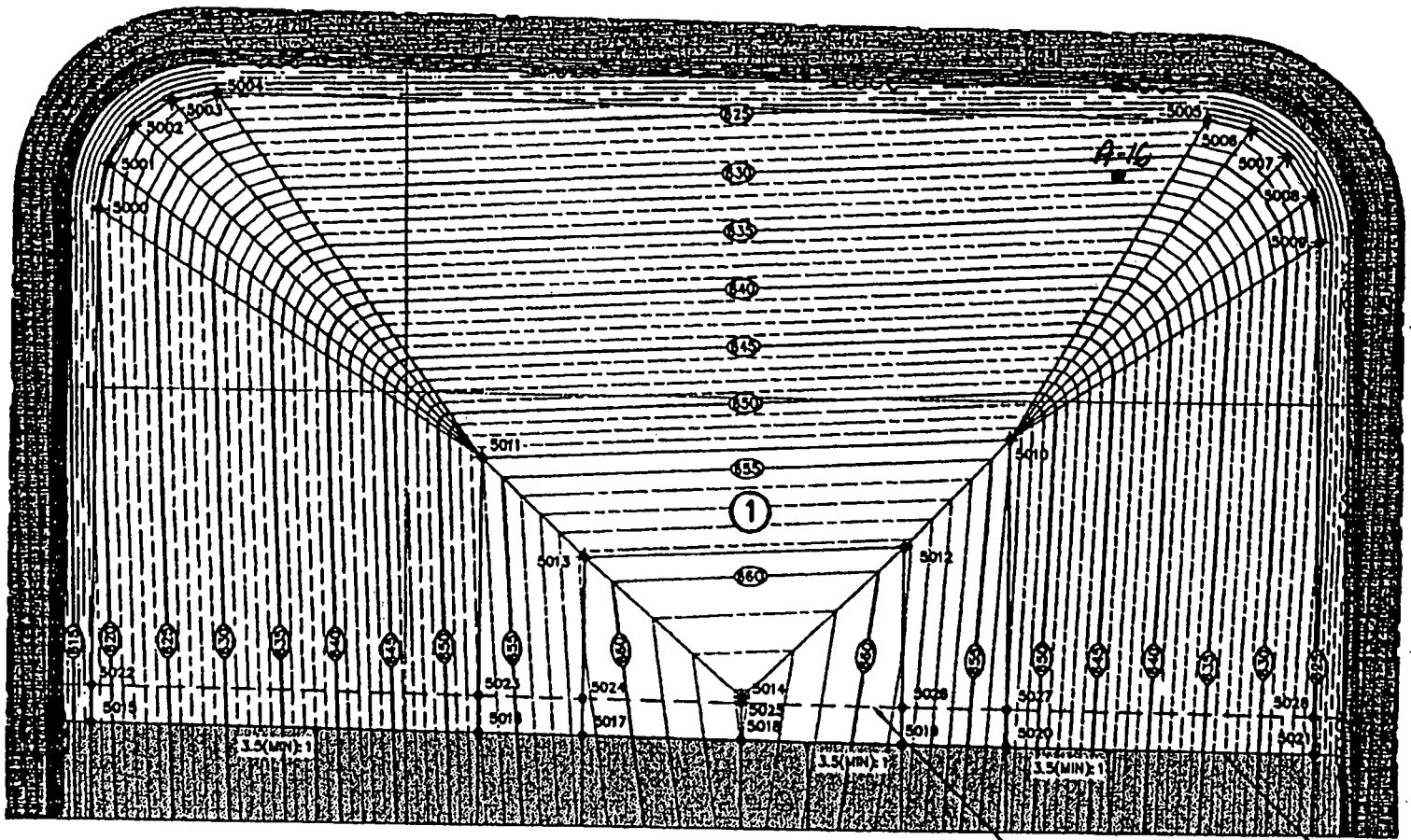
4554

COMMENTS:

000321

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



CONSTRUCTION QUALITY ASSURANCE LIMIT FOR COMPACTED CLAY CAP

EXTENT OF FINAL COVER SYSTEM TEMPORARY TERMINATION

4554

000322

DATE: 17 DAY April MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG (ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 18 day April month 2001 year

SPECIFICATION REQUIREMENTS

SOURCE: On-site MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: _____ (CIRCLE ONE) LIFT THICKNESS (LOOSE/COMPACTED): 8"

% COMPACTION: 95 MOISTURE RANGE: ± 3% ASTM D 698: A (B) C / ASTM D 1557: A B C (CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 NUCLEAR GAUGE SERIAL NO. 20979 COR. FACTOR: N/A QA ID: KS

	TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
				SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
*	A-17	See Sketch	4"/1	CF01-04	12.1	121.5	13.2	136.1	120.3	99.0	✓				
	A-18	See Sketch	4"/1	CF01-04	12.1	121.5	14.2	135.5	118.7	97.7	✓				
	A-19	See Sketch	4"/1	CF01-04	12.1	121.5	14.1	133.1	116.7	96.0	✓				
	A-20	See Sketch	4"/1	CF01-04	12.1	121.5	13.4	133.8	118.0	97.1	✓				
	A-21	See Sketch	4"/1	CF01-04	12.1	121.5	13.6	133.1	117.2	96.5	✓				
	A-22	See Sketch	4"/1	CF01-04	12.1	121.5	12.8	134.0	118.8	97.8	✓				
	A-23	See Sketch	4"/1	CF01-04	12.1	121.5	11.8	134.4	120.2	98.9	✓				
	A-24	See Sketch	4"/1	CF01-04	12.1	121.5	13.1	134.1	118.6	97.6	✓				
	A-25	See Sketch	4"/1	CF01-04	12.1	121.5	12.6	134.9	119.8	98.6	✓				
	A-26	See Sketch	4"/1	CF01-04	12.1	121.5	14.5	134.0	117.1	96.4	✓				

4554

COMMENTS: Drive ring sample taken

000323

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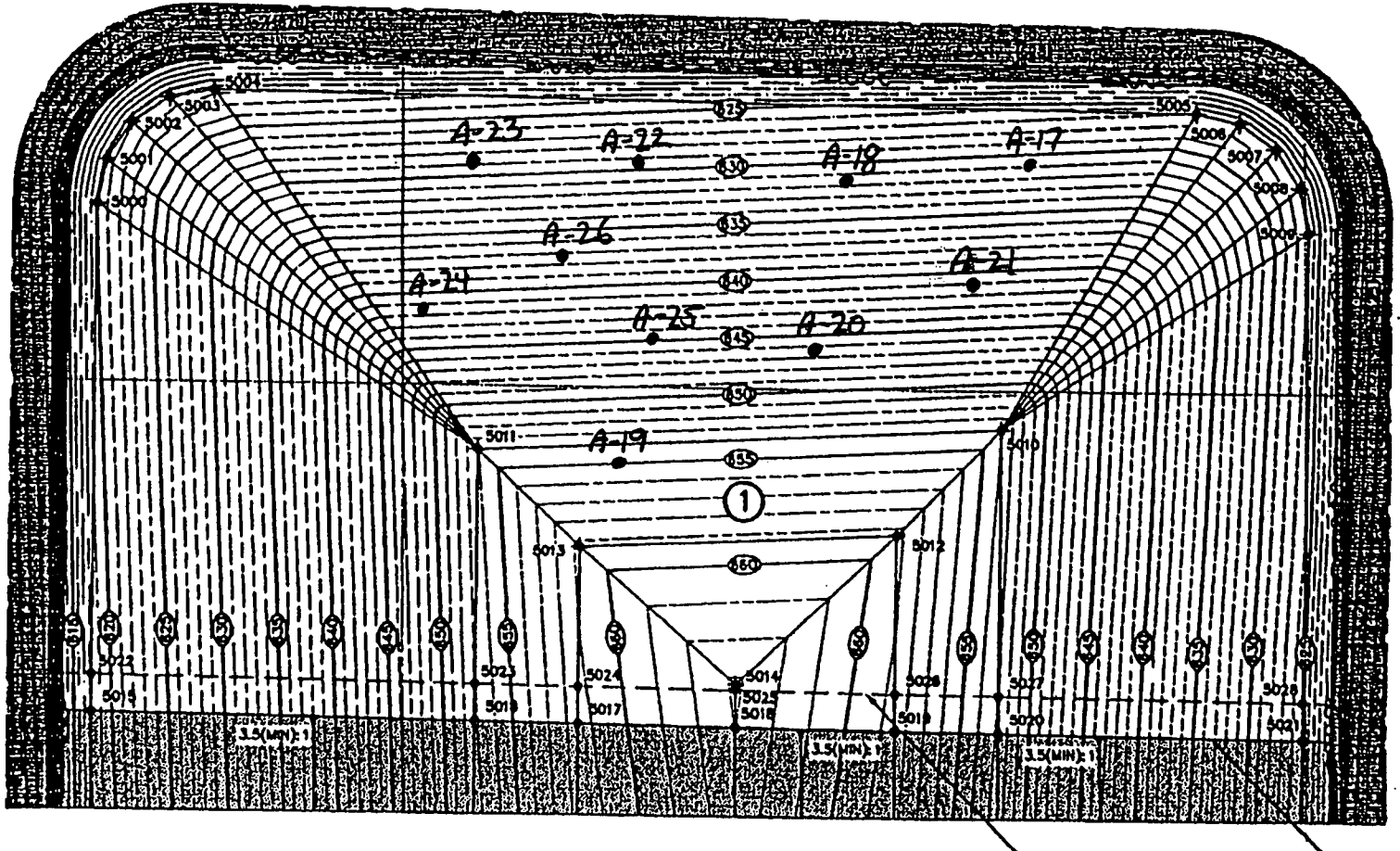
CELL #1 - FINAL COVER

GQ1341 TASK 04.1



CONSTRUCTION QUALITY ASSURANCE LIMIT FOR COMPACTED CLAY CAP

EXTENT OF FINAL COVER SYSTEM TEMPORARY TERMINATION

4554

000324

DATE: 18 DAY April MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III Cap Cell 1

DATE: 23 day April month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D (698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ± 3% LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: SP-1 Stockpile MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: Contouring layer
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: 3430 GAUGE SERIAL NO. 27418 CORRECTION FACTOR Y = N/A QA ID: CL

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
A27	See Location Map	4"/1	G60-3	10.0	128.4	14.1	131.8	115.4	89.9		✓	A-44 ~~A-38~~	✓	
A28	" " "	4"/1	"	10.0	128.4	12.0	133.4	119.1	92.9		✓	A-45	✓	
A29	" " "	4"/1	"	10.0	128.4	13.2	@ ~~119.1~~ 136.9	120.9	94.2		✓	A-49	✓	
A30	" " "	4"/1	"	10.0	128.4	12.3	133.2	118.6	92.4		✓	A-47	✓	
A31	" " "	4"/1	"	10.0	128.4	12.8	134.0	118.8	92.5		✓	A-46	✓	

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

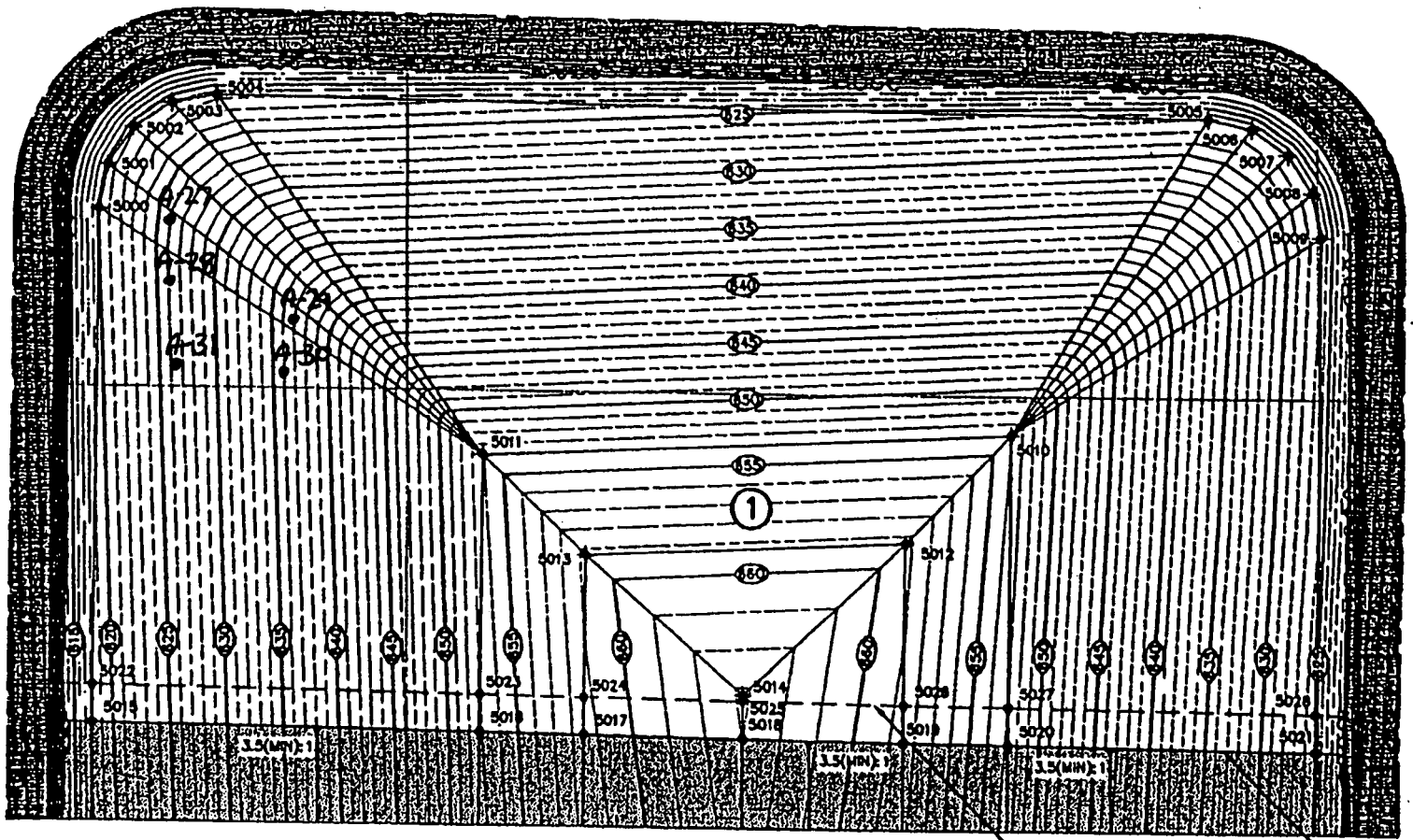
©GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: TBL SHEET NO. 1 OF 2

000325

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



4554

000326

DATE: 23 DAY April MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 602341 TASK NO.: 04.1

DESCRIPTION: Phase III Cap Cell 1

DATE: 24 day April month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D (698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±3% LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: Borrow Area Stockpiles MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: Contouring layer
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: 3430 GAUGE SERIAL NO. 27418 CORRECTION FACTOR Y = N/A QA ID: CS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
A-32	See Location Map	4 / 1	~~CF01-04 GE03~~	12.1	121.5	12.4	132.2	117.6	96.8	✓				
A-33	" " "	4 / 1	~~CF01-04 GE03~~	12.1	121.5	11.3	134.0	120.4	99.1	✓				
A-34	" " "	4 / 1	~~CF01-04 GE03~~	12.1	121.5	12.7	130.6	115.8	95.3	✓				
A-35	" " "	4 / 1	~~CF01-04 GE03~~	12.1	121.5	12.0	132.1	117.9	97.1	✓				
A-36	" " "	4 / 1	~~CF01-04 GE03~~	12.1	121.5	11.4	134.6	120.8	99.4	✓				
A-37	" " "	4 / 1	~~CF01-04 GE03~~	12.1	121.5	11.5	136.9	122.8	101.1	✓				
		/												
		/												
		/												
		/												

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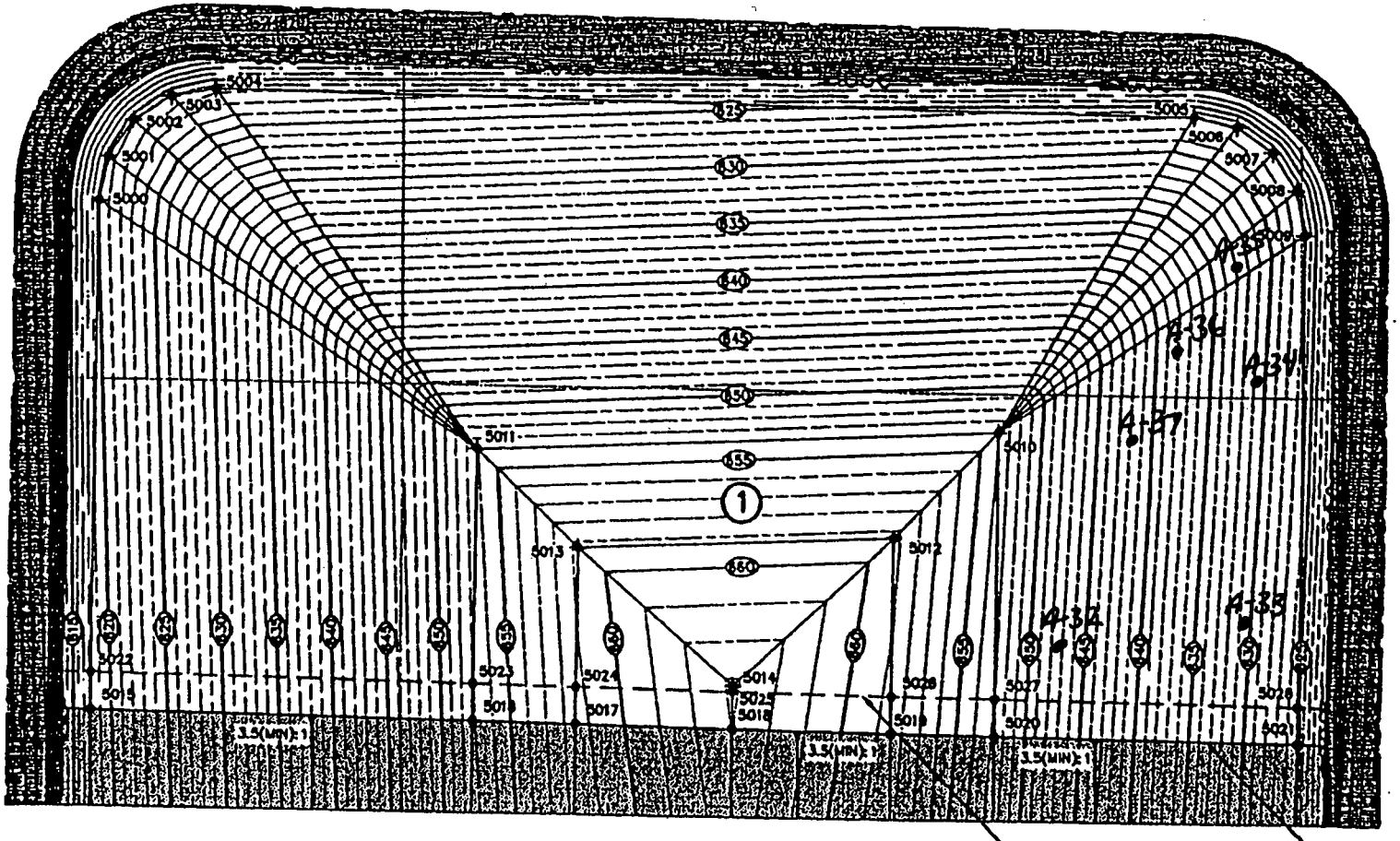
00032

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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000328

DATE: 24 DAY April MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GA 1341 TASK NO.: 04.1

DESCRIPTION: Phase III Cell 1 Cap

DATE: 25 day April month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D (698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±3% LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: SP1 STOCKPILE MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: Contouring layer
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: 3430 GAUGE SERIAL NO. 27418 CORRECTION FACTOR Y = N/A QA ID: CF

TEST NO.	TEST LOCATION (SEE ATTACHED MAP)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
A-38	NW CORNER SLOPE	4 / 1	GEO 3	10.0	128.4	8.5	133.1	122.7	95.6 ~~95.9~~ (TBV)	✓				
A-39	" "	4 / 1	GEO 1	~~11.1~~ 7.6	136.1	6.4	141.2	132.7	97.5	✓				
A-40	" "	4 / 1	GEO 1	7.6	136.1	7.8	141.3	131.1 ~~133.4~~ (TBV)	96.3 ~~98.0~~ (TBV)	✓				
A-41	" "	4 / 1	GEO 1	7.6	136.1	6.5	139.4	131.0	96.3	✓				
A-42	" "	4 / 1	GEO 1	7.6	136.1	5.9	143.4	135.4	99.5	✓				
A-43	" "	4 / 1	GEO-3	10.0	128.4	9.4	135.2	123.6 ~~125.8~~ (TBV)	96.3 ~~97.1~~ (TBV)	✓				
A-44	" "	4 / 1	GEO 2	11.1	125.1	10.5	137.5	121.7	97.3 ~~94.8~~	✓				
A-45	" "	4 / 1	GEO-2	11.1	125.1	11.9	133.9	119.7	95.7	✓				
A-46	" "	4 / 1	GEO-2	11.1	125.1	10.6	133.1	120.3	96.2	✓				
A-47	" "	4 / 1	GEO-2	11.1	125.1	10.3	133.0	120.6	96.4	✓				

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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000329

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ 134 TASK NO.: 04.1

DESCRIPTION: Phase III Cell 1 Cap

DATE: 25 day April month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 ___ % COMPACTION / MOISTURE RANGE: ±3 LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: SP-01 Stockpile MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER: Contouring layer

NUCLEAR GAUGE TYPE: 3430 GAUGE SERIAL NO. 27418 CORRECTION FACTOR Y = N/A QA ID: CI

TEST NO.	TEST LOCATION (SEE ATTACHED MAP)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
A-48	NW CORNER SLOPE	4/1	Geo 1	~~6.0~~ 7.6	136.1	8.7	141.1	129.7	95.3	✓				
A-49	" "	4/1	Geo 1	7.6	136.1	8.2	140.8	130.2	95.7	✓				

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

©GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: TAM SHEET NO. 2 OF 3

000330

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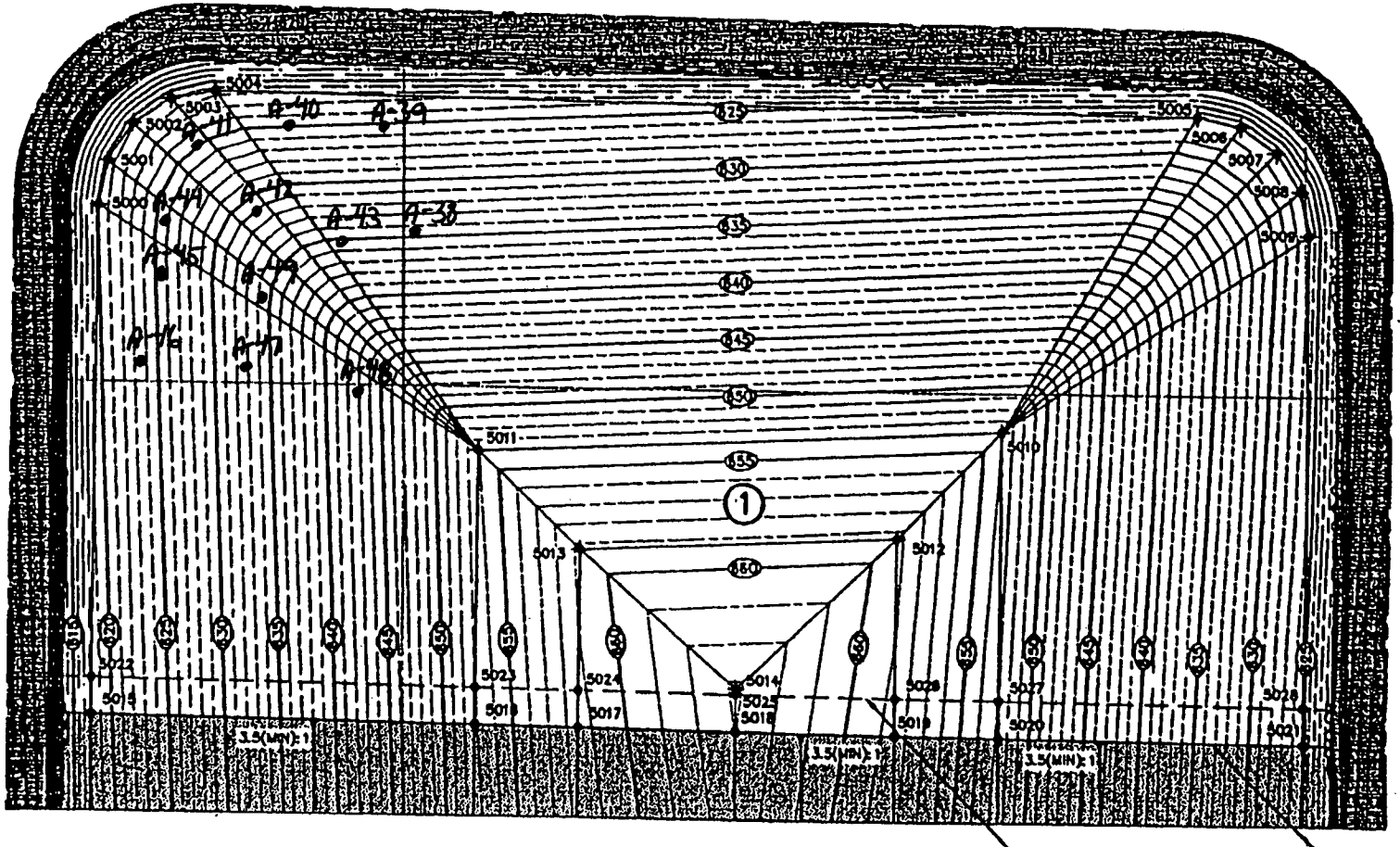
CELL #1 - FINAL COVER

GQ1341 TASK 04.1



CONSTRUCTION QUALITY ASSURANCE LIMIT FOR COMPACTED CLAY CAP

EXTENT OF FINAL COVER SYSTEM TEMPORARY TERMINATION

4554

000331

DATE: 25 DAY April MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III - CELL #1 CAP

DATE: 26 day April month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ~~N/A~~ ±3% LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: SP 1 STOCKPILE MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: Contouring layer
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: 3430 GAUGE SERIAL NO. 27418 CORRECTION FACTOR Y = N/A QA ID: CS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
A-50	See test location Map	4"/1	GEO-2	11.1	125.1	13.7	135.9	119.5	95.5	✓				
A-51	" " " "	4"/1	GEO-2	11.1	125.1	10.0	135.3	123.0	98.3	✓				
A-52	" " " "	4"/1	GEO-2	11.1	125.1	10.8	135.1	122.0	97.5	✓				
A-53	" " " "	4"/1	GEO-3	10.0	128.4	7.5	137.2	127.7	99.5	✓				
A-54	" " " "	4"/1	GEO-3	10.0	128.4	8.9	139.7	128.3	99.9	✓				
A-55	" " " "	4"/1	GEO-3	10.0	128.4	8.3	138.2	127.6	99.4	✓				
		/												
		/												
		/												
		/												

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000332

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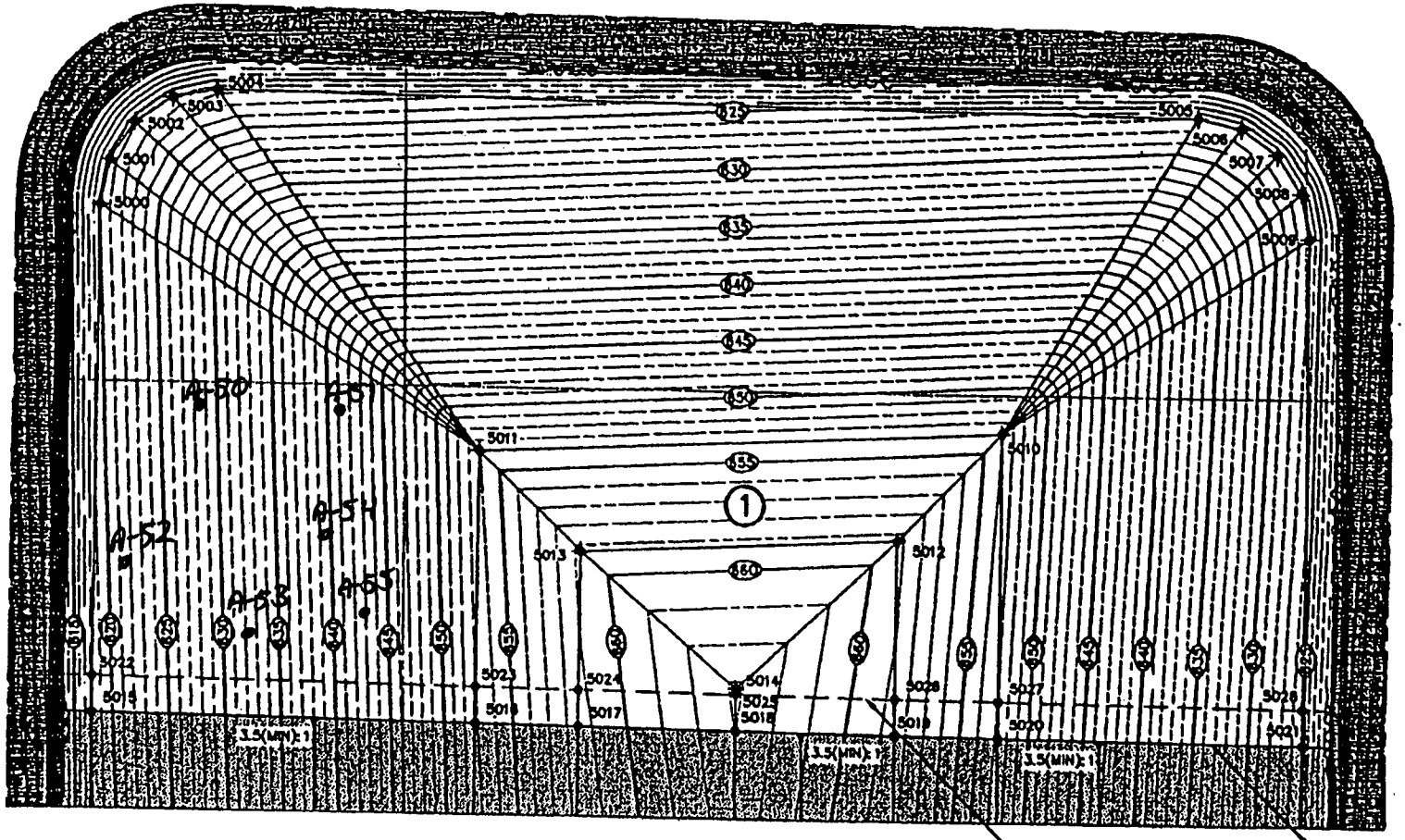
CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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000333

DATE: 26 DAY April MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III - CELL #1 CAP

DATE: 01 day (TUESDAY) MAY month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±3% LIFT THICKNESS (LOOSE / COMPACTED): 8"

MATERIAL SOURCE: SP-1 STOCKPILE MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: CONTOURING LAYER (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: (TOP)

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
A-56	EAST SLOPE	6"/L-2	GEO-1	7.6	136.1	6.9	143.0	133.8	98.3	P	—	—	—	—
A-57		6"/L-2	GEO-3	10.0	128.4	7.7	136.3	126.6	98.6	P	—	—	—	—
A-58		6"/L-2	GEO-3	10.0	128.4	8.9	137.6	126.3	98.4	P	—	—	—	—
A-59		6"/L-2	GEO-1	7.6	136.1	6.4	144.7	136.0	99.9	P	—	—	—	—
A-60		6"/L-2	GEO-1	7.6	136.1	6.7	145.8	136.6	100.4	P	—	—	—	—
A-61		6"/L-2	~~GEO-3~~ GEO-20-1	~~10.0~~ 7.6	~~128.4~~ 136.1	9.1	141.4	129.5	~~99.9~~ 95.2	P	—	—	—	—
A-62		6"/L-2	GEO-1	7.6	136.1	7.7	144.0	133.7	98.2	P	—	—	—	—
A-63		6"/L-2	GEO-2	11.1	125.1	9.9	131.2	119.4	95.4	P	—	—	—	—
A-64		6"/L-2	GEO-2	11.1	125.1	12.4	135.8	120.8	96.6	P	—	—	—	—
A-65	NORTH SLOPE	6"/L-2	GEO-3	10.0	128.4	7.0	136.5	127.6	99.4	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

NA = NOT APPLICABLE

DRNE CYLINDER (CL-3) TAKEN AT A-61.

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 041

DESCRIPTION: PHASE III - CELL #1 CAP

DATE: 01 day MAY month 2001 year (TUESDAY)

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±3% LIFT THICKNESS (LOOSE / COMPACTED): 8"

MATERIAL SOURCE: SP-1 STOCKPILE MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: CONTOURING LAYER (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: (TRC)

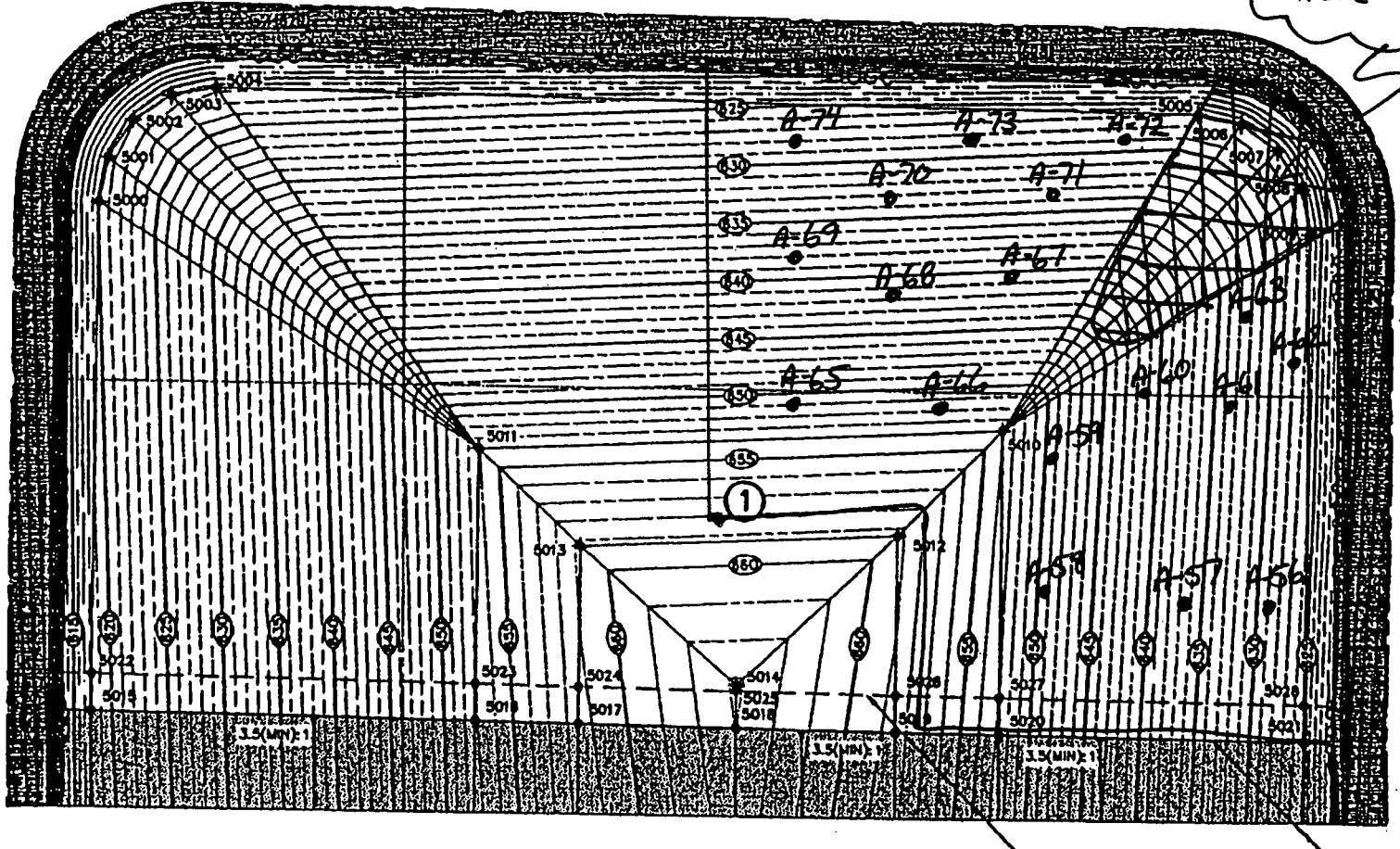
TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
A-66	NORTH SLOPE	6"/L-2	GEO-1	7.6	136.1	5.7	138.0	130.5	95.9	P	—	—	—	—
A-67	" "	6"/L-2	GEO-1	7.6	136.1	5.8	142.0	134.2	98.6	P	—	—	—	—
A-68	" "	6"/L-2	GEO-1	7.6	136.1	6.4	144.3	135.7	99.7	P	—	—	—	—
A-69	" "	6"/L-2	GEO-1	7.6	136.1	5.5	137.8	130.6	95.9	P	—	—	—	—
A-70	" "	6"/L-2	GEO-1	7.6	136.1	6.4	140.2	131.8	96.8	P	—	—	—	—
A-71	" "	6"/L-2	GEO-1	7.6	136.1	4.8	142.1	135.6	99.6	P	—	—	—	—
A-72	" "	6"/L-2	GEO-1	7.6	136.1	7.3	141.3	131.7	96.8	P	—	—	—	—
A-73	" "	6"/L-2	GEO-1	7.6	136.1	6.6	142.6	133.8	98.3	P	—	—	—	—
A-74	" "	6"/L-2	GEO-1	7.6	136.1	5.6	145.6	137.9	101.3	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

CELL #1 - FINAL COVER

GQ1341 TASK 04.1

Additional Fill + Grading Needed Here



CONSTRUCTION QUALITY ASSURANCE LIMIT FOR COMPACTED CLAY CAP

EXTENT OF FINAL COVER SYSTEM TEMPORARY TERMINATION

4554

000336

DATE: 1 DAY May MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG (ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III - CELL #1 CAP DATE: 04 day MAY month 2001 year FRIDAY

SPECIFICATION REQUIREMENTS

SOURCE: SP-1 STOCKPILE MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / (OTHER): CONTOURING LAYER (CIRCLE ONE) LIFT THICKNESS (LOOSE)/COMPACTED): 8"

% COMPACTION: ≥95% MOISTURE RANGE: ±3% ASTM D 698: A B C (CIRCLE ONE) / ASTM D 1557: A B C

NUCLEAR GAUGE TYPE: TROXLER 3440 NUCLEAR GAUGE SERIAL NO. 20979 COR. FACTOR: NA QA ID: TBC/KS

TEST NO.	TEST LOCATION (SEE ATTACHED MAP)	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
A-75	NORTH SLOPE	6"/L-2	GEO-1	7.6	136.1	4.9	140.5	133.8	98.3	P	—	—	—	—
A-76	" "	6"/L-2	GEO-1	7.6	136.1	5.5	142.9	135.5	99.6	P	—	—	—	—
A-77	" "	6"/L-2	GEO-1	7.6	136.1	5.3	138.4	131.5	96.6	P	—	—	—	—
A-78	" "	6"/L-2	GEO-1	7.6	136.1	5.5	137.8	130.7	96.0	P	—	—	—	—
A-79	" "	6"/L-2	GEO-1	7.6	136.1	5.7	142.1	134.5	98.8	P	—	—	—	—
A-80	" "	6"/L-2	GEO-1	7.6	136.1	5.1	143.4	136.4	100.2	P	—	—	—	—
A-81	" "	6"/L-2	GEO-3	10.0	128.4	9.6	136.5	124.6	97.0	P	—	—	—	—
A-82	" "	6"/L-2	GEO-3	10.0	128.4	8.2	134.7	124.4	96.9	P	—	—	—	—
A-83	" "	6"/L-2	GEO-3	10.0	128.4	7.8	134.1	124.4	96.9	P	—	—	—	—
A-84	WEST SLOPE	6"/L-2	GEO-3	10.0	128.4	7.5	125.8	117.0	91.1		F	96	✓	

COMMENTS: NA = NOT APPLICABLE
DRIVE CYLINDER (CL-04) WAS TAKEN AT A-81

4554

000337

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG (ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: PHASE III - CELL #1 CAP

DATE: 04 day MAY month 2001 year FRIDAY

SPECIFICATION REQUIREMENTS

SOURCE: SP-1 STOCKPILE MATERIAL TYPE: (CIRCLE ONE) (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: CONTOURING LAYER LIFT THICKNESS (LOOSE / COMPACTED): 8"

% COMPACTION: ≥95% MOISTURE RANGE: ±3% ASTM D 698: (CIRCLE ONE) (A) B C / ASTM D 1557: A B C

NUCLEAR GAUGE TYPE: TROXLER 3440 NUCLEAR GAUGE SERIAL NO. 20979 COR. FACTOR: NA QA ID: TOC

TEST NO.	TEST LOCATION (SEE ATTACHED)	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
A-85	WEST SLOPE	6" / L-2	GEO-3	10.0	128.4	7.9	133.9	124.1	96.7	P	–	–	–	–
A-86	" "	6" / L-2	GEO-1	7.6	136.1	7.1	140.7	131.4	96.5	P	–	–	–	–
A-87	" "	6" / L-2	GEO-1	7.6	136.1	6.5	145.5	136.7	100.4	P	–	–	–	–

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COMMENTS: NA = NOT APPLICABLE.

000338

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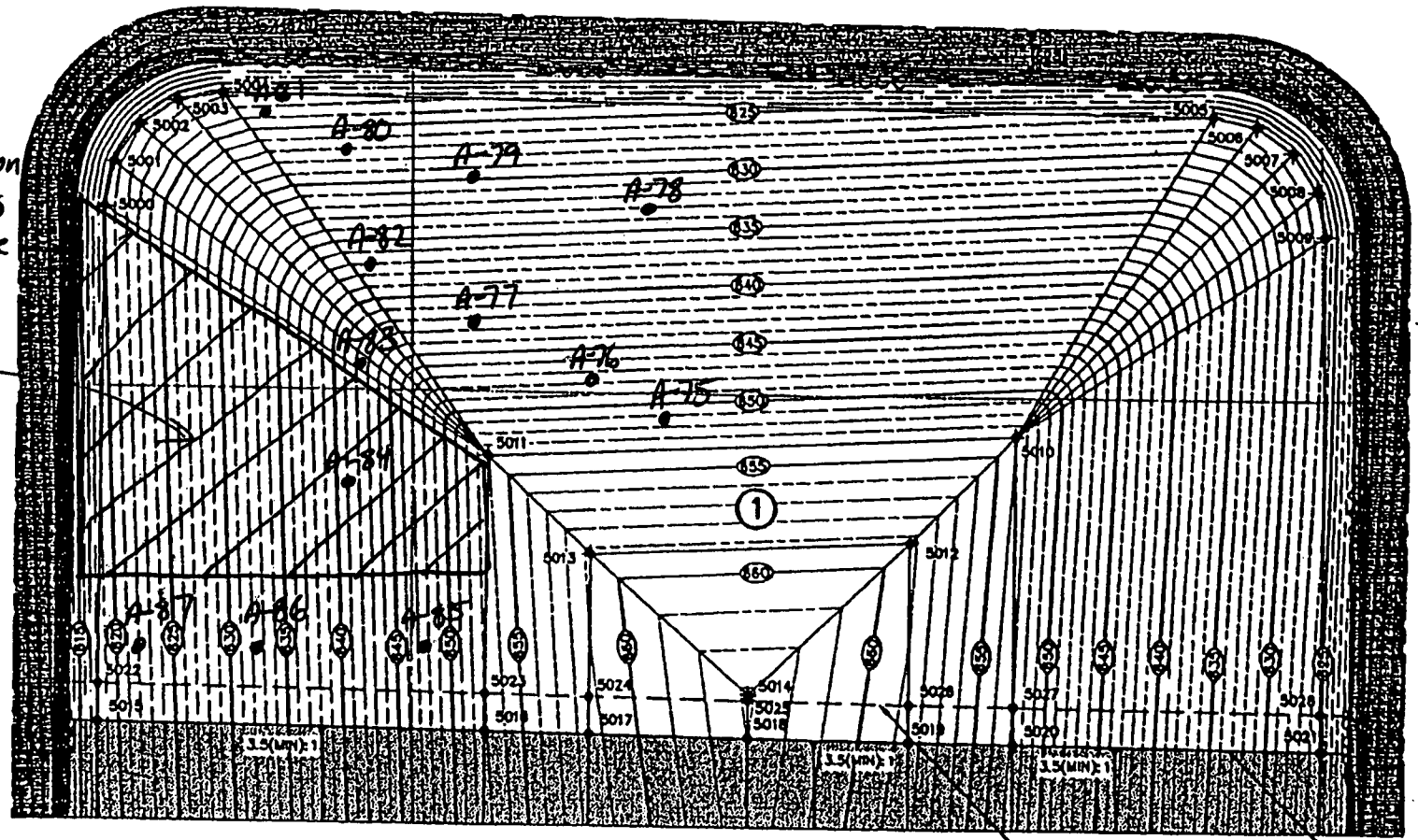
CELL #1 - FINAL COVER

GQ1341 TASK 04.1

No Apparent Compaction w/ Sheepsfoot. Needs Additional Compactive Effort.



4554

000339

DATE: 4 DAY May MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 9 day May month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±3% LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: on-site

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / (OTHER:) Contouring layer

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
A-88	See attached Map	4"/2	Geo 2	11.1	125.1	10.6	126.5	114.3	91.4		✓	A-97	✓	
A-89		4"/2	Geo 2	11.1	125.1	13.1	126.9	112.1	89.6		✓	A-98	✓	
A-90		6"/2	Geo 1 KS	7.6 ~~11.1~~ KS	136.1 ~~125.1~~ KS	7.3	139.5	130.0	95.5	✓				
A-91		6"/2	Geo 2	11.1	125.1	10.8	130.9	118.1	94.4		✓	A-92	✓	
A-92		6"/2	Geo 3	10.0	128.4	9.6	136.1	124.2	96.7	✓				
A-93		6"/2	Geo 2	11.1	125.1	10.6	134.5	121.6	97.2	✓				
A-94		6"/2	Geo 2	11.1	125.1	13.2	139.4	123.1	98.4	✓				
A-95		6"/2	Geo 2	11.1	125.1	12.2	135.3	120.6	96.4	✓				
A-96		6"/2	Geo 1	7.6	136.1	9.3	143.6	131.4	96.5	✓				
A-97		6"/2	Geo 2	11.1	125.1	13.3	135.8	119.8	95.8	✓				

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000340

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GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: CL SHEET NO. 1 OF 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 9 day May month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±3% LIFT THICKNESS (LOOSE)/COMPACTED): 8"

MATERIAL SOURCE: on-site MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY (OTHER): Contouring layer

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
A-98	See attached map	6"/2	Geo2	11.1	125.1	11.1	135.8	122.2	97.7	✓				
A-99		6"/2	Geo2	11.1	125.1	11.9	136.7	122.2	97.7	✓				
A-100		6"/2	Geo2	11.1	125.1	12.0	135.0	120.5	96.4	✓				

4554

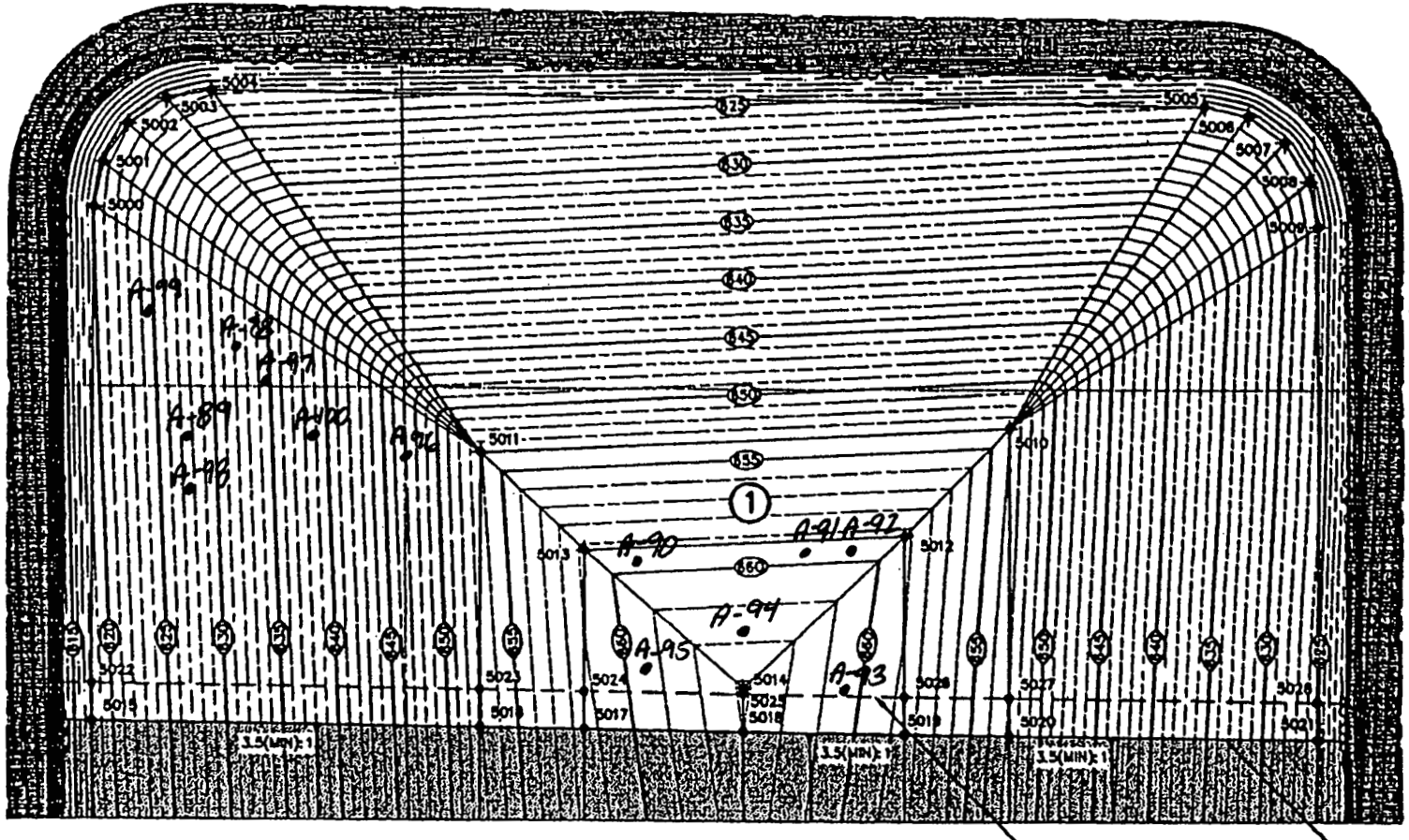
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000341

©GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: CJ SHEET NO. 2 OF 3

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



- 4554

000342

DATE: 9 DAY May MONTH 2001 YEAR

CONTOURING LAYER DRIVE CYLINDER TEST RESULTS

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 19 day April month 2001 year

SOURCE: on-site QA ID: KS

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

% COMPACTION: 95 MOISTURE CONTENT RANGE: ± 3%

TEST LOCATION: Contouring layer - lift 1 TEST NO.: A-17 ks Contoring Layer - #1

FIELD TEST DATA - ASTM D 2937 QA ID: KS

A	CYLINDER NO. 01-2 VOLUME[1] (cf)	0.03359	D	WEIGHT OF WET SAMPLE = B-C (lbs)	4.48
B	WEIGHT OF SAMPLE & CYLINDER (lbs)	5.81	E	WET UNIT WEIGHT = D/A (lbs)	133.4
C	WEIGHT OF CYLINDER (lbs)	1.33	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	114.3

NOTE: CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT - ASTM D 2216 QA ID: DLF

O	WT. OF TARE NO. 101 (grams)	8.3	R	WT. OF WATER = P-Q (grams)	50.4
P	WT. OF WET SOIL & TARE (grams)	361.0	S	WT. OF DRY SOIL = Q-O (grams)	302.3
Q	WT. OF DRY SOIL & TARE (grams)	310.6	T	MOISTURE CONTENT = (R/S)X100 (%)	16.7

PROCTOR TEST DATA _____ MAXIMUM DRY UNIT WT. (pcf) _____ OPTIMUM MOISTURE CONTENT (%) _____

COMPARISON WITH NUCLEAR GAUGE - ASTM D 2922 AND D 3017 QA ID: _____

TEST NO.		A-17	U	MOISTURE CONTENT (%)	13.2
WET UNIT WT.	(pcf)	136.1	V	DRY UNIT WT. (pcf)	120.3
DELTA DRY UNIT WT. = F - V		-6.0		DELTA MOISTURE CONTENT = T - U	3.5

COMMENTS:

000344

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: G01341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 25 day April month 2001 year

TEST NO.: Contouring Layer #2

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: Contouring Layer

% COMPACTION: 95% MOISTURE CONTENT RANGE: ± 3%

FDT LOCATION: A-38 FDT TEST NO.: Contouring Layer #2 / A-38

FIELD TEST DATA – ASTM D 2937 QA ID: CA

A	CYLINDER NO. 01-01 VOLUME[1] (cf)	0.03350	E	WET UNIT WEIGHT = D/A (lbs)	133.4
B	WEIGHT OF SAMPLE & CYLINDER (lbs)	5.83	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	121.5
C	WEIGHT OF CYLINDER (lbs)	1.36	G	PERCENT COMPACTION = F\L (%)	N/A
D	WEIGHT OF WET SAMPLE = B-C (lbs)	4.47		PASS\FAIL	N/A

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: CA

O	WT. OF TARE NO. 33 (grams)	8.2	R	WT. OF WATER = P-Q (grams)	38.7
P	WT. OF WET SOIL & TARE (grams)	441.3	S	WT. OF DRY SOIL = Q-O (grams)	394.4
Q	WT. OF DRY SOIL & TARE (grams)	402.6	T	MOISTURE CONTENT = (R/S)X100 (%)	9.8

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 128.4 (pcf) OPTIMUM MOISTURE CONTENT 10.0 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: CA

DELTA MOISTURE CONTENT = T - U		1.3%	U	FDT MOISTURE CONTENT (%)	8.5
FDT WET UNIT WT.	(pcf)	133.1	V	FDT DRY UNIT WT. (pcf)	122.7
DELTA DRY UNIT WT. = F - V	(lbs)	1.2			

COMMENTS:

000345

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GEOSYNTEC CONSULTANTS

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FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ 1341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 02 day May month 2001 year

TEST NO.: ~~CL-3~~ Contouring Layer #3

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: Contouring Layer

% COMPACTION: 95 % MOISTURE CONTENT RANGE: ± 3 %

FDT LOCATION: @ A-61 FDT TEST NO.: A-61

FIELD TEST DATA – ASTM D 2937 QA ID: DLE

A	CYLINDER NO. 01 VOLUME[1] (cf)	0.03350	E	WET UNIT WEIGHT = D/A (lbs)	140.9
B	WEIGHT OF SAMPLE & CYLINDER 2756.7g (lbs)	6.08	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	126.4
C	WEIGHT OF CYLINDER 616.3g (lbs)	1.36	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs)	4.72			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DLE

O	WT. OF TARE NO. 31 (grams)	8.30	R	WT. OF WATER = P–Q (grams)	53.3
P	WT. OF WET SOIL & TARE (grams)	525.8	S	WT. OF DRY SOIL = Q–O (grams)	464.2
Q	WT. OF DRY SOIL & TARE (grams)	472.5	T	MOISTURE CONTENT = (R/S)X100 (%)	11.5

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 128.4 (pcf) OPTIMUM MOISTURE CONTENT 10.0 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: DLE

DELTA MOISTURE CONTENT = T – U	2.4	U	FDT MOISTURE CONTENT (%)	9.1
FDT WET UNIT WT. (pcf)	141.4	V	FDT DRY UNIT WT. (pcf)	129.5
DELTA DRY UNIT WT. = F – V	3.1		FDT #	A-61

COMMENTS:

000346

GEOSYNTEC CONSULTANTS

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FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 04 day MAY month 2001 year

TEST NO.: ~~CL04~~ Contouring Layer #4

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRCLE ONE) (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: Contour Layer

% COMPACTION: 95% MOISTURE CONTENT RANGE: ±3%

FDT LOCATION: A-81 FDT TEST NO.: ~~CL04~~ A-81

FIELD TEST DATA – ASTM D 2937 QA ID: MH/DLE

A	CYLINDER NO. 01-2 VOLUME(1) (cf)	0.03359	E	WET UNIT WEIGHT = D/A (lbs)	136.4
B	WEIGHT OF SAMPLE & CYLINDER 2679.8 (lbs)	5.91	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	119.5
C	WEIGHT OF CYLINDER 605.3 (lbs)	1.33	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs)	4.58			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: MH/DLE

O	WT. OF TARE NO. 18 (grams)	8.36	R	WT. OF WATER = P–Q (grams)	44.37
P	WT. OF WET SOIL & TARE (grams)	367.3	S	WT. OF DRY SOIL = Q–O (grams)	~~314.57~~ 314.5
Q	WT. OF DRY SOIL & TARE (grams)	322.93	T	MOISTURE CONTENT = (R/S)X100 (%)	14.1

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. ~~124.6~~ 128.4 MH (pcf) OPTIMUM MOISTURE CONTENT 10.0 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: MH

DELTA MOISTURE CONTENT = T – U	4.5	U	FDT MOISTURE CONTENT (%)	9.6
FDT WET UNIT WT. (pcf)	136.5	V	FDT DRY UNIT WT. (pcf)	124.6
DELTA DRY UNIT WT. = F – V	5.1		FDT #	~~CL04~~ A-81

COMMENTS: Borrow area material on the top portion of the tube, SP1 Stockpile on the bottom.

000347

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COMPACTED CLAY CAP

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 691341 TASK NO.: 04.1

DESCRIPTION: Cell 1 Cap Construction

DATE: 10 day May month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: 0-3% LIFT THICKNESS (LOOSE/COMPACTED): ____

MATERIAL SOURCE: On-Site (S.P. 00-4) MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER: Clay liner
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = ____ QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
B-1	See attached map	6"/1	00-4	11.9	123.9	12.4 / 13.9	128.0	112.4	90.7		✓	B-5		
B-2		6"/1	00-4	11.9	123.9	11.6 / 13.2	138.7	122.5	98.9	✓				
B-3		6"/1	00-4	11.9	123.9	10.7 / 12.5	132.0	117.3	94.6		✓	B-6		
B-4		6"/1	00-4	11.9	123.9	12.1 / 13.6	137.8	121.3	97.9	✓				
B-5		6"/1	00-4	11.9	123.9	11.6 / 13.2	136.4	120.5	97.3	✓		B-1	✓	
B-6		6"/1	00-4	11.9	123.9	11.4 / 13.0	136.0	120.4	97.2	✓		B-3	✓	
B-7		6"/1	00-4	11.9	123.9	11.9 / 13.5	135.0	118.9	96.0	✓				
B-8		6"/1	00-4	11.9	123.9	11.4 / 13.0	138.2	122.3	98.7	✓				
B-9		6"/1	00-4	11.9	123.9	12.7 / 14.1	136.4	119.5	96.5	✓				
B-10		6"/1	00-4	11.9	123.9	11.1 / 12.8	~~120.9~~ 136.4 KS	120.9	97.6	✓				

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

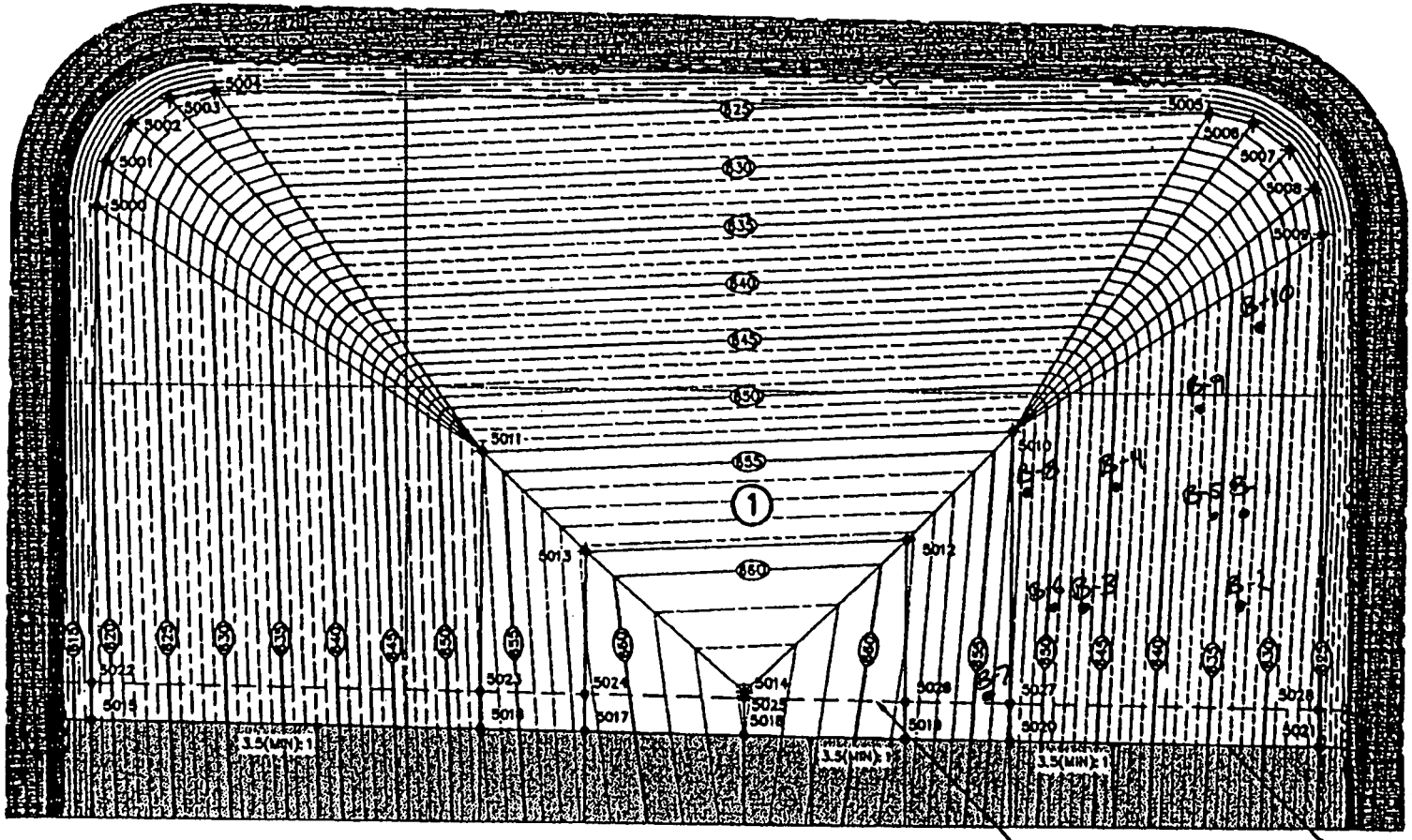
©GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: CJ SHEET NO. 1 OF 2

4554

000249

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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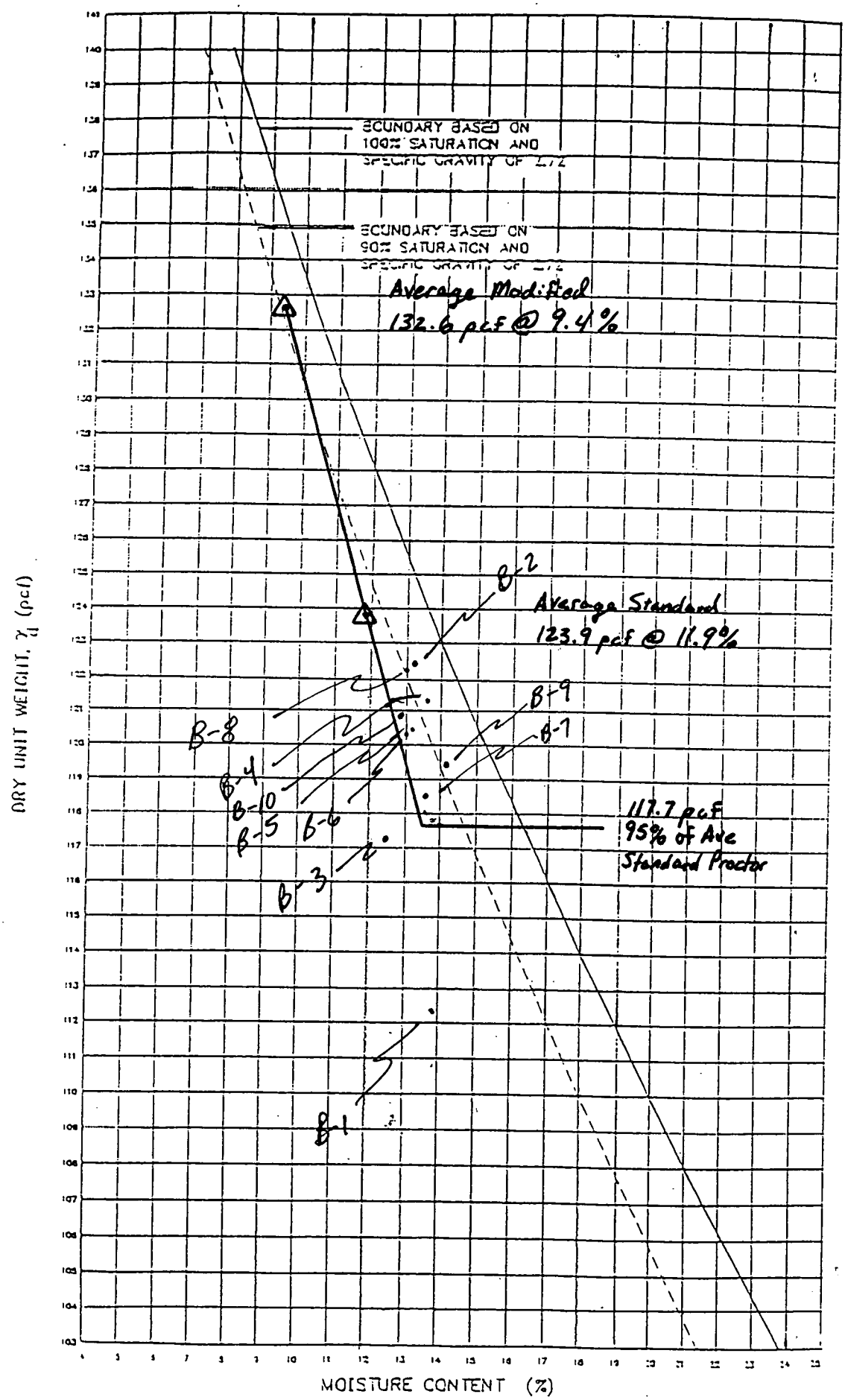
000350

DATE: 10 DAY May MONTH 2001 YEAR



STOCKPILE
00-4

~~DD=~~

DD=(-3.48)(m%) + 165.31

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP

DATE: 23 day (WEDNESDAY) MAY month 2001 year

SPECIFICATION REQUIREMENTS (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3% APZ LIFT THICKNESS (LOOSE / COMPACTED): 10"

MATERIAL SOURCE: STOCKPILES 00-4 & 00-3 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: (TAM)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-17 11	NORTH SLOPE	6"/L-1	00-4	11.9	123.9	10.4 / 12.2	140.1	124.9	100.8	P	–	—	–	–
B-18 12	NORTH SLOPE	6"/L-1	00-4	11.9	123.9	10.2 / 12.0	139.1	124.2	100.2	P	–	—	–	–
B-19 13	NORTH SLOPE	6"/L-1	00-4	11.9	123.9	11.7 / 13.3	138.0	121.8	98.3	P	–	–	–	–
B-20 14	NORTH SLOPE	6"/L-1	00-4	11.9	123.9	10.3 / 12.1	138.9	123.9	100.0	P	–	—	–	–
B-21 15	NORTH SLOPE	6"/L-1	00-4	11.9	123.9	12.0 / 13.6	136.4	120.1	96.9	P	–	—	–	–
B-22 16	NORTH SLOPE	6"/L-1	00-4	11.9	123.9	12.5 / 14.0	137.2	120.4	97.2	P	–	—	–	–
B-23 17	NORTH SLOPE	6"/L-1	00-4	11.9	123.9	12.7 / 14.1	137.6	120.6	97.3	P	–	—	–	–
B-24 18	NORTH SLOPE	6"/L-1	00-4	11.9	123.9	11.6 / 13.2	137.2	121.2	97.8	P	–	—	–	–
B-25 19	NORTH SLOPE	6"/L-1	00-4	11.9	123.9	10.4 / 12.2	139.6	124.4	100.4	P	–	—	–	–
B-26 20	NORTH SLOPE	6"/L-1	00-4	11.9	123.9	11.3 / 13.0	137.7	121.9	98.4	P	–	—	–	–

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP

DATE: 23 day MAY month 2001 year WEDNESDAY

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3 AP2 LIFT THICKNESS (LOOSE / COMPACTED): 10"

MATERIAL SOURCE: STOCKPILES 04-4 & 04-3 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY OTHER:

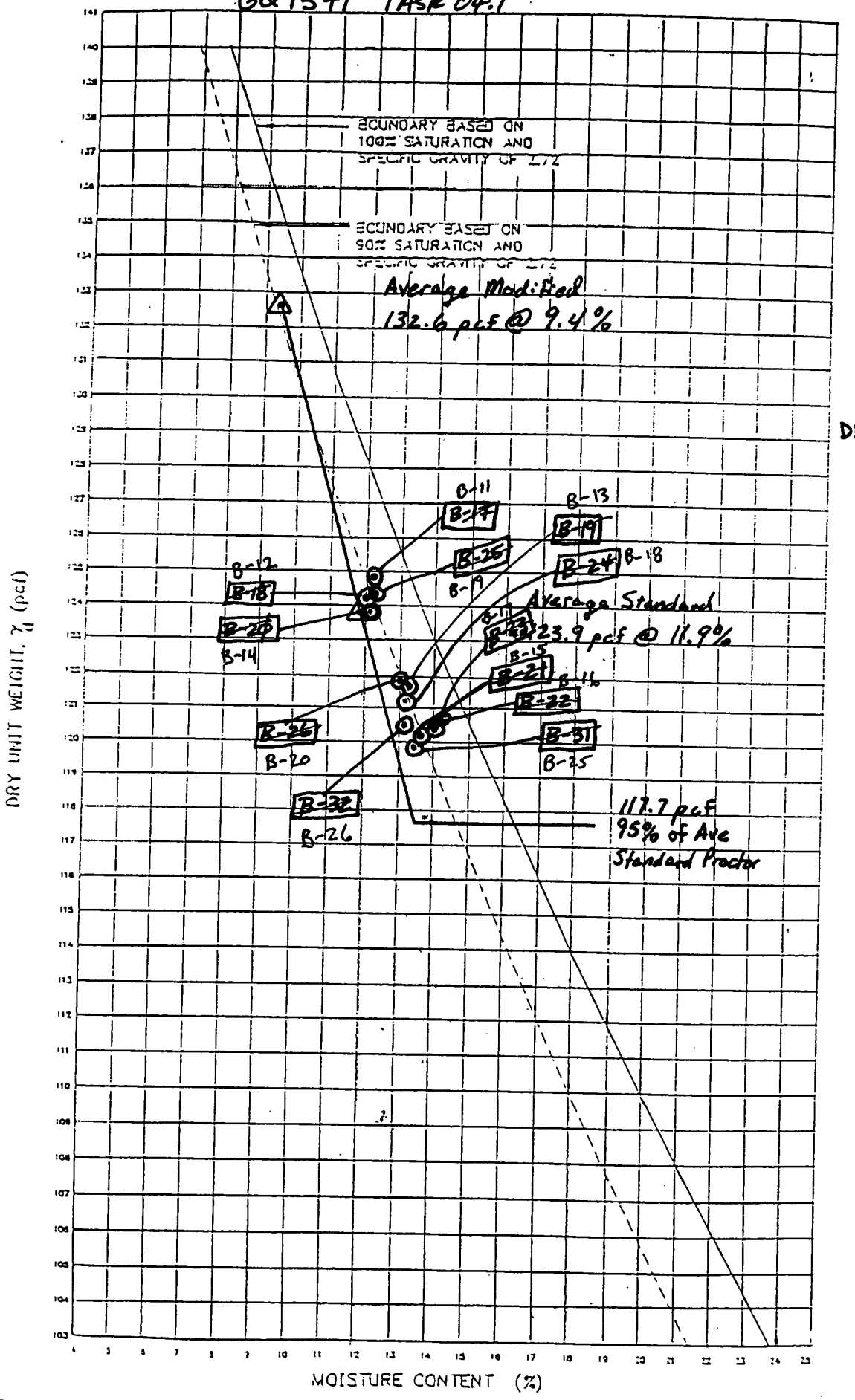
NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: TBM

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-27 21	N.E. CORNER	6"/L-1	04-3	12.0	123.9	12.2 / 13.7	137.3	120.8	97.5	P	–	–	–	–
B-28 22	N.E. CORNER	6"/L-1	04-3	12.0	123.9	11.9 / 13.5	137.8	121.4	98.0	P	–	–	–	–
B-29 23	N.E. CORNER	6"/L-1	04-3	12.0	123.9	12.3 / 13.8	136.4	119.9	96.8	P	–	–	–	–
B-30 24	N.E. CORNER	6"/L-1	04-3	12.0	123.9	11.2 / 12.9	138.4	122.6	99.0	P	–	–	–	–
B-31 25	NORTH SLOPE	6"/L-1	04-4	11.9	123.9	11.9 / 13.5	136.1	119.9	96.8	P	–	–	–	–
B-32 26	NORTH SLOPE	6"/L-1	04-4	11.9	123.9	11.5 / 13.1	136.3	120.5	97.3	P	–	–	–	–
		/												
		/												
		/												
		/												

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

CELL #1 - FINAL COVER -- 4554

GQ 1341 TASK 04.1



STOCKPILE 00-4

~~DD=~~

DD=(-3.48)(m%) + 165.3

000354

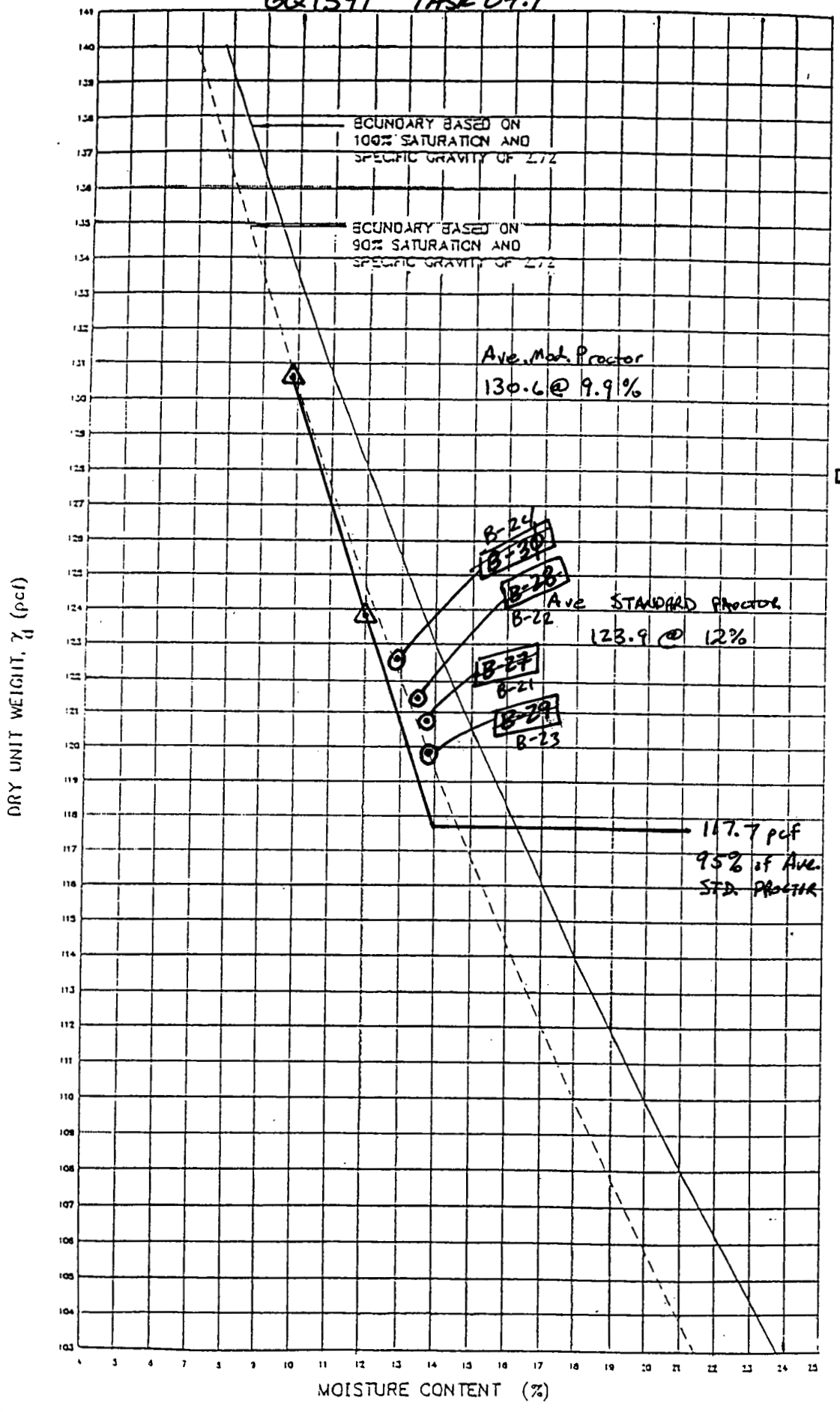
23 MAY 2001

SHEET No 5 OF 5

CELL #1 - FINAL COVER

4554

GQ1341 TASK 04.1



STOCKPILE 003

DD = -3.1905(%m) + 162.1857

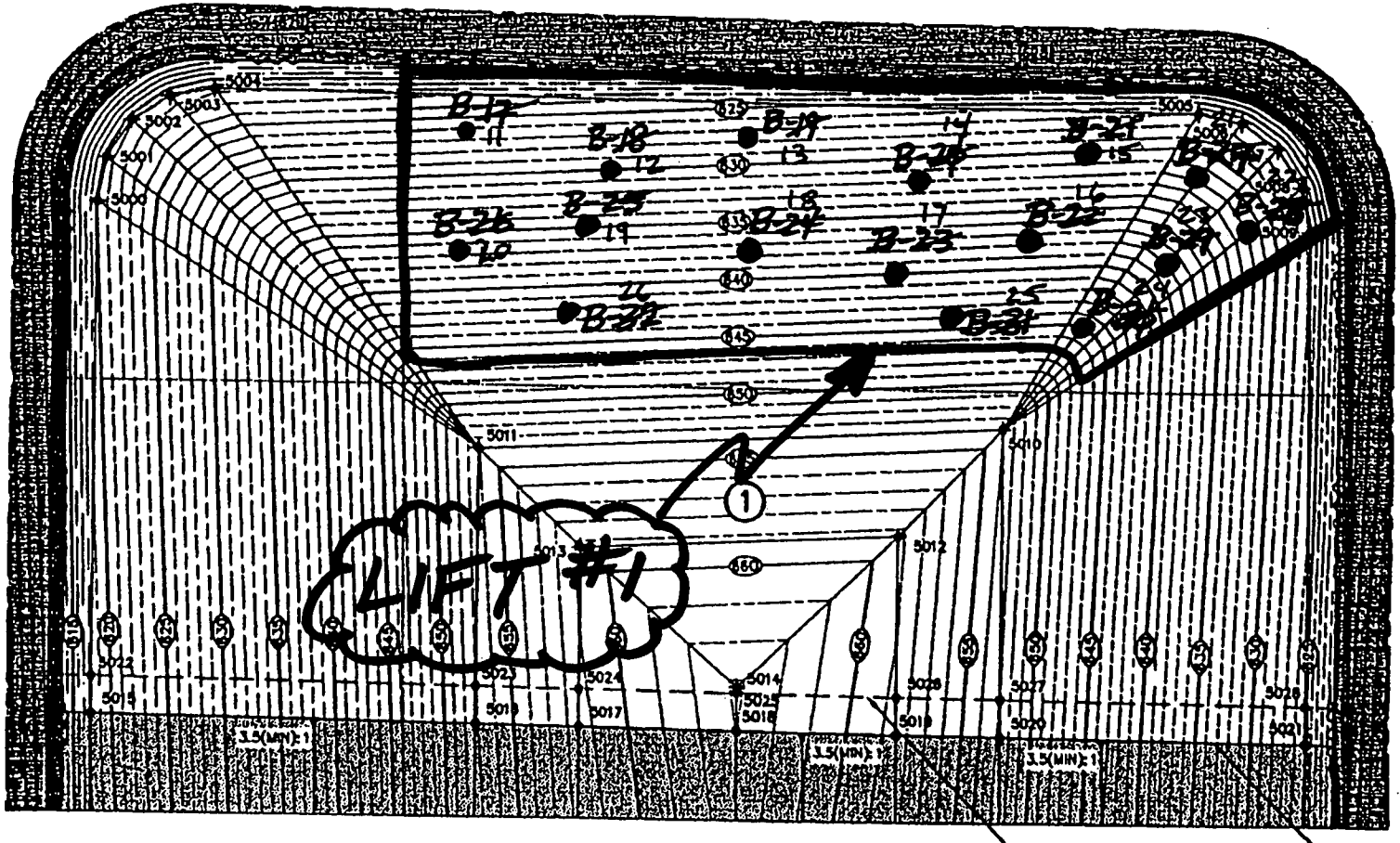
000355

23 MAY 2001

SHEET No 4 OF 5

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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DATE: 23 DAY MAY MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: CELL #1 - CAP

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 29 day MAY month 2001 year TUESDAY

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0.3% -2% LIFT THICKNESS (LOOSE / COMPACTED): 10"

MATERIAL SOURCE: STOCKPILE 00-3 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459x+3.4043 QA ID: CL

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-28	WEST SLOPE	6"/1	003	12.0	123.9	14.3 / 15.5	130.8	113.2	91.4		✓	B-36	P	—
B-29	WEST SLOPE	6"/1	003	12.0	123.9	14.8 / 15.9	131.8	113.7	91.8		✓	B-37	P	—
B-30	WEST SLOPE	6"/1	003	12.0	123.9	12.2 / 13.7	134.8	118.6	95.7	✓				
B-31	WEST SLOPE	6"/1	003	12.0	123.9	12.8 / 14.2	130.8	114.5	92.4		✓	B-40	P	—
B-32	WEST SLOPE	6"/1	003	12.0	123.9	12.0 / 13.6	134.5	118.4	95.6	✓	✓	B-41	P	—
B-33	WEST SLOPE	6"/1	004	11.9	123.9	13.5 / 14.8	134.2	116.9	94.3		✓	B-42	P	—
B-34	WEST SLOPE	6"/1	004	11.9	123.9	11.6 / 13.2	134.5	118.8	95.9		✓	B-43	P	—
B-35	WEST SLOPE	6"/1	004	11.9	123.9	13.7 / 15.0	131.7	114.5	92.4		✓	B-44	P	—
		/												
		/												

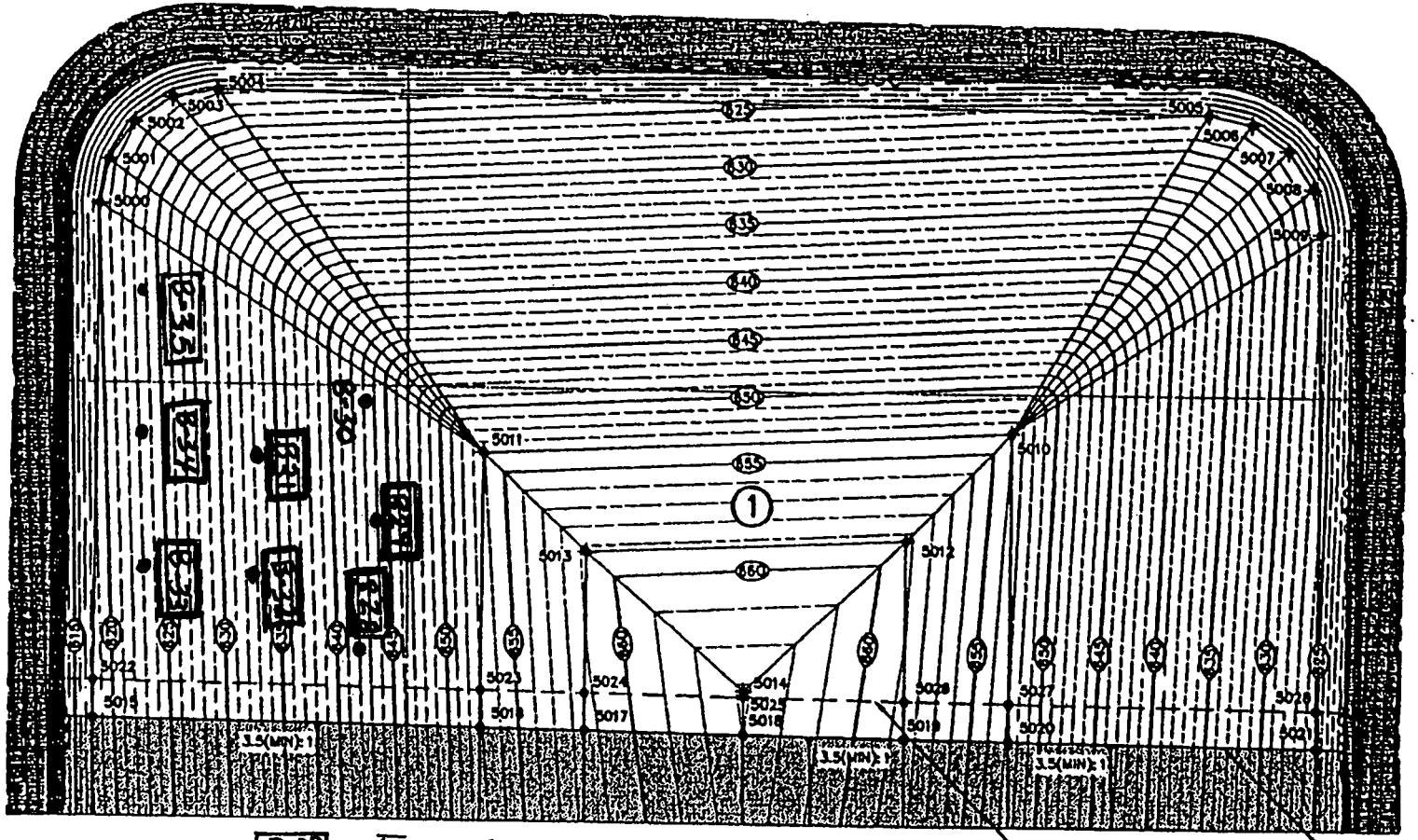
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000351

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



B-28 - FAILING NDT

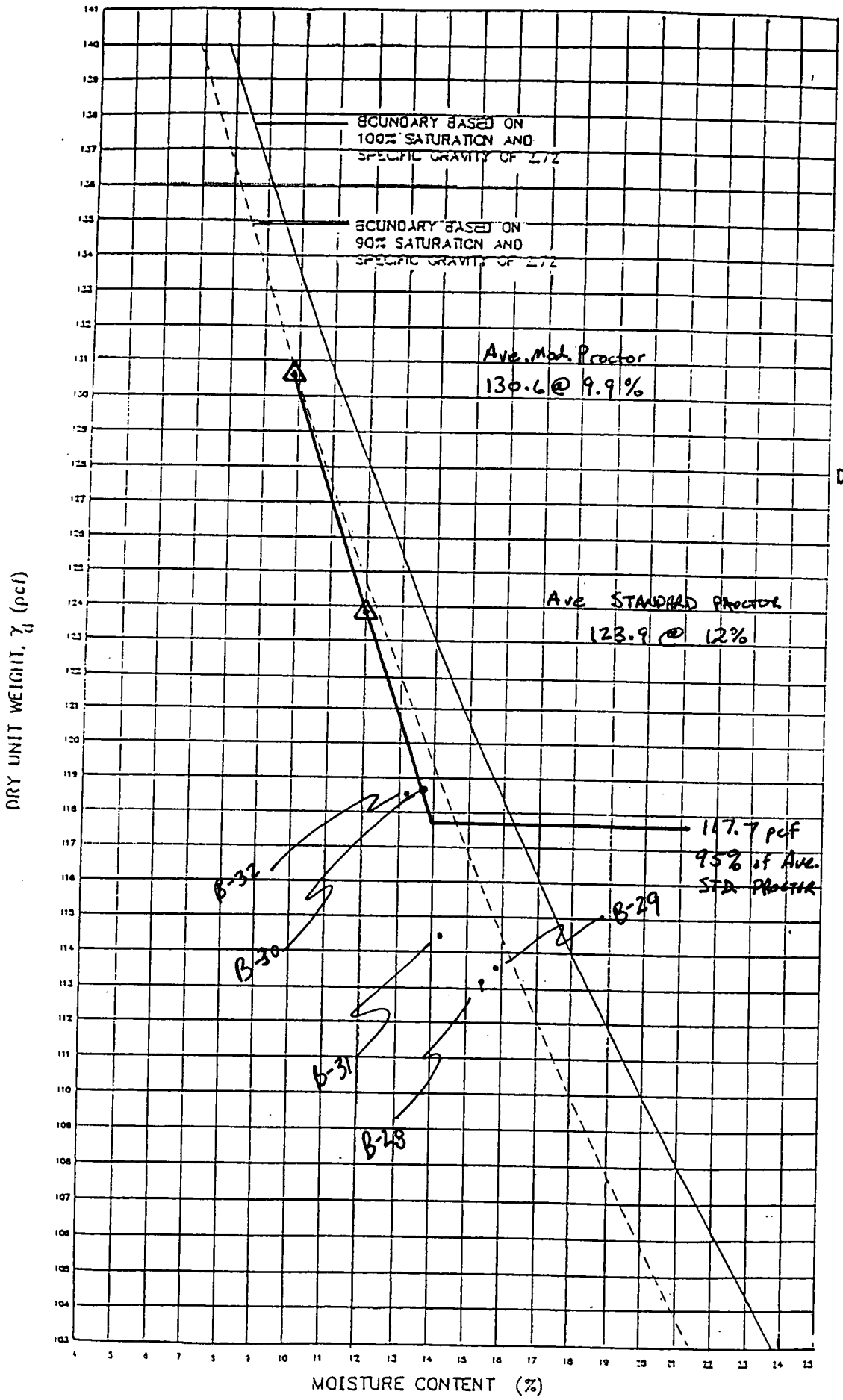
CONSTRUCTION QUALITY ASSURANCE LIMIT FOR COMPACTED CLAY CAP

EXTENT OF FINAL COVER SYSTEM TEMPORARY TERMINATION

4554

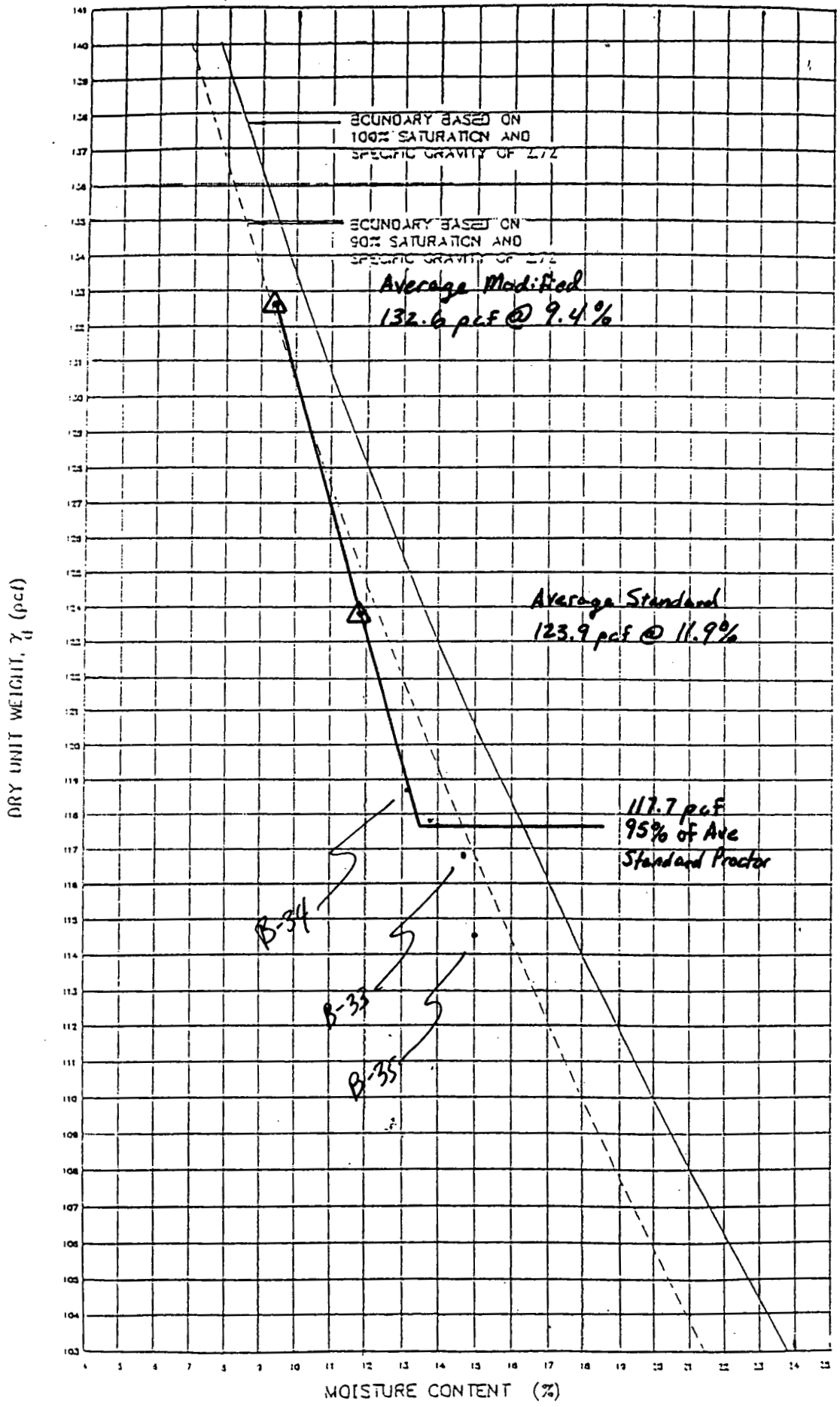
000358

DATE: 29 DAY MAY MONTH 2001 YEAR



STOCKPILE 003

DD = -3.1905(%m) + 162.1857



STOCKPILE
00-4

~~DD=~~

DD=(-3.48)(m%) +165.31

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 60134 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP

DATE: 30 day MAY month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3% ADB LIFT THICKNESS (LOOSE / COMPACTED): 8"

MATERIAL SOURCE: STOCKPILES 00-3 & 00-4 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: (TOY)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-36	WEST SLOPE	L-1/6"	00-3	12.0	123.9	12.9 / 14.3	137.1	119.9	96.8	P	–	–	–	–
B-37	↓	L-1/6"	00-3	12.0	123.9	11.0 / 12.7	139.1	123.4	99.6	P	–	–	–	–
B-38		L-1/6"	00-3	12.0	123.9	11.9 / 13.5	136.0	119.8	96.7	P	–	–	–	–
B-39		L-1/6"	00-3	12.0	123.9	12.9 / 14.3	134.6	117.8	95.1	P	–	–	–	–
B-40		L-1/6"	00-3	12.0	123.9	13.3 / 14.7	135.4	118.0	95.2	P	–	–	–	–
B-41		L-1/6"	00-3	12.0	123.9	12.1 / 13.6	135.5	119.3	96.3	P	–	–	–	–
B-42		L-1/6"	00-4	11.9	123.9	11.7 / 13.3	136.1	120.1	96.9	P	–	–	–	–
B-43		L-1/6"	00-4	11.9	123.9	11.2 / 12.9	137.7	122.0	98.5	P	–	–	–	–
B-44		L-1/6"	00-4	11.9	123.9	11.1 / 12.8	136.7	121.2	97.8	P	–	–	–	–
B-45		L-1/6"	00-4	11.9	123.9	11.8 / 13.4	137.1	120.9	97.6	P	–	–	–	–

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

DRIVE CYLINDER (CC#1) WAS TAKEN AT TEST B-45.

4554

36

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP

DATE: 30 day MAY month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3% APE LIFT THICKNESS (LOOSE / COMPACTED): 8"

MATERIAL SOURCE: STOCKPILE 00-3 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: (TBM)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-46	NORTH SLOPE	/	00-3	12.0	123.9	12.2 / 13.7	135.2	118.9	96.0	P	–	–	–	–
B-47	↓	/	00-3	12.0	123.9	10.6 / 12.4	138.9	123.6	99.8	P	–	–	–	–
B-48	↓	/	00-3	12.0	123.9	11.1 / 12.8	138.1	~~122.7~~ 122.4	98.8	P	–	–	–	–
B-49	TOP OF CELL	/	00-3	12.0	123.9	13.7 / 15.0	136.4	118.6	95.7	P	–	–	–	–
B-50	↓	/	00-3	12.0	123.9	11.1 / 12.8	139.5	123.7	99.8	P	–	–	–	–
B-51	↓	/	00-3	12.0	123.9	10.6 / 12.4	138.1	122.9	99.2	P	–	–	–	–
B-52	↓	/	00-3	12.0	123.9	10.8 / 12.5	138.5	123.1	99.4	P	–	–	–	–
B-53	↓	/	00-3	12.0	123.9	12.1 / 13.6	135.0	118.8	95.9	P	–	–	–	–
B-54	↓	/	00-3	12.0	123.9	10.9 / 12.6	139.9	124.2	100.2	P	–	–	–	–
B-55	↓	/	00-3	12.0	123.9	12.7 / 14.1	135.9	119.1	96.1	P	–	–	–	–

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

DRIVE CYLINDER (CC#2) TAKEN AT TEST B-51.

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP

DATE: 30 day MAY month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3% APZ LIFT THICKNESS ((LOOSE) / COMPACTED): 8"

MATERIAL SOURCE: STOCK PILE 00-3 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 34.43 QA ID: (TRX)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-56	TOP OF CELL	6" / L-1	00-3	12.0	123.9	12.0 / 13.6	135.9	119.6	96.5	P	–	–	–	–

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

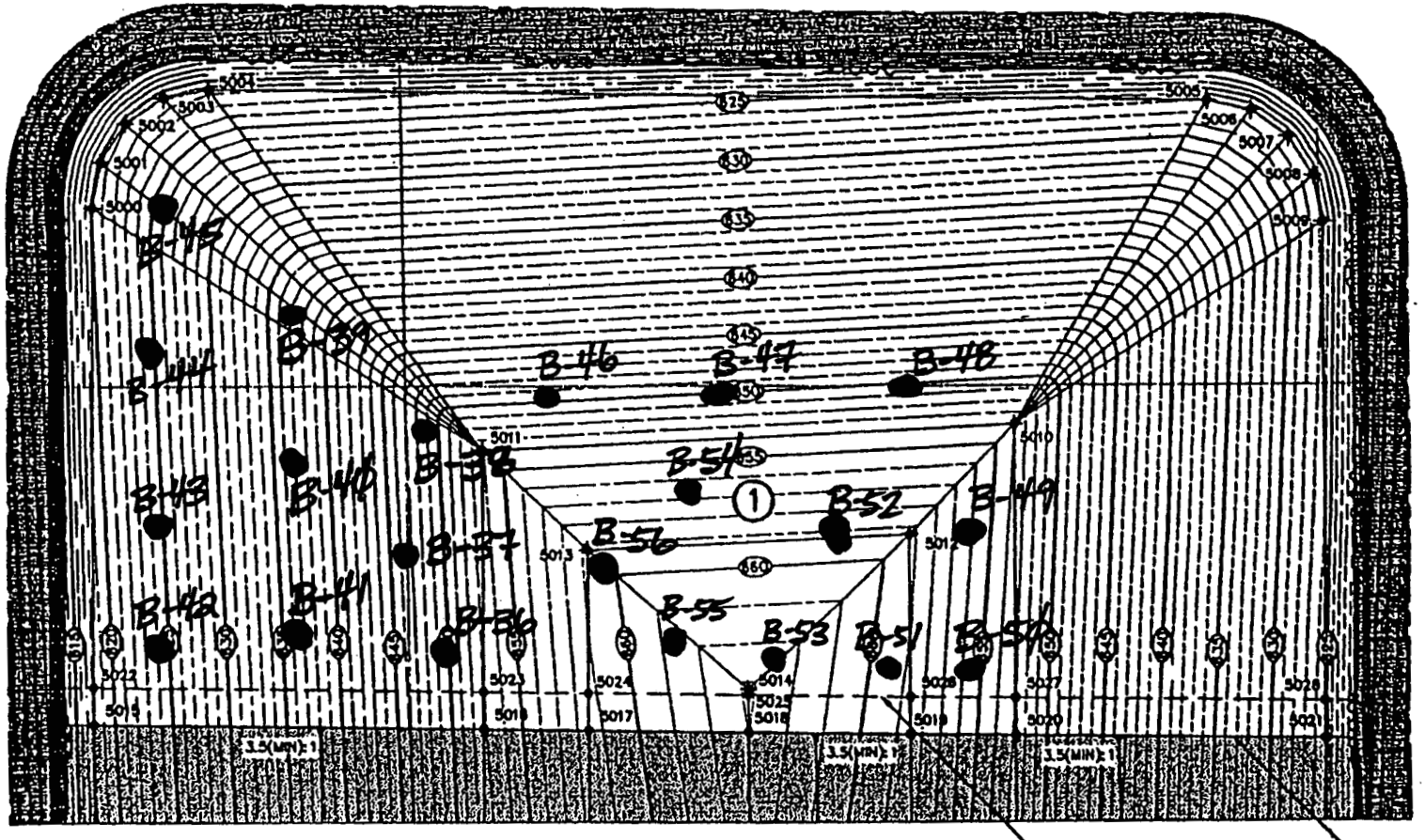
GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: [illegible] SHEET NO. 3 OF 6

4554

000363

CELL #1 - FINAL COVER

GQ1341 TASK 04.1

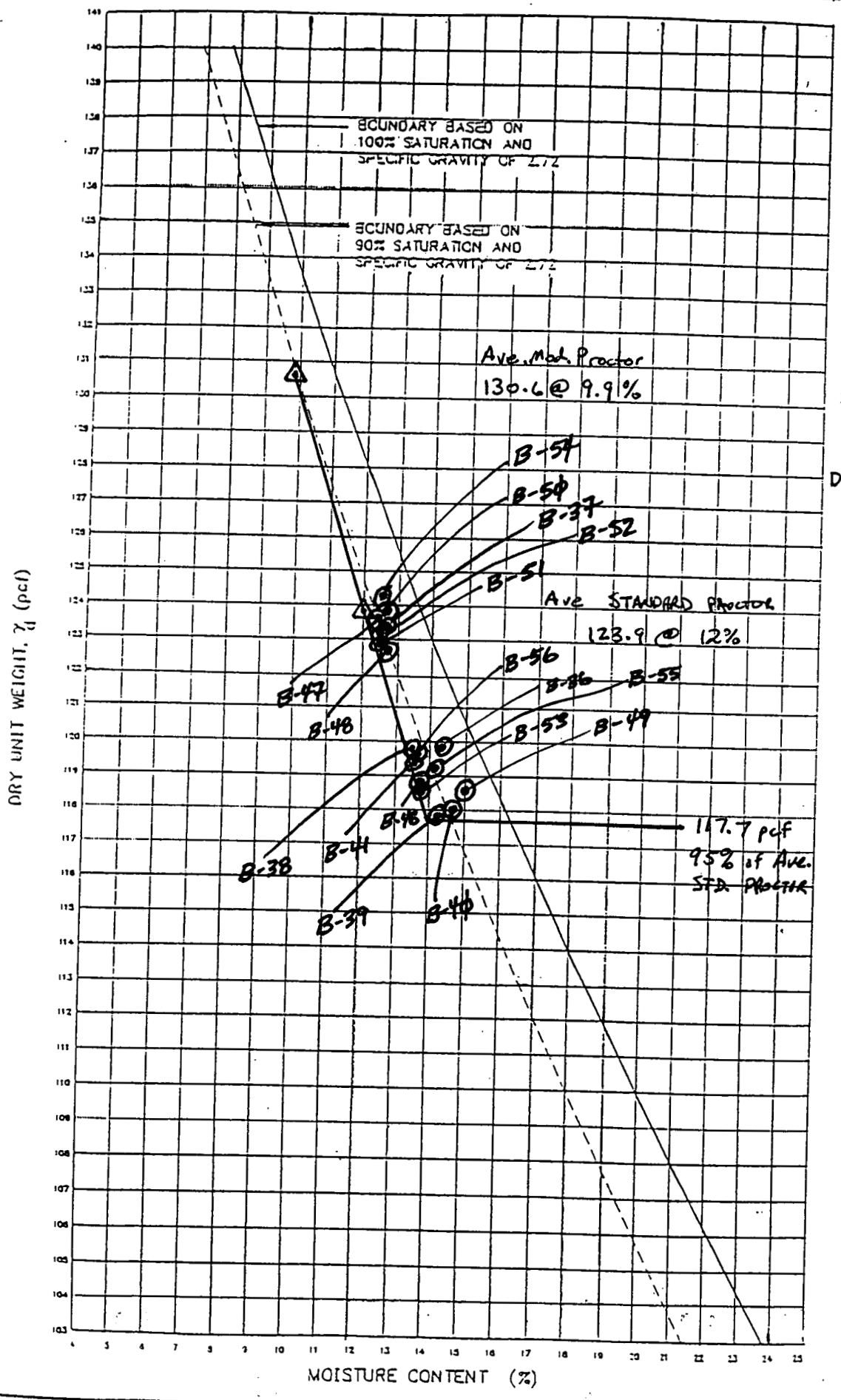


-- 4554

000364

DATE: 30 DAY MAY MONTH 2001 YEAR

30 MAY 2001 - 4554



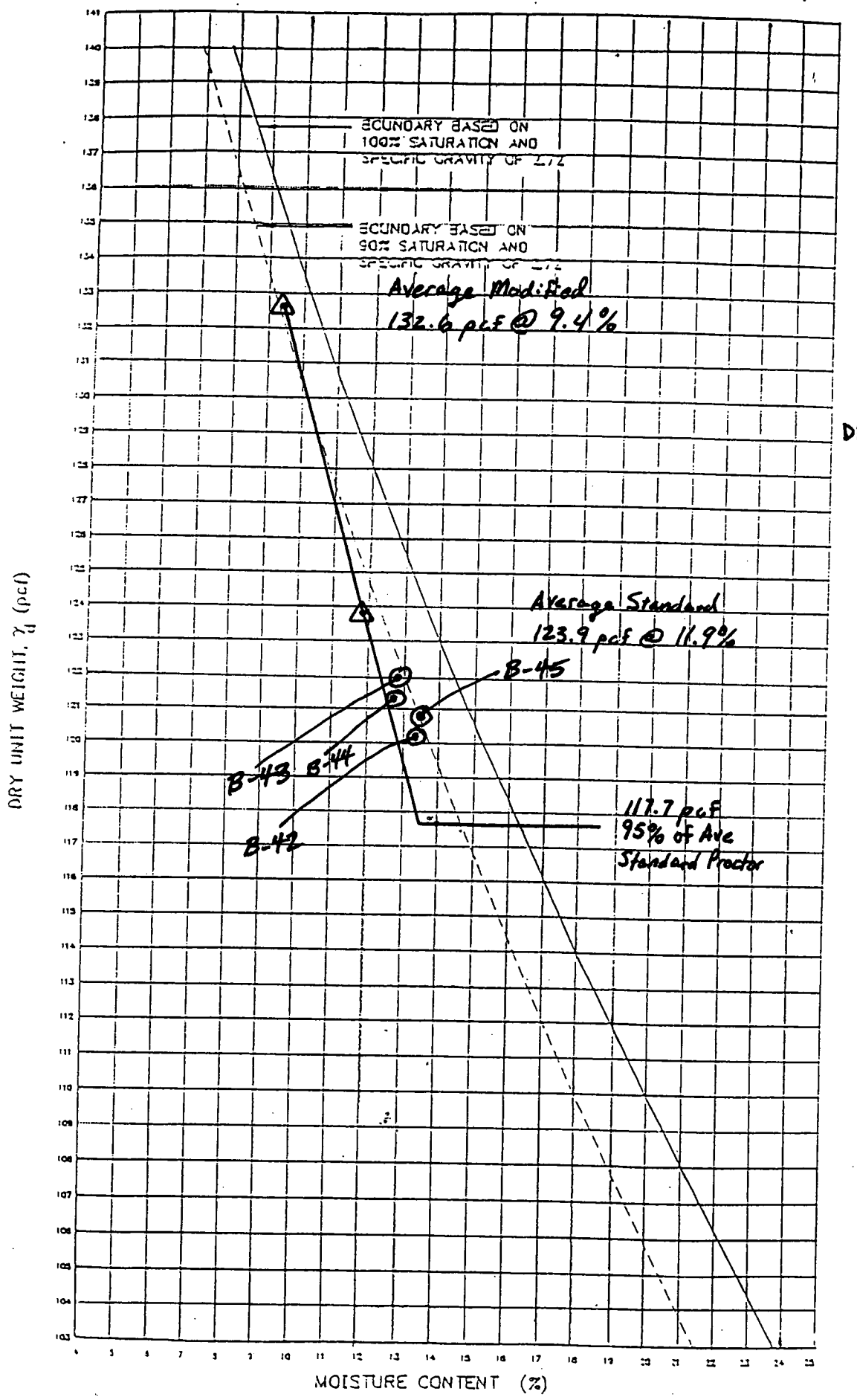
STOCKPILE 003

DD = -3.1905(%m) + 162.1857

000365

SHEET No. 5 OF 6

30 MAY 2001 - 4554



STOCKPILE
00-4

~~DD=~~

DD=(-3.48)(m%) + 165.3

366

SHEET No. 6 OF 6

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 04 day June month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3% LIFT THICKNESS (LOOSE/COMPACTED): 7"

MATERIAL SOURCE: STOCKPILE 00-3 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: Troxx 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459 X + 3.4043 QA ID: GA

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-57	See Location Map	6"/2	003	12.0	123.9	11.9 / 13.5	136.4	120.2	97.0	✓				
B-58	" " "	6"/2	00-3	12.0	123.9	11.1 / 12.8	136.9	121.4	98.0	✓				
B-59	" " "	6"/2	00-3	12.0	123.9	11.9 / 13.5	137.8	121.4	98.0	✓				
B-60	" " "	6"/2	00-3	12.0	123.9	12.2 / 13.7	136.3	119.9	96.8	✓				
B-61	" " "	6"/2	00-3	12.0	123.9	12.8 / 14.2	136.2	119.3	96.3	✓				
B-62	" " "	6"/2	00-3	12.0	123.9	11.6 / 13.2	136.5	120.6	97.3	✓				
B-63	" " "	6"/2	00-3	12.0	123.9	~~14.1~~ 12.6 / 14.1	134.4	117.8	95.1	✓				
B-64	" " "	6"/2	00-3	12.0	123.9	12.0 / 13.6	135.6	119.4	96.4	✓				
B-65	" " "	6"/2	003	12.0	123.9	12.2 / 13.7	136.4	120.0	96.8	✓				
B-66	" " "	6"/2	003	12.0	123.9	10.9 / 12.6	138.1	122.6	99.0	✓				

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

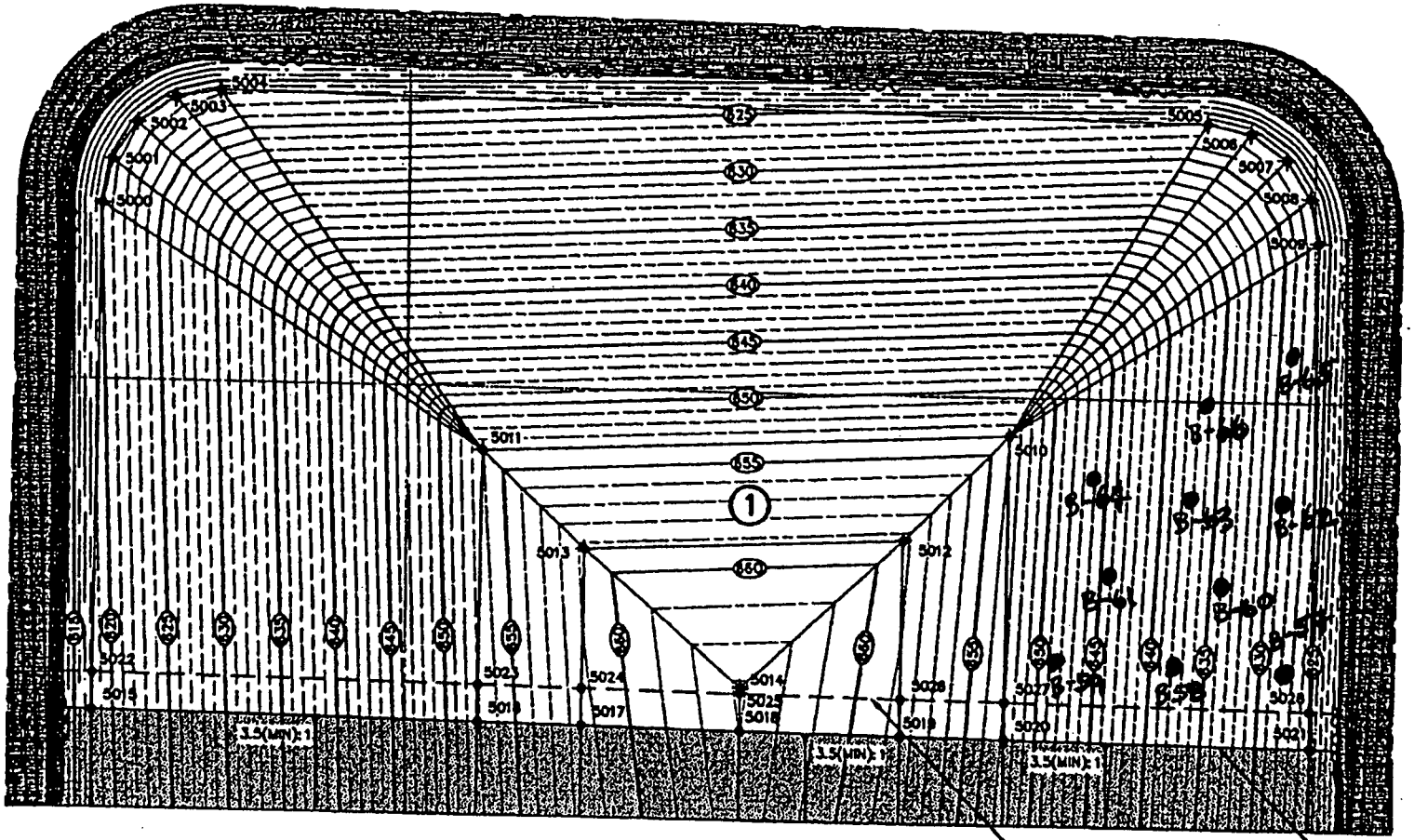
4554

000367

GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: TBL SHEET NO. 1 OF 3

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



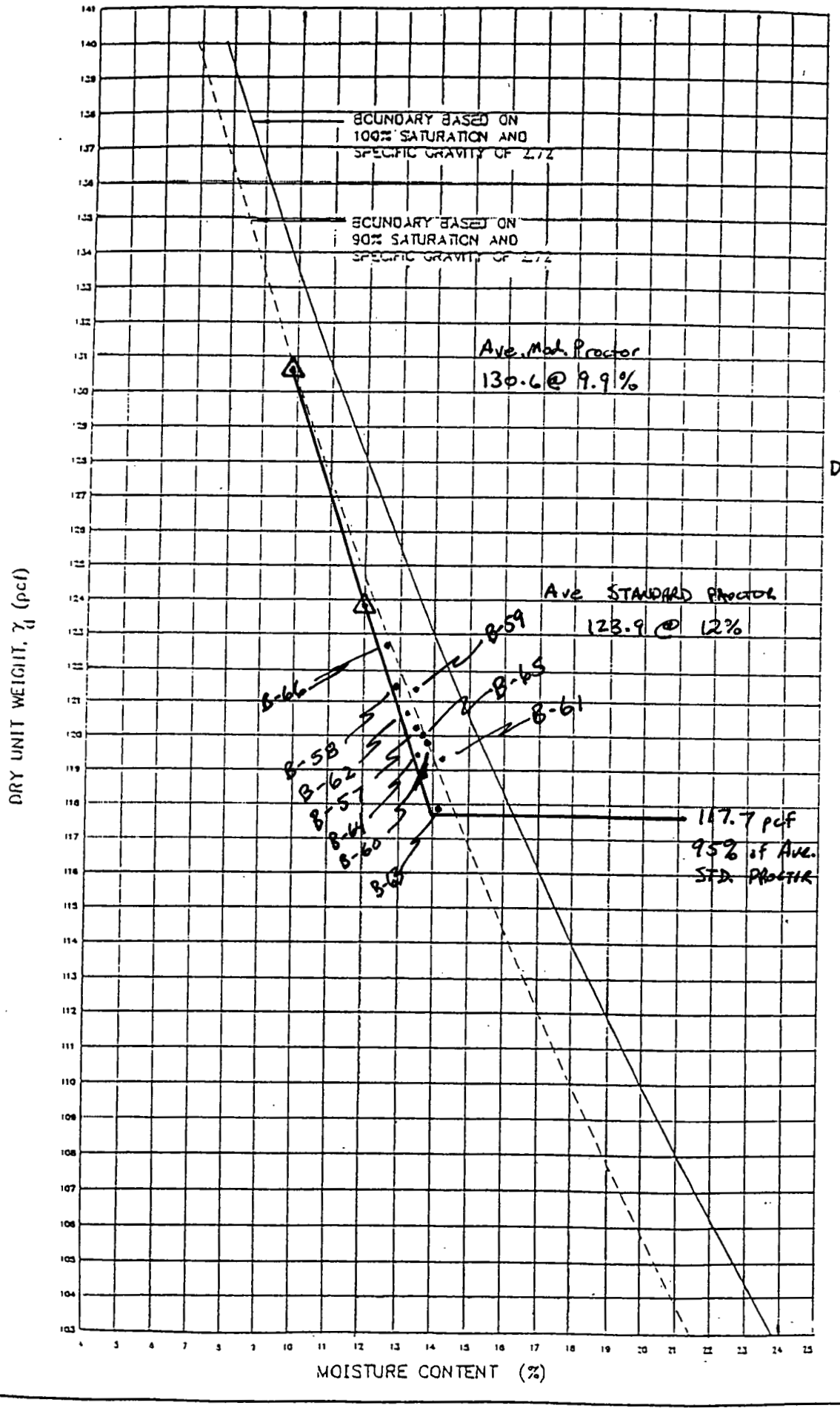
CONSTRUCTION QUALITY ASSURANCE LIMIT FOR COMPACTED CLAY CAP

EXTENT OF FINAL COVER SYSTEM TEMPORARY TERMINATION

4554

000368

DATE: 04 DAY JUNE MONTH 2001 YEAR



STOCKPILE 003

DD = -3.1905(%m) + 162.185

SHEET No 3 OF 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION:

DATE: 08 day JUNE month 2001 year FRIDAY

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3% APZ APZ LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: STOCKPILES 00-2 & 00-3 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: TBE

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-67	WEST SLOPE	6"/L-2	00-2	12.2	124.1	12.8 / 14.2	137.3	120.2	96.9	P	—	—	—	—
B-68	WEST SLOPE	6"/L-2	00-2	12.2	124.1	13.2 / 14.6	135.3	118.1	95.2	P	—	—	—	—
B-69	WEST SLOPE	6"/L-2	00-3	12.0	123.9	12.0 / 13.6	139.4	122.7	99.0	P	—	—	—	—
B-70	WEST SLOPE	6"/L-2	00-3	12.0	123.9	12.5 / 14.0	136.4	119.6	96.5	P	—	—	—	—
B-71	WEST SLOPE	6"/L-2	00-3	12.0	123.9	10.7 / 12.5	138.4	123.0	99.3	P	—	—	—	—
B-72	WEST SLOPE	6"/L-2	00-2	12.2	124.1	12.7 / 14.1	135.9	119.1	96.0	P	—	—	—	—
B-73	WEST SLOPE	6"/L-2	00-2	12.2	124.1	13.8 / 15.1	135.7	117.9	95.0	P	—	—	—	—
B-74	WEST SLOPE	6"/L-2	00-2	12.2	124.1	12.0 / 13.6	137.6	121.1	97.6	P	—	—	—	—
B-75	WEST SLOPE	6"/L-2	00-3	12.0	123.9	11.7 / 13.3	139.0	122.7	99.0	P	—	—	—	—
B-76	WEST SLOPE	6"/L-2	00-3	12.0	123.9	12.0 / 13.6	136.9	120.5	97.3	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: CH SHEET NO. 1 OF 5

000370

554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 08 day JUNE month 2001 year FRIDAY

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3% APZ LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: STOCKPILE 00-2 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: (TBC)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-77	"TOP" OF CELL	6"/L-2	00-2	12.2	124.1	10.7 / 12.5	138.8	123.4	99.4	P	–	–	–	–
B-78	"TOP" OF CELL	6"/L-2	00-2	12.2	124.1	10.5 / 12.3	140.8	125.4	101.0	P	–	–	–	–
B-79	"TOP" OF CELL	6"/L-2	00-2	12.2	124.1	12.3 / 13.8	137.1	120.5	97.1	P	–	–	–	–
B-80	"TOP" OF CELL	6"/L-2	00-2	12.2	124.1	11.0 / 12.7	140.1	124.3	100.2	P	–	–	–	–
B-81	"TOP" OF CELL	6"/L-2	00-2	12.2	124.1	11.6 / 13.2	138.9	122.7	98.9	P	–	–	–	–
B-82	"TOP" OF CELL	6"/L-2	00-2	12.2	124.1	10.5 / 12.3	140.0	124.7	100.5	P	–	–	–	–
B-83	"TOP" OF CELL	6"/L-2	00-2	12.2	124.1	11.5 / 13.1	139.3	123.2	99.3	P	–	–	–	–
		/												
		/												
		/												

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

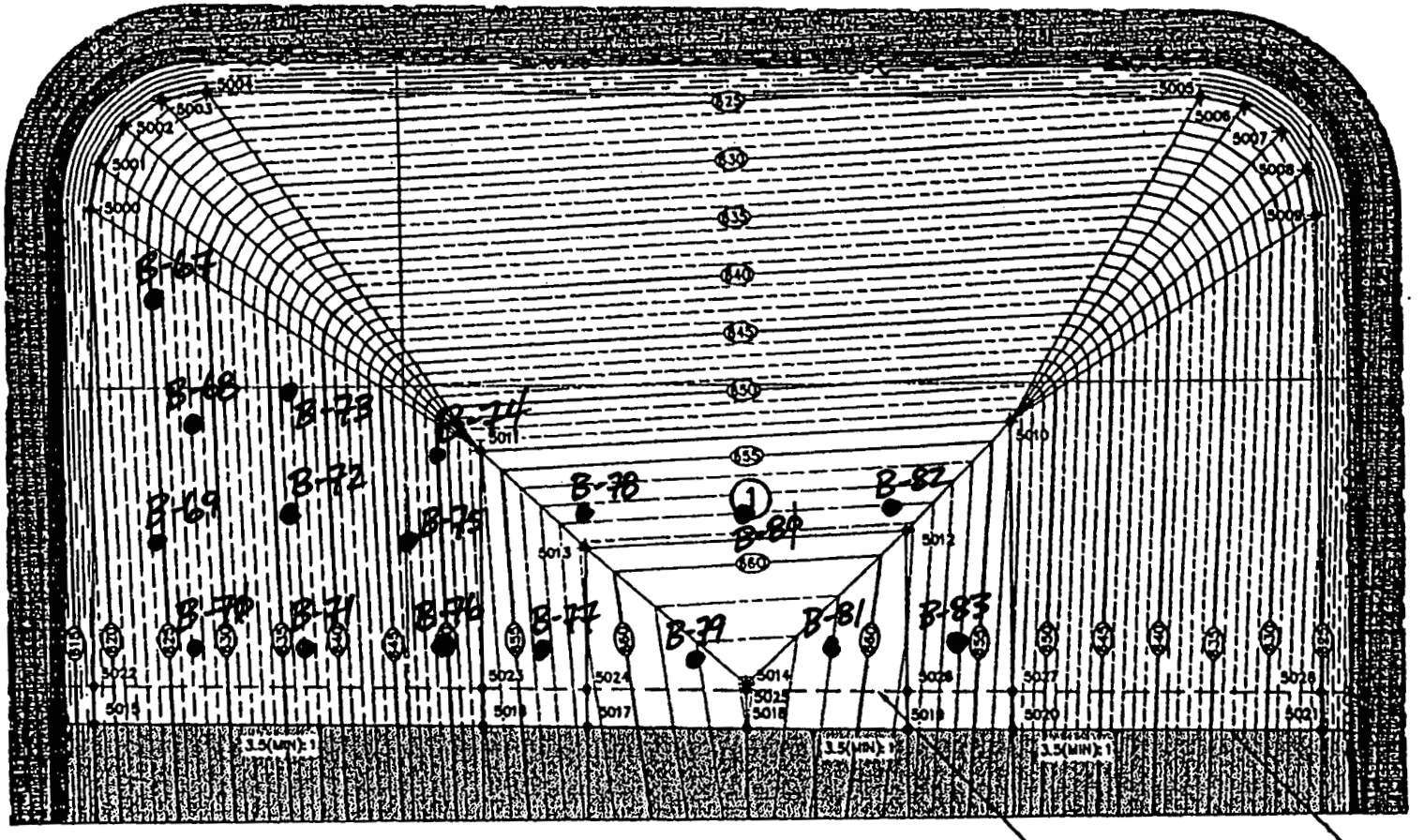
GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: SH SHEET NO. 2 OF 5

454

000371

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



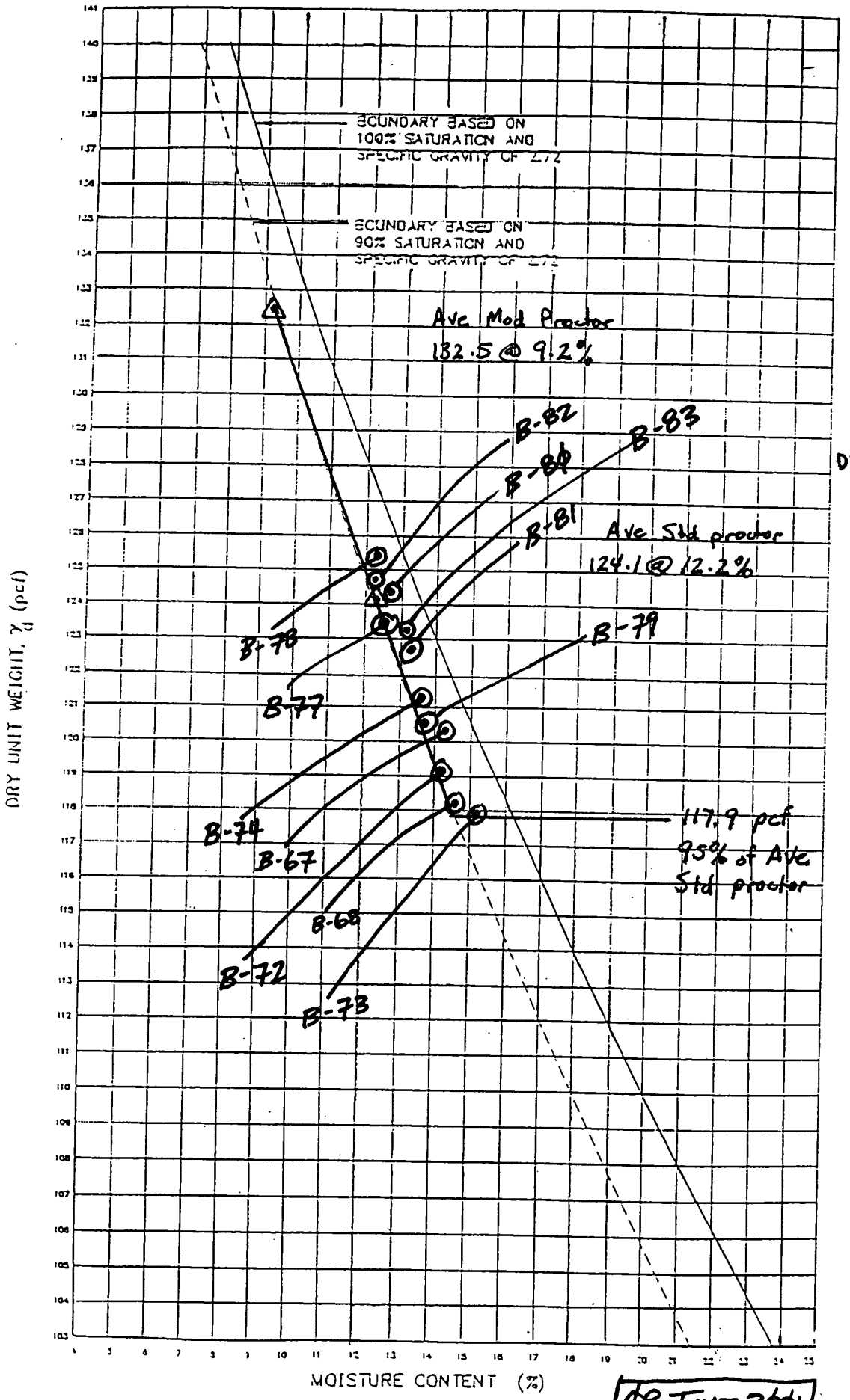
4554

000372

DATE: 08 DAY JUNE MONTH 2001 YEAR

GQ 1341 - TASK 04.1

4554



Stockpile 00-

DD = -2.80(%m) + 158.26

000373

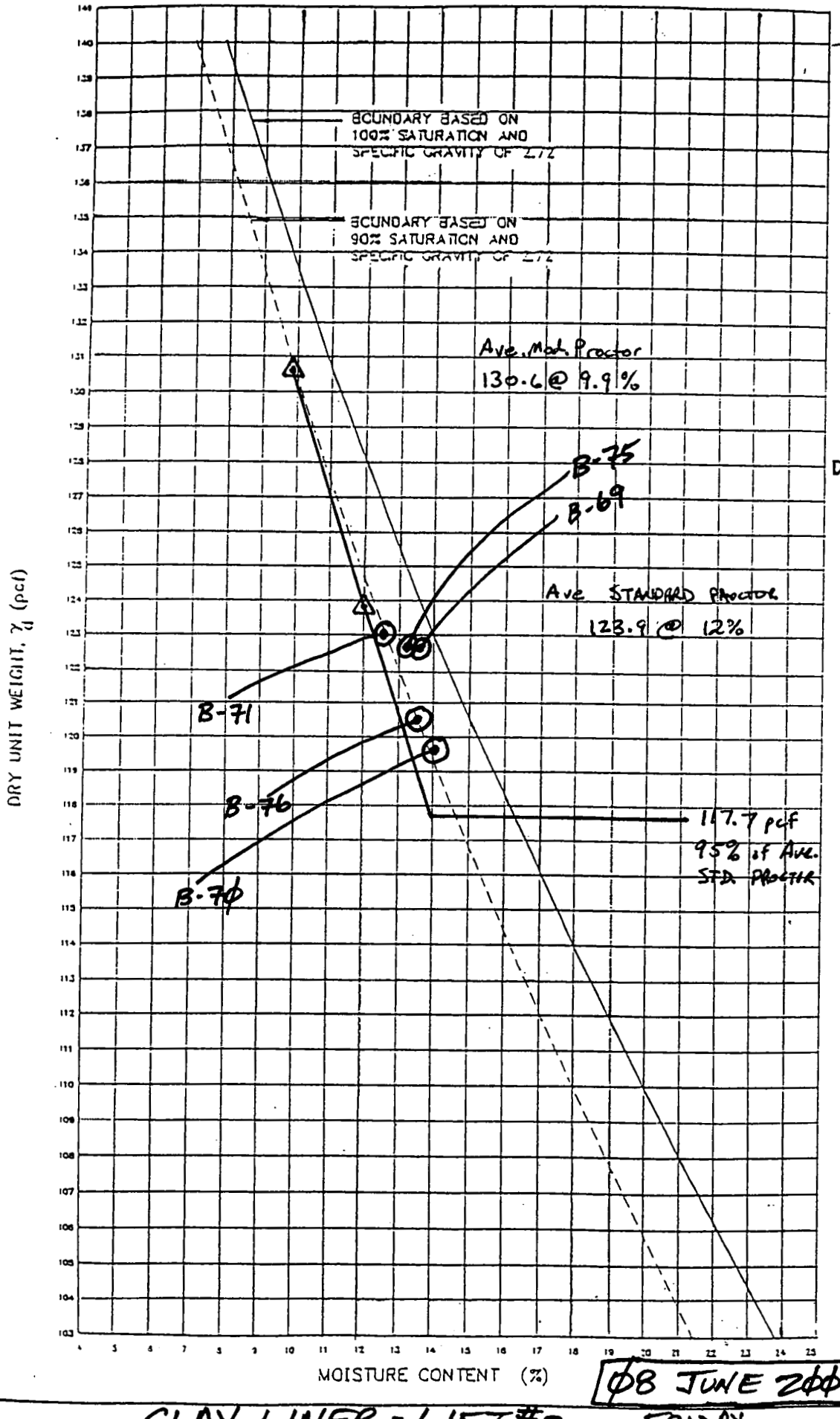
CLAY LINER - LIFT #2

08 JUNE 2001
FRIDAY

SHEET No 4 OF 5

GQ 1341 - TASK 04.1

4554



STOCKPILE 003

DD = -3.1905(%m) + 162.1857

000374

08 JUNE 2001

CLAY LINER - LIFT #2 FRIDAY

SHEET No 5 OF 5

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: CELL #1 - CAP

DATE: 11 (MONDAY) day JUNE month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3% LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: STOCKPILE 00-3 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459x + 3.4043 QA ID: TBD

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-84	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	12.7 / 14.1	138.7	121.6	98.1	P	–	–	–	–
B-85	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	12.9 / 14.3	136.5	119.4	96.4	P	–	–	–	–
B-86	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	13.7 / 15.0	135.6	117.9	95.2	P	–	–	–	–
B-87	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	12.4 / 13.9	137.9	121.1	97.7	P	–	–	–	–
B-88	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	13.5 / 14.8	135.9	118.4	95.6	P	–	–	–	–
B-89	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	13.1 / 14.5	138.7	121.1	97.7	P	–	–	–	–
B-90	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	13.5 / 14.8	135.5	118.0	95.2	P	–	–	–	–
		/												
		/												
		/												

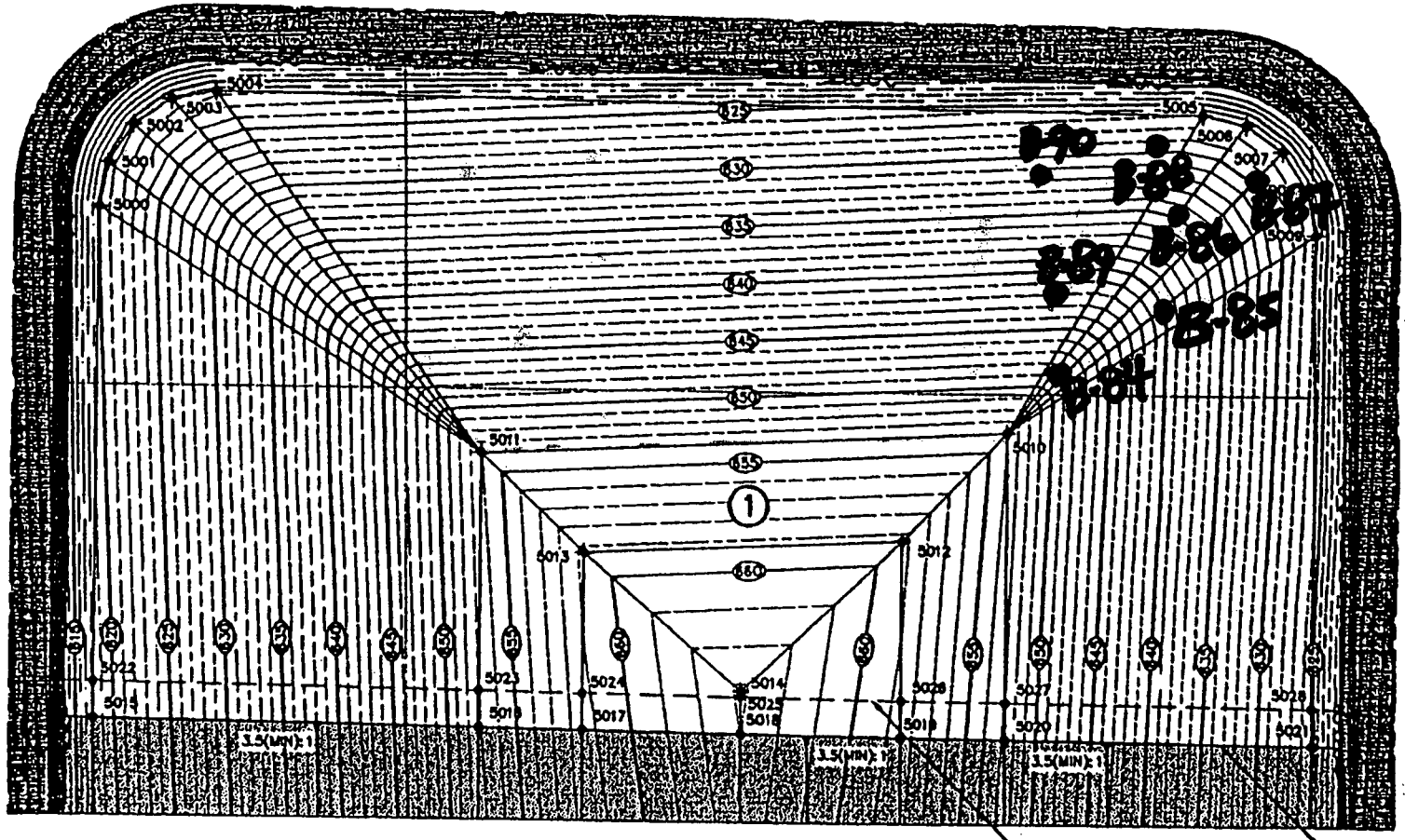
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

4554

000375

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



CONSTRUCTION QUALITY ASSURANCE LIMIT FOR COMPACTED CLAY CAP

EXTENT OF FINAL COVER SYSTEM TEMPORARY TERMINATION

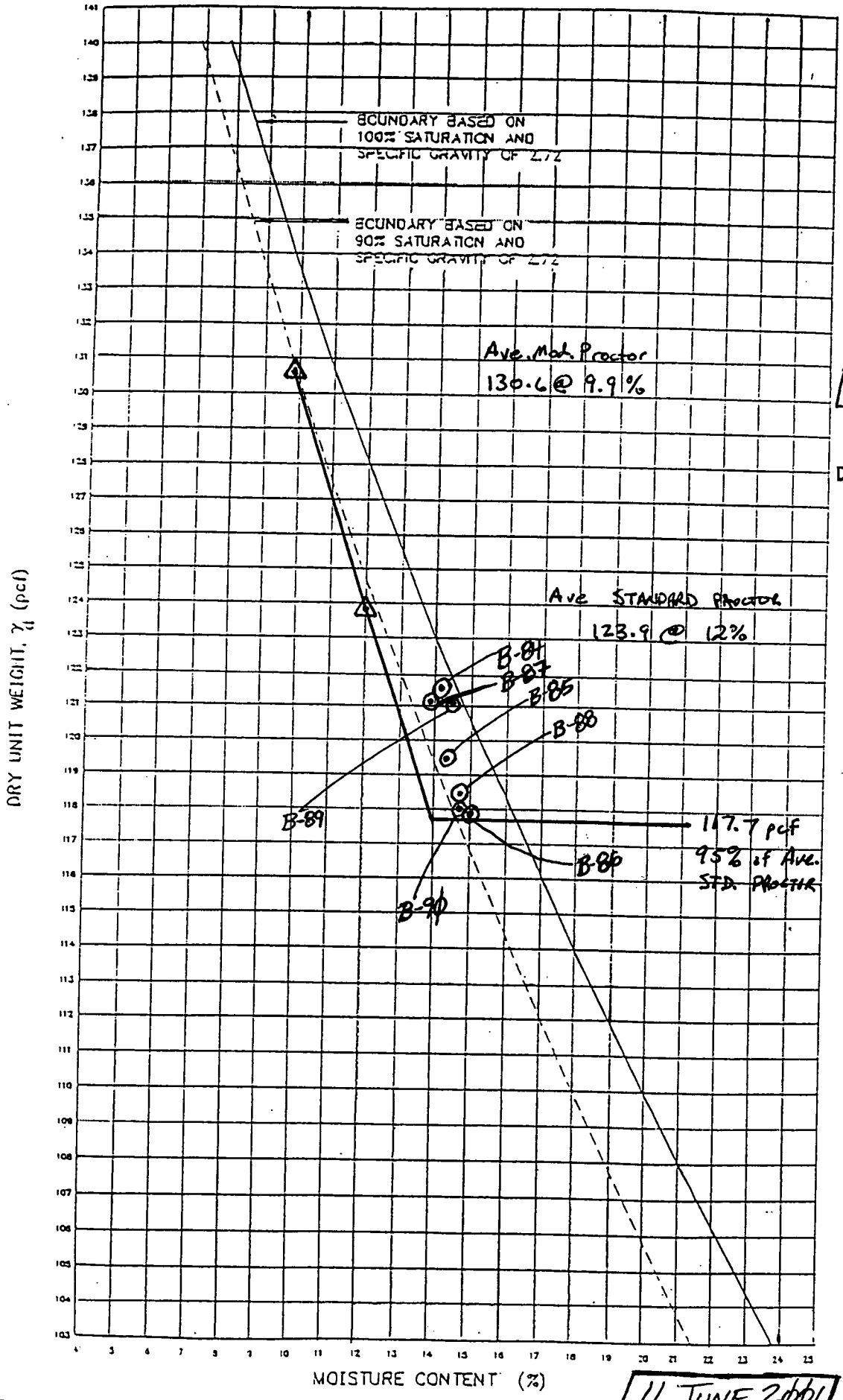
- 4554

000376

DATE: 11 DAY JUNE MONTH 2001 YEAR

GQ1341-04.1

4554



STOCKPILE 003

DD = -3.1905(%m) + 162.1857

000377

11 JUNE 2001

SHEET No. 3 OF 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III, CELL #1 - CAP CONSTRUCTION

DATE: 11 day June month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D (698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: 0-3% APZ LIFT THICKNESS (LOOSE/COMPACTED): 6"

MATERIAL SOURCE: ~~AP Borrow area~~ Borrow area CL MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. ~~20797~~ 20979 CORRECTION FACTOR Y = 0.8459x + 3.4043 QA ID: CL

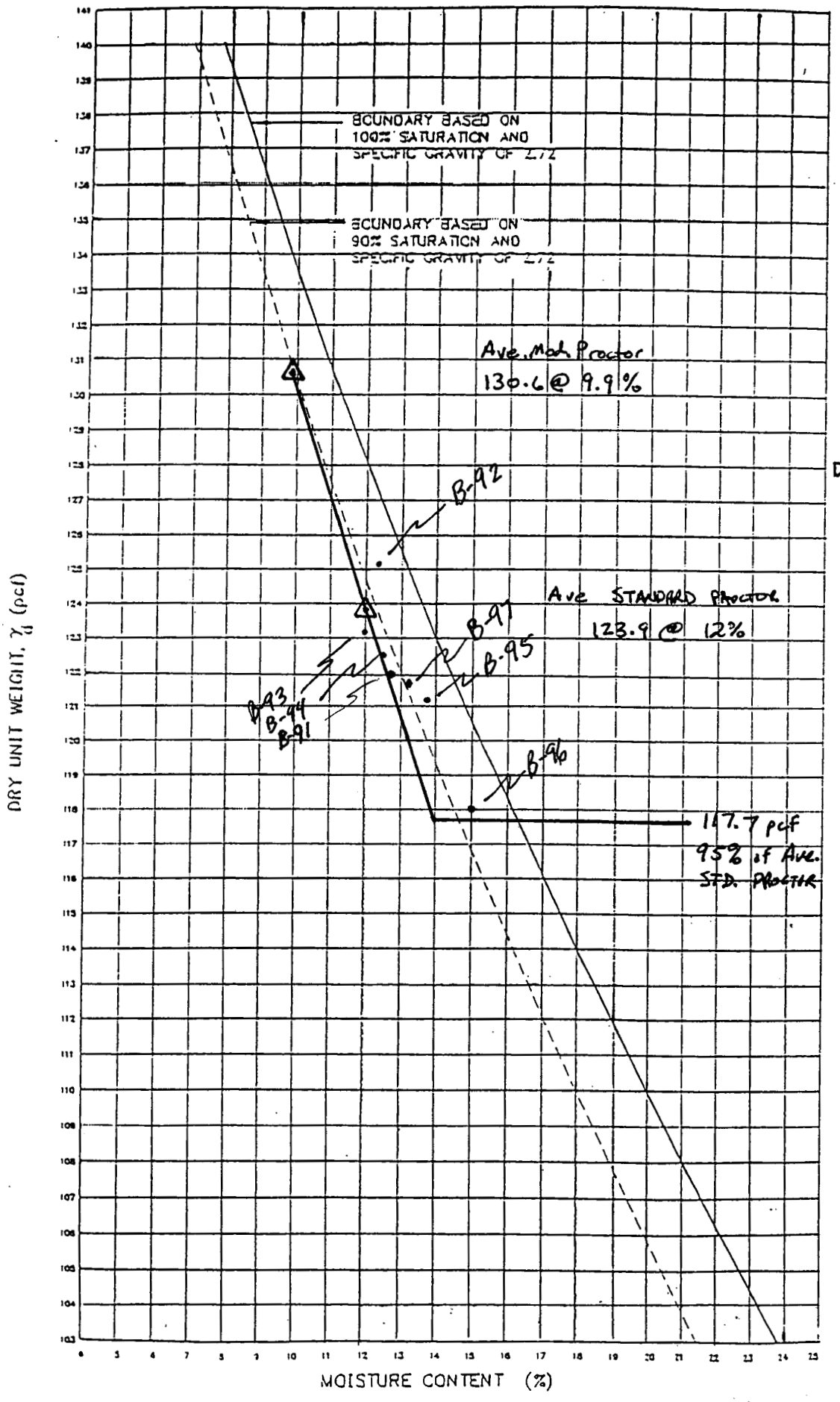
TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-91	See location map	2 2/6"	00-3	12.0	123.9	10.9 / 12.6	137.4	122.0	98.5	✓				
B-92		2 2/6"	00-3	12.0	123.9	10.6 / 12.4	140.7	125.2	101.0	✓				
B-93		6"/2	00-3	12.0	123.9	10.2 / 12.0	138.0	123.2	99.4		✓	B-95	✓	
B-94		6"/2	00-3	12.0	123.9	10.7 / 12.5	137.6	122.3	98.7	✓				
B-95		6"/2	00-3	12.0	123.9	12.3 / 13.8	137.8	121.1	97.7	✓				
B-96		6"/2	00-3	12.0	123.9	13.7 / 15.0	135.7	118.0	95.2	✓				
B-97		6"/2	00-3	12.0	123.9	11.5 / 13.1	137.7	121.8	98.3	✓				
		~~6"/2~~	~~00-3~~	~~12.0~~	~~123.9~~									

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

4554

000378

GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: TBV SHEET NO. 1 OF 3



STOCKPILE 003

DD = -3.1905(%m) + 162.1857

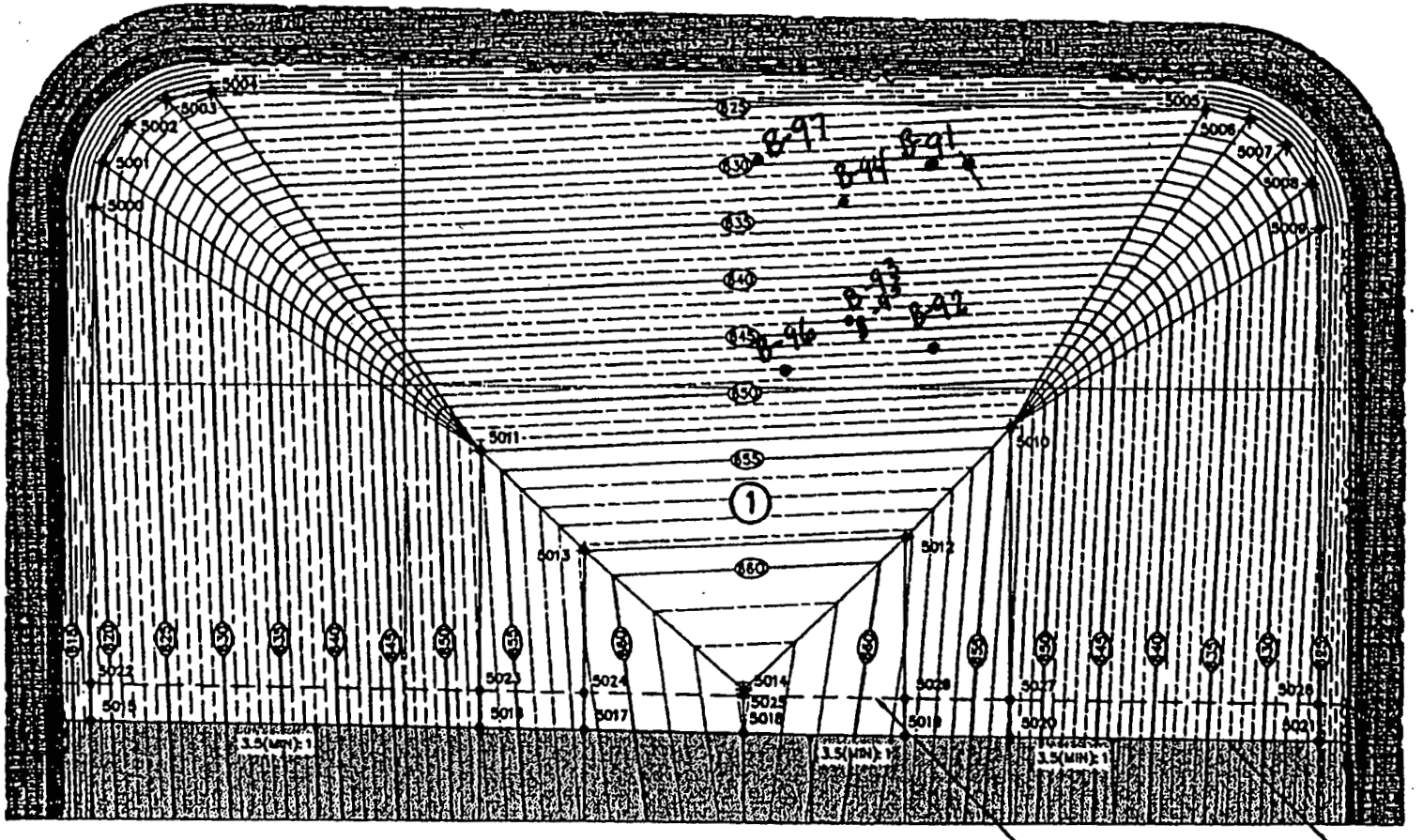
000379

16 June 2001
2 of 3

✓ O.K. (TBL)

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



4554

000380

DATE: 11 DAY June MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 02

DESCRIPTION: EPLTS

DATE: 12 day June month 01 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95% COMPACTION / MOISTURE RANGE: ~~6~~ 1.3 TD LIFT THICKNESS (LOOSE/COMPACTED): 6"

MATERIAL SOURCE: Stockpile 2 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: TD/CS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-113	See Location MAP	6" / 3	00-2	12.2	124.1	11.5 / 13.1	140.0	123.8	99.8	P				
B-114		6" / 3	00-2	12.2	124.1	11.8 / 13.4	138.5	122.1	98.4	P				
B-115		6" / 3	00-2	12.2	124.1	12.0 / 13.6	137.0	120.6	~~120.2~~ 97.2 TD	P				
B-116		6" / 3	002	12.2	124.1	10.3 / 12.7	141.1	125.8	101.4	P				
B117		6" / 3	002	12.2	124.1	11.4 / 13.0	137.4	121.6	@ 98, 198.0 TD	F		B118		
B118		6" / 3	002	12.2	124.1	10.6 / 12.4	138.8	123.5	~~12~~ 99.5 TD	P				
B119		6" / 3	002	12.2	124.1	10.3 / 12.2	141.2	125.8	101.4	P		~~B111~~ TD		
B120		6" / 3	002	12.2	124.1	11.4 / 13.0	139.4	123.4	99.4	P		B111		
		/												
		/												

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

©GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: CA SHEET NO. 1 OF 3

4554

000381

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CAP - CELL #1

DATE: 12 day JUNE month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 ~~102~~ % COMPACTION / MOISTURE RANGE: +0-3 ~~+2~~ LIFT THICKNESS (LOOSE) / COMPACTED): 8"

MATERIAL SOURCE: STOCKPILE 00-3 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459x + 3.4043 QA ID: (TBC)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-98	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	11.6 / 13.2	136.2	120.3	97.1	P	–	–	–	–
B-99	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	12.3 / 13.8	138.3	121.5	98.1	P	–	–	–	–
B-100	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	12.0 / 13.6	137.3	120.9	97.6	P	–	–	–	–
B-101	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	11.7 / 13.3	139.1	122.8	99.1	P	–	–	–	–
B-102	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	13.4 / 14.7	135.5	118.1	95.3	P	–	–	–	–
B-103	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	12.4 / 13.9	137.3	120.5	97.3	P	–	–	–	–
B-104	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	12.1 / 13.6	140.0	123.2	99.4	P	–	–	–	–
B-105	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	12.0 / 13.6	138.0	121.5	98.1	P	–	–	–	–
B-106	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	12.4 / 13.9	136.2	119.6	96.5	P	–	–	–	–
B-107	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	11.3 / 13.0	137.8	121.9	98.4	P	–	–	–	–

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

4554

000382

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: CELL #1 - CAP

DATE: 12 day JUNE month 2001 year (TUESDAY)

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION (APZ) / MOISTURE RANGE: +0-3 (APZ) LIFT THICKNESS (LOOSE) COMPACTED): 8"

MATERIAL SOURCE: STOCKPILES 00-3 & 00-2 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X+3.4043 QA ID: (FAN)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-108	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	11.8 / 13.4	135.8	119.8	96.7	P	—	—	—	—
B-109	NORTH SLOPE	6"/L-2	00-3	12.0	123.9	12.8 / 14.2	136.0	119.1	96.1	P	—	—	—	—
B-110	WEST SLOPE	6"/L-3	00-2	12.2	124.1	11.0 / 12.7	139.6	123.9	99.8	P	—	—	—	—
B-111	WEST SLOPE	6"/L-3	00-2	12.2	124.1	9.7 / 11.6	138.8	124.4	100.2	—	F	B-120	P	—
B-112	WEST SLOPE	6"/L-3	00-2	12.2	124.1	11.4 / 13.0	138.4	122.5	98.7	P	—	—	—	—

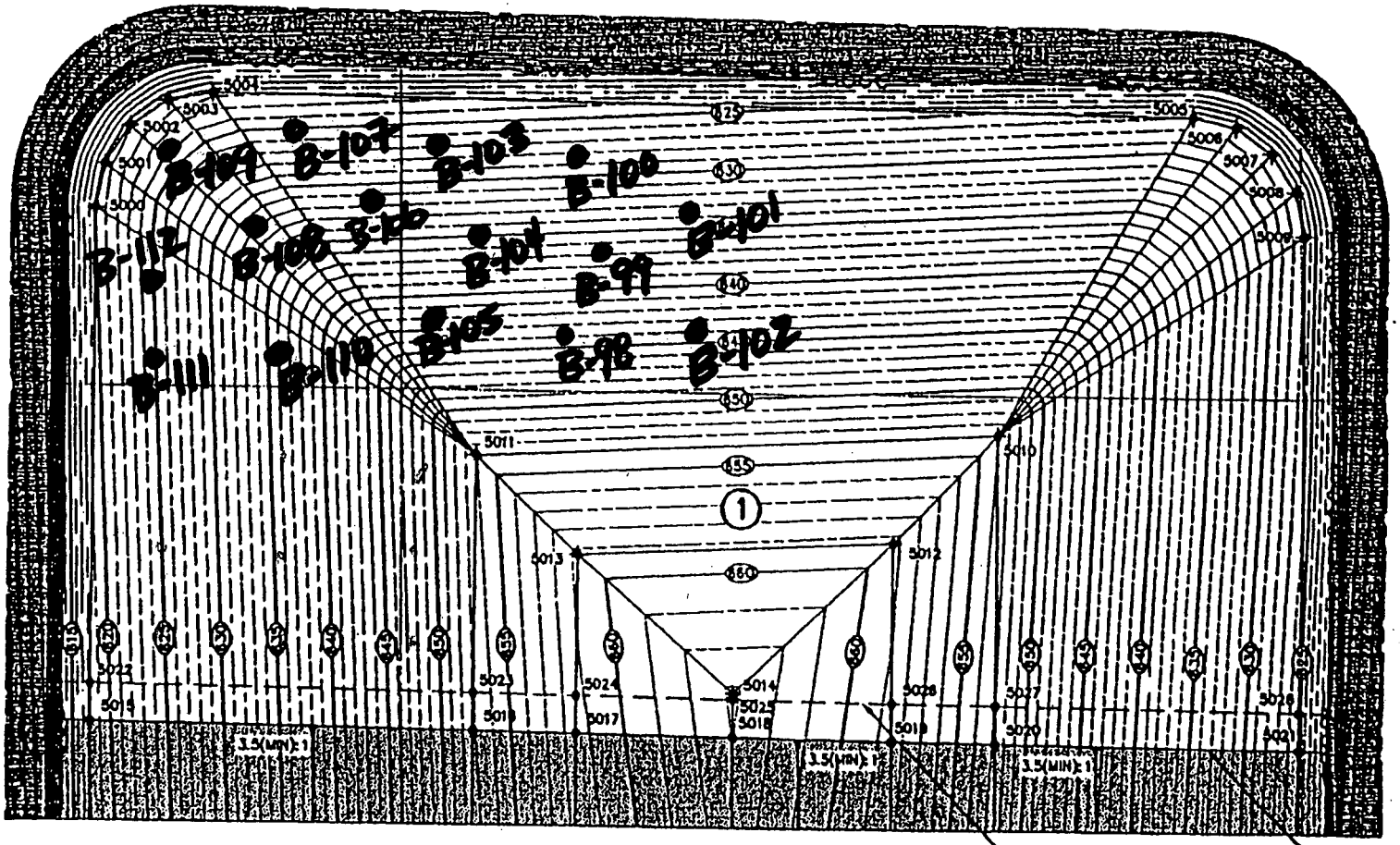
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

4554

000383

CELL #1 - FINAL COVER

GQ1341 TASK 04.1

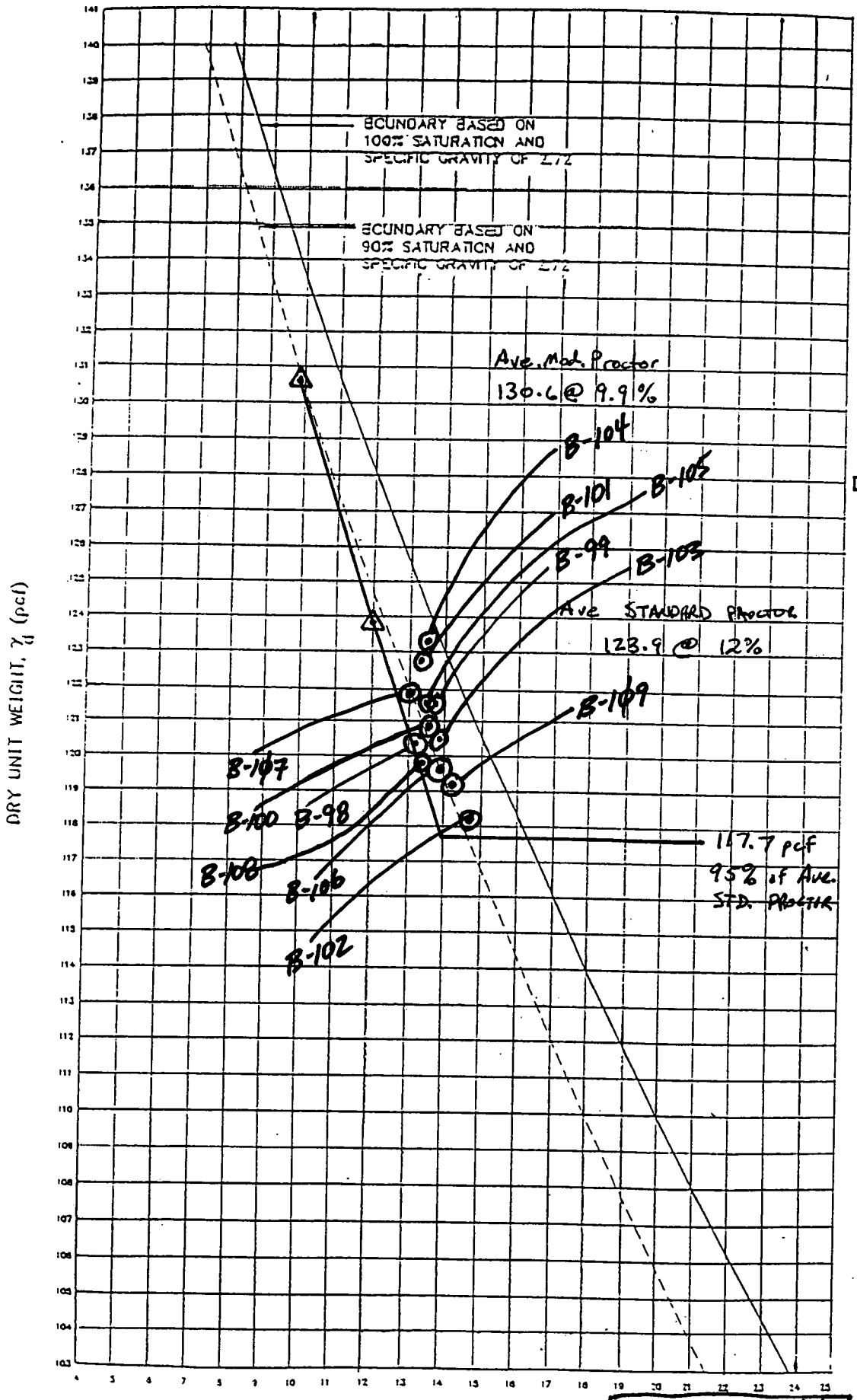


000384

4554

DATE: 13 DAY JUNE MONTH 2001 YEAR

GQ1341 - TASK 041 4554



STOCKPILE 003

DD = -3.1905(%m) + 162.1857

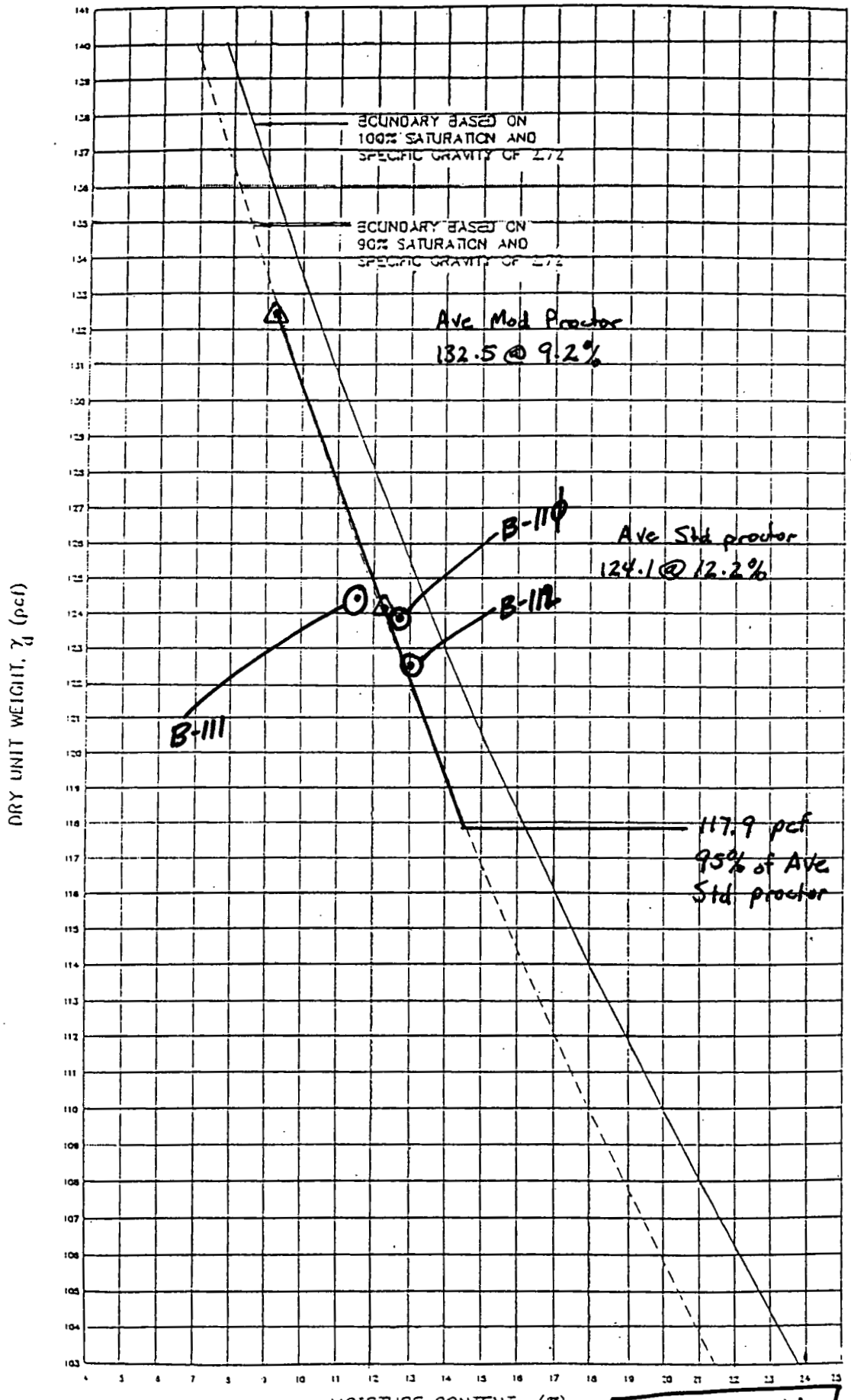
000385

12 JUNE 2001

SHEET No 4 OF 5

GQ 1341 - TASK 04.1

4554



Stockpile 00-

DD = -2.80(%m) + 158.26

12 JUNE 2001

000386

SHEET No 5 OF 5

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 02

DESCRIPTION: EPLTS

DATE: 12 day June month 01 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95% COMPACTION / MOISTURE RANGE: ~~6~~ +3 TD LIFT THICKNESS (LOOSE/COMPACTED): 6"

MATERIAL SOURCE: Stockpile 2 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: TD/CS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-113	See Location MAP	6" / 3	00-2	12.2	124.1	11.5 / 13.1	140.0	123.8	99.8	P				
B-114		6" / 3	00-2	12.2	124.1	11.8 / 13.4	138.5	122.1	98.4	P				
B-115		6" / 3	00-2	12.2	124.1	12.0 / 13.6	137.0	120.6	~~120.2~~ 97.2 TD	P				
B116		6" / 3	002	12.2	124.1	10.3 / 12.2	141.1	125.8	101.4	P				
B117		6" / 3	002	12.2	124.1	11.4 / 13.0	137.4	121.6	~~98.1~~ 98.0 TD	~~P~~	F	B118		
B118		6" / 3	002	12.2	124.1	10.6 / 12.4	138.8	123.5	~~12~~ 99.5 TD	P				
B119		6" / 3	002	12.2	124.1	10.3 / 12.2	141.2	125.8	101.4	P		~~B117~~ TD		
B120		6" / 3	002	12.2	124.1	11.4 / 13.0	139.4	123.4	99.4	P		B111		
		/												
		/												

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

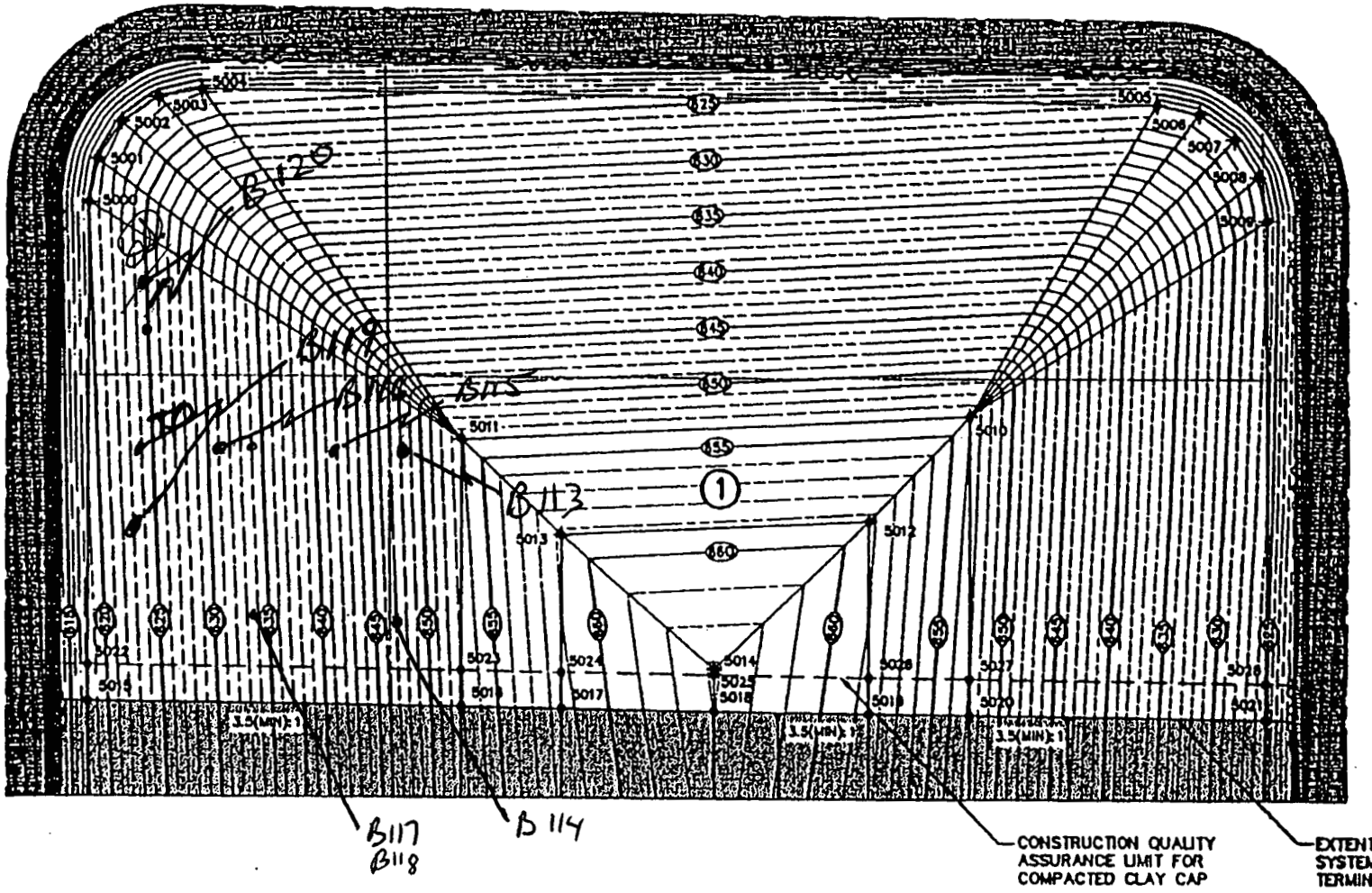
4554

000382

GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: CA SHEET NO. 1 OF 3

CELL #1 - FINAL COVER

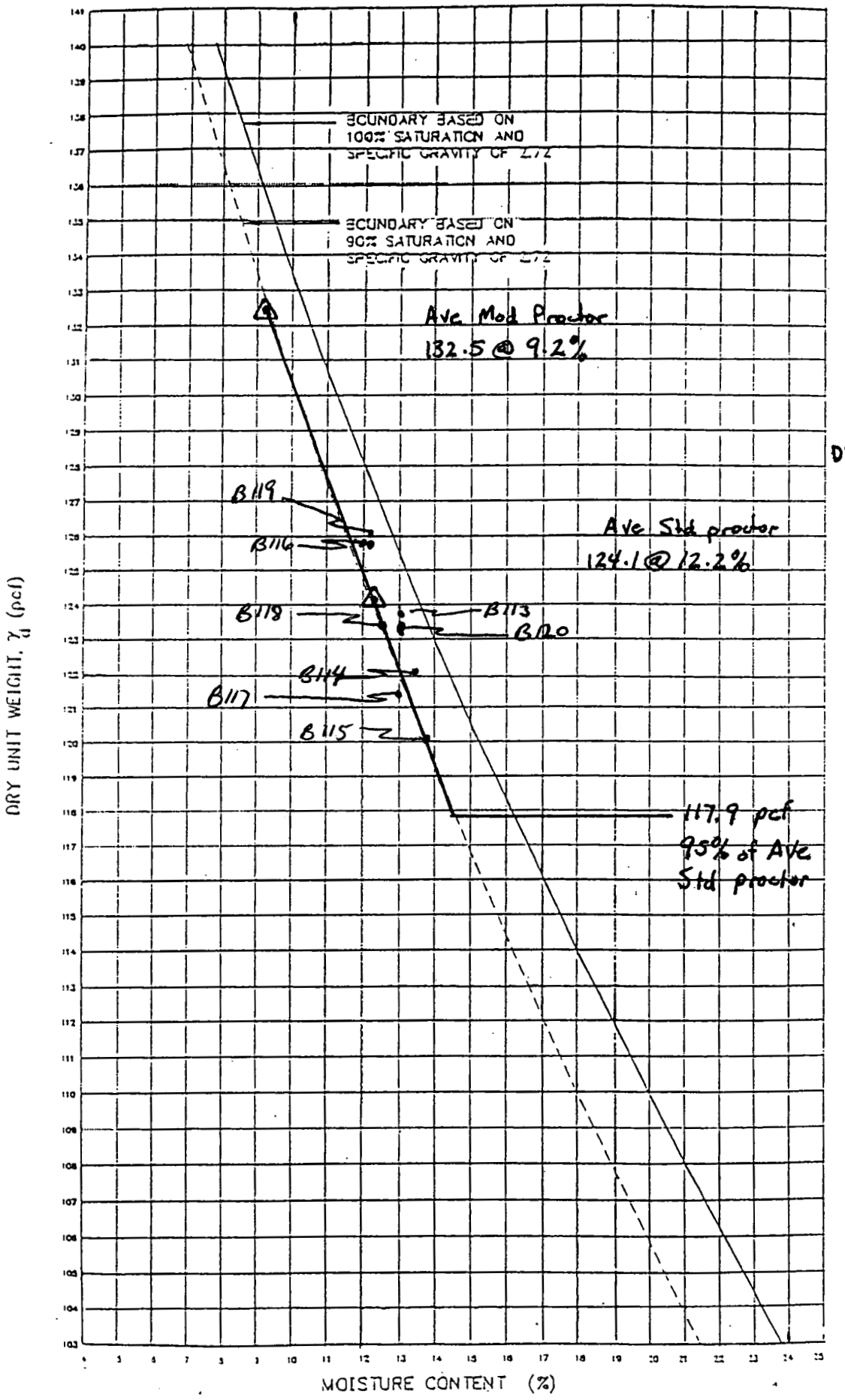
GQ1341 TASK 04.1



4554

000388

DATE: 12 DAY JUN MONTH 01 YEAR



Stockpile 00-2

DD = -2.80(%m)+158.26

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04

DESCRIPTION: Phase III - Cell #1 CAP

DATE: 13 day June month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: 0-3% LIFT THICKNESS (LOOSE/(COMPACTED): 6"

MATERIAL SOURCE: 002 Stockpile MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: CL

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
B-121	See Location Map	6/3	002	12.2	124.1	10.5 12.3	139.7	124.4	100.2	P				
B-122		6/3	00-2	12.2	124.1	13.0 14.4	136.6	119.4	96.2	P				
B-123		6/3	00-2	12.2	124.1	12.7 14.1	138.0	120.9	97.4	P				
B-124		6/3	00-2	12.2	124.1	11.7 13.3	137.4	121.3	97.7	P				
B-125		6/3	00-2	12.2	124.1	13.2 14.6	137.6	120.1	96.8	P				
B-126		6/3	00-2	12.2	124.1	12.5 14.0	139.2	122.1	98.4	P				
B-127		6/3	00-2	12.2	124.1	12.8 14.2	138.2	121.0	97.5	P				
B-128		6/3	00-2	12.2	124.1	11.6 13.2	138.4	122.3	98.6	P				
B-129		6/3	00-2	12.2	124.1	12.4 13.9	138.5	121.6	98.0	P				
B-130		6/3	00-2	12.2	124.1	12.7 14.1	138.9	121.7	98.1	P				

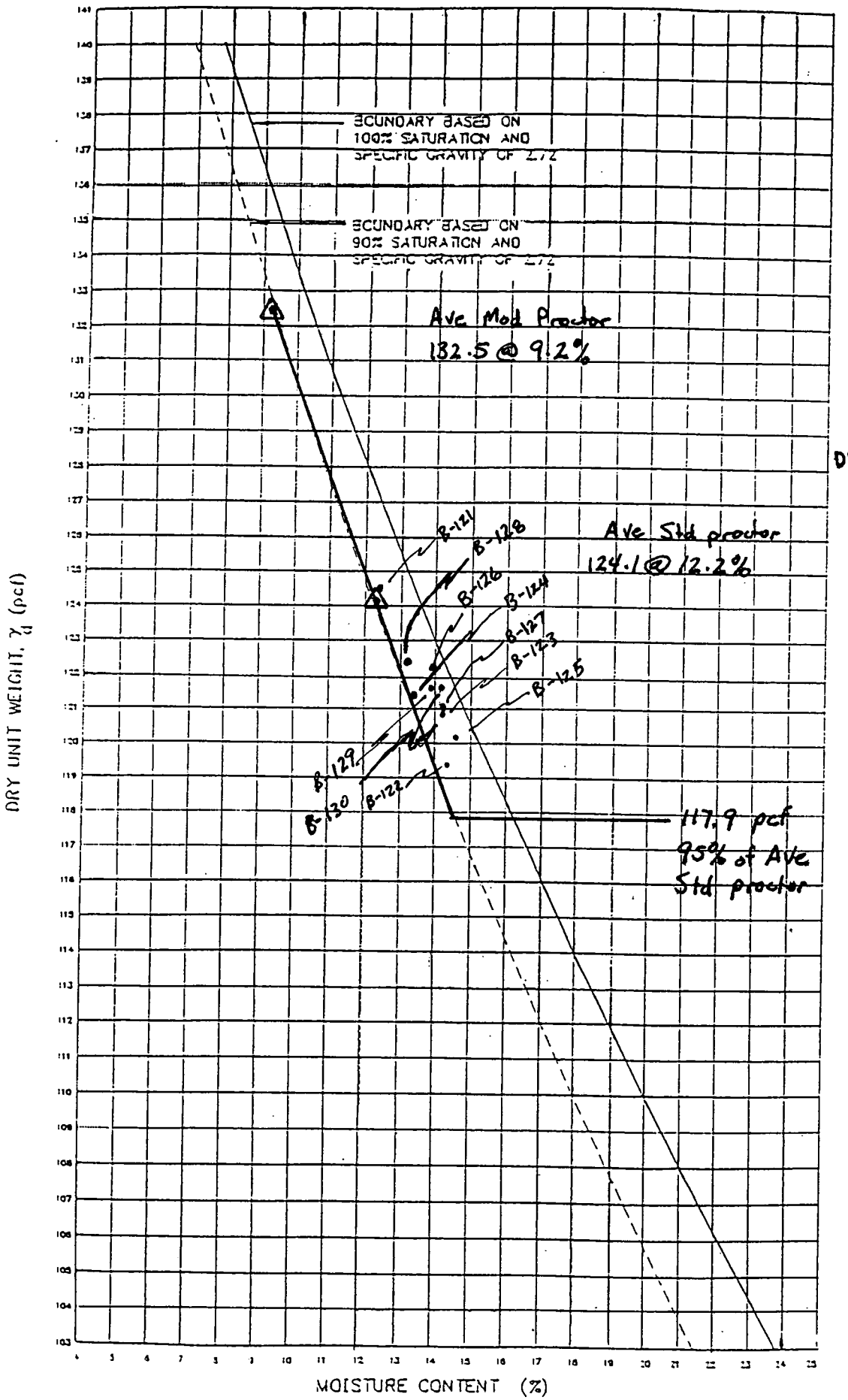
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

4554

000380

©GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: TAU SHEET NO. 1 OF 3

-- 4554



Stockpile 00-2

DD = -2.80(%m) + 158.26

000391

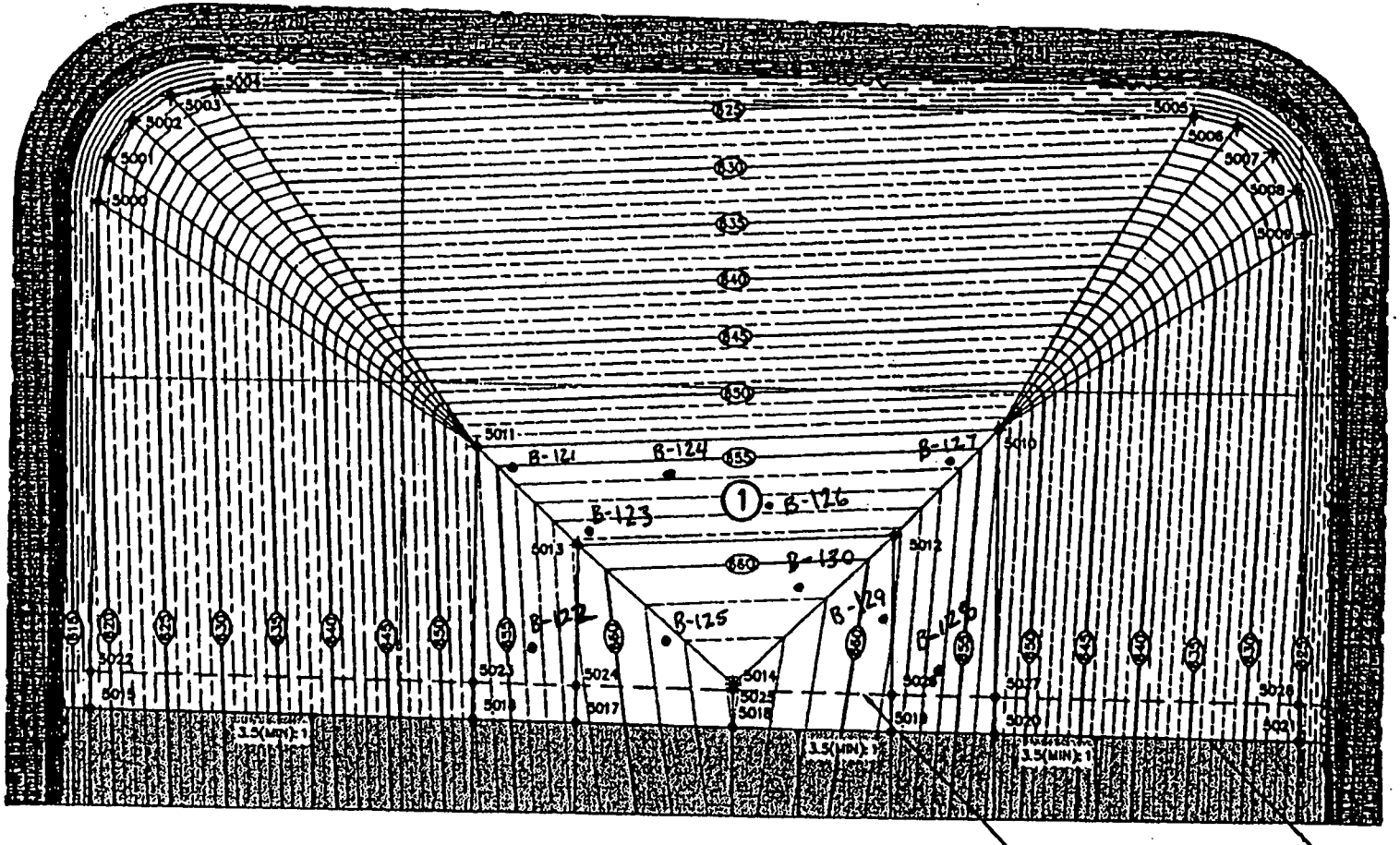
June 11 2001

2 of 3

✓ O.K. (TBW)

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



CONSTRUCTION QUALITY ASSURANCE LIMIT FOR COMPACTED CLAY CAP

EXTENT OF FINAL COVER SYSTEM TEMPORARY TERMINATION

4554

000392

DATE: 11 DAY June MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III - CELL #1 CAP

DATE: 14 day June month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: 0 to 3% APZ LIFT THICKNESS (LOOSE/(COMPACTED)): 6"

MATERIAL SOURCE: 002 Stockpile East Borrow AREA

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: Gl

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-131	See Location Map	6"/3	00-2	12.2	124.1	10.8 / 12.5	138.9	123.5	99.5	P				
B-132		6"/3	00-2	12.2	124.1	10.7 / 12.5	137.3	122.0	98.3		F	B-139	P	
B-133		6"/3	00-2	12.2	124.1	11.4 / 13.0	140.0	123.9	99.8	P				
B-134		6"/3	00-2	12.2	124.1	12.4 / 13.9	136.2	119.6	96.4	P				
B-135		6"/3	00-2	12.2	124.1	10.8 / 12.5	138.7	123.3	99.3	P				
B-136		6"/3	00-2	12.2	124.1	11.1 / 12.8	139.4	123.6	99.6	P				
B-137		6"/3	00-2	12.2	124.1	12.0 / 13.6	137.4	121.0	97.5	P				
B-138		6"/3	00-2	12.2	124.1	11.1 / 12.8	140.0	124.1	100.0	P				
B-139		6"/3	00-2	12.2	124.1	11.0 / 12.7	139.4	123.7	99.7	P				
B-140		6"/3	00-2	12.2	124.1	11.2 / 12.9	139.4	123.5	99.5	P				

4554

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000393

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III - Cell #1 CAP

DATE: 14 day June month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: 0 to +3% LIFT THICKNESS (LOOSE/(COMPACTED)): 6"

MATERIAL SOURCE: 002 Stockpile East Borrow area

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459x + 3.4043 QA ID: CS

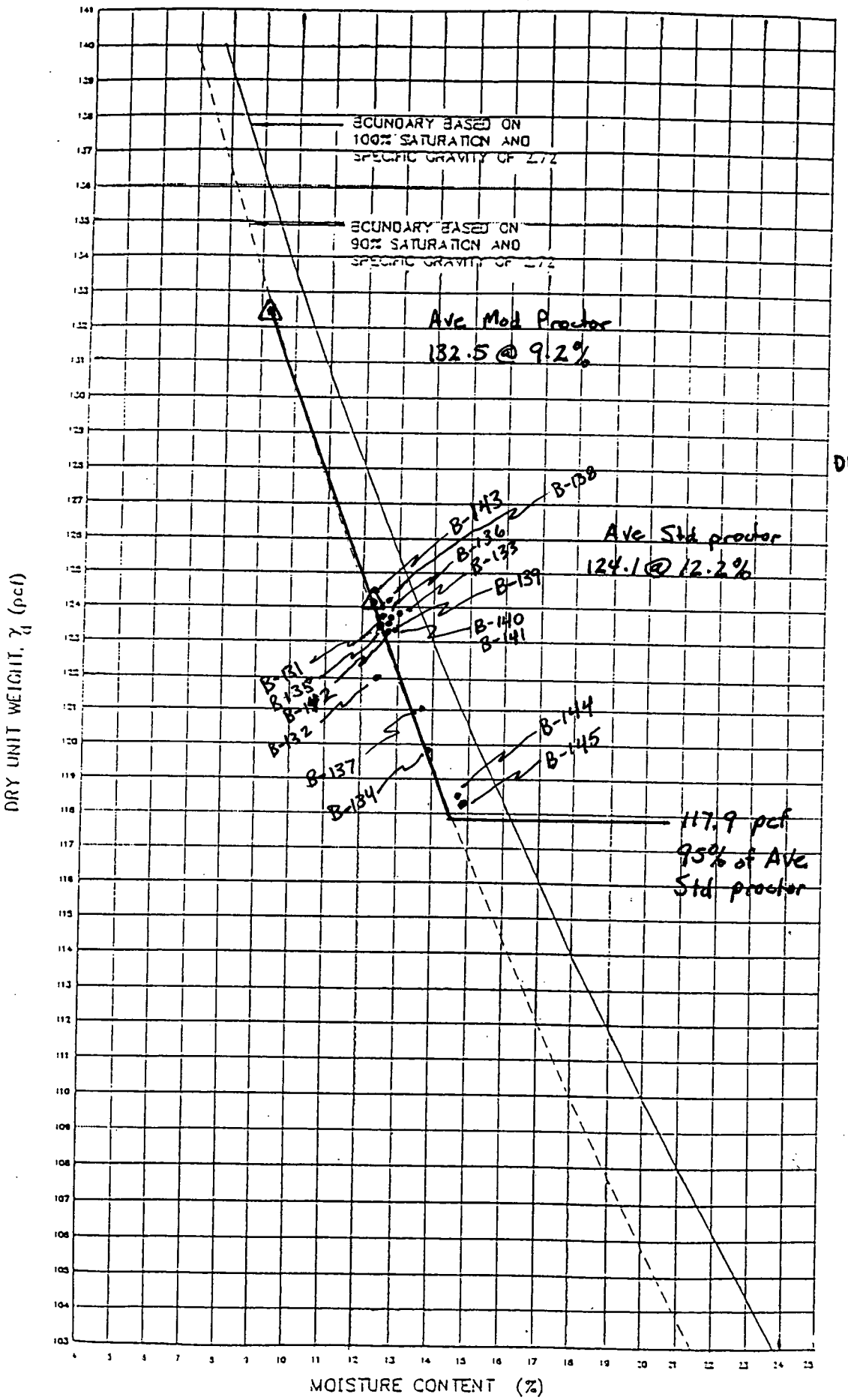
TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-141	See Location Map	6"/3	002	12.2	124.1	11.2 12.9	139.4	123.5	99.5	P				
B-142	↓	6"/3	002	12.2	124.1	10.7 12.5	138.8	123.4	99.4	P				
B-143	↓	6"/3	002	12.2	124.1	10.4 12.2	139.5	124.3	100.2	P				
B-144	↓	6"/3	002	12.2	124.1	13.2 14.6	135.8	118.5	95.5	P				
B-145	↓	6"/3	002	12.2	124.1	13.3 14.7	135.6	118.2	95.3	P				

4554

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000394

©GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: TBC SHEET NO. 2 OF 4



Stockpile 00-

DD = -2.80(%m)+158.26

000395

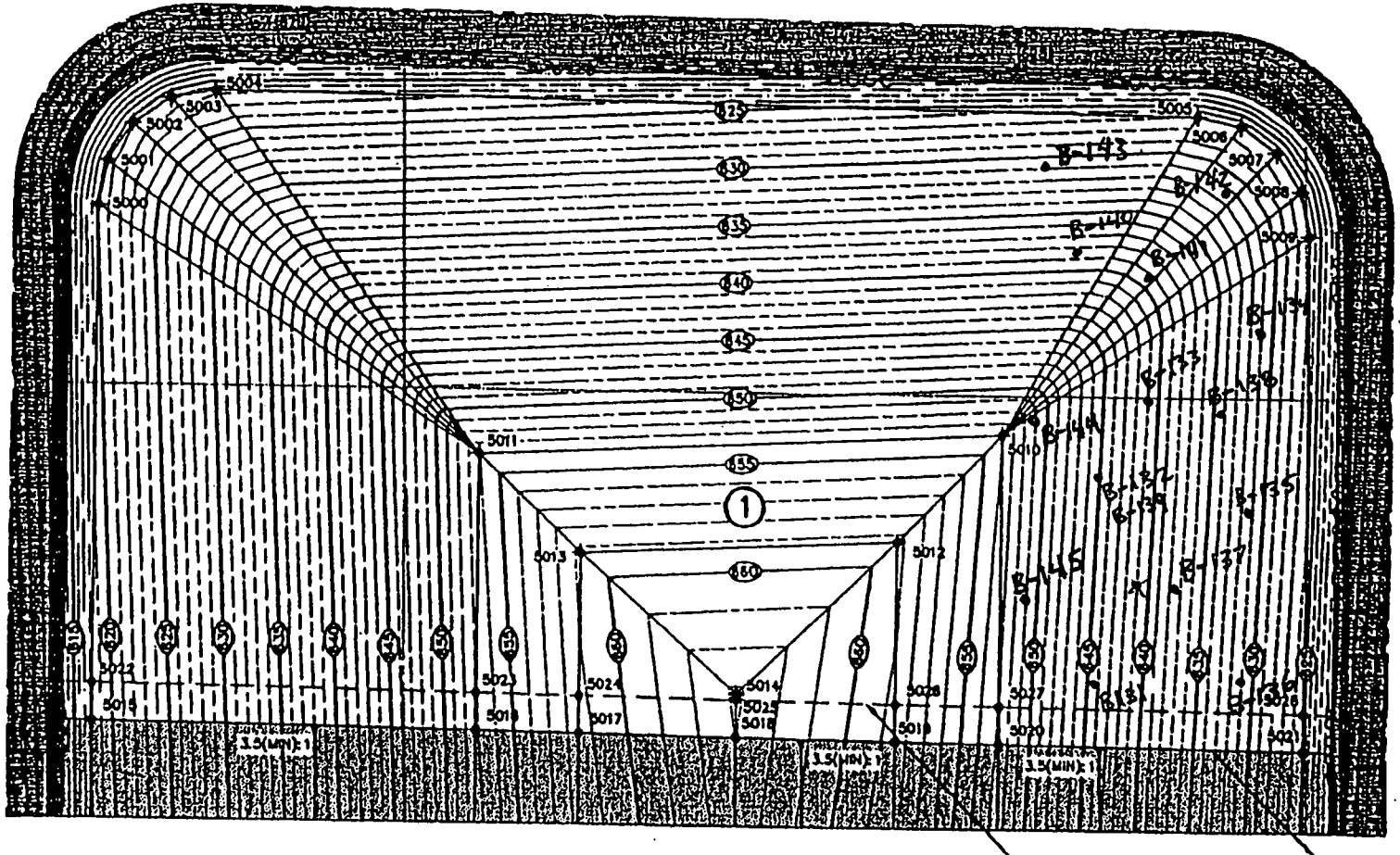
June 2001

3 of 4

✓ O.K

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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000396

DATE: 14 DAY June MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GR1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 - CAP CONSTRUCTION

DATE: 15 day JUNE month 2001 year FRIDAY

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3% AP2 LIFT THICKNESS (LOOSE / COMPACTED): 8"

MATERIAL SOURCE: STOCKPILE 00-2 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: TP / TP

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-146	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	11.1 / 12.8	142.1	126.0	101.5	P	—	—	—	—
B-147	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	11.2 / 12.9	141.7	125.5	101.1	P	—	—	—	—
B-148	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	11.5 / 13.1	138.9	122.8	99.0	P	—	—	—	—
B-149	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	10.7 / 12.5	139.7	124.2	100.1	P	—	—	—	—
B-150	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	12.2 / 13.7	137.7	121.1	97.6	P	—	—	—	—
B-151	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	10.7 / 12.5	139.2	123.7	99.7	P	—	—	—	—
B-152	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	10.5 / 12.3	139.2	124.0	99.9	P	—	—	—	—
B-153	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	11.6 / 13.2	140.0	[illegible]	99.7	P	—	—	—	—
B-154	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	10.4 / 12.2	141.4	126.0	101.5	P	—	—	—	—
B-155	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	11.5 / 13.1	141.6	125.2	100.9	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000387

4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 15 day JUNE month 2001 year FRIDAY

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95% APZ COMPACTION / MOISTURE RANGE: +0-3% APZ LIFT THICKNESS (LOOSE / COMPACTED): 6-8"

MATERIAL SOURCE: STOCKPILE 00-2 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: TBM/TP

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-156	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	12.3 / 13.8	138.7	121.9	98.2	P	—	—	—	—
B-157	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	10.7 / 12.5	140.1	124.5	100.3	P	—	—	—	—
B-158	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	11.4 / 13.0	141.4	125.1	100.8	P	—	—	—	—
B-159	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	10.1 / 11.9	136.7	122.2	98.5	—	F	*		
B-160	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	10.9 / 12.6	140.1	124.4	100.2	P	—	—	—	—
B-161	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	9.6 / 11.5	141.8	127.2	102.5	—	F	*		

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y) * Test No's 162, 163, 164, and 165 were taken in the same general vicinity as tests 158, 159, 160, and 161 after the area was re-stabilized, hydrated and compacted. Tests 162-164 passed project specifications.

000398

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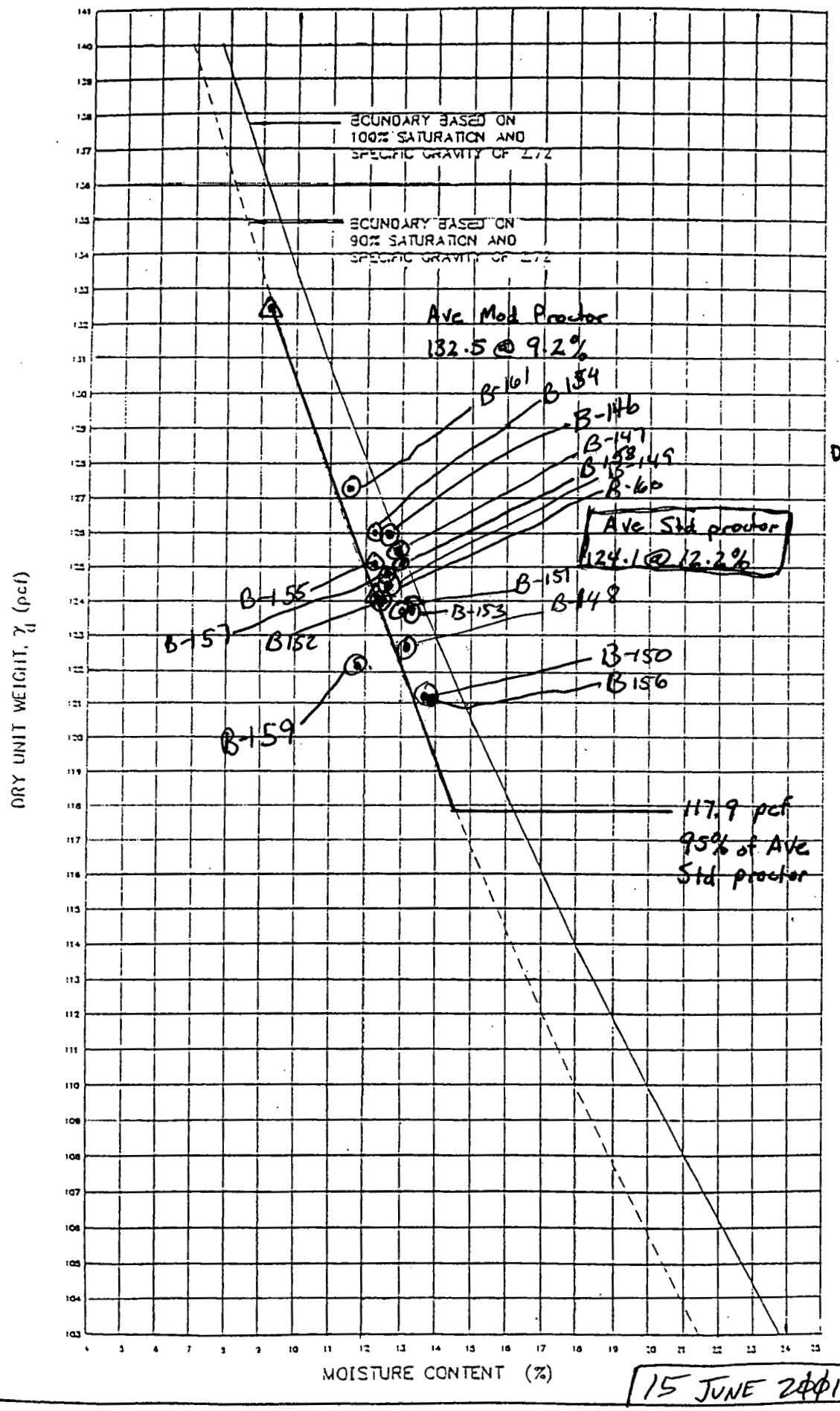
GQ1341 - TASK 04.1 4554



Stockpile 00-2

DD = -2.80(%m)+158.26

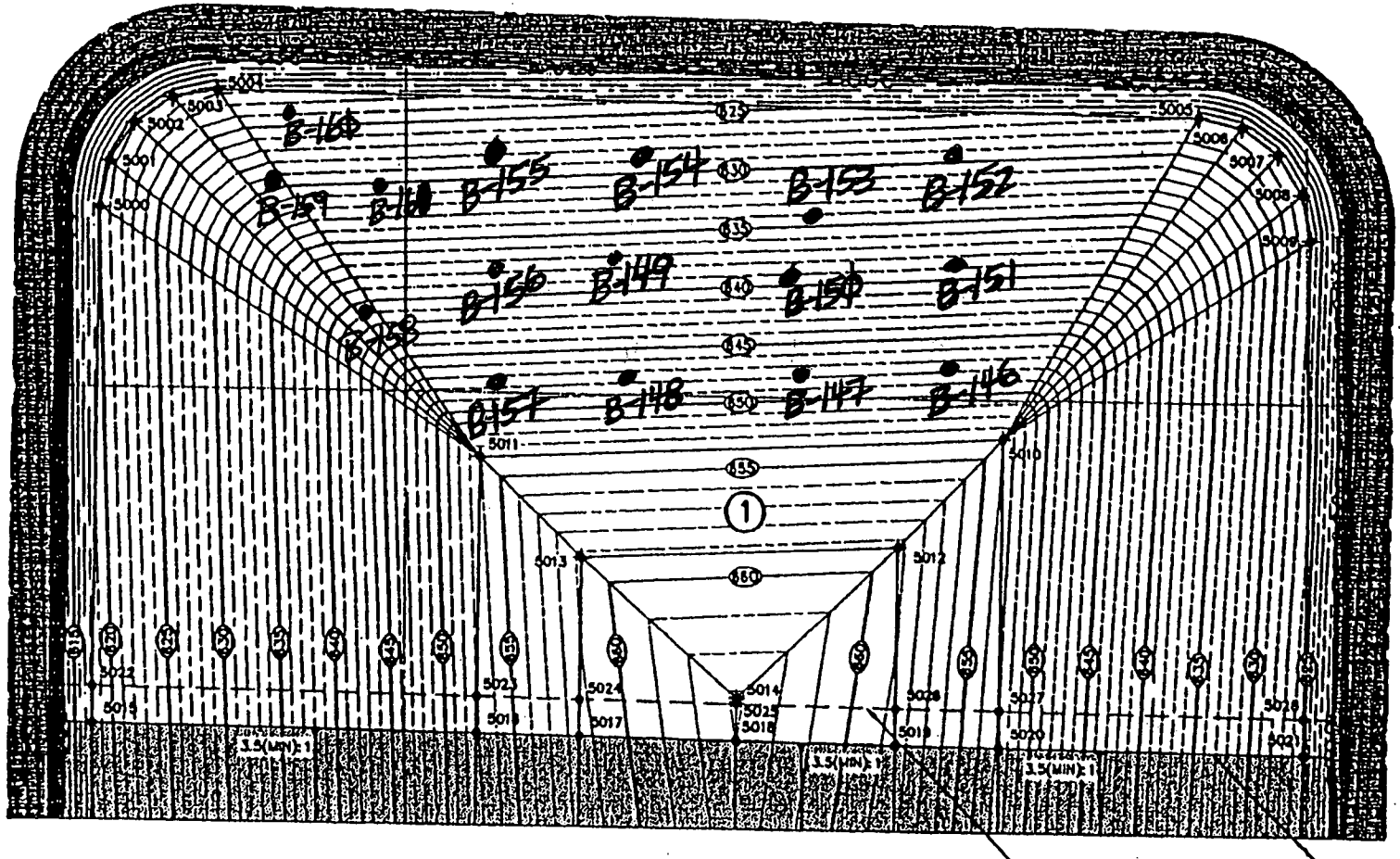
000399

15 JUNE 2001

SHEET No 4 OF 4

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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000400

DATE: 15 DAY JUNE MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 18 (MONDAY) day JUNE month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 (APZ) % COMPACTION / MOISTURE RANGE: +0.3 (APZ) LIFT THICKNESS (LOOSE/COMPACTED): 6"

MATERIAL SOURCE: STOCKPILE 00-2 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

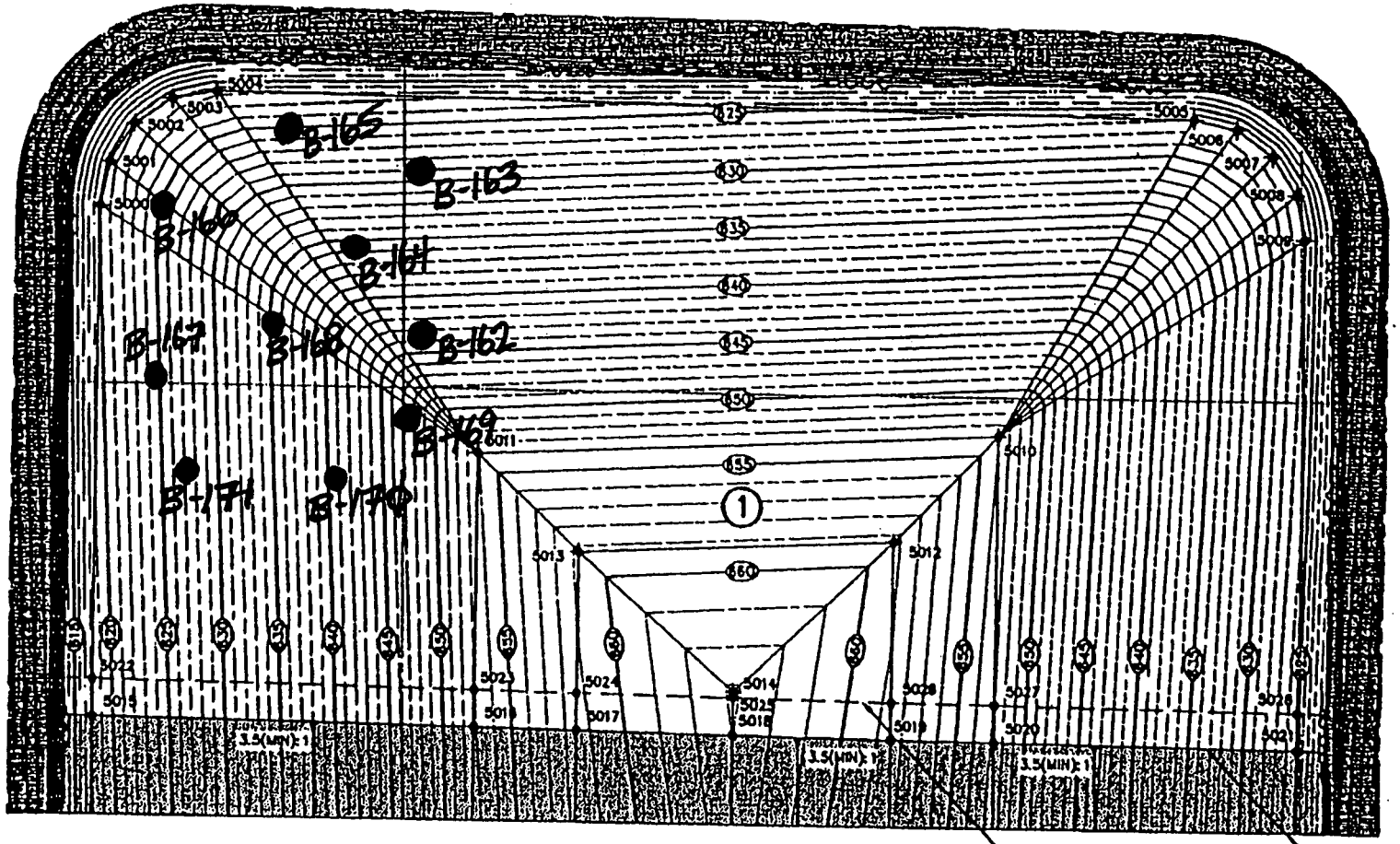
NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID:

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-162	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	13.5 ~~14.8~~	138.6	120.7	97.3	P	—	—	—	—
B-163	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	13.2 ~~14.6~~	137.9	120.3	96.9	P	—	—	—	—
B-164	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	13.4 ~~14.7~~	136.7	119.2	96.1	P	—	—	—	—
B-165	NORTH SLOPE	6"/L-3	00-2	12.2	124.1	12.1 ~~13.6~~	139.1	122.4	98.6	P	—	—	—	—
B-166	WEST SLOPE	6"/L-4	00-1	12.0	124.2	11.9 ~~13.5~~	139.4	122.8	98.9	P	—	—	—	—
B-167	WEST SLOPE	6"/L-4	00-1	12.0	124.2	12.3 ~~13.8~~	138.5	121.7	98.0	P	—	—	—	—
B-168	WEST SLOPE	6"/L-4	00-1	12.0	124.2	11.2 ~~12.9~~	140.8	124.7	100.4	P	—	—	—	—
B-169	WEST SLOPE	6"/L-4	00-1	12.0	124.2	10.9 ~~12.6~~	139.3	123.7	99.6	P	—	—	—	—
B-170	WEST SLOPE	6"/L-4	00-1	12.0	124.2	13.4 ~~14.7~~	135.8	118.4	95.3	P	—	—	—	—
B-171	WEST SLOPE	6"/L-4	00-1	12.0	124.2	13.7 ~~15.0~~	136.1	118.3	95.2	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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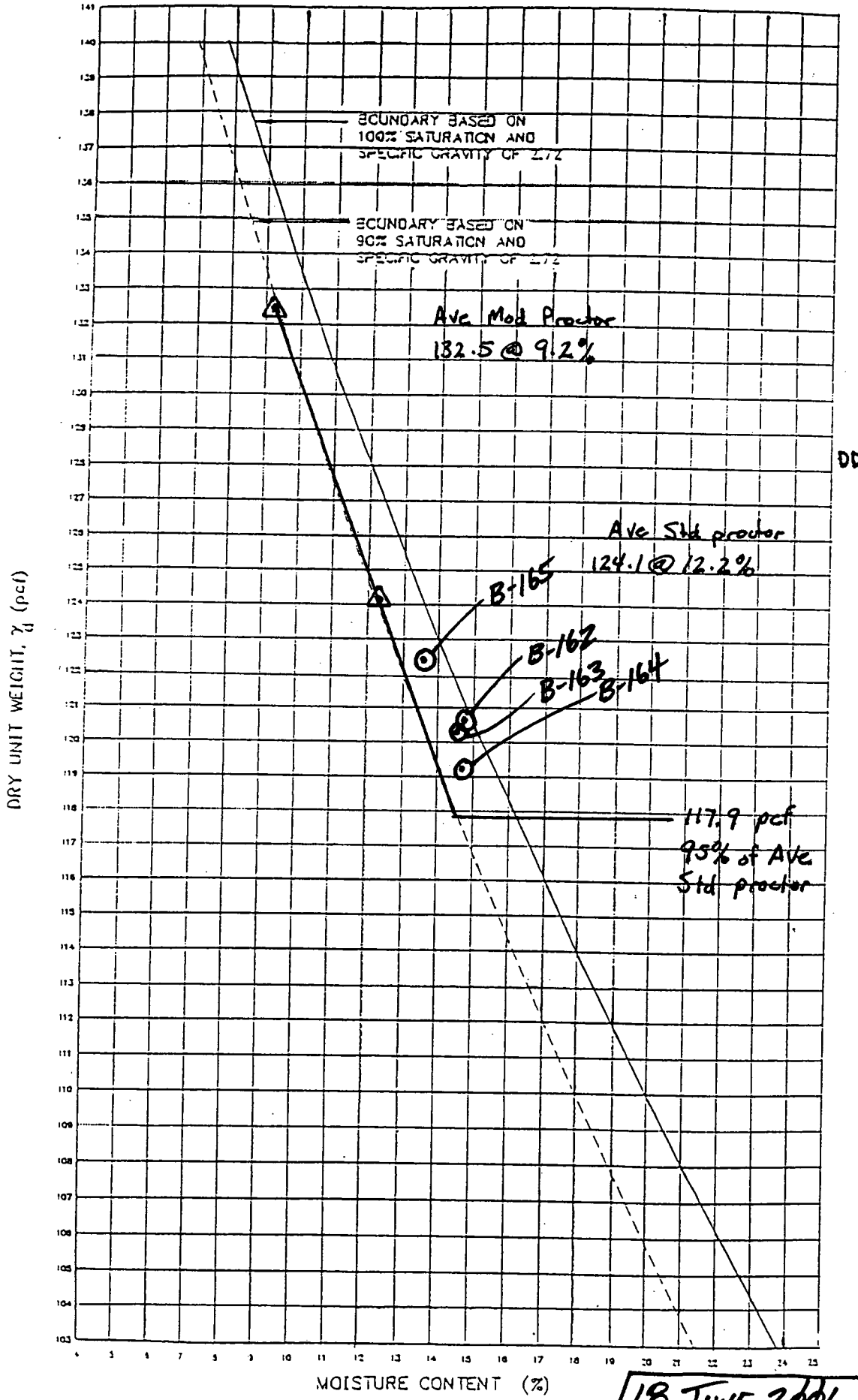
000402

DATE: 18 DAY JUNE MONTH 2001 YEAR

GQ1341 - TASK 04.1

- 4554



Stockpile 00-2

DD = -2.80(%m) + 158.26

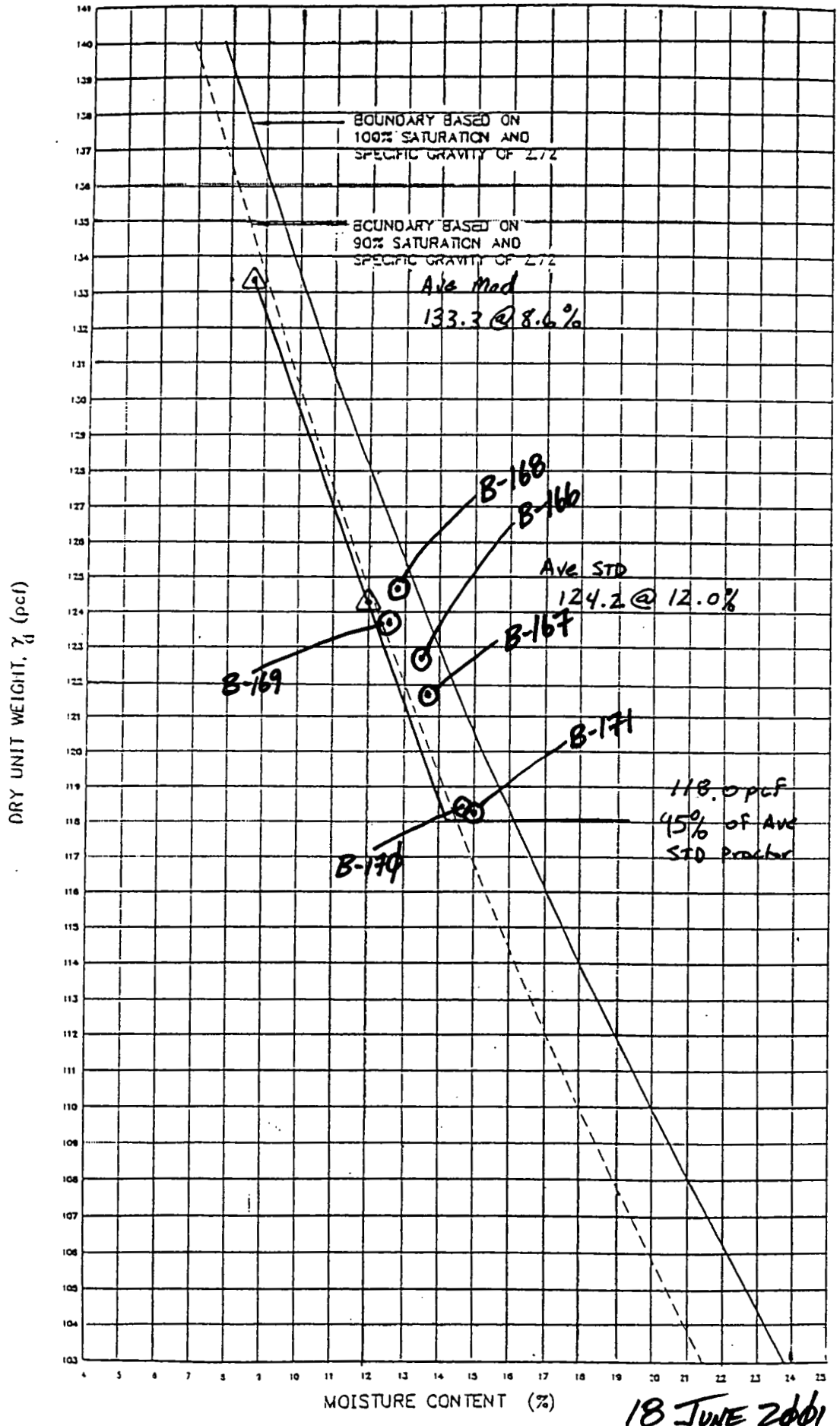
18 JUNE 2001

000403

SHEET No 3 OF 4

GQ 1341 - TASK 04.1

4554



STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

18 JUNE 2001

000404

SHEET No 4 OF 4

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 19 day TUESDAY JUNE month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: 70-32 APZ LIFT THICKNESS (LOOSE/COMPACTED): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459 X + 3.4043 QA ID: TBK

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
B-172	WEST SLOPE	6"/L-4	00-1	12.0	124.2	11.9 13.5	140.3	123.6	99.5	P	—	—	—	—
B-173	WEST SLOPE	6"/L-4	00-1	12.0	124.2	11.9 13.5	137.4	121.1	97.5	P	—	—	—	—
B-174	WEST SLOPE	6"/L-4	00-1	12.0	124.2	11.4 13.0	140.0	123.9	99.8	P	—	—	—	—
B-175	WEST SLOPE	6"/L-4	00-1	12.0	124.2	10.8 12.5	140.2	124.6	100.3	P	—	—	—	—
B-176	WEST SLOPE	6"/L-4	00-1	12.0	124.2	11.1 12.8	141.3	125.3	100.9	P	—	—	—	—
B-177	N.E. "SPINE"	6"/L-4	00-1	12.0	124.2	10.2 12.0	142.1	126.9	102.2	P	—	—	—	—
B-178	TOP OF CELL	6"/L-4	00-1	12.0	124.2	10.3 12.1	143.2	127.7	102.8	P	—	—	—	—
B-179	TOP OF CELL	6"/L-4	00-1	12.0	124.2	9.7 (11.6)	142.5	127.7	102.8	—	F	B-181	P	—
B-180	NW "SPINE"	6"/L-4	00-1	12.0	124.2	12.4 13.9	138.6	121.7	98.0	P	—	—	—	—
B-181	TOP OF CELL	6"/L-4	00-1	12.0	124.2	10.7 12.5	140.7	125.1	100.7	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: CA SHEET NO. 1 OF 4

000405

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 19 day JUNE month 2001 year TUESDAY

SPECIFICATION REQUIREMENTS (ASTM D 698) ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: -1.0-3 LIFT THICKNESS (LOOSE / COMPACTED): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: (TRU)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH / LIFT NO.	LAB RESULTS: SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-182	TOP OF CELL	6"/L-4	00-1	12.0	124.2	10.3 / 12.1	140.8	125.6	101.1	P	—	—	—	—
B-183	TOP OF CELL	6"/L-4	00-1	12.0	124.2	12.6 / 14.1	136.6	119.7	96.3	P	—	—	—	—
B-184	TOP OF CELL	6"/L-4	00-1	12.0	124.2	13.7 / 15.0	136.2	118.4	95.3	P	—	—	—	—

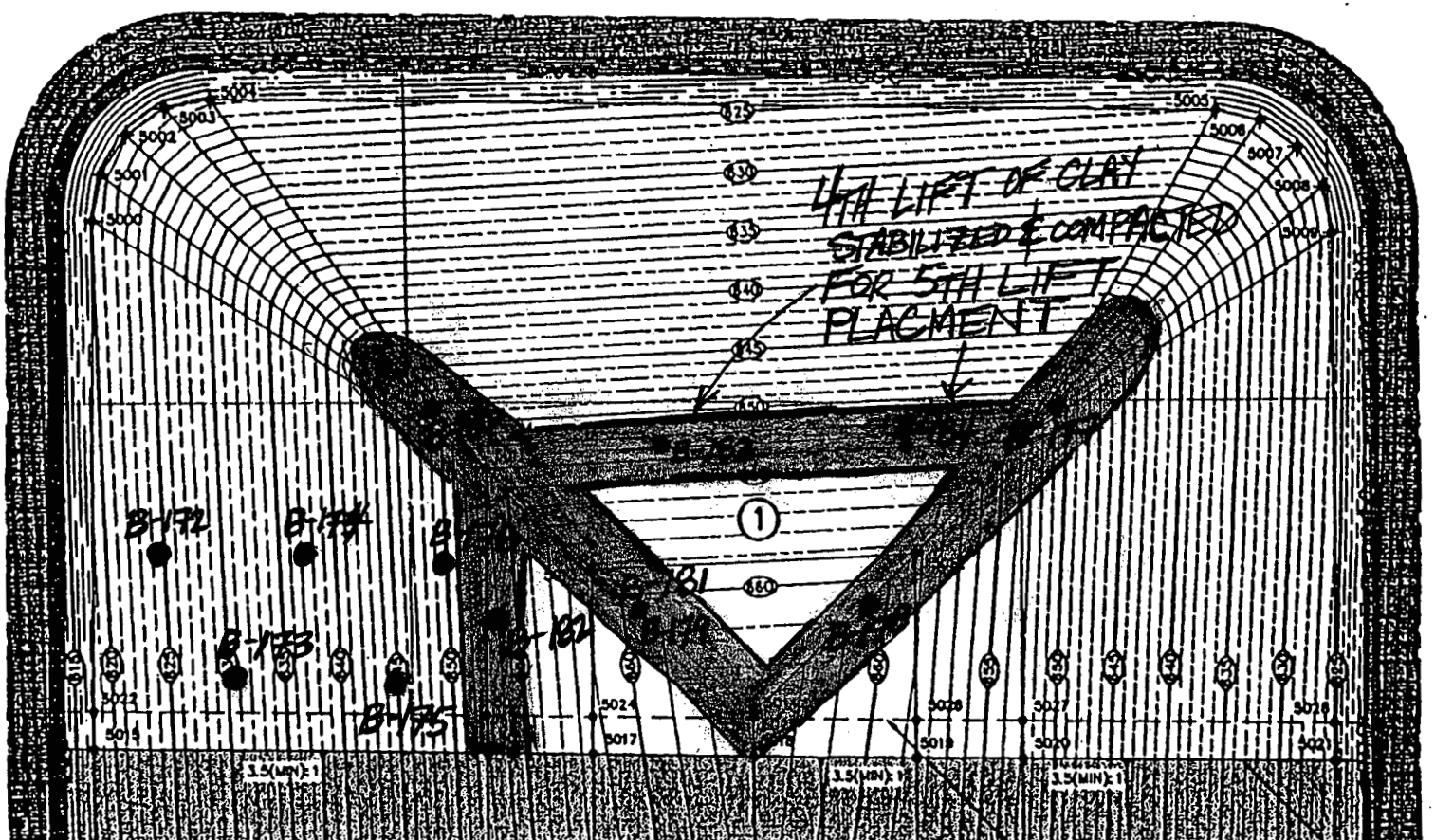
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000406

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



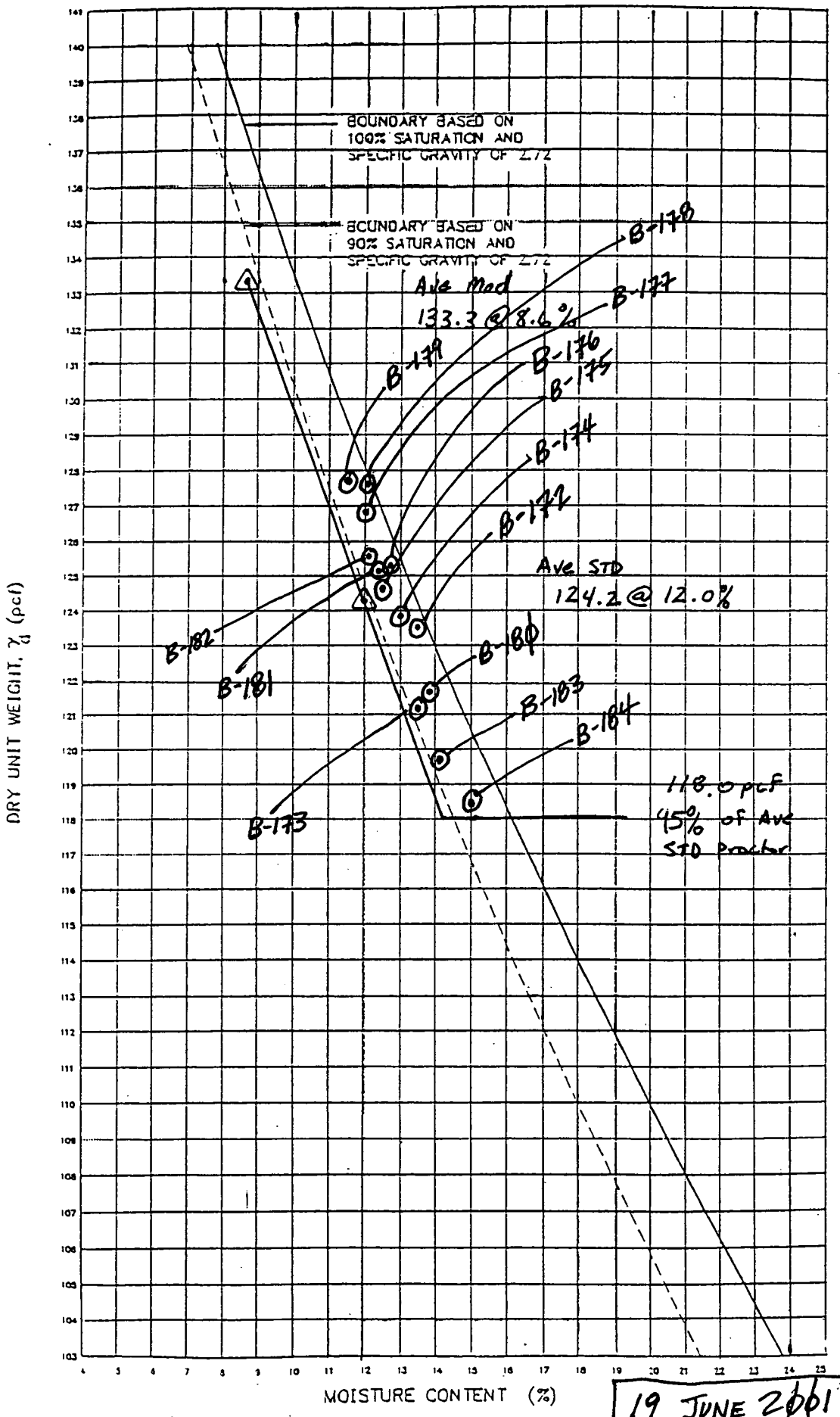
4554

000407

DATE: 19 DAY JUNE MONTH 2001 YEAR

GQ1341 – TASK 041

– 4554



STOCKPILE 00-1

DD = -2.6765(%m) + 156.3179

000408

19 JUNE 2001

SHEET No 4 OF 4

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 20 day JUNE month 2001 year WEDNESDAY

SPECIFICATION REQUIREMENTS: (ASTM D 698) ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3% APZ LIFT THICKNESS (LOOSE/(COMPACTED): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE (CLAY) OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: (TRU)

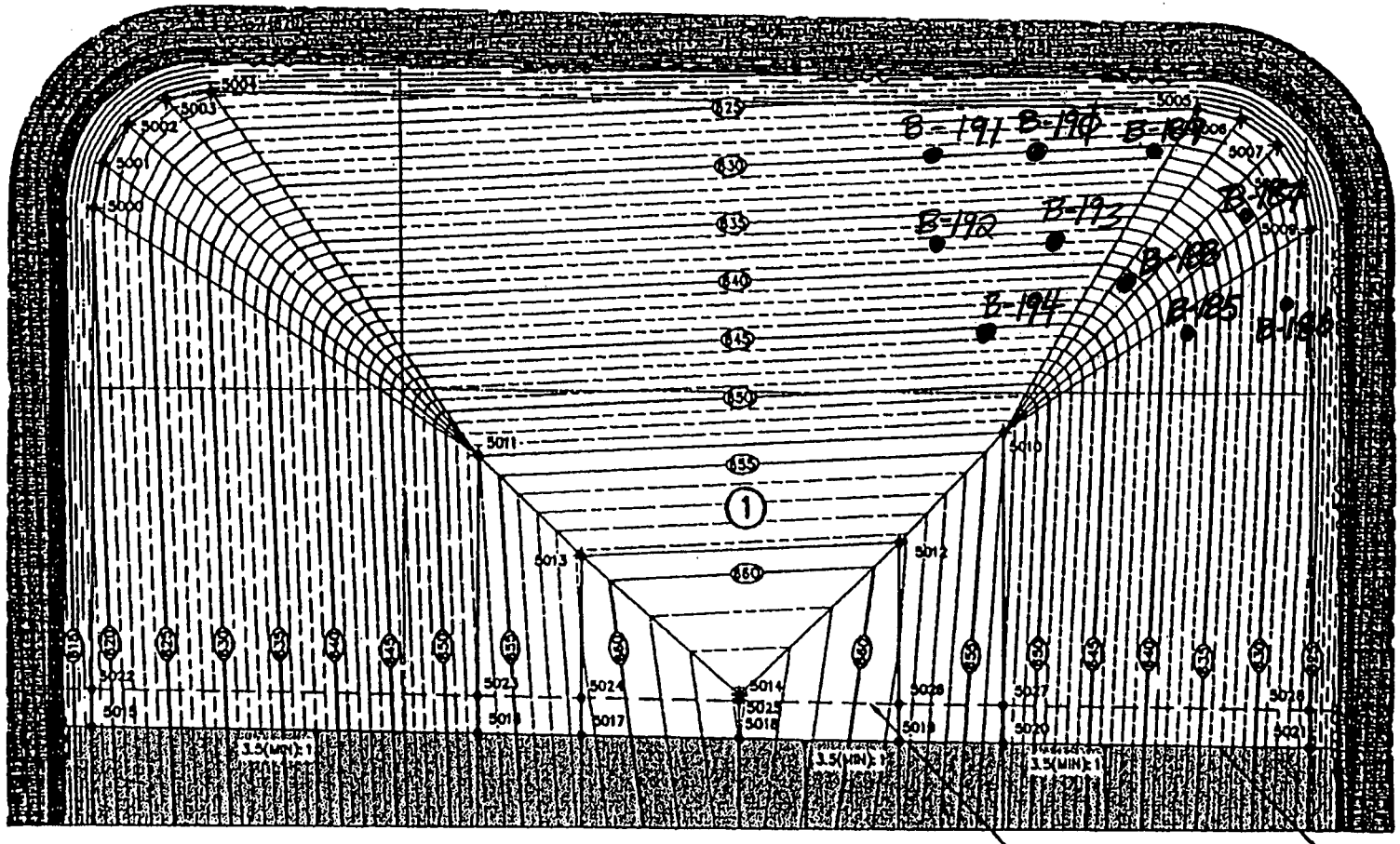
TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-185	N.E. CORNER	6"/L-4	00-1	12.0	124.2	11.6 13.2	140.7	124.2	100.1	P	—	—	—	—
B-186	N.E. CORNER	6"/L-4	00-1	12.0	124.2	13.4 14.7	136.9	119.4	96.1	P	—	—	—	—
B-187	N.E. CORNER	6"/L-4	00-1	12.0	124.2	12.4 13.9	141.3	124.1	99.9	P	—	—	—	—
B-188	N.E. CORNER	6"/L-4	00-1	12.0	124.2	12.2 13.7	140.6	123.7	99.6	P	—	—	—	—
B-189	NORTH SLOPE	6"/L-4	00-1	12.0	124.2	11.6 13.2	140.6	124.2	100.0	P	—	—	—	—
B-190	NORTH SLOPE	6"/L-4	00-1	12.0	124.2	11.1 12.8	140.1	124.2	100.0	P	—	—	—	—
B-191	NORTH SLOPE	6"/L-4	00-1	12.0	124.2	12.7 14.1	137.3	120.3	96.9	P	—	—	—	—
B-192	NORTH SLOPE	6"/L-4	00-1	12.0	124.2	11.4 13.0	137.5	121.7	98.0	P	—	—	—	—
B-193	NORTH SLOPE	6"/L-4	00-1	12.0	124.2	13.6 14.9	135.9	118.3	95.2	P	—	—	—	—
B-194	NORTH SLOPE	6"/L-4	00-1	12.0	124.2	12.2 13.7	137.7	121.1	97.5	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000409

CELL #1 - FINAL COVER

GQ1341 TASK 04.1

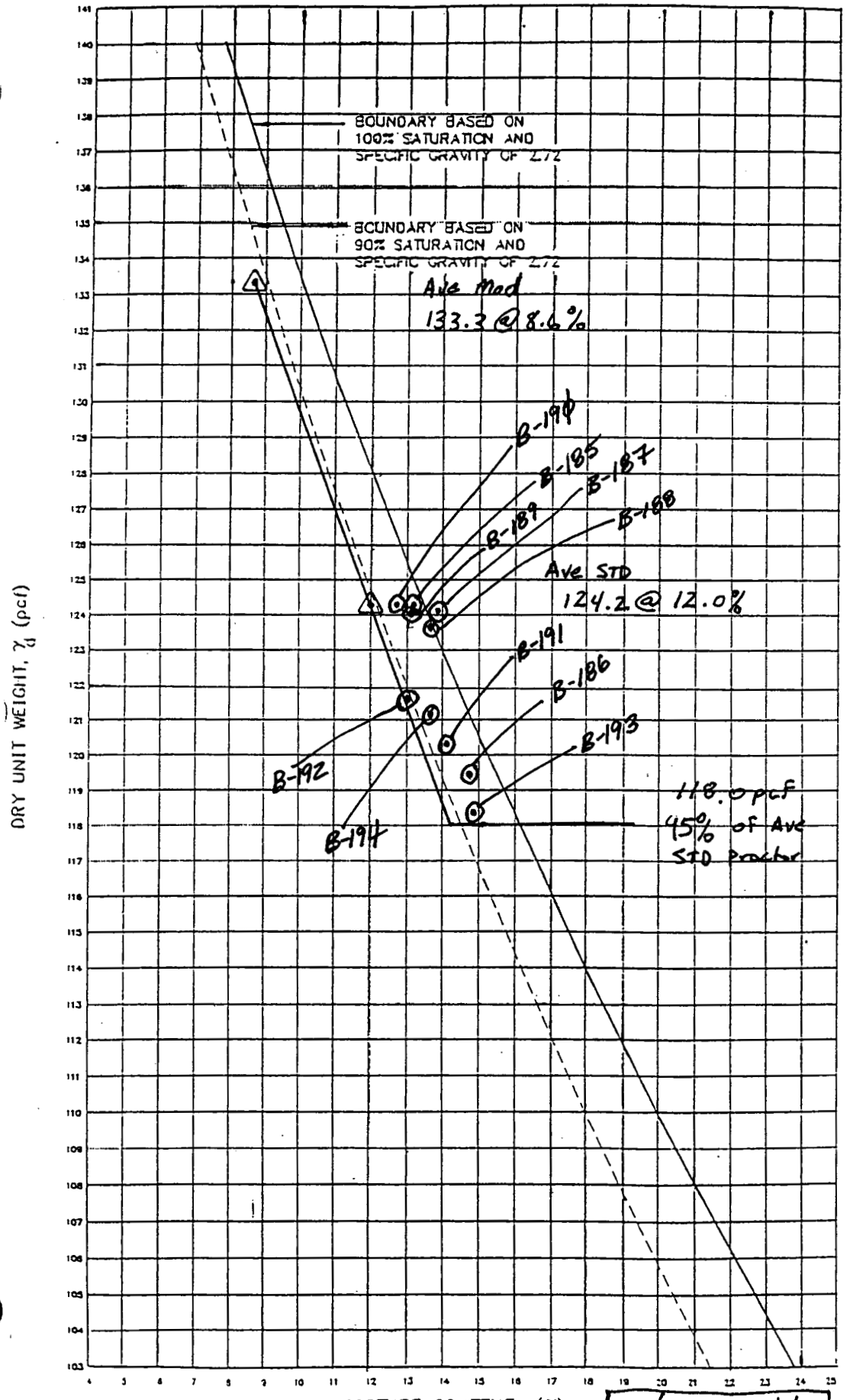


— 4554

000410

DATE: 20 DAY JUNE MONTH 2001 YEAR

GQ1341-TASK 04.1 - 4554



STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

20 JUNE 2001

000411

SHEET No 3 OF 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 22 day (FRIDAY) JUNE month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3 LIFT THICKNESS (LOOSE/(COMPACTED)): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE (CLAY) OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4013 QA ID: (TBR)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-195	TOE OF WEST SLOPE	6"/L-1	00-1	12.0	124.2	11.0 / 12.7	140.9	125.0	100.6	P	–	–	–	–
B-196	TOE OF WEST SLOPE	6"/L-1	00-1	12.0	124.2	13.2 / 14.6	136.0	118.7	95.6	P	–	–	–	–
B-197	TOE OF WEST SLOPE	6"/L-1	00-1	12.0	124.2	12.2 / 13.7	137.8	121.2	97.6	P	–	–	–	–
B-198	TOE OF WEST SLOPE	6"/L-1	00-1	12.0	124.2	12.4 / 13.9	137.0	120.3	96.9	P	–	–	–	–

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

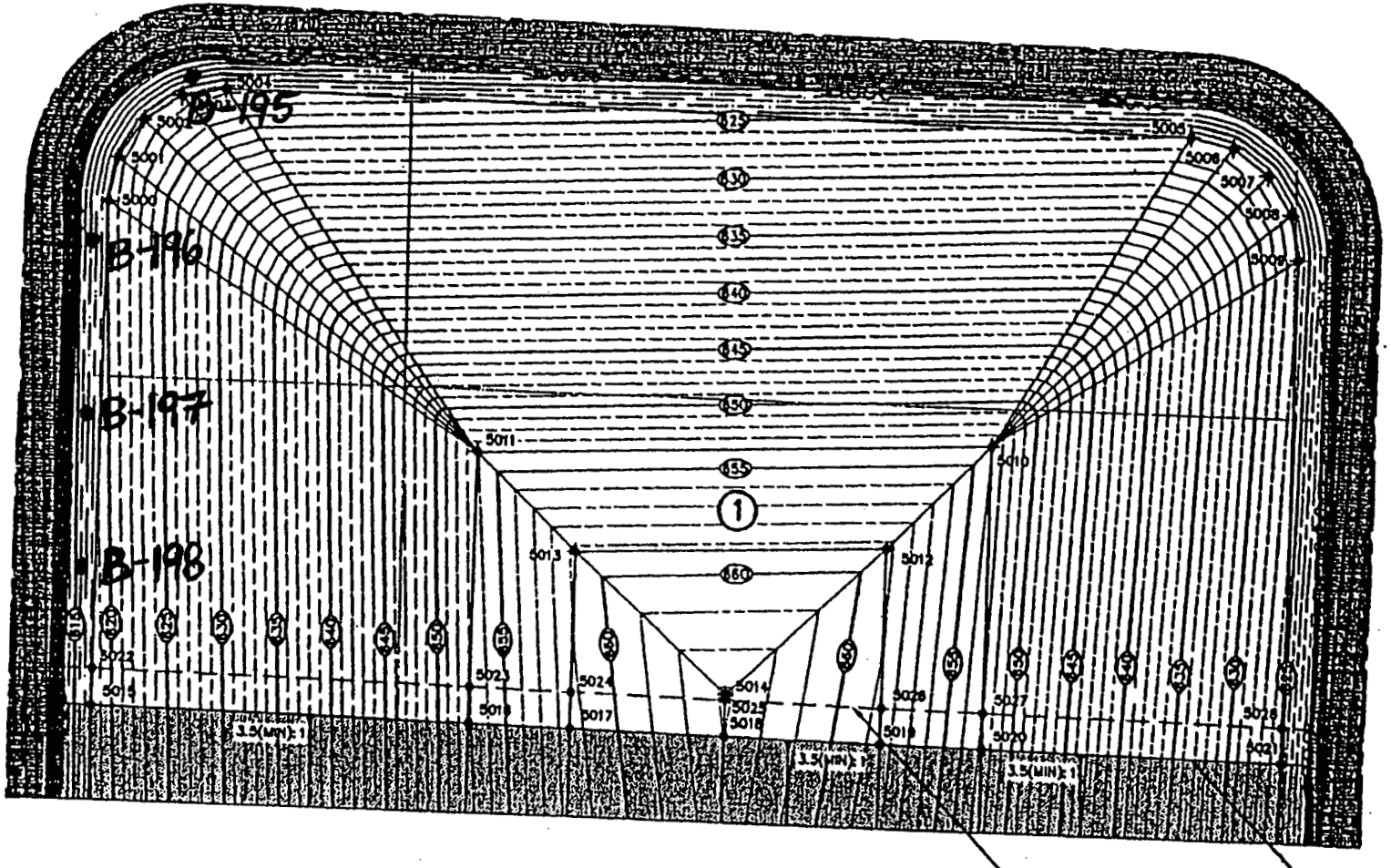
©GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: CH SHEET NO. 1 OF 3

000412

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



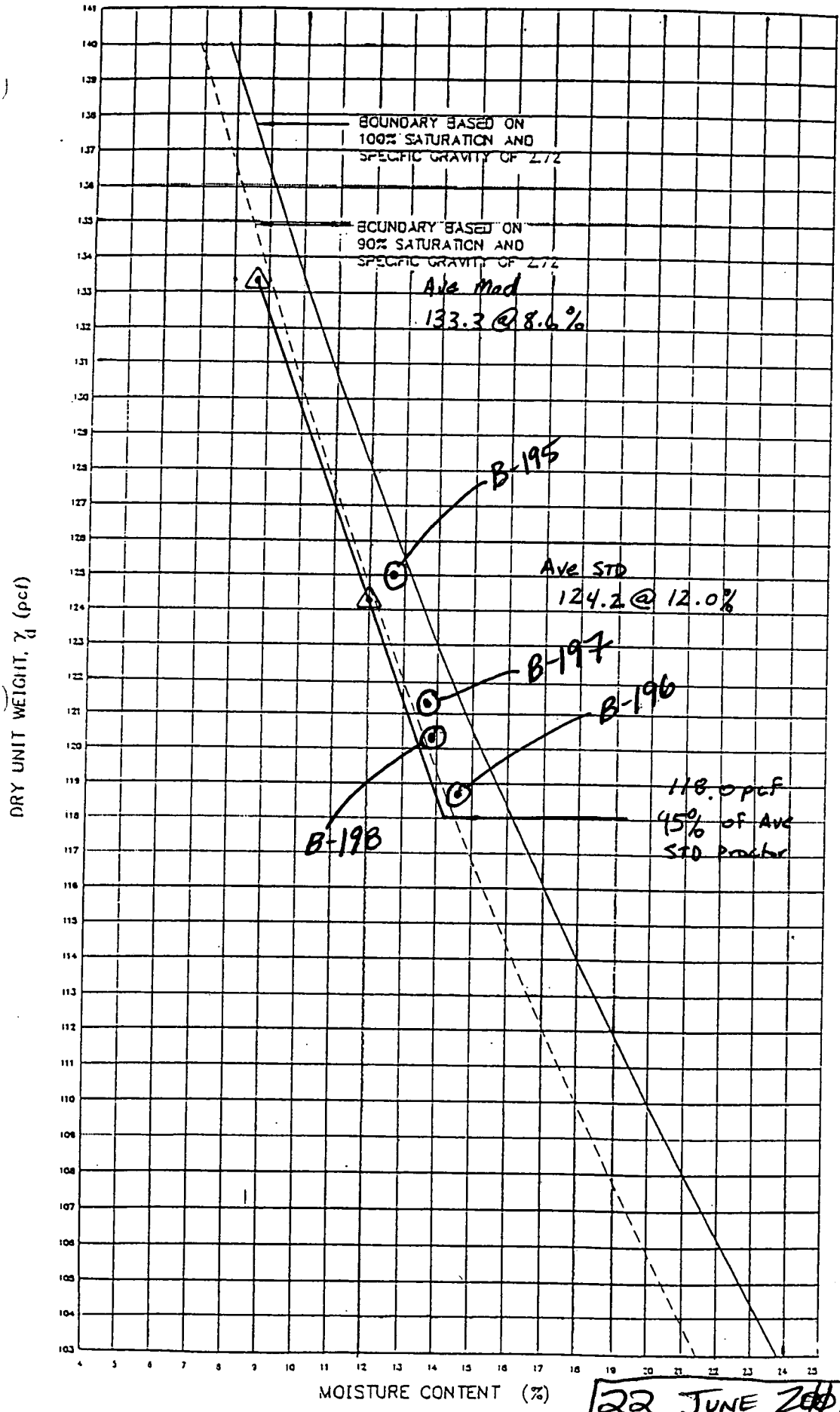
000413

4554

DATE: 22 DAY JUNE MONTH 2001 YEAR

SHEET No. 2 OF 3

GQ1341 - TASK 04.1 - 4554



STOCKPILE
00-1

DD = -2.6765 (%m)
+156.3179

000414

22 JUNE 2001

SHEET 3 OF 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: CELL #1 CAP CONSTRUCTION

PROJECT NO.: GQ134 TASK NO.: 04.1

DATE: 25 day (MONDAY) JUNE month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3 (APZ) LIFT THICKNESS (LOOSE / (COMPACTED): 6"

MATERIAL SOURCE: STOCKPILE 00-1

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: (TBV)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-199	WEST SLOPE TOE	6"/L-2	00-1	12.0	124.2	10.5 / 12.3	141.7	126.2	101.6	P	—	—	—	—
B-200	WEST SLOPE TOE	6"/L-2	00-1	12.0	124.2	13.2 / 14.6	135.9	118.6	95.5	P	—	—	—	—
B-201	WEST SLOPE TOE	6"/L-2	00-1	12.0	124.2	13.7 / 15.0	136.8	119.0	95.8	P	—	—	—	—
B-202	WEST SLOPE TOE	6"/L-2	00-1	12.0	124.2	13.1 / 14.5	135.9	118.7	95.6	P	—	—	—	—
B-203	WEST SLOPE TOE	6"/L-3	00-1	12.0	124.2	12.9 / 14.3	135.5	118.5	95.4	P	—	—	—	—
B-204	WEST SLOPE TOE	6"/L-3	00-1	12.0	124.2	11.7 / 13.3	137.4	121.3	97.7	P	—	—	—	—
B-205	WEST SLOPE TOE	6"/L-3	00-1	12.0	124.2	12.7 / 14.1	136.4	119.5	96.2	P	—	—	—	—
B-206	WEST SLOPE TOE	6"/L-3	00-1	12.0	124.2	12.2 / 13.7	137.9	121.3	97.7	P	—	—	—	—
B-207	WEST SLOPE TOE	6"/L-4	00-1	12.0	124.2	12.1 / 13.6	136.2	119.9	96.5	P	—	—	—	—
B-208	WEST SLOPE TOE	6"/L-4	00-1	12.0	124.2	12.4 / 13.9	139.1	122.1	98.3	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

004155

4554

©GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM

CHECKED BY: CA

SHEET NO. 1 OF 4

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 25 day JUNE month 2001 year (MONDAY)

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: +0-3 / AMZ LIFT THICKNESS (LOOSE/(COMPACTED)): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: (TRB)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-209	WEST SLOPE TOE	6"/L-4	00-1	12.0	124.2	13.7 15.0	136.2	118.4	95.3	P	—	—	—	—
B-210	WEST SLOPE TOE	6"/L-4	00-1	12.0	124.2	12.9 14.3	136.9	119.8	96.5	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

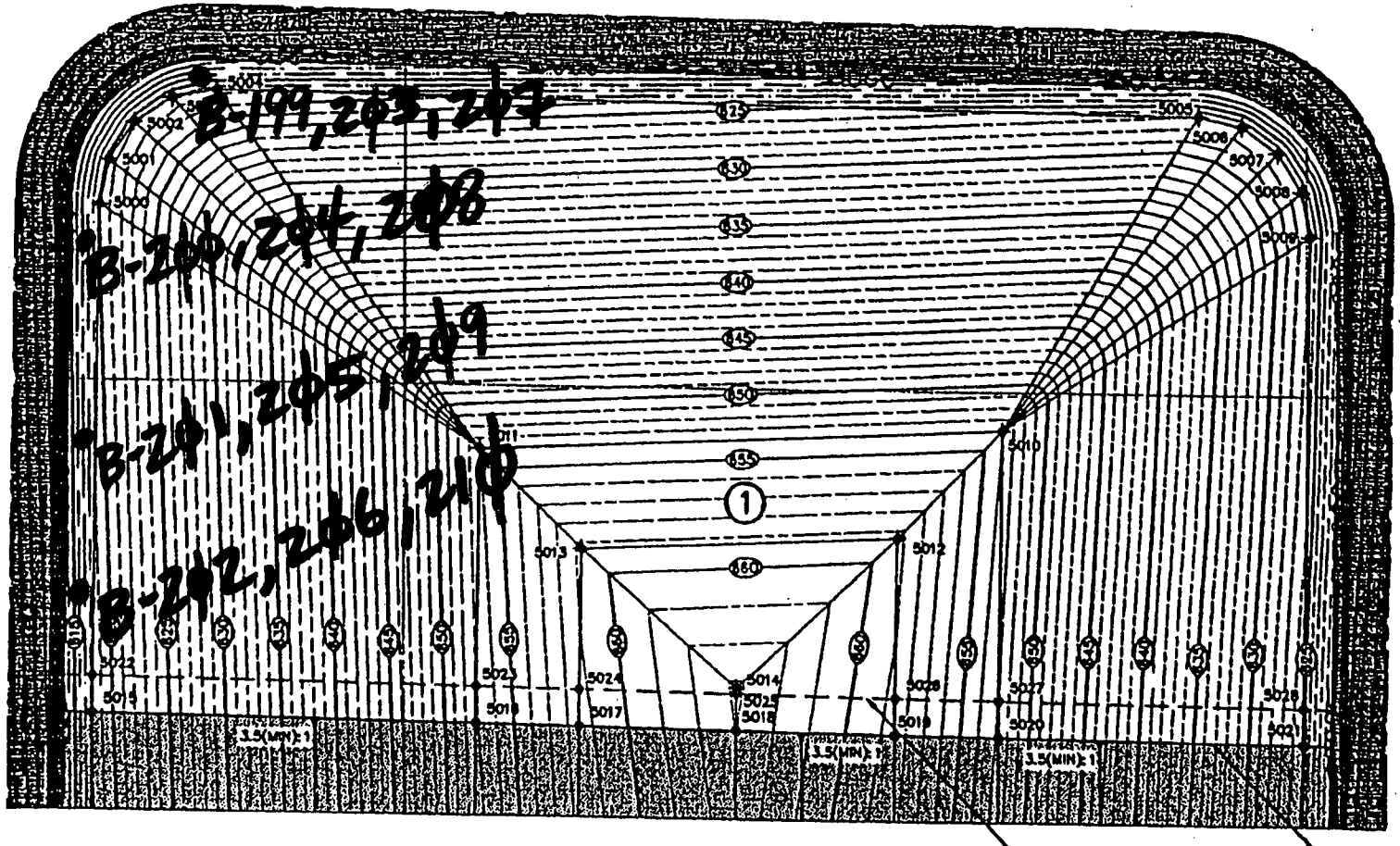
©GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: CA SHEET NO. 2 OF 4

000416

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



4554

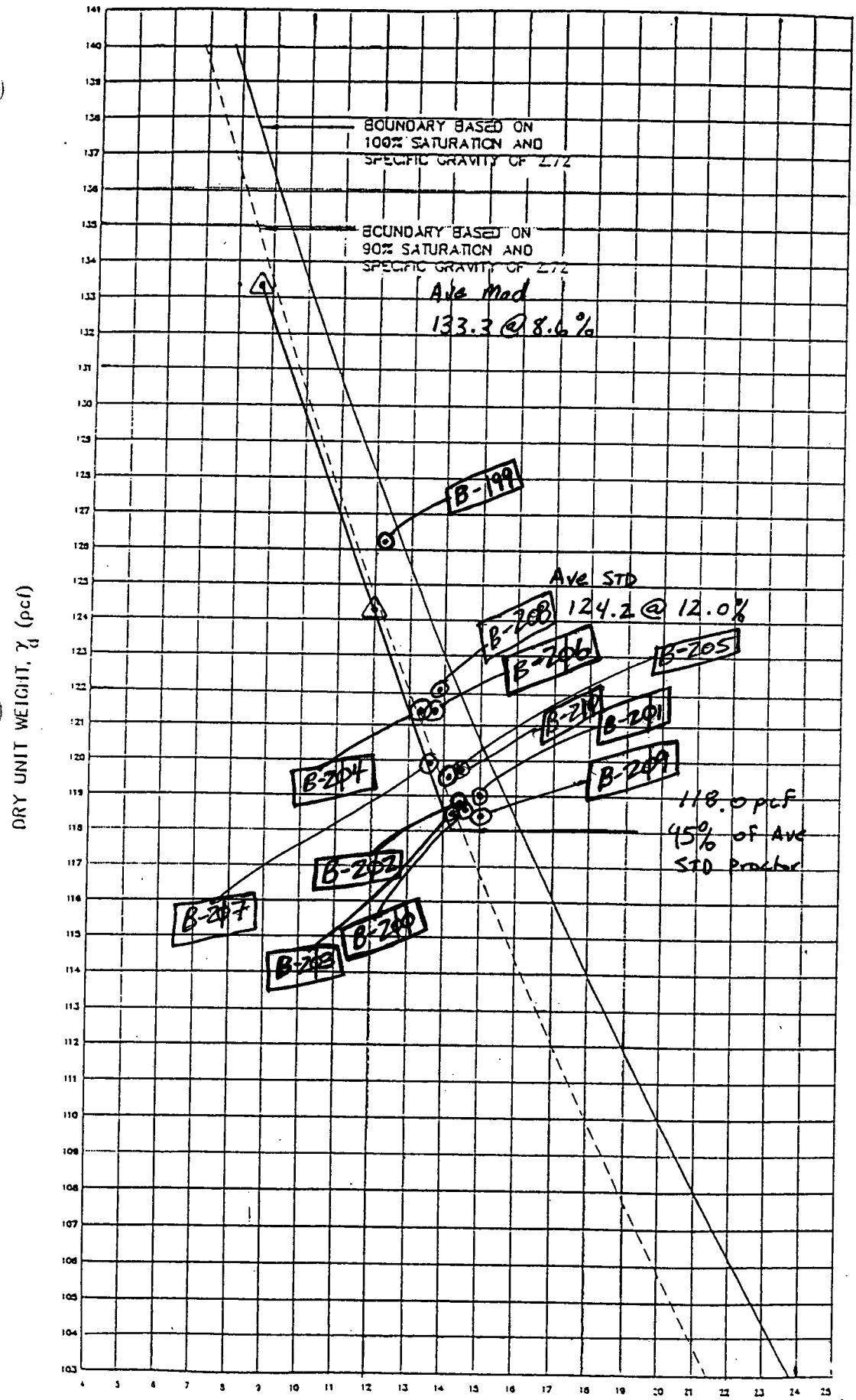
000417

DATE: 25 DAY JUNE MONTH 2001 YEAR

SHEET No 3 OF 4

GQ1341 - TASK 04.1

4554



STOCKPILE
00-1

DD= -2.6765(%m)
+156.3179

25 JUNE 2001

000418

SHEET No. 4 OF 4

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 26 (TUESDAY) day JUNE month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % (AP2) COMPACTION / MOISTURE RANGE: +0-3% (AP2) LIFT THICKNESS (LOOSE / (COMPACTED): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: (784)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
B-211	TOP OF CELL	6"/L-5	00-1	12.0	124.2	13.1 / 14.5	135.6	118.4	95.3	P	—	—	—	—
B-212	TOP OF CELL	6"/L-5	00-1	12.0	124.2	12.8 / 14.2	136.5	119.5	96.2	P	—	—	—	—
B-213	TOP OF CELL	6"/L-5	00-1	12.0	124.2	13.7 / 15.0	135.7	118.0	95.0	P	—	—	—	—
B-214	TOP OF CELL	6"/L-5	00-1	12.0	124.2	13.0 / 14.4	137.2	119.9	96.5	P	—	—	—	—
B-215	TOP OF CELL	6"/L-5	00-1	12.0	124.2	13.1 / 14.5	135.3	118.2	95.2	P	—	—	—	—
B-216	TOP OF CELL	6"/L-4	00-1	12.0	124.2	11.2 / 12.9	138.4	122.6	98.7	P	—	—	—	—
B-217	TOP OF CELL	6"/L-4	00-1	12.0	124.2	11.9 / 13.5	138.4	121.9	98.1	P	—	—	—	—
B-218	TOP OF CELL	6"/L-5	00-1	12.0	124.2	12.1 / 13.6	137.3	120.9	97.3	P	—	—	—	—
B-219	Top of Cell	6"/L-4	00-1	12.0	124.2	11.6 / 13.2	138.7	122.5	98.7	P	—	—	—	—
B-220	Top of Cell	6"/L-5	00-1	12.0	124.2	11.4 / 13.0	138.5	122.6	98.7	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000416

4554

GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: SHEET NO. 1 OF 4

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 26 (TUESDAY) day JUNE month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % (AFZ) COMPACTION / MOISTURE RANGE: +0-3% (AFZ) LIFT THICKNESS (LOOSE/(COMPACTED)): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459 X + 3.4043 QA ID: (TBD)

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
B-221	Top of Cell	6"/L-4	00-1	12.0	124.2	13.4 / 14.7	137.3	119.7	96.4	P	—	—	—	—
B-222	Top of Cell	6"/L-5	00-1	12.0	124.2	13.7 / 15.0	135.9	118.2	95.2	P	—	—	—	—
B-223	Top of Cell	6"/L-4	00-1	12.0	124.2	13.2 / 14.6	135.8	118.5	95.4	P	—	—	—	—
B-224	Top of Cell	6"/L-4	00-1	12.0	124.2	12.1 / 13.6	136.5	120.2	96.8	P	—	—	—	—
B-225	Top of Cell	6"/L-5	00-1	12.0	124.2	10.3 / 12.1	139.8	124.7	100.4	P	—	—	—	—
B-226	Top of Cell	6"/L-4	00-1	12.0	124.2	11.5 / 13.1	138.2	122.2	98.4	P	—	—	—	—
B-227	Top of Cell	6"/L-4	00-1	12.0	124.2	11.8 / 13.4	139.6	123.1	99.1	P	—	—	—	—
		/												
		/												
		/												

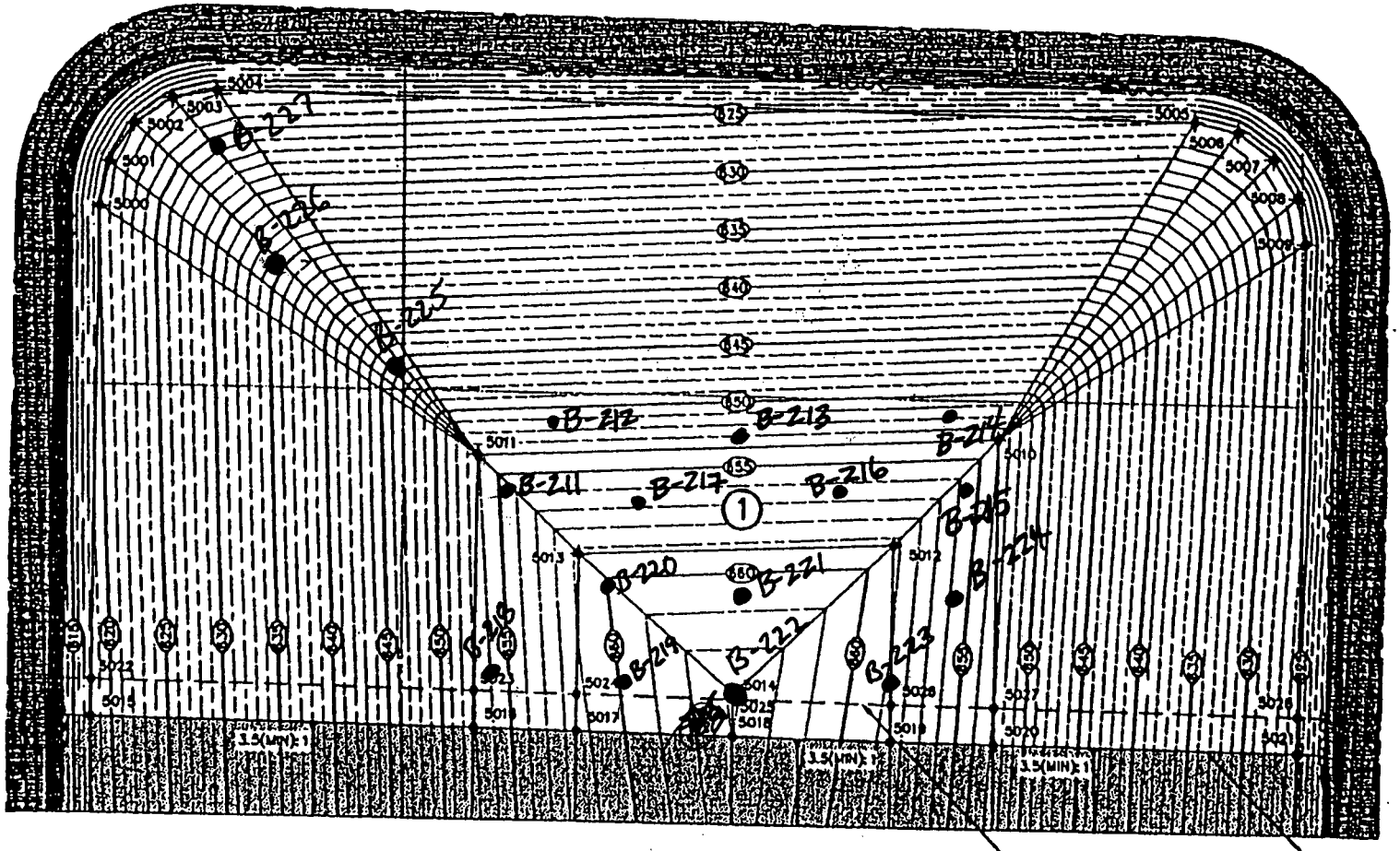
000420

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



- 4554

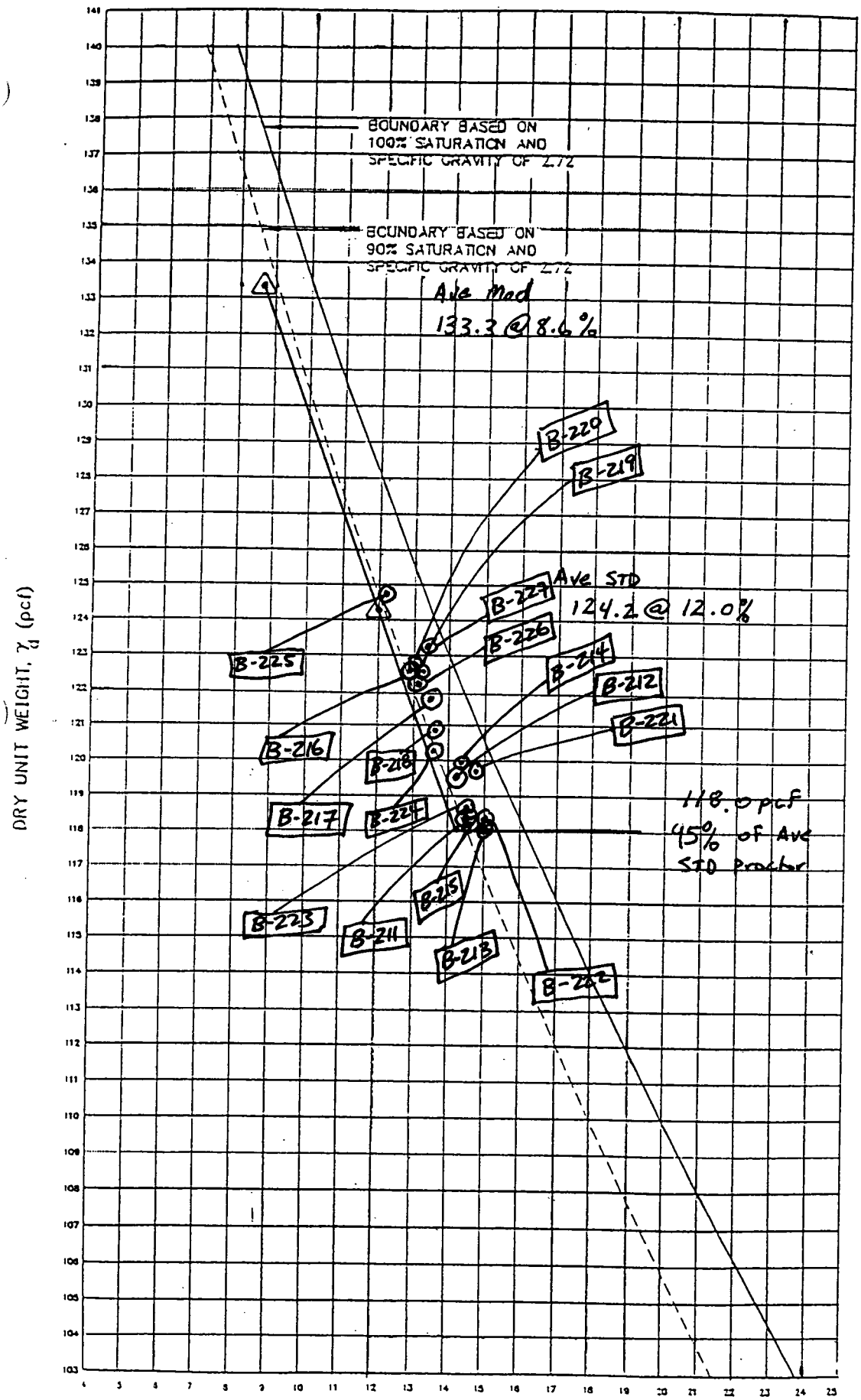
000421

DATE: 26 DAY JUNE MONTH 2001 YEAR
TUESDAY

SHEET No 3 OF 4

GQ134-TASK 041

-- 4554



DD = -2.6765(%m) + 156.3179

26 JUNE 2001

000422

SHEET 4 OF 4

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Cell #1 Cap Construction

DATE: 27 day June month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ~~10-3%~~ AP2 LIFT THICKNESS (LOOSE/(COMPACTED): 6"

MATERIAL SOURCE: Stockpile 00-1 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
B-228	North Slope	6"/L-4	00-1	12.0	124.2	13.0 / 14.4	136.8	119.6	96.3	P	–	–	–	–
B-229	North Slope	6"/L-4	00-1	12.0	124.2	12.3 / 13.8	138.8	121.9	98.1	P	–	–	–	–
B-230	North Slope	6"/L-4	00-1	12.0	124.2	13.7 / 15.0	135.8	118.1	95.1	P	–	–	–	–
B-231	North Slope	6"/L-4	00-1	12.0	124.2	11.4 / 13.0	141.5	125.2	100.8	P	–	–	–	–
B-232	North Slope	6"/L-4	00-1	12.0	124.2	10.3 / 12.1	139.2	124.2	100.0	P	–	–	–	–
B-233	North Slope	6"/L-4	00-1	12.0	124.2	11.1 / 12.8	136.6	121.1	97.5		F	B-234	P	–
B-234	North Slope	6"/L-4	00-1	12.0	124.2	11.6 / 13.2	140.6	124.2	100.0	P	–	–	–	–
B-235	North Slope	6"/L-4	00-1	12.0	124.2	11.4 / 13.0	140.6	124.4	100.1	P	–	–	–	–
B-236	North Slope	6"/L-4	00-1	12.0	124.2	10.7 / 12.5	139.8	124.3	100.0	P	–	–	–	–
B-237	North Slope	6"/L-4	00-1	12.0	124.2	12.0 / 13.6	136.8	120.4	97.0	P	–	–	–	–

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000426

-- 4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Cell #1 Cap Construction

DATE: 27 day June month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ~~+0-3%~~ Apz LIFT THICKNESS (LOOSE/(COMPACTED): 6"

MATERIAL SOURCE: Stockpile 00-1 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
B-238	North Slope	6"/L-4	00-1	12.0	124.2	13.3 / 14.7	138.9	121.1	97.5	P	—	—	—	—
B-239	North Slope	6"/L-4	00-1	12.0	124.2	11.0 / 12.7	138.2	122.6	98.7	P	—	—	—	—

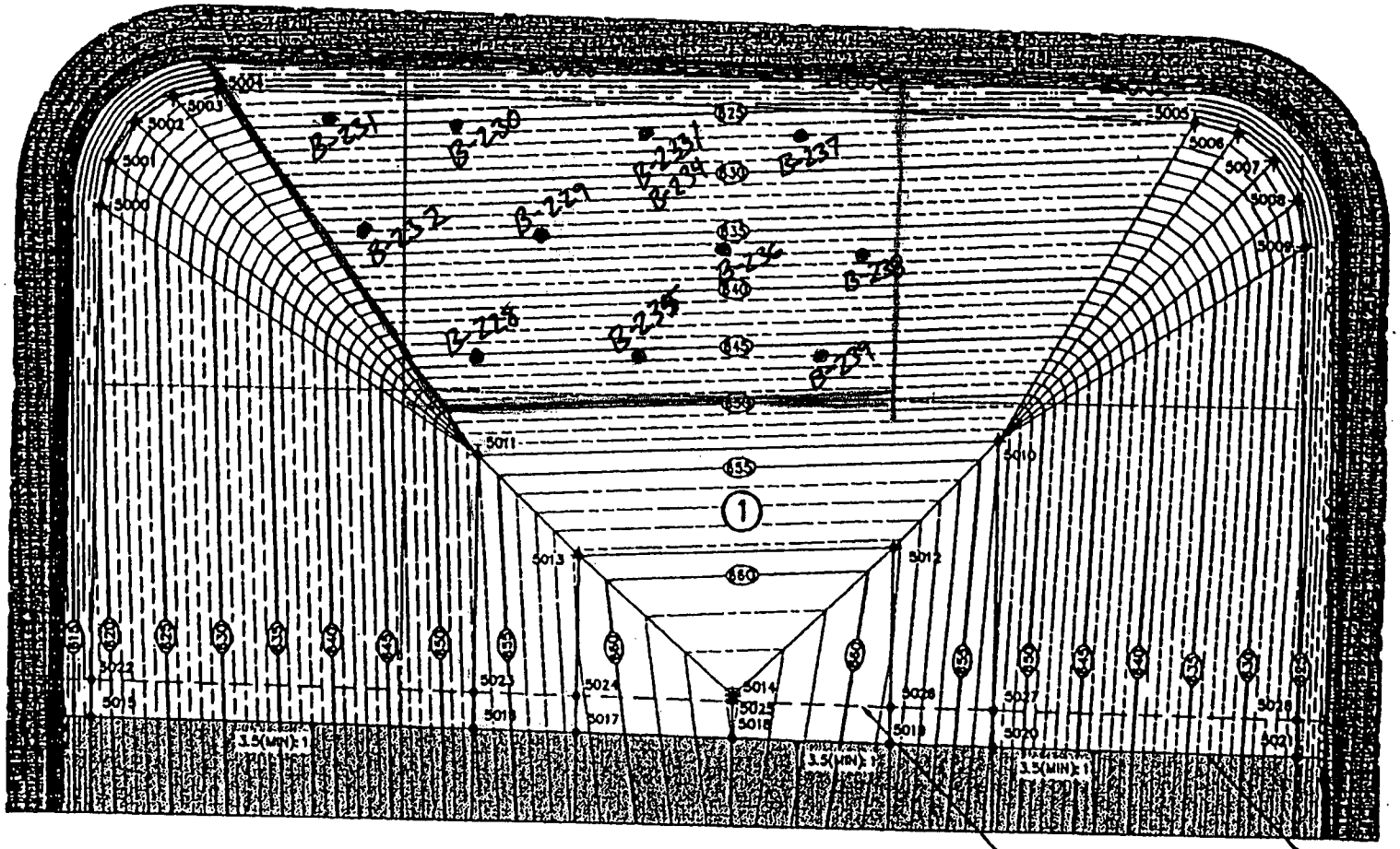
000424

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1

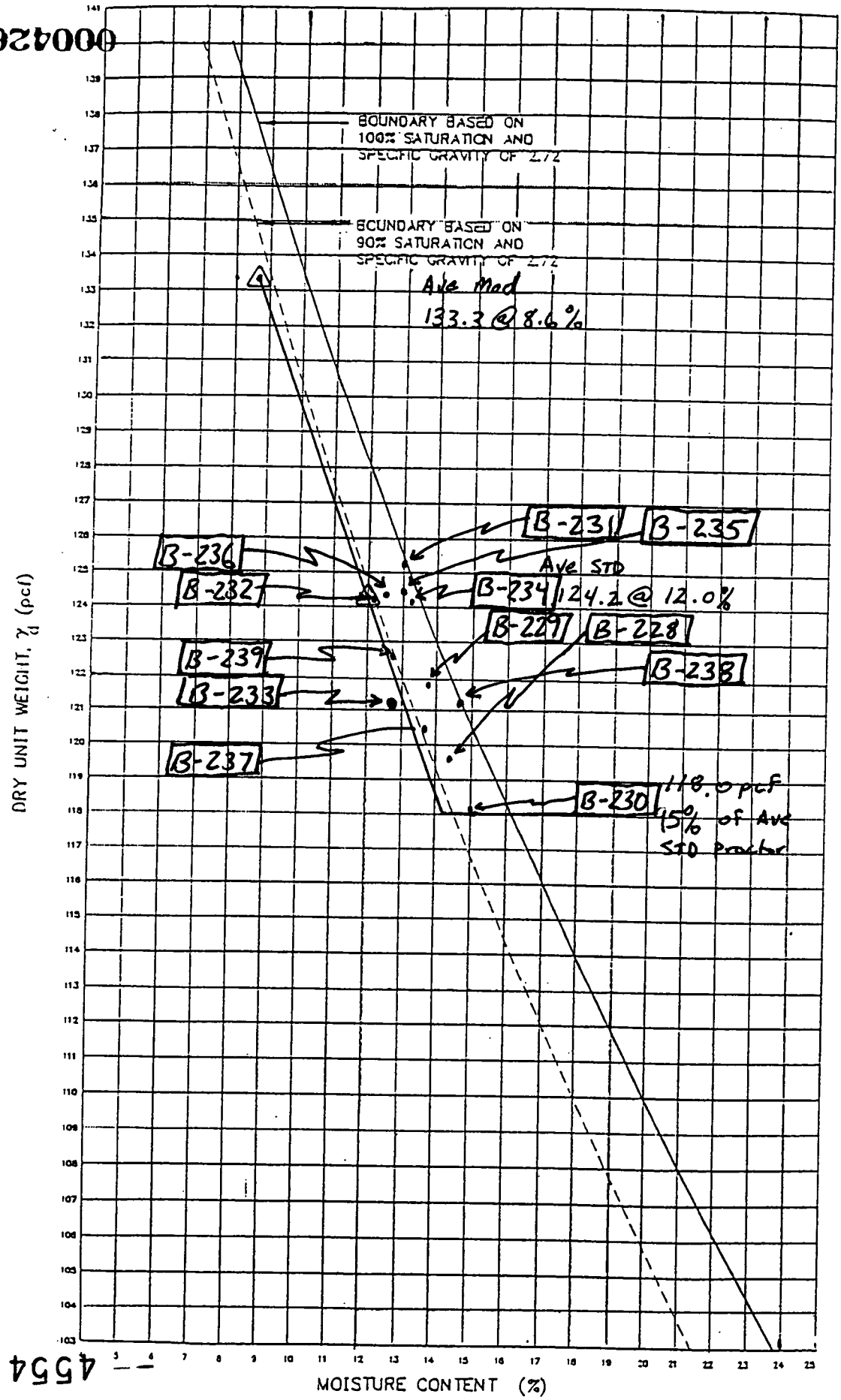


4554

000425

DATE: 22 DAY June MONTH 2001 YEAR

000426



STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

4554

27 June 2001

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 28 day JUNE month 2001 year (THURSDAY)

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION (AP2) / MOISTURE RANGE: +0-3% (AP2) LIFT THICKNESS (LOOSE/COMPACTED): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 26979 CORRECTION FACTOR Y = 0.8459K + 3.4043 QA ID: TBD

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-240	NORTH TOE	6"/L-1	00-1	12.0	124.2	10.6 / 12.4	138.6	123.3	99.3	P	—	—	—	—
B-241	NORTH TOE	6"/L-1	00-1	12.0	124.2	12.0 / 13.6	137.6	121.1	97.5	P	—	—	—	—
B-242	NORTH TOE	6"/L-2	00-1	12.0	124.2	11.6 / 13.2	138.7	122.5	98.6	P	—	—	—	—
B-243	NORTH TOE	6"/L-2	00-1	12.0	124.2	11.4 / 13.0	138.6	122.7	98.8	P	—	—	—	—

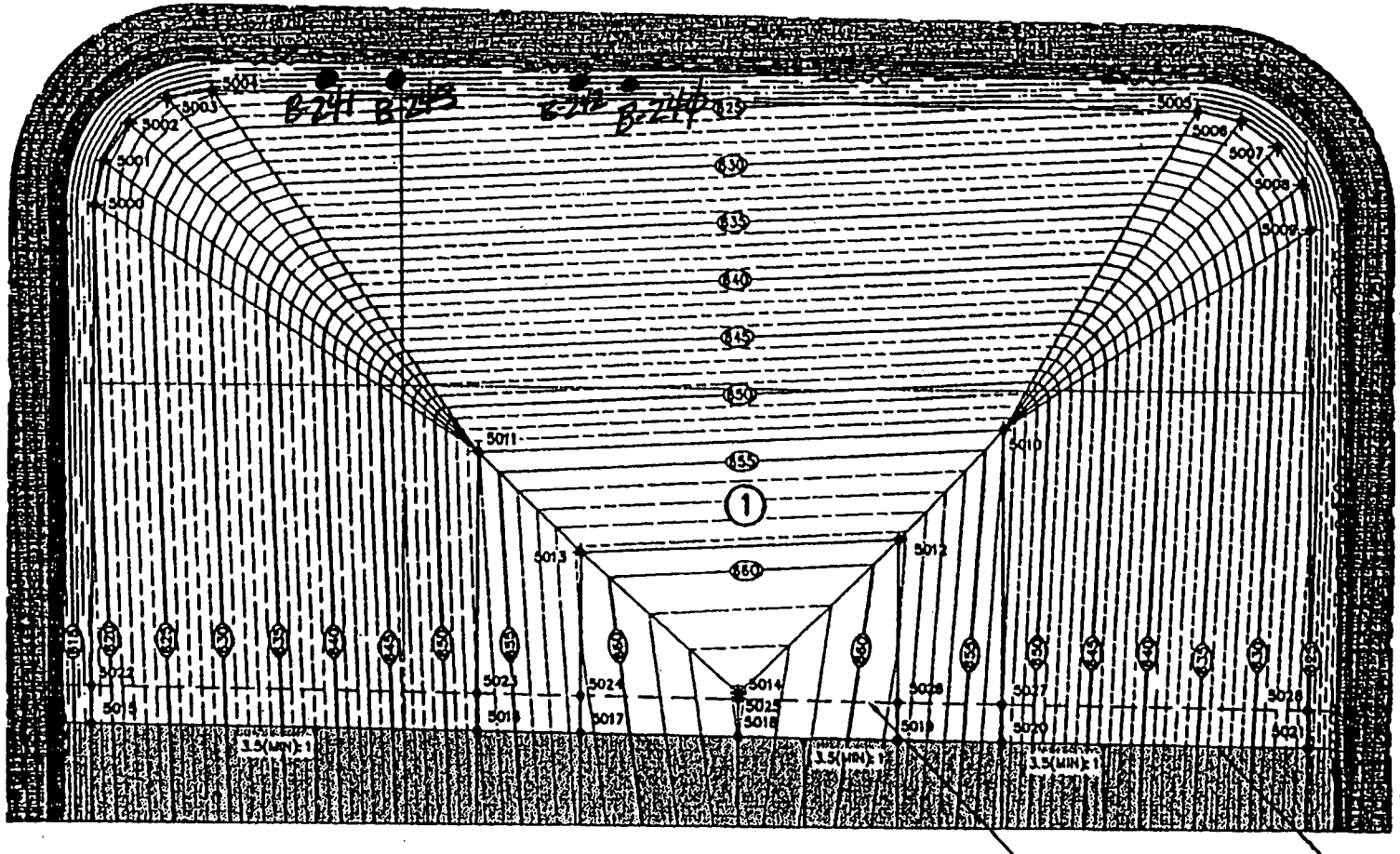
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000427

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1

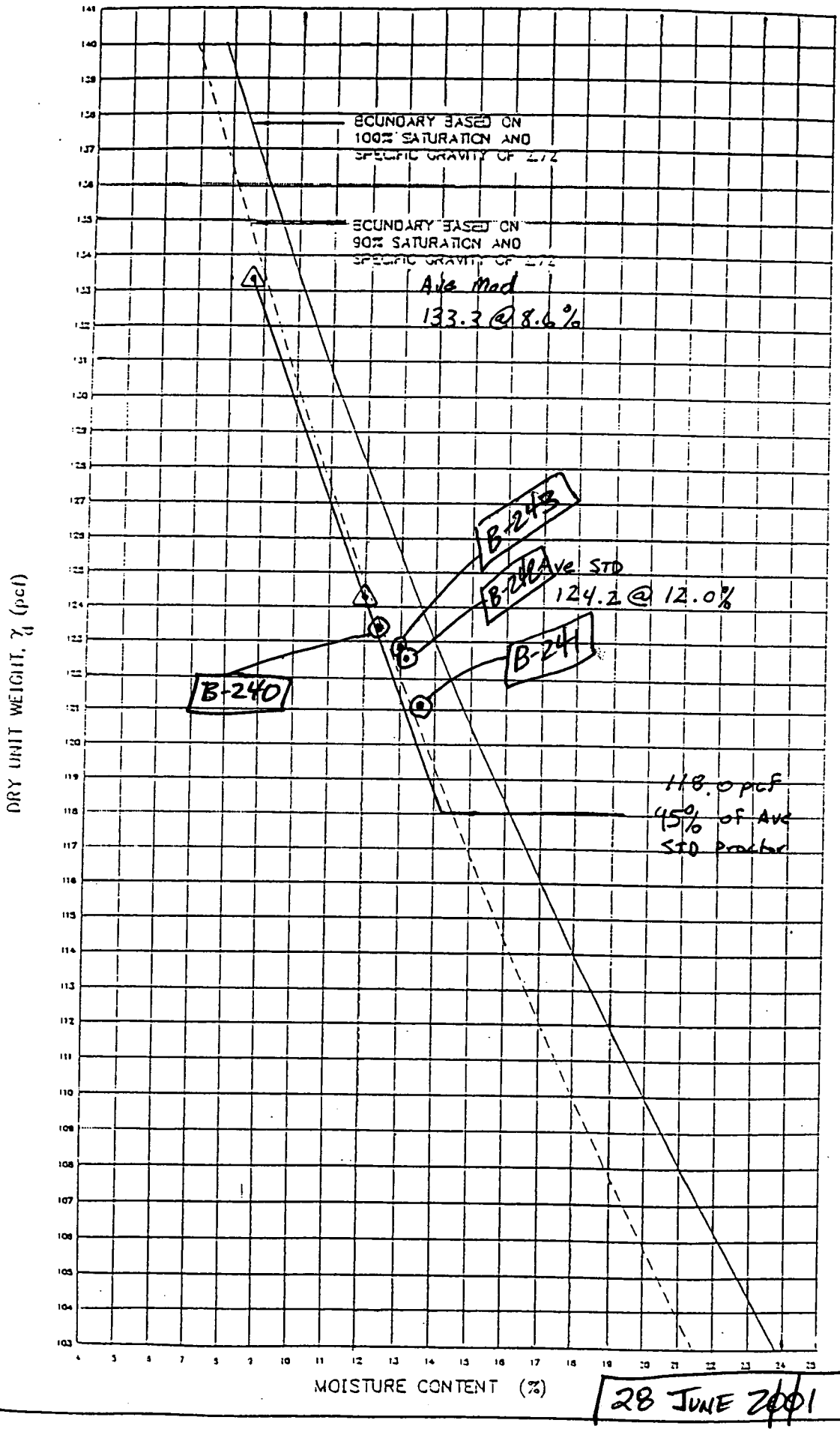


4554

000428

DATE: 28 DAY JUNE MONTH 2001 YEAR

GQ1344 - TASK 04.1 - 4554



STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

000429

28 JUNE 2001

SHEET No 3 of 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 02 day JULY month 2001 year (MONDAY)

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ~~-0-3%~~ APZ LIFT THICKNESS (LOOSE/(COMPACTED)): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X+3.4043 QA ID: (TBD)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-244	WEST TOE	6"/L-1	00-1	12.0	124.2	10.3 / 12.1	139.8	124.7	100.4	P	—	—	—	—
B-245	WEST TOE	6"/L-1	00-1	12.0	124.2	10.7 / 12.5	139.7	124.2	100.0	P	—	—	—	—
B-246	NORTH-WEST CORNER TOE	6"/L-1	00-1	12.0	124.2	13.7 / 15.0	136.7	118.9	95.7	P	—	—	—	—
B-247	WEST TOE	6"/L-2	00-1	12.0	124.2	12.8 / 14.2	137.9	120.8	97.3	P	—	—	—	—
B-248	WEST TOE	6"/L-2	00-1	12.0	124.2	13.6 / 14.9	137.0	119.2	96.0	P	—	—	—	—
B-249	EAST SLOPE	6"/L-4	00-1	12.0	124.2	12.9 / 14.3	137.2	120.0	96.6	P	—	—	—	—
B-250	EAST SLOPE	6"/L-4	00-1	12.0	124.2	11.5 / 13.1	140.7	124.4	100.2	P	—	—	—	—
B-251	EAST SLOPE	6"/L-4	00-1	12.0	124.2	10.8 / 12.5	140.3	124.7	100.4	P	—	—	—	—
B-252	EAST SLOPE	6"/L-4	00-1	12.0	124.2	11.1 / 12.8	138.6	122.9	99.0	P	—	—	—	—
B-253	NORTHWEST CORNER TOE	6"/L-2	00-1	12.0	124.2	11.7 / 13.3	138.6	122.3	98.5	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000430

4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 02 day JULY month 2001 year (MONDAY)

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION (AVE) / MOISTURE RANGE: +0.3 (AVE) LIFT THICKNESS (LOOSE/COMPACTED): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY (CIRCLE ONE) OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459 X + 3.4043 QA ID: TM

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-254	WEST TOE	6"/L-3	00-1	12.0	124.2	11.6 / 13.2	139.0	122.8	98.9	P	–	–	–	–
B-255	WEST TOE	6"/L-3	00-1	12.0	124.2	11.9 / 13.5	138.0	121.6	97.9	P	–	–	–	–
B-256	NORTHWEST CORNER TOE	6"/L-3	00-1	12.0	124.2	13.5 / 14.0	136.0	118.5	95.4	P	–	–	–	–
B-257	NORTHWEST CORNER TOE	6"/L-4	00-1	12.0	124.2	13.0 / 14.4	136.4	119.2	96.0	P	–	–	–	–
B-258	WEST TOE	6"/L-4	00-1	12.0	124.2	12.3 / 13.8	138.1	121.4	97.7	P	–	–	–	–
B-259	WEST TOE	6"/L-4	00-1	12.0	124.2	13.7 / 15.0	136.4	118.6	95.5	P	–	–	–	–

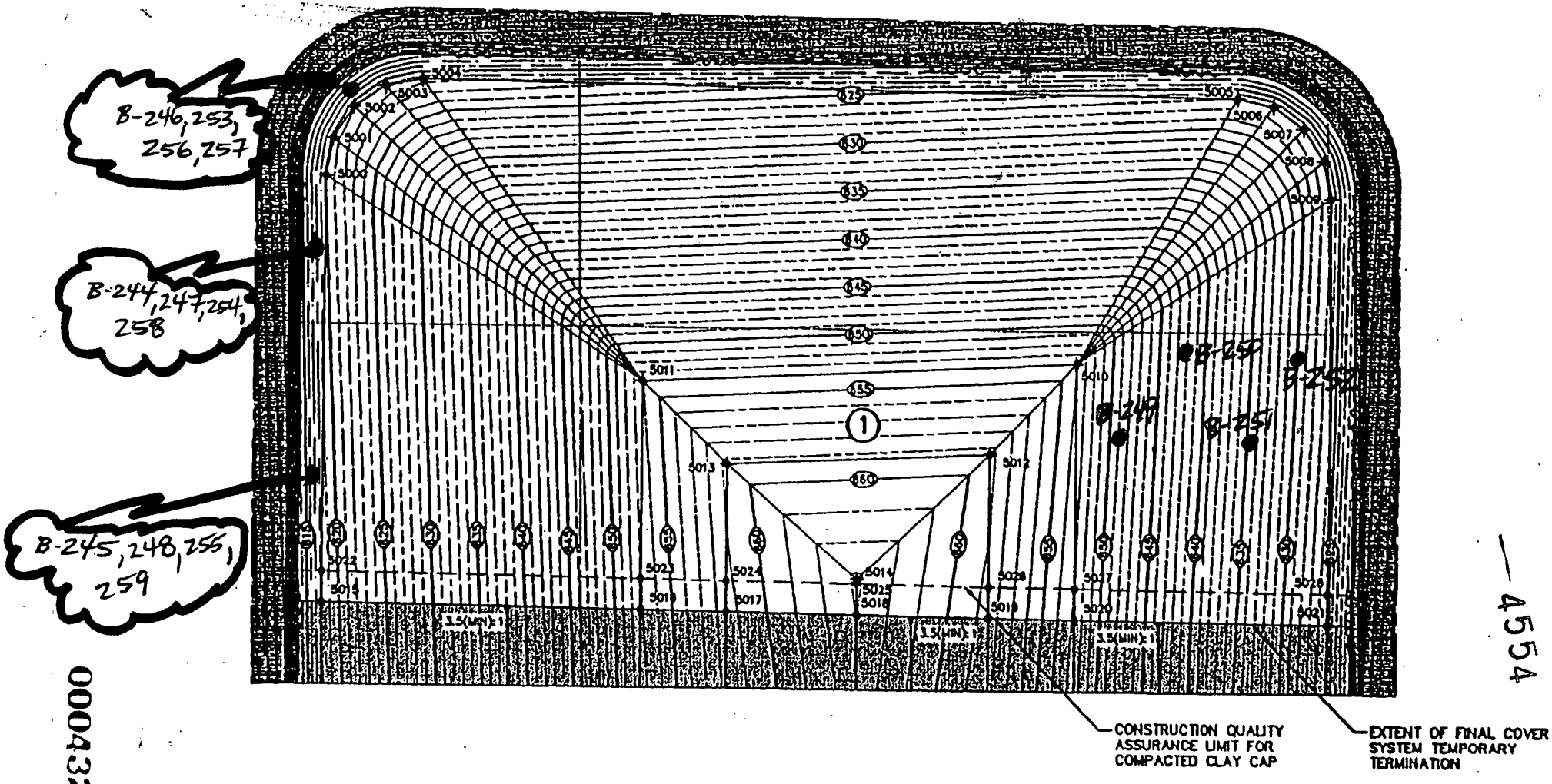
000431

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



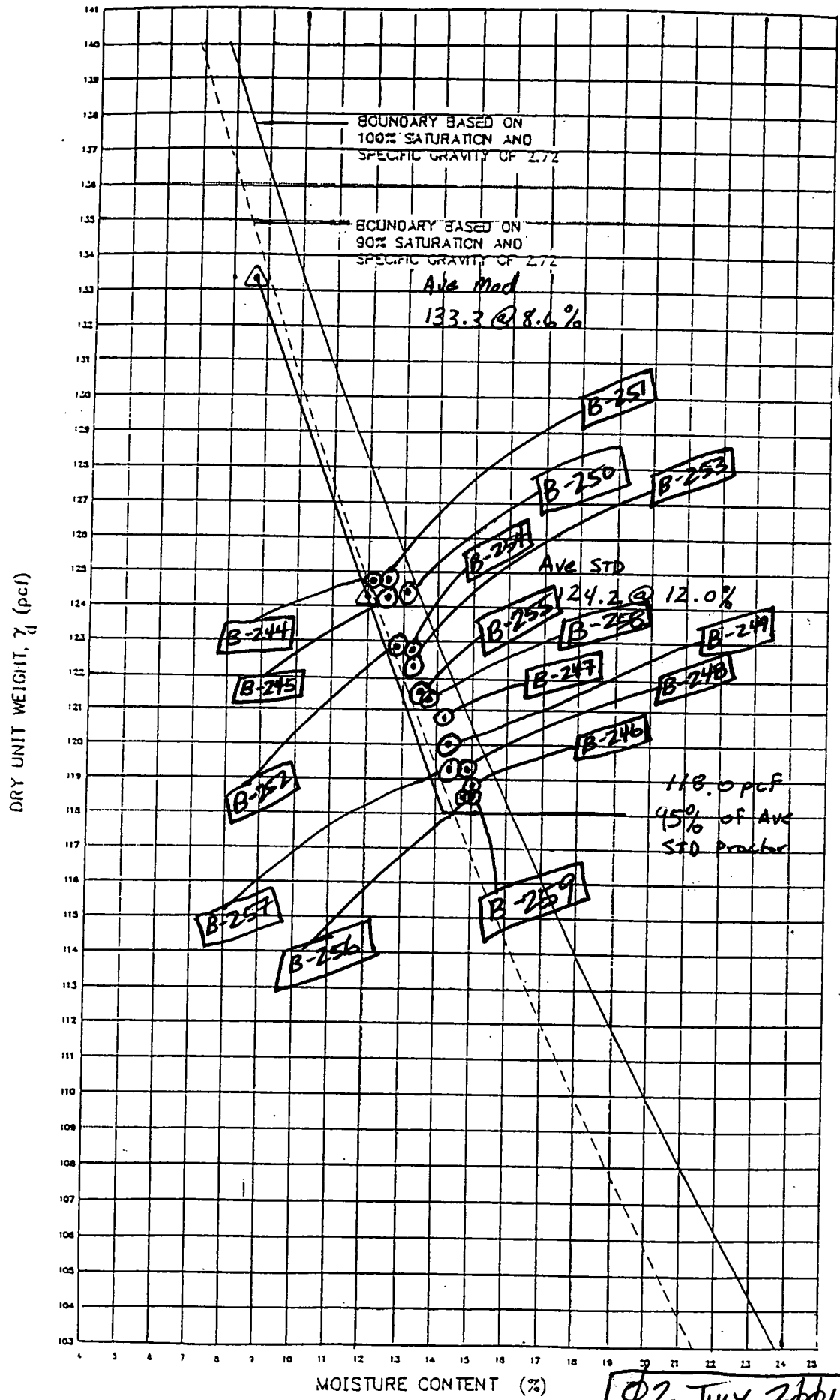
000432

-4554

DATE: 02 DAY JULY MONTH 2001 YEAR

GQ 1341 - TASK 04.1

4554



STOCKPILE 04-1

DD = -2.6765(%m) + 156.3179

000433

04 JULY 2001

SHEET No 4 OF 4

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 05 day JULY month 2001 year (THURSDAY)

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: 10-3 APZ LIFT THICKNESS (LOOSE/(COMPACTED): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: TBD/KS

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-260	EAST SLOPE	6"/L-4	00-1	12.0	124.2	11.5 13.1	138.2	122.2	98.4	P	—	—	—	—
B-261	EAST SLOPE	6"/L-4	00-1	12.0	124.2	11.3 13.0	139.4	123.4	99.4	P	—	—	—	—
B-262	EAST SLOPE	6"/L-4	00-1	12.0	124.2	10.7 12.5	138.9	123.5	99.4	P	—	—	—	—
B-263	EAST SLOPE	6"/L-4	00-1	12.0	124.2	11.4 13.8 13.1	139.0	122.9	99.0	P	—	—	—	—
B-264	NORTH TOE REWORK	6"/L-1	00-1	12.0	124.2	13.2 14.6	137.5	120.0	96.6	P	—	—	—	—
B-265	NORTH TOE REWORK	6"/L-1	00-1	12.0	124.2	13.0 14.4	136.6	119.4	96.1	P	—	—	—	—
B-266	NORTH TOE REWORK	6"/L-1	00-1	12.0	124.2	13.4 14.7	135.9	118.5	95.4	P	—	—	—	—
B-267	NORTH TOE REWORK	6"/L-2	00-1	12.0	124.2	13.0 14.4	135.4	118.4	95.3	P	—	—	—	—
B-268	NORTH TOE REWORK	6"/L-2	00-1	12.0	124.2	12.4 13.9	139.9	122.8	98.9	P	—	—	—	—
B-269	NORTH TOE REWORK	6"/L-2	00-1	12.0	124.2	13.7 15.0	135.9	118.2	95.2	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

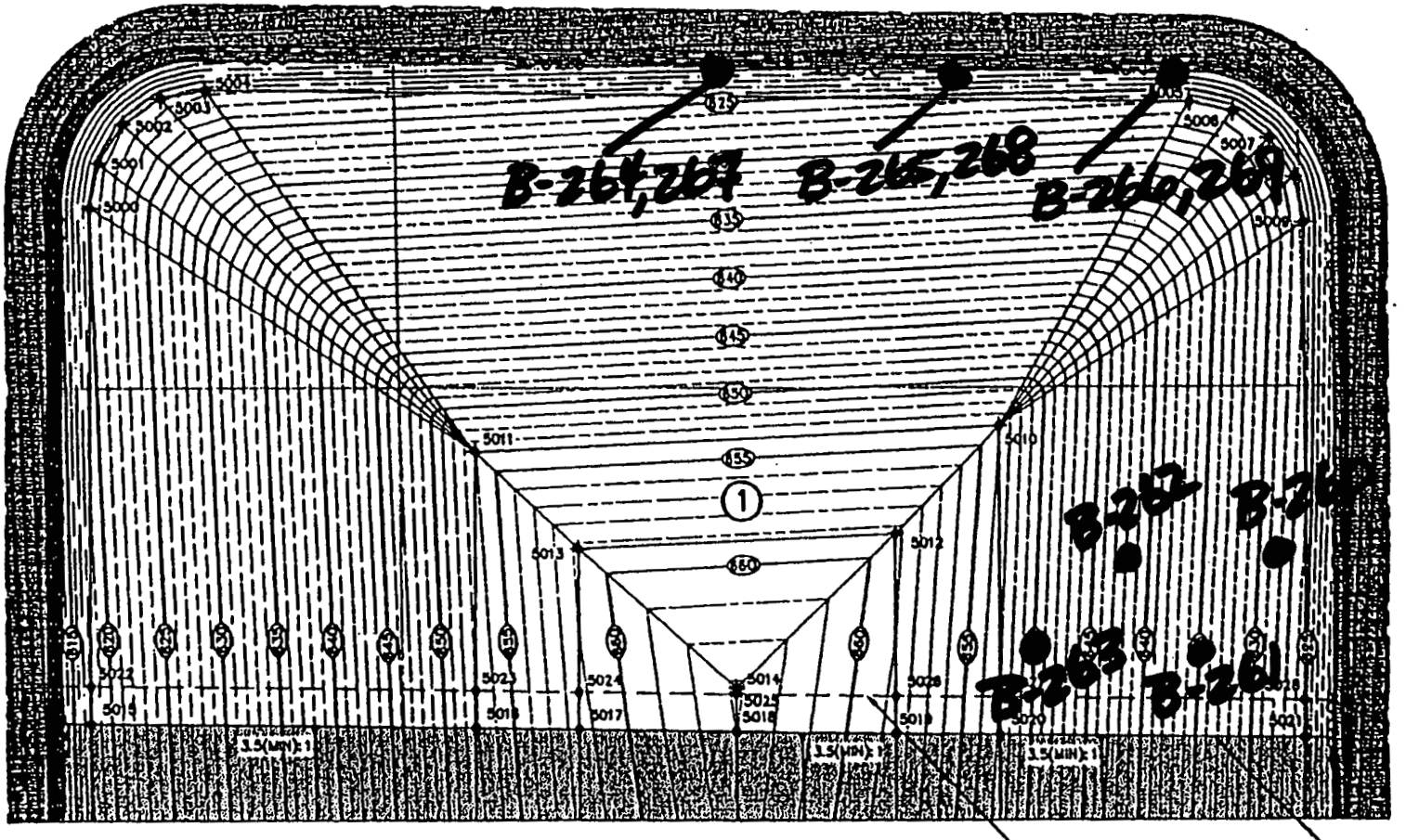
CHECKED BY: [illegible]

000434

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



CONSTRUCTION QUALITY ASSURANCE LIMIT FOR COMPACTED CLAY CAP

EXTENT OF FINAL COVER SYSTEM TEMPORARY TERMINATION

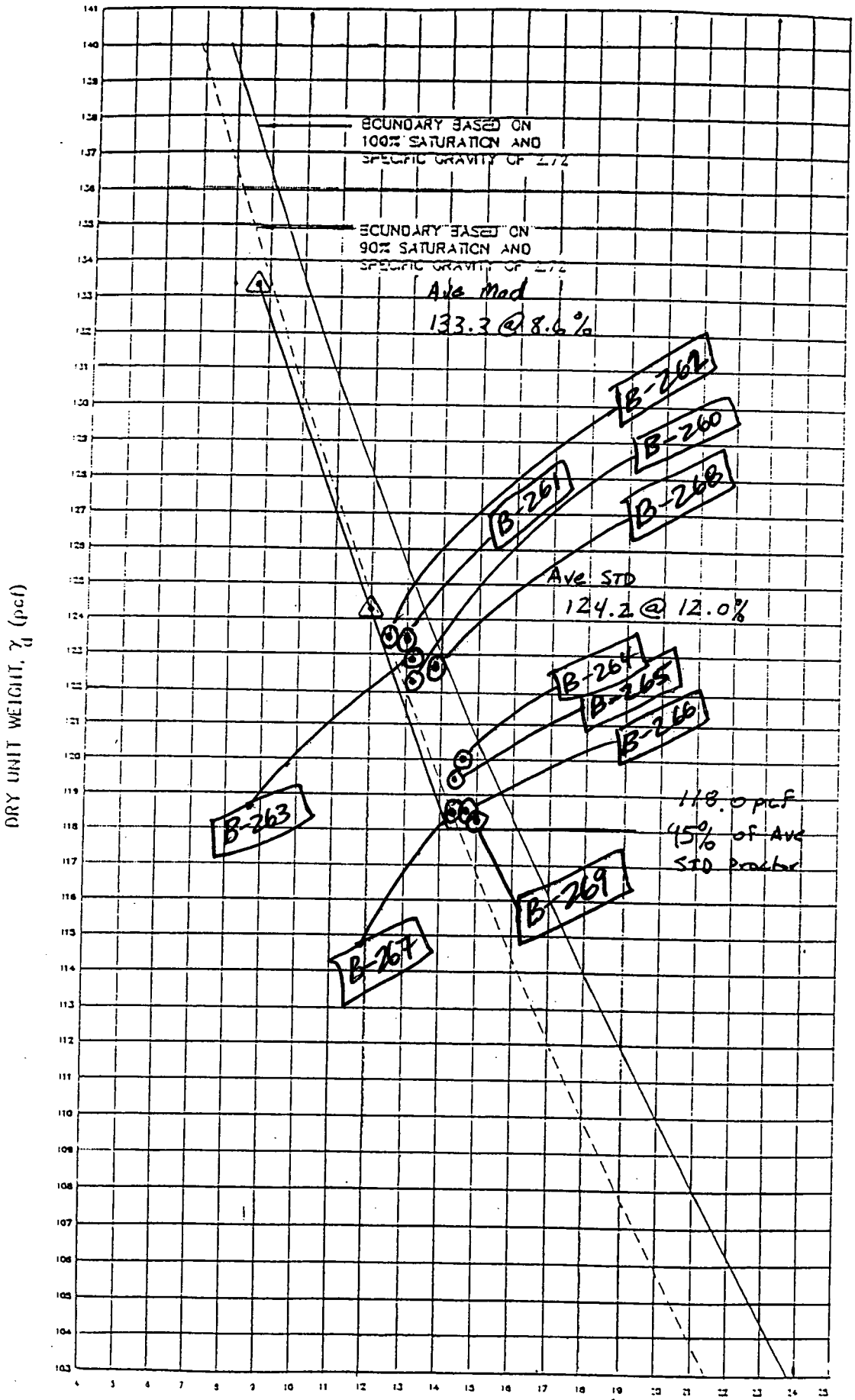
4554

000435

DATE: 05 DAY JULY MONTH 2001 YEAR

GQ134 - TASK 04.1

4554



STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

000436

05 JULY 2001

SHEET No. 3 OF 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Cell #1 Cap Construction

DATE: 6 (FRIDAY) day July month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 (APZ) % COMPACTION / MOISTURE RANGE: +0-3% (APZ) LIFT THICKNESS (LOOSE/(COMPACTED): 6"

MATERIAL SOURCE: Stockpile 00-1 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: KS/(TBC)

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
B-270	N Slope W side near toe	6" / L-2	ϕϕ-1	12.ϕ	124.2	11.7 / 13.3	137.5	121.4	97.7	P	–	–	–	–
B-271	N Slope W side near toe	6" / L-2	ϕϕ-1	12.ϕ	124.2	12.0 / 13.6	136.4	120.1	96.7	P	–	–	–	–
B-272	N Slope W side near toe	6" / L-2	ϕϕ-1	12.ϕ	124.2	13.1 / 14.5	136.2	119.0	95.8	P	–	–	–	–
B-273	NORTHWEST TOE REWORK	6" / L-2	ϕϕ-1	12.ϕ	124.2	13.ϕ / 14.4	136.4	119.2	96.ϕ	P	–	–	–	–
B-274	NORTHWEST TOE REWORK	6" / L-2	ϕϕ-1	12ϕ	124.2	12.4 / 13.9	137.2	12ϕ.5	97ϕ	P	–	–	–	–
B-275	NORTHWEST TOE REWORK	6" / L-3	ϕϕ-1	12ϕ	124.2	13.2 / 14.6	136.5	119.1	95.9	P	–	–	–	–
B-276	NORTHWEST TOE REWORK	6" / L-3	ϕϕ-1	12ϕ	124.2	12.7 / 14.1	138.2	121.1	97.5	P	–	–	–	–
		/												
		/												
		/												

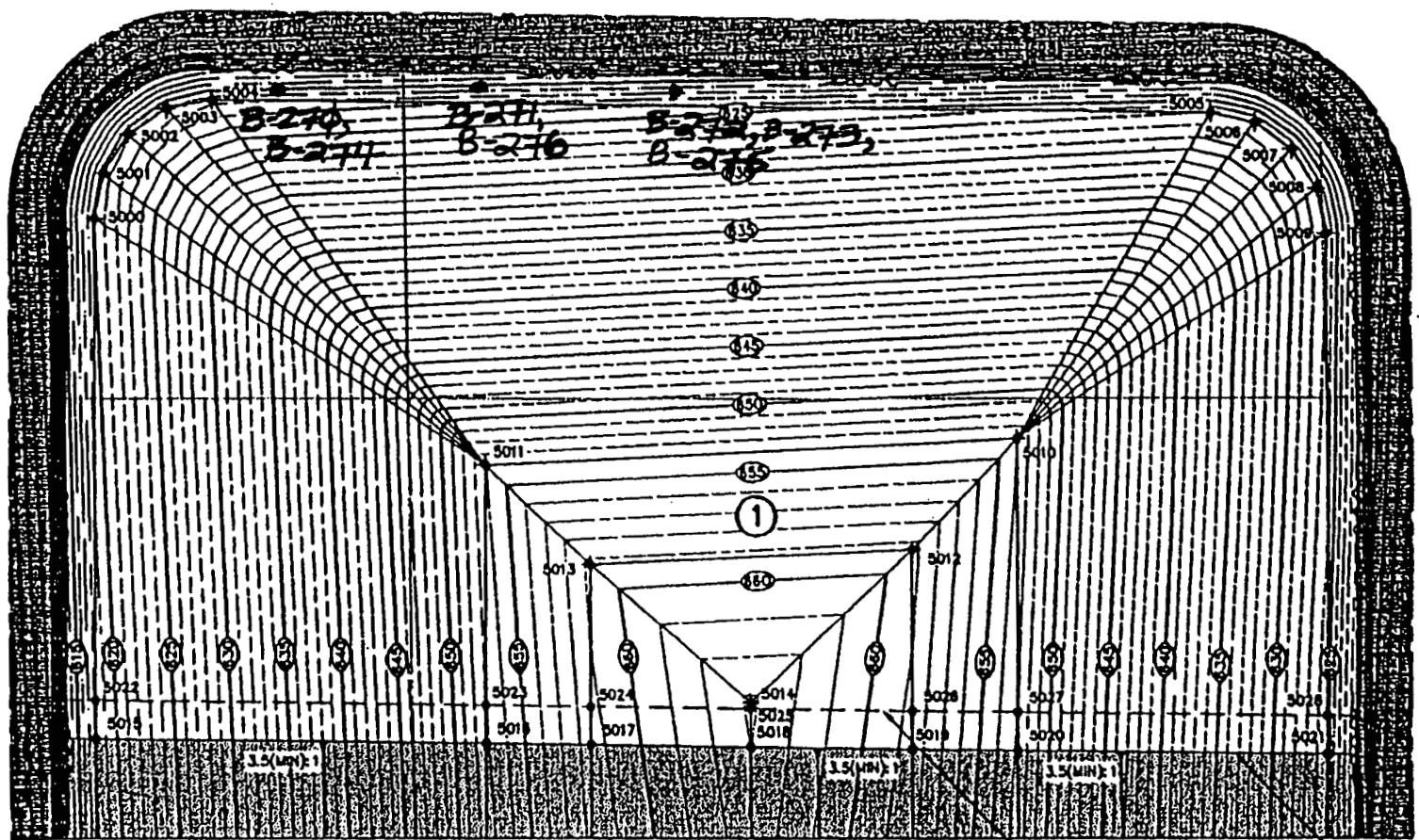
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000437

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



CONSTRUCTION QUALITY ASSURANCE LIMIT FOR COMPACTED CLAY CAP

EXTENT OF FINAL COVER SYSTEM TEMPORARY TERMINATION

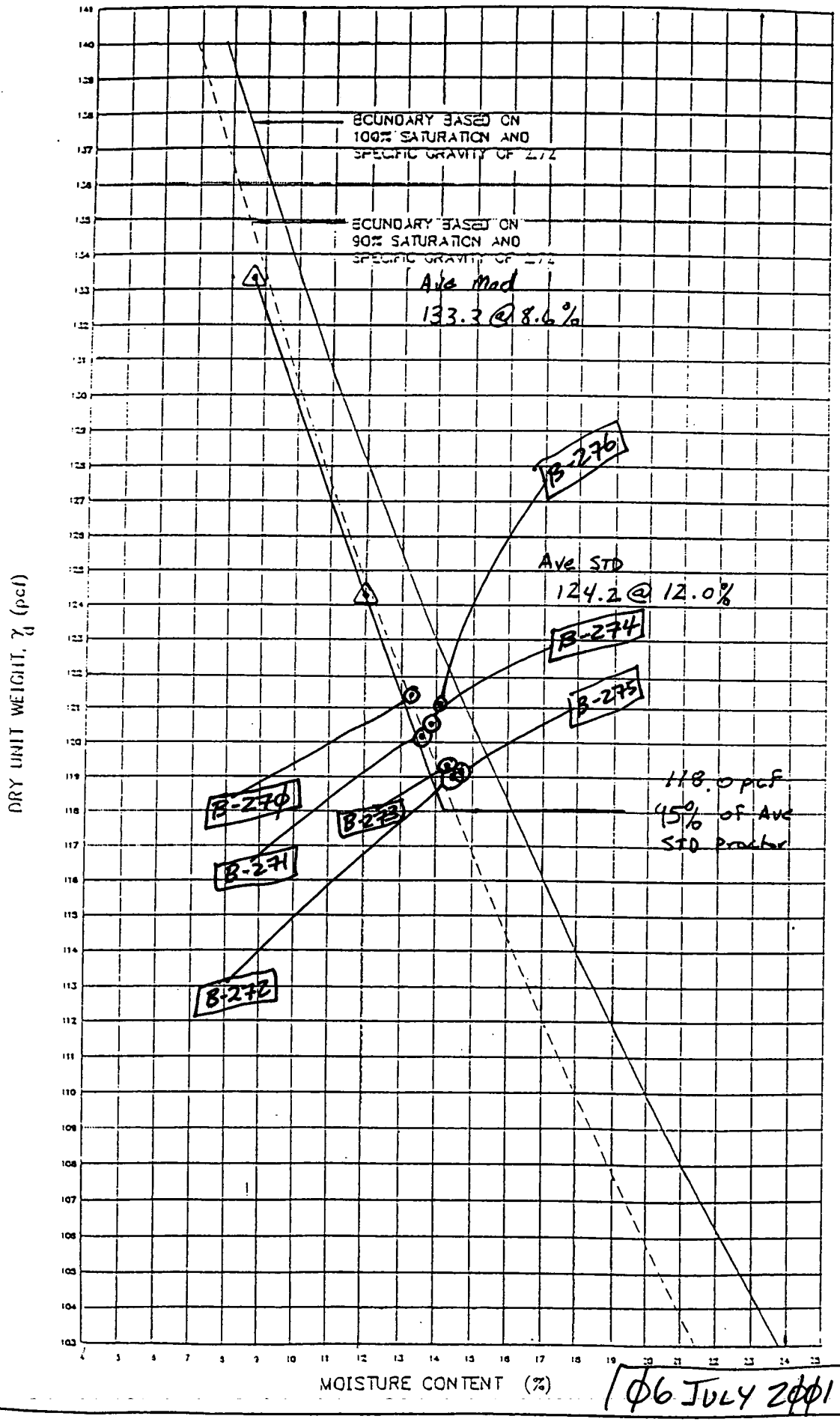
— 4554

000438

DATE: 06 DAY JULY MONTH 2001 YEAR

GQ1341 - TASK 04.1

4554



STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

000439

06 JULY 2001

SHEET No. 3 of

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Cell #1 Cap Construction

DATE: 9 day July month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ~~+0-3%~~ APZ LIFT THICKNESS (LOOSE/(COMPACTED): 6"

MATERIAL SOURCE: Stockpile 00-1 MATERIAL TYPE: (FILL) KS / SUBGRADE / SUBBASE / (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459x+3.4043 QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-278	North Slope	6"/C-4	00-1	12.0	124.2	12.7 14.1	137.6	120.6	97.1	P	–	–	–	–
B-279	North Slope	6"/C-4	00-1	12.0	124.2	13.3 14.7	135.2	117.9	~~95.0~~ 94.9	~~P~~ F	–	~~1~~ 283	P	–

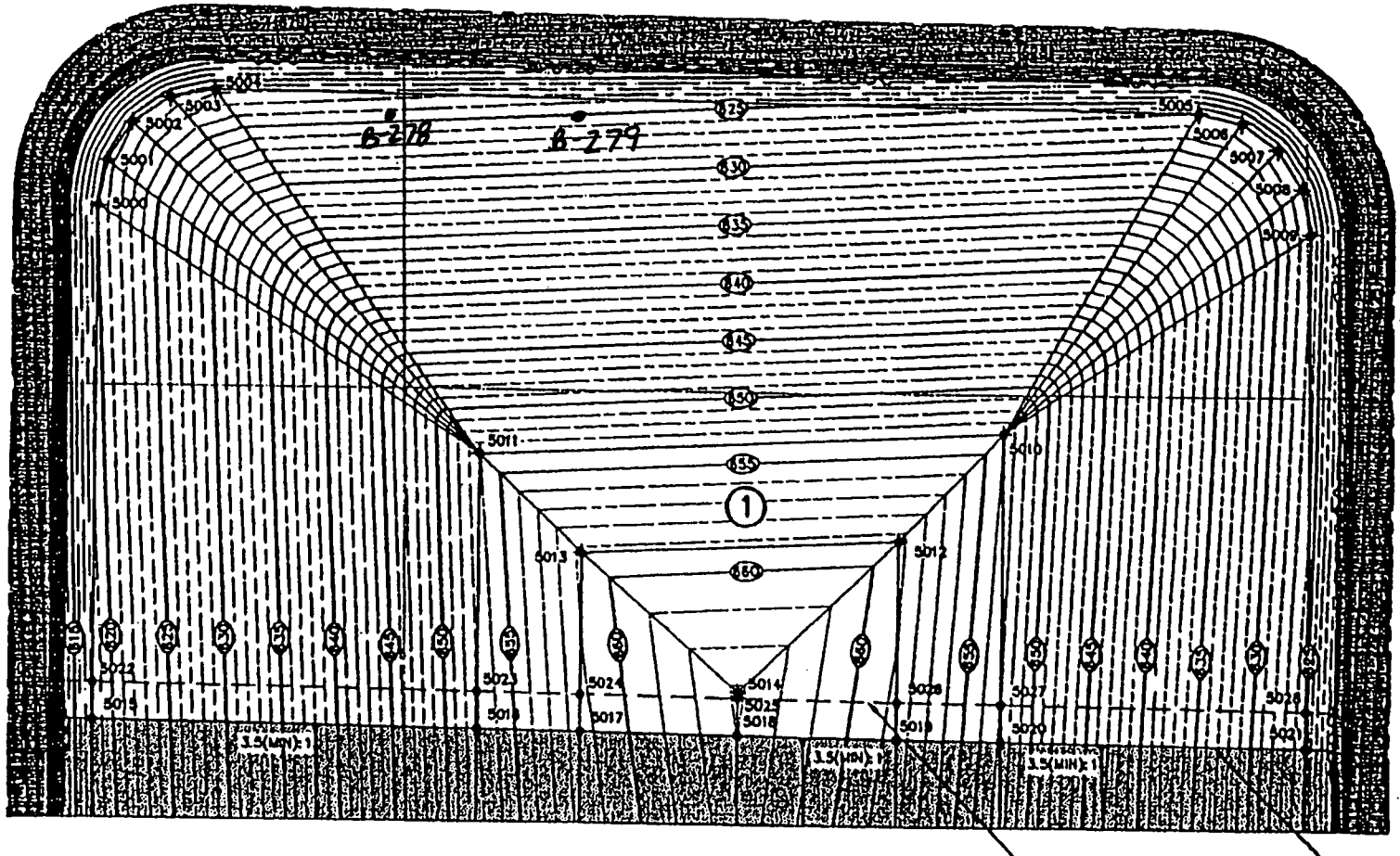
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000440

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



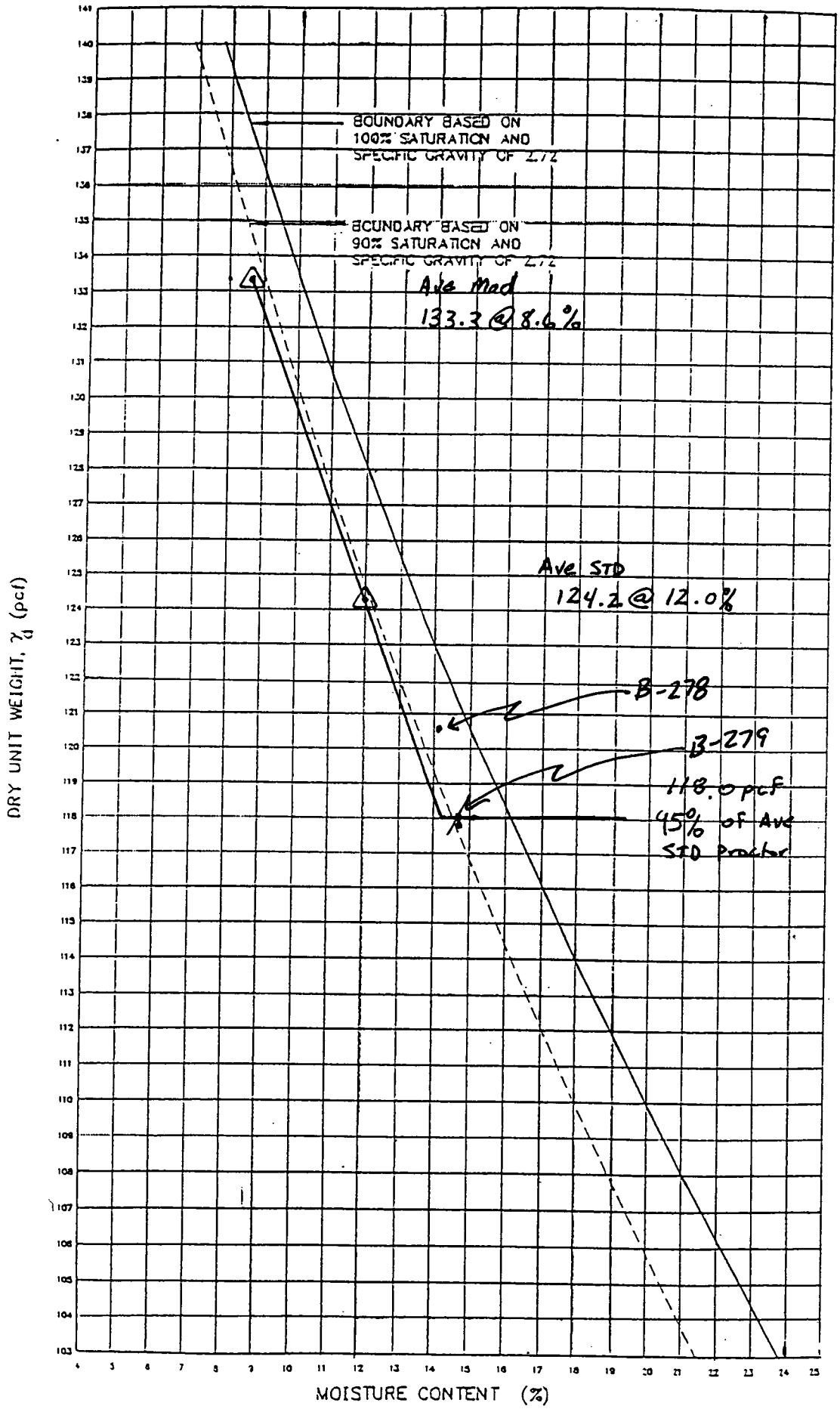
000441

-- 4554

DATE: 7 DAY July MONTH 2001 YEAR

9 July 2001

4554



STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

000442

Sheet 3 of 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: CELL # 1 CAP CONSTRUCTION

DATE: 10 day JULY month 2001 year TUESDAY

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 ~~90~~ 95 APZ % COMPACTION / MOISTURE RANGE: ~~+0.32~~ APZ LIFT THICKNESS (LOOSE/COMPACTED): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459 x + 3.4043 QA ID: TBL

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-280	NORTHEAST TOE REPAIR	6"/L-3	00-1	12.0	124.2	13.1 / 14.5	137.6	120.2	96.8	P	–	–	–	–
B-281	NORTHEAST TOE REPAIR	6"/L-3	00-1	12.0	124.2	13.5 / 14.8	136.1	118.6	95.5	P	–	–	–	–
B-282	NORTHEAST TOE REPAIR	6"/L-3	00-1	12.0	124.2	13.7 / 15.0	136.9	119.0	95.8	P	–	–	–	–

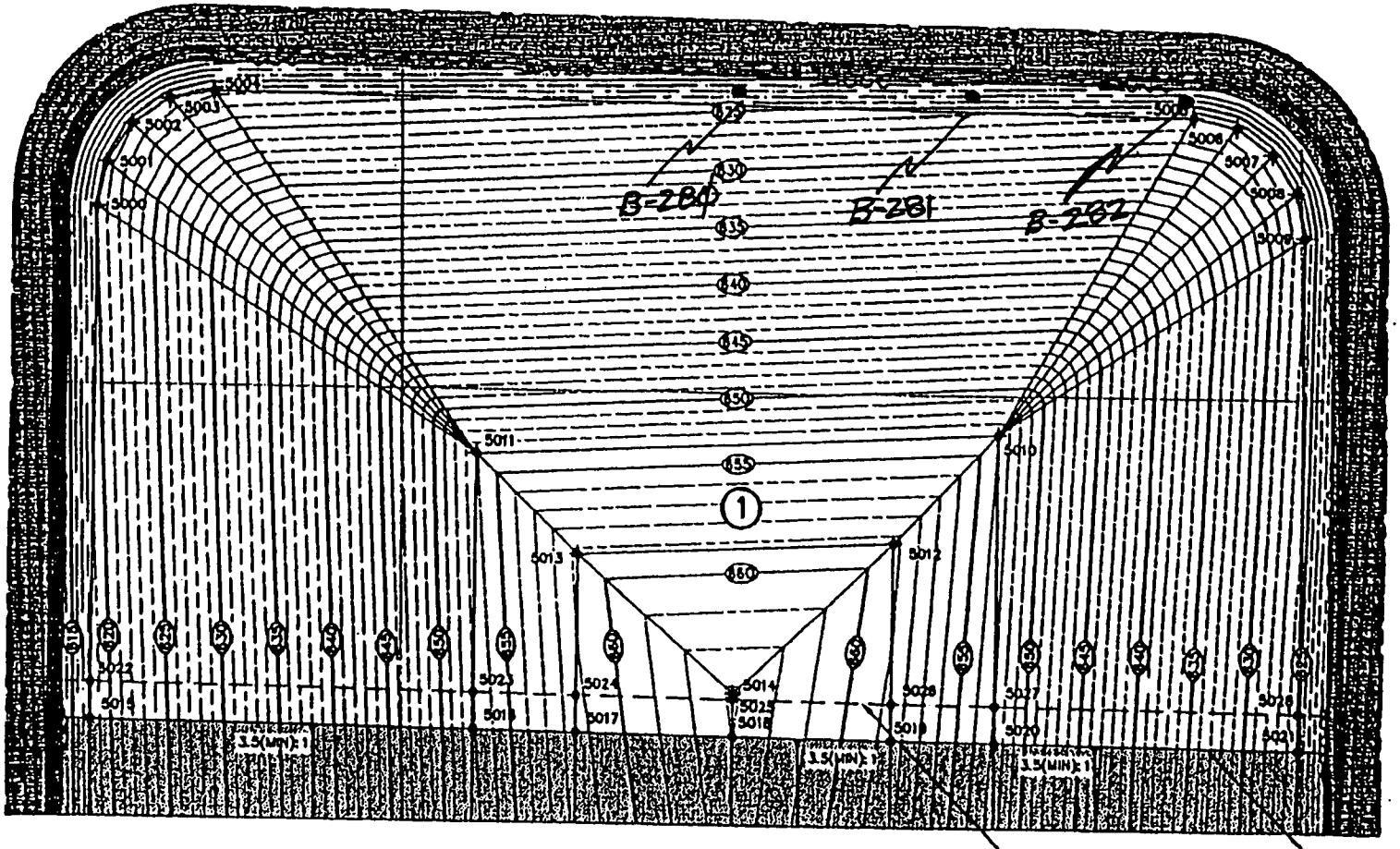
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000443

454

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



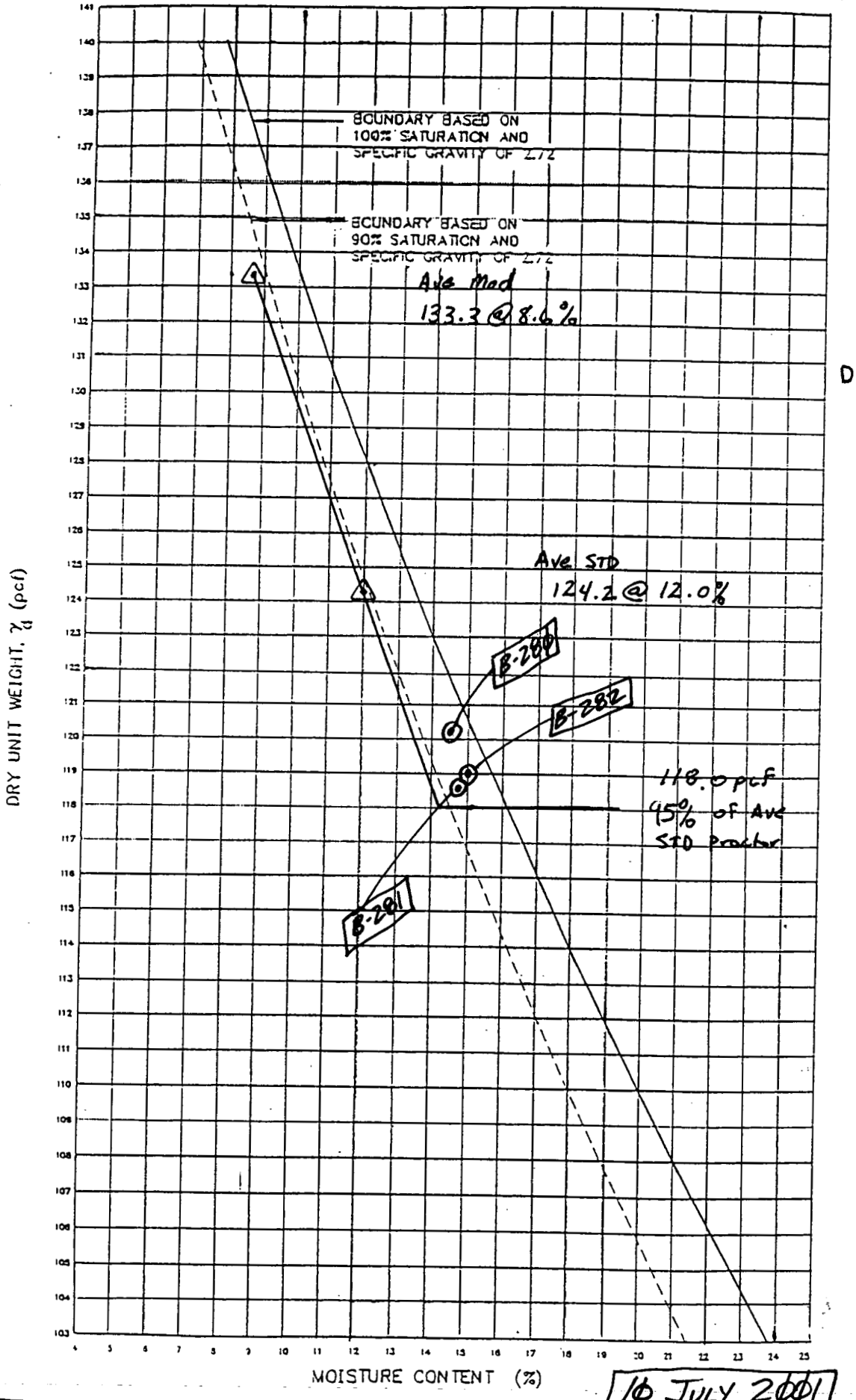
4554

000444

DATE: 10 DAY July MONTH 2001 YEAR

GQ 1341 - TASK 04.1

4554



STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

000445

10 JULY 2001

SHEET No 3 OF 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 13 day JULY month 2001 year (FRIDAY)

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 ~~95~~ 95 % COMPACTION / MOISTURE RANGE: ~~+0-3%~~ +0-3% LIFT THICKNESS (LOOSE/(COMPACTED): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X+3.4043 QA ID: (TBD)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-283	NORTH EAST TOE REPAIR	6" / L-4	00-1	12.0	124.2	13.1 / 14.5	136.2	119.0	95.8	P	—	—	—	—
B-284	N. EAST TOE REPAIR	6" / L-4	00-1	12.0	124.2	12.8 / 14.2	135.7	118.8	95.7	P	—	—	—	—
B-285	N. EAST TOE REPAIR	6" / L-4	00-1	12.0	124.2	13.7 / 15.0	135.9	118.2	95.2	P	—	—	—	—

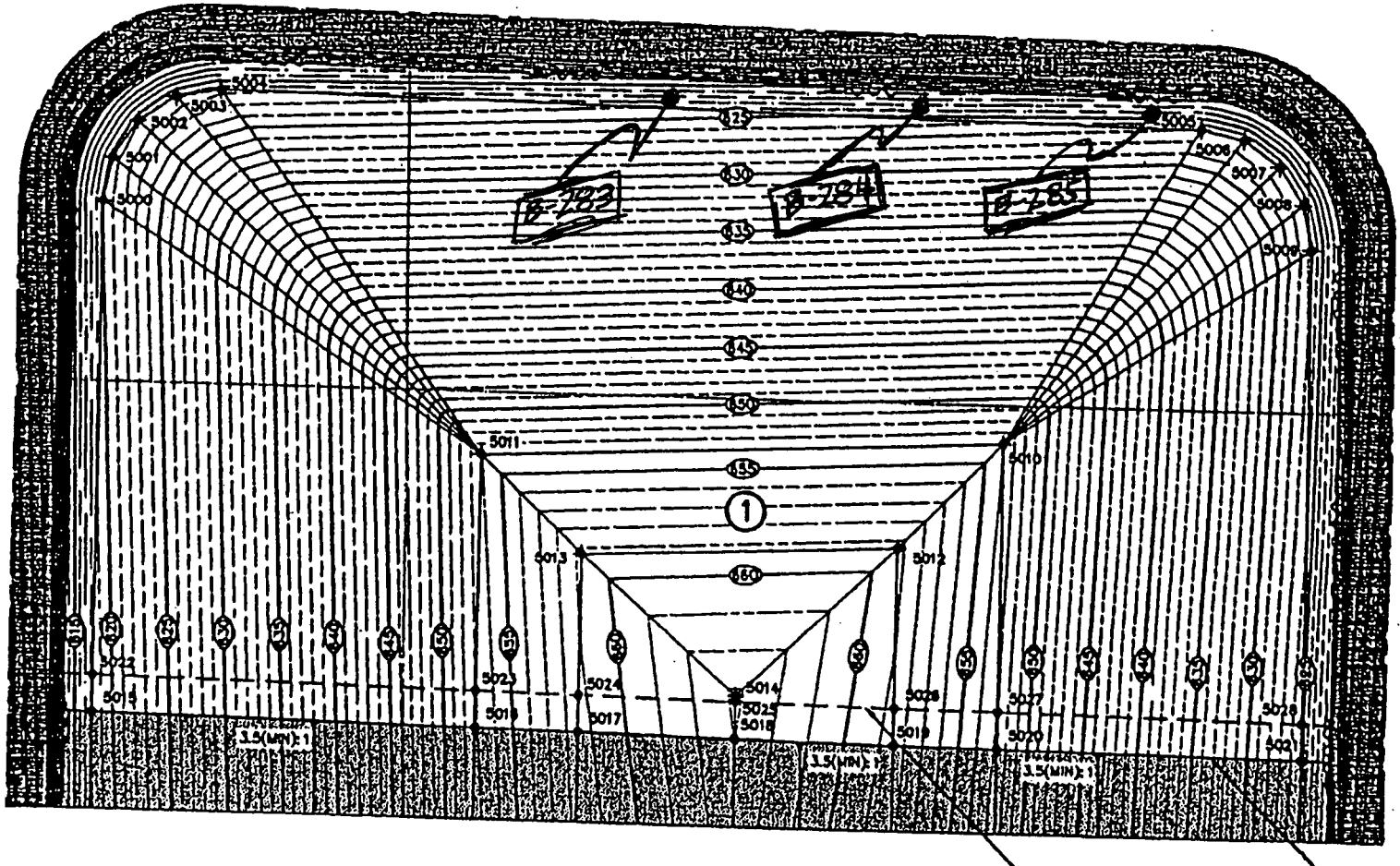
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

000446

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



DATE: 13 DAY JULY MONTH 2001 YEAR

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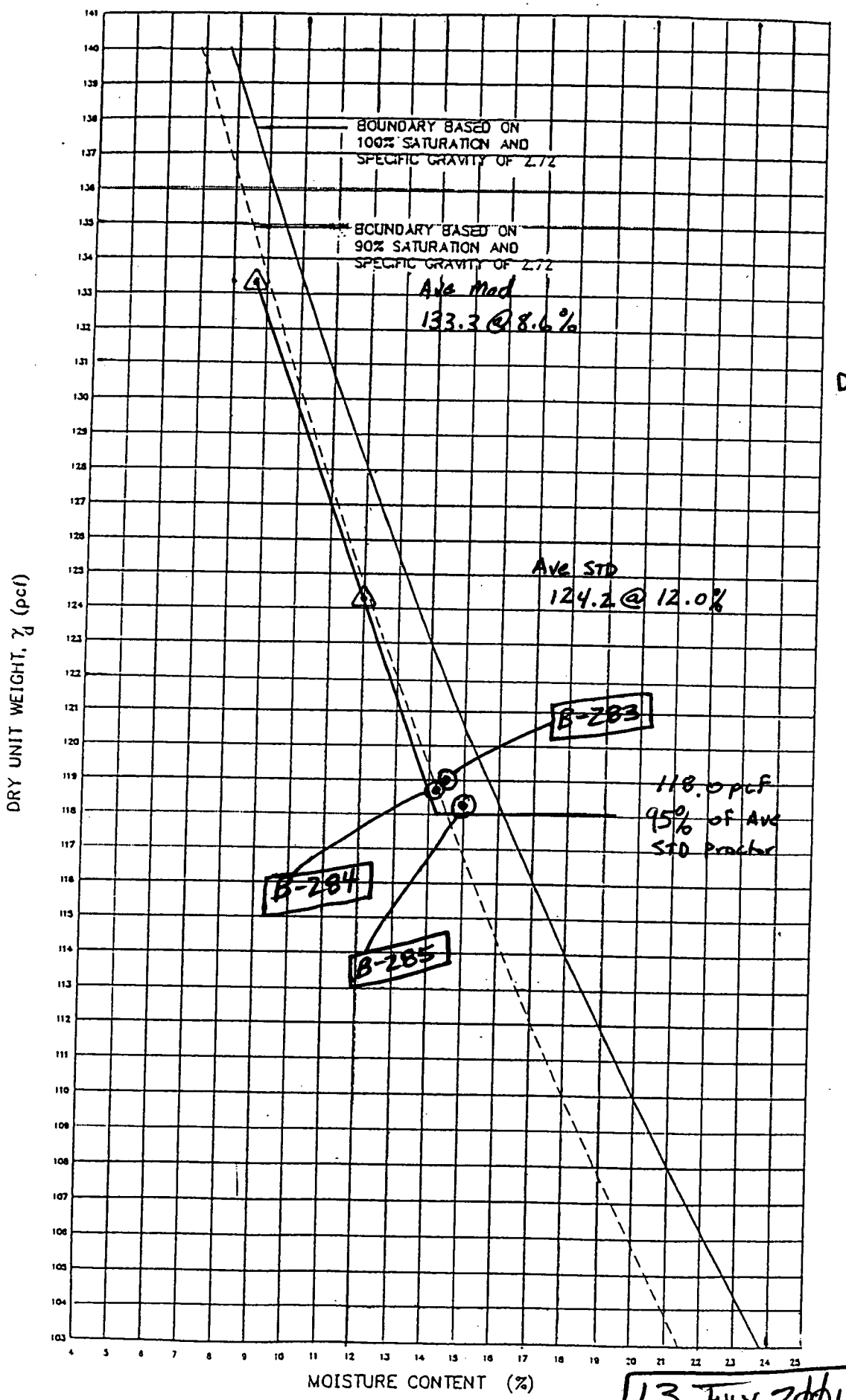
GQ 1341 - TASK 04.1

4554



STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

000448

13 JULY 2001

SHEET No 3 OF 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 17 (TUESDAY) day JULY month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 ~~95~~ 95 % COMPACTION / MOISTURE RANGE: ~~-3%~~ 16-3% LIFT THICKNESS (LOOSE/(COMPACTED)) 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

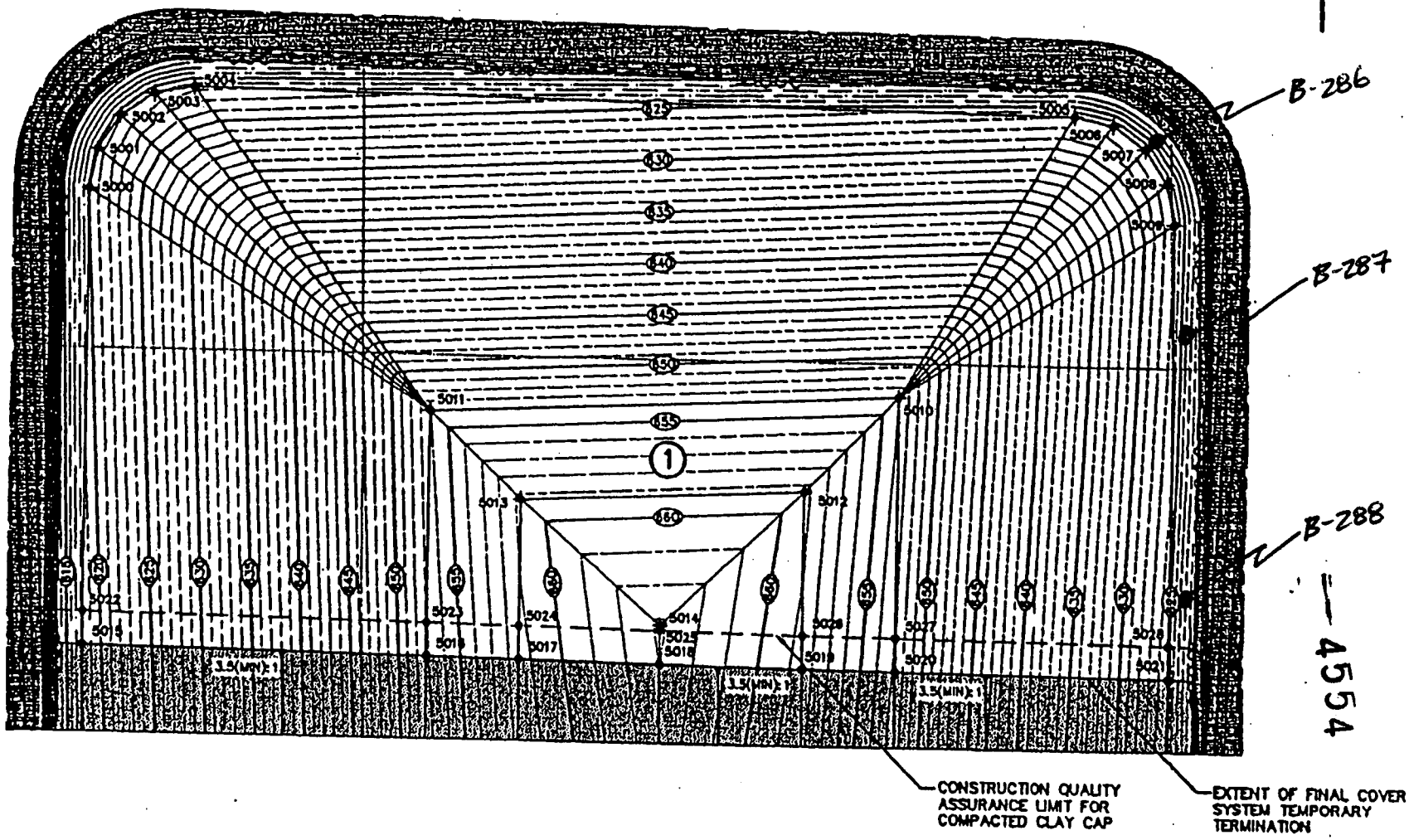
NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459x + 3.4043 QA ID: (TBU)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-286	N.EAST TOE REPAIR	6"/L-1	00-1	12.0	124.2	13.1 / 14.5	135.8	118.6	95.5	P	—	—	—	—
B-287	EAST TOE REPAIR	6"/L-1	00-1	12.0	124.2	13.0 / 14.4	136.2	119.1	95.9	P	—	—	—	—
B-288	EAST TOE REPAIR	6"/L-1	00-1	12.0	124.2	12.7 / 14.1	137.3	120.3	96.9	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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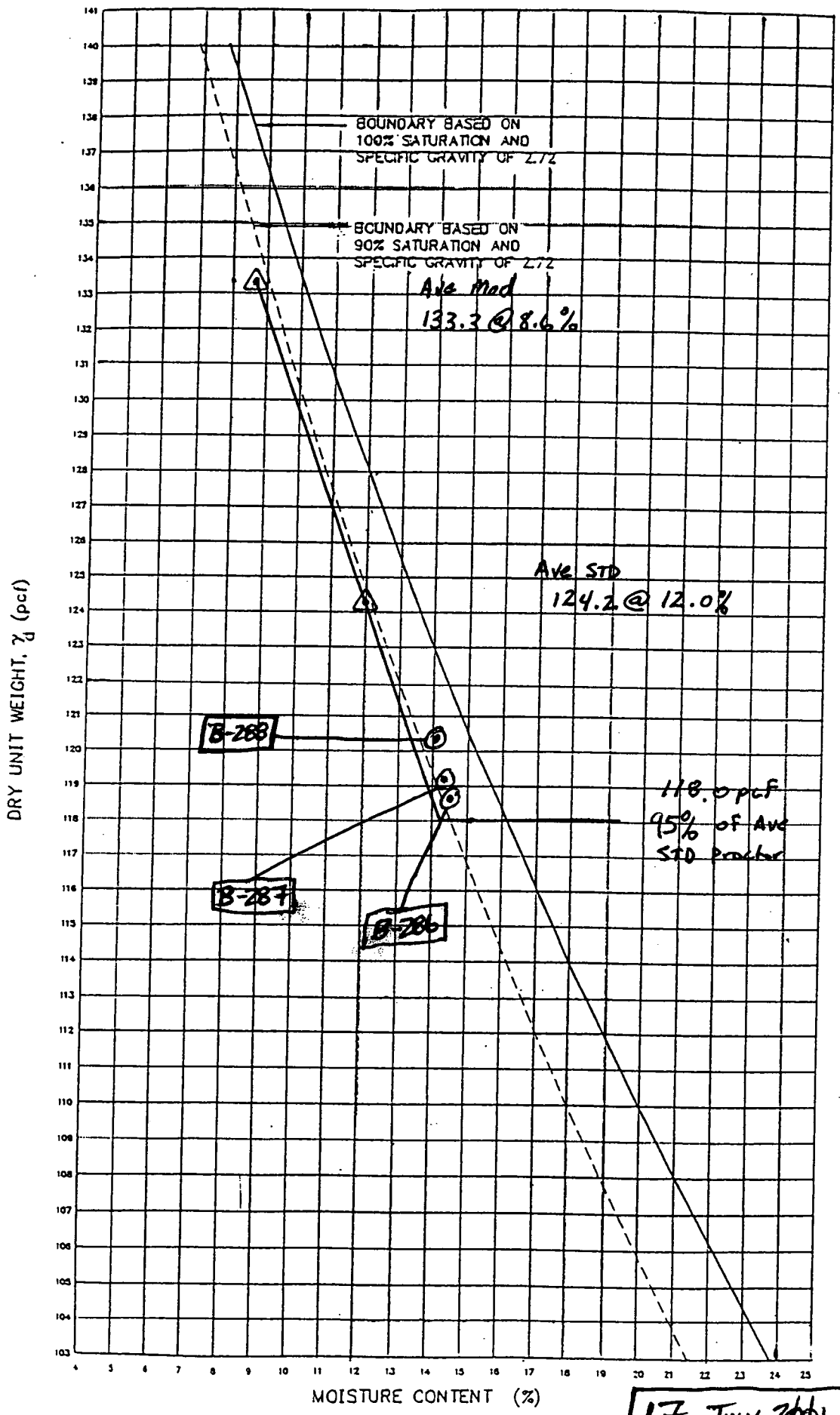
DATE: 17 DAY JULY MONTH 2001 YEAR

-4554

GQ 1341 - TASK 04.1

4554



STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

000451

17 JULY 2001

SHEET No 3 OF 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 20 day JULY month 2001 year (FRIDAY)

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: to 3% LIFT THICKNESS (LOOSE/(COMPACTED)): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: (TBD)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-289	EAST TOE REPAIR	6" / L-2	00-1	12.0	124.2	13.6 14.9	135.7	118.1	95.1	P	–	–	–	–
B-290	EAST TOE REPAIR	6" / L-2	00-1	12.0	124.2	13.2 14.6	135.5	118.2	95.2	P	–	–	–	–
B-291	EAST TOE REPAIR	6" / L-2	00-1	12.0	124.2	12.0 13.6	136.6	120.2	96.8	P	–	–	–	–
B-292	EAST TOE REPAIR	6" / L-3	00-1	12.0	124.2	13.5 14.8	136.0	118.5	~~95.5~~ 95.4	P	–	–	–	–
B-293	EAST TOE REPAIR	6" / L-3	00-1	12.0	124.2	12.9 14.3	135.2	118.3	95.3	P	–	–	–	–
B-294	EAST TOE REPAIR	6" / L-3	00-1	12.0	124.2	13.6 14.9	136.4	118.7	95.6	P	–	–	–	–

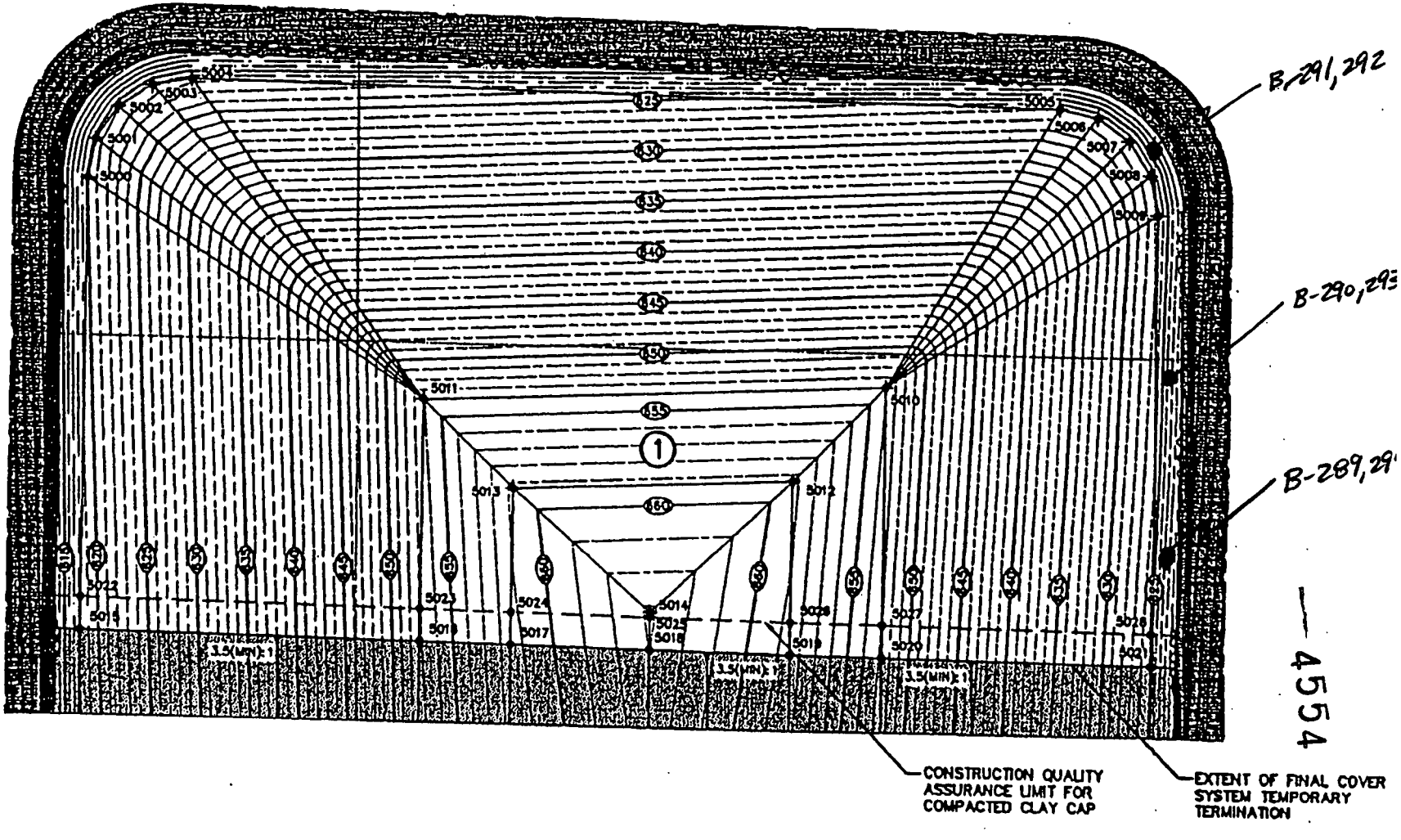
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

CHECKED BY: [illegible]

SHEET NO. 1 OF 1

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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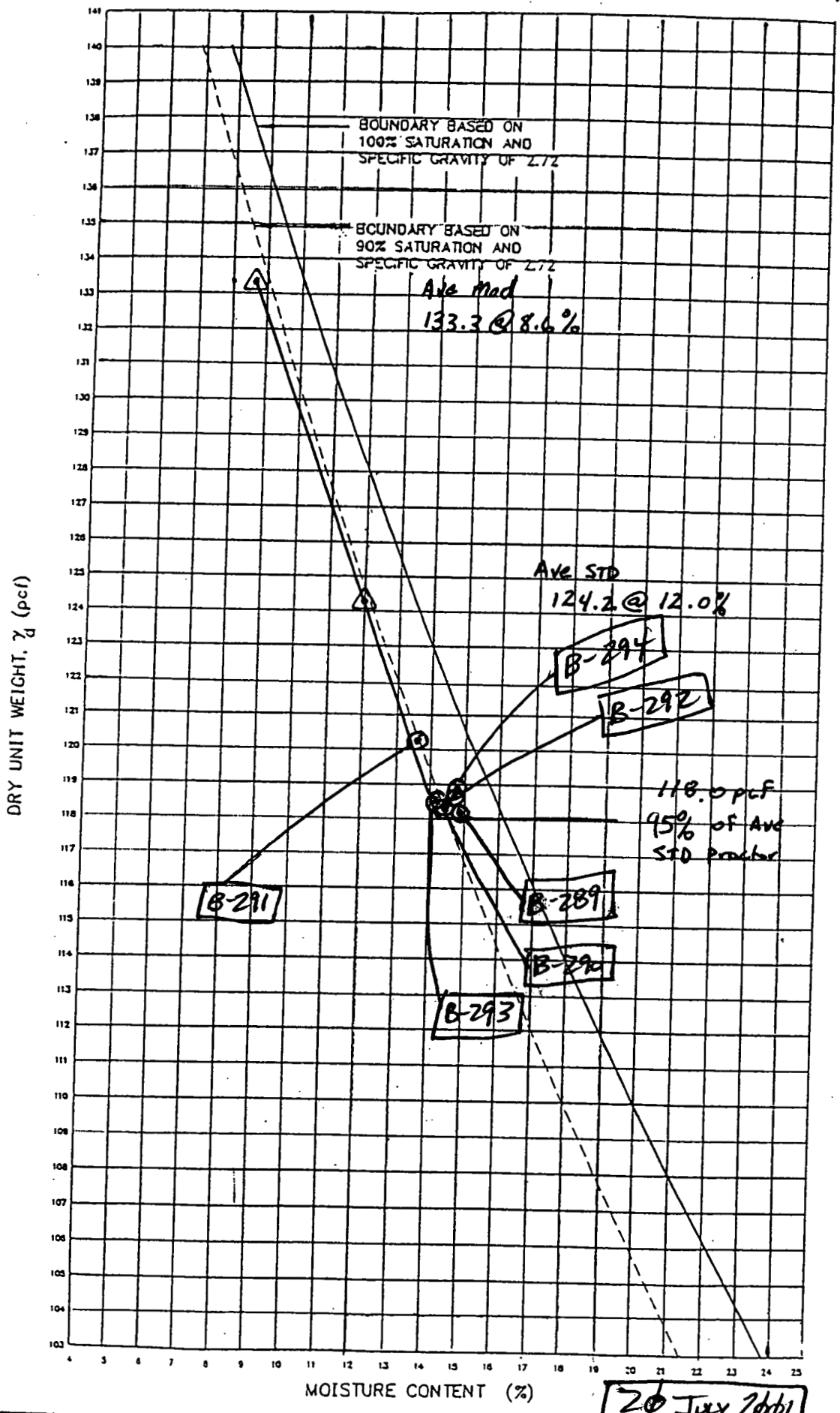
— 4554

DATE: 20 DAY JULY MONTH 2001 YEAR

GQ1341-TASK 04.1

4554



STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

20 July 2001

000454

SHEET No ___ OF ___

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: CELL #1 CAP CONSTRUCTION

DATE: 23 day JULY month 2001 year (MONDAY)

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 ≥95 APZ % COMPACTION / MOISTURE RANGE: +0-2% APZ LIFT THICKNESS (LOOSE/(COMPACTED)): 6"

MATERIAL SOURCE: STOCKPILE 00-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = 0.8459X + 3.4043 QA ID: (TRW)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
B-295	EAST TOE REPAIR	6"/L-4	00-1	12.0	124.2	13.0 / 14.4	137.5	120.2	96.8	P	—	—	—	—
B-296	EAST TOE REPAIR	6"/L-4	00-1	12.0	124.2	11.6 / 13.2	138.1	122.0	98.2	P	—	—	—	—
B-297	EAST TOE REPAIR	6"/L-4	00-1	12.0	124.2	10.2 / 12.0	139.5	124.6	100.3	P	—	—	—	—
B-298	EAST TOE REPAIR	6"/L-5	00-1	12.0	124.2	12.2 / 13.7	138.2	121.5	97.8	P	—	—	—	—
B-299	EAST TOE REPAIR	6"/L-5	00-1	12.0	124.2	10.5 / 12.3	139.8	124.5	100.2	P	—	—	—	—
B-300	EAST TOE REPAIR	6"/L-5	00-1	12.0	124.2	10.9 / 12.6	139.5	123.9	99.8	P	—	—	—	—
B-301	NORTH EAST TOE REPAIR	6"/L-6	00-1	12.0	124.2	12.0 / 13.6	137.2	120.8	97.3	P	—	—	—	—
		/												
		/												
		/												

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

©GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: [illegible] SHEET NO. 1 OF 3

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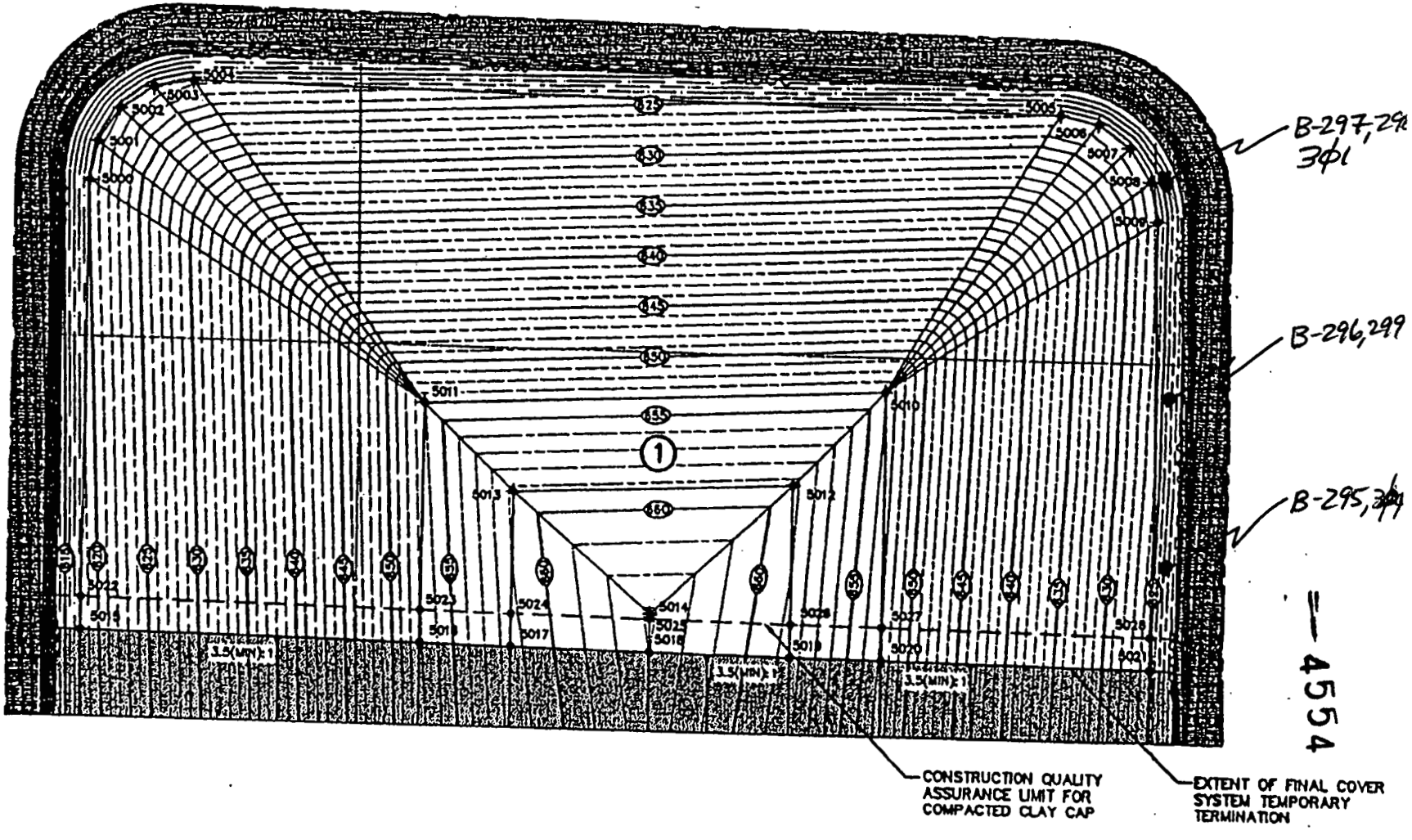
4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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DATE: 23 DAY JULY MONTH 2001 YEAR

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GQ1341-TASK 04.1

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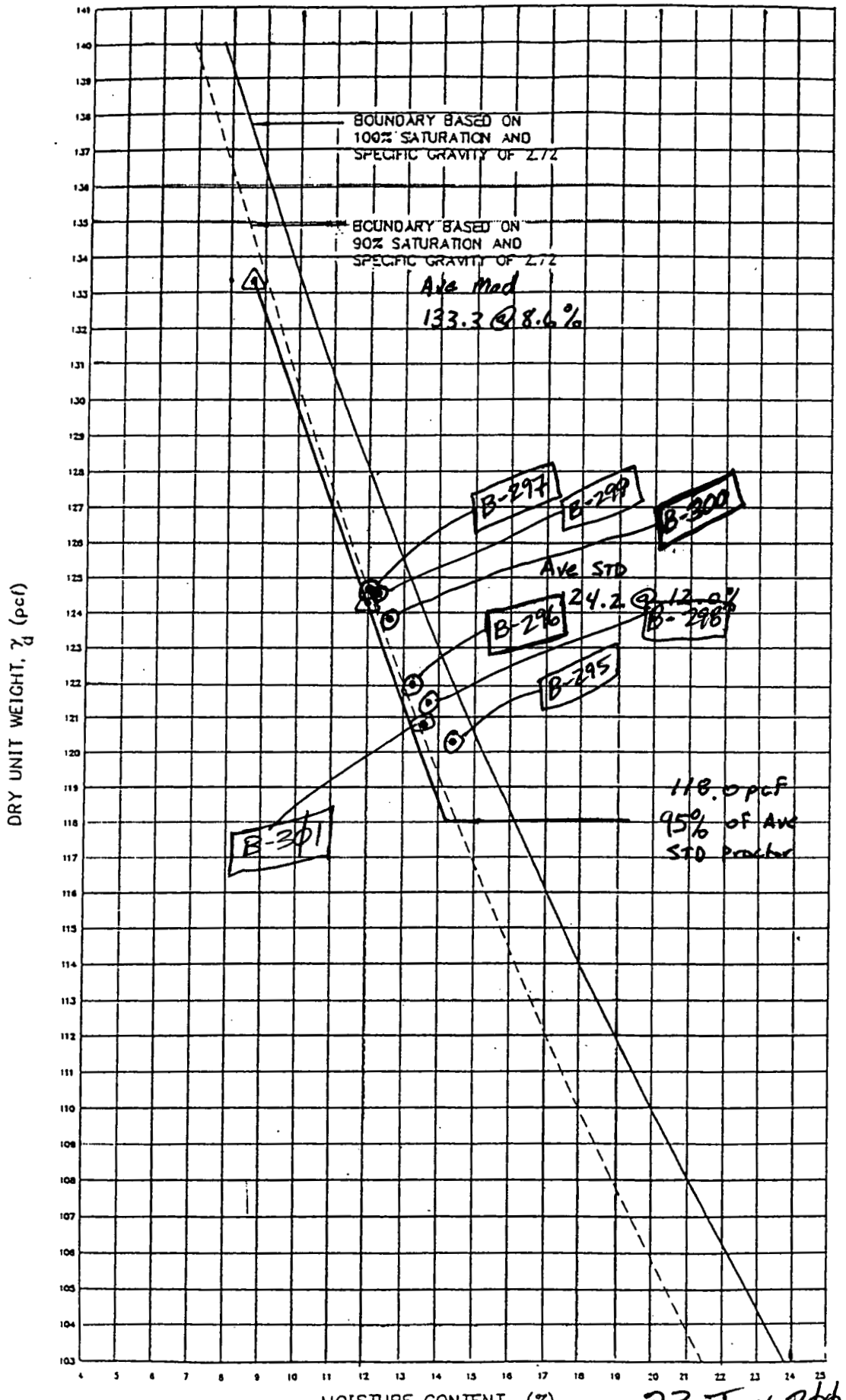

STOCKPILE
00-1

DD = -2.6765(%m)
+156.3179

23 JULY 2001

000457

SHEET No. 3 OF 3

CLAY CAP DRIVE CYLINDER TEST RESULTS

2095.63

GEOSYNTEC CONSULTANTS

← 4554
FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 30 day MAY month 2001 year

TEST NO.: DRCC #1 Sample Taken 30/may/2001

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) OTHER: Compacted Clay Cap

% COMPACTION: ≥95% - APZ MOISTURE CONTENT RANGE: +0-3% - APZ

FDT LOCATION: @B-45 (L-1) ⇒ SEE MAP FDT TEST NO.: B-45

FIELD TEST DATA – ASTM D 2937 QA ID: DLE

A	CYLINDER NO. 01-3 VOLUME(1) (cf)	0.03346	E	WET UNIT WEIGHT = D/A (lbs)	138.1
B	WEIGHT OF SAMPLE & CYLINDER (lbs) 2711.8g	5.98	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	121.8
C	WEIGHT OF CYLINDER (lbs) 617.5g	1.36	G		
D	WEIGHT OF WET SAMPLE = B-C (lbs) 2094.3	4.62			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DLE

O	WT. OF TARE NO. #215 (grams)	8.3	R	WT. OF WATER = P-Q (grams)	67.0
P	WT. OF WET SOIL & TARE (grams)	575.7	S	WT. OF DRY SOIL = Q-O (grams)	500.4
Q	WT. OF DRY SOIL & TARE (grams)	508.7	T	MOISTURE CONTENT = (R/S)X100 (%)	13.4

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. _____ (pcf) OPTIMUM MOISTURE CONTENT _____ (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: DLE

DELTA MOISTURE CONTENT = T - U	0.0	U	FDT MOISTURE CONTENT (%)	11.8/13.4
FDT WET UNIT WT. (pcf)	137.1	V	FDT DRY UNIT WT. (pcf)	120.9
DELTA DRY UNIT WT. = F - V	0.9		FDT #	B-45

COMMENTS:

000459

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GEOSYNTEC CONSULTANTS

4554

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 60134/ TASK NO.: 041

DESCRIPTION: Phase III DATE: 30 day MAY month 2001 year

TEST NO.: DRCC#2 Sample Taken 30/MAY/2001

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) OTHER: Compacted Clay Cap

% COMPACTION: ≥95% - APZ MOISTURE CONTENT RANGE: +0-3% & APZ

FDT LOCATION: @ B-51 (L-1) ⇒ SEE MAP FDT TEST NO.: B-51

FIELD TEST DATA – ASTM D 2937 QA ID: DLE

A	CYLINDER NO. 01-4 VOLUME[1] (cf)	0.03355	E	WET UNIT WEIGHT = D/A (lbs)	135.9
B	WEIGHT OF SAMPLE & CYLINDER 2678.2 (lbs)	5.90	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	~~119.6~~ @
C	WEIGHT OF CYLINDER 608.6 g (lbs)	1.34	G		120.0
D	WEIGHT OF WET SAMPLE = B-C (lbs)	4.56			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DLE

O	WT. OF TARE NO. #24 (grams)	8.3	R	WT. OF WATER = P-Q (grams)	65.2
P	WT. OF WET SOIL & TARE (grams)	562.3	S	WT. OF DRY SOIL = Q-O (grams)	~~478.6~~ 488.8 @
Q	WT. OF DRY SOIL & TARE (grams)	497.1	T	MOISTURE CONTENT = (R/S)X100 (%)	~~13.6~~ @ 13.3 1.1

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. _____ (pcf) OPTIMUM MOISTURE CONTENT DLE _____ (%)

COMPARISON WITH NUCLEAR GAUGE – @ ASTM D 2922 AND D 3017 QA ID: DLE

DELTA MOISTURE CONTENT = T - U	0.9 ~~1.2~~	U	FDT MOISTURE CONTENT (%)	10.6/12.4
FDT WET UNIT WT. (pcf)	138.1	V	FDT DRY UNIT WT. (pcf)	122.9
DELTA DRY UNIT WT. = F - V	@ ~~-3.3~~ 2.9		FDT #	B-51

COMMENTS:

000460

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GEOSYNTEC CONSULTANTS

4554

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 11 day June month 2001 year

TEST NO.: DR CC-3 B-85

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: Compacted Clay Cap

% COMPACTION: ≥95% & APZ MOISTURE CONTENT RANGE: +0-3% & APZ

FDT LOCATION: B-85 (SEE LOGS) FDT TEST NO.: B-85

FIELD TEST DATA – ASTM D 2937 QA ID: DLE

A	CYLINDER NO. 01-4 VOLUME[1] (cf)	0.03355	E	WET UNIT WEIGHT = D/A (lbs)	134.4
B	WEIGHT OF SAMPLE & CYLINDER 2653.5 gr (lbs)	5.85	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	118.2
C	WEIGHT OF CYLINDER 608.6 gr (lbs)	1.34	G		
D	WEIGHT OF WET SAMPLE = B-C 2045.74 gr (lbs)	4.51			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DLE

O	WT. OF TARE NO. 215 (grams)	8.3	R	WT. OF WATER = P-Q (grams)	62.9
P	WT. OF WET SOIL & TARE (grams)	528.8	S	WT. OF DRY SOIL = Q-O (grams)	457.6 ~~8~~ DLE
Q	WT. OF DRY SOIL & TARE (grams)	466.9	T	MOISTURE CONTENT = (R/S)X100 (%)	13.7 1.

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. _____ (pcf) OPTIMUM MOISTURE CONTENT _____ (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: _____

DELTA MOISTURE CONTENT = T - U	~~0.8~~ -0.6	U	FDT MOISTURE CONTENT (%)	12.9/14.3
FDT WET UNIT WT. (pcf)	136.1	V	FDT DRY UNIT WT. (pcf)	119.4
DELTA DRY UNIT WT. = F - V	-1.2		FDT #	B-85

COMMENTS:

000461

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GEOSYNTEC CONSULTANTS

4554

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 13 day June month 2006 year

TEST NO.: ~~B-103~~ DRCC-04 Sample taken 12/~~June~~/2009

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: Compacted Clay cap

% COMPACTION: 95% MOISTURE CONTENT RANGE: 0% to +3%

FDT LOCATION: North Slope FDT TEST NO.: B-103

FIELD TEST DATA – ASTM D 2937 QA ID: DLE

A	CYLINDER NO. 01-3 VOLUME(1) (cf)	0.03346	E	WET UNIT WEIGHT = D/A (lbs)	139.3
B	WEIGHT OF SAMPLE & CYLINDER 2730.6 (lbs)	6.02	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	124.3
C	WEIGHT OF CYLINDER 617.5g. (lbs)	1.36	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs)	4.66			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01–in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DLE

O	WT. OF TARE NO. #24 (grams)	8.3	R	WT. OF WATER = P–Q (grams)	58.6
P	WT. OF WET SOIL & TARE (grams)	552.1	S	WT. OF DRY SOIL = Q–O (grams)	485.2
Q	WT. OF DRY SOIL & TARE (grams)	493.5	T	MOISTURE CONTENT = (R/S)X100 (%)	12.1

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 12.0 (pcf) OPTIMUM MOISTURE CONTENT 123.9 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: _____

DELTA MOISTURE CONTENT = T – U	-1.9	U	FDT MOISTURE CONTENT (%)	12.4/13.9
FDT WET UNIT WT. (pcf)	137.3	V	FDT DRY UNIT WT. (pcf)	120.5
DELTA DRY UNIT WT. = F – V	3.8		FDT #	0.3

COMMENTS:

000462

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 14 day June month 2001 year

TEST NO.: DRCC-5

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

% COMPACTION: 95% MOISTURE CONTENT RANGE: 0 to +3%

FDT LOCATION: East Slope / Lift #3 FDT TEST NO.: B 136

FIELD TEST DATA – ASTM D 2937 QA ID: DLE

A	CYLINDER NO. 01-3 VOLUME[1] (cf)	0.03346	E	WET UNIT WEIGHT = D/A (lbs)	14.66
B	WEIGHT OF SAMPLE & CYLINDER (lbs)	616	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	124.8
C	WEIGHT OF CYLINDER 2768.2 617.5 (lbs)	1.36	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs)	4.74			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DLE

O	WT. OF TARE NO. #212 (grams)	8.33	R	WT. OF WATER = P–Q (grams)	33.53
P	WT. OF WET SOIL & TARE (grams)	289.60	S	WT. OF DRY SOIL = Q–O (grams)	247.74
Q	WT. OF DRY SOIL & TARE (grams)	256.07	T	MOISTURE CONTENT = (R/S)X100 (%)	13.5

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 124.1 (pcf) OPTIMUM MOISTURE CONTENT 12.2 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID:

DELTA MOISTURE CONTENT = T – U	0.7	U	FDT MOISTURE CONTENT (%)	11.1 / 12.8
FDT WET UNIT WT. (pcf)	139.4	V	FDT DRY UNIT WT. (pcf)	123.6
DELTA DRY UNIT WT. = F – V	1.2		FDT #	

COMMENTS:

000463

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GEOSYNTEC CONSULTANTS

4554

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: G-Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day June month 2001 year

TEST NO.: DRCC-6 Date Taken 15 June 2001

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

% COMPACTION: 95% MOISTURE CONTENT RANGE: Ø To 3%

FDT LOCATION: List 3, North Slope FDT TEST NO.: B-146

FIELD TEST DATA – ASTM D 2937 QA ID: DLE

A	CYLINDER NO. 01-4 VOLUME[1] (cf)	0.03355	E	WET UNIT WEIGHT = D/A (lbs)	140.4
B	WEIGHT OF SAMPLE & CYLINDER 2742.1 ~~2728.7~~ (lbs)	6.05	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	125.4
C	WEIGHT OF CYLINDER 608.6 gmm (lbs)	~~608.6~~ 134	G		
D	WEIGHT OF WET SAMPLE = B-C 2136.5 (lbs)	4.71			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DLE

O	WT. OF TARE NO. #101 (grams)	8.2	R	WT. OF WATER = P-Q (grams)	40.9
P	WT. OF WET SOIL & TARE (grams)	390.6	S	WT. OF DRY SOIL = Q-O (grams)	341.5
Q	WT. OF DRY SOIL & TARE (grams)	349.7	T	MOISTURE CONTENT = (R/S)X100 (%)	12.0 11.1

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT._____(pcf) OPTIMUM MOISTURE CONTENT_____(%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: DLE

DELTA MOISTURE CONTENT = T - U		0.4/-0.8	U	FDT MOISTURE CONTENT (%)	11.1/12.8
FDT WET UNIT WT. (pcf)		142.1	V	FDT DRY UNIT WT. (pcf)	126.Ø
DELTA DRY UNIT WT. = F - V		-0.6		FDT #	

COMMENTS:

000464

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4554

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 09.1

DESCRIPTION: Phase III DATE: 19 day June month 2001 year

TEST NO.: DRCC-7 Sample Taken 19/June/2001

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

% COMPACTION: 95% MOISTURE CONTENT RANGE: 0 to 3%

FDT LOCATION: West Slope FDT TEST NO.: B-172

FIELD TEST DATA – ASTM D 2937 QA ID: DLE

A	CYLINDER NO. Ø1-3 VOLUME(1)	(cf)	0.03346	E	WET UNIT WEIGHT = D/A	(lbs) 139.6
B	WEIGHT OF SAMPLE & CYLINDER 2735.9 gr.	(lbs)	6.03	F	DRY UNIT WEIGHT = E/[1+(T/100)]	(pcf) 124.3
C	WEIGHT OF CYLINDER 617.5 gr	(lbs)	1.36	G		
D	WEIGHT OF WET SAMPLE = B–C	(lbs)	4.67			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DLE

O	WT. OF TARE NO. #24	(grams)	8.3	R	WT. OF WATER = P–Q	(grams) 45.8
P	WT. OF WET SOIL & TARE	(grams)	427.9	S	WT. OF DRY SOIL = Q–O	(grams) 373.8
Q	WT. OF DRY SOIL & TARE	(grams)	382.1	T	MOISTURE CONTENT = (R/S)X100	(%) 12.3

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. _____ (pcf) OPTIMUM MOISTURE CONTENT _____ (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: _____

DELTA MOISTURE CONTENT = T – U	0.4/-1.2	U	FDT MOISTURE CONTENT	(%)	11.9/13.5
FDT WET UNIT WT.	(pcf) 140.3	V	FDT DRY UNIT WT.	(pcf)	123.6
DELTA DRY UNIT WT. = F – V	0.7		FDT #		B-172

COMMENTS:

000465

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GEOSYNTEC CONSULTANTS

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FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 09.1

DESCRIPTION: Phase III DATE: 20 day June month 2001 year

TEST NO.: FDT# B-189 DRCC-8

SPECIFICATION REQUIREMENTS: Sample Date 20/June/2001

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) OTHER:

% COMPACTION: 95 MOISTURE CONTENT RANGE: 0% to 3%

FDT LOCATION: B-189 North Slope FDT TEST NO.: B-189

FIELD TEST DATA – ASTM D 2937 QA ID: DLE

A	CYLINDER NO. 01-4 VOLUME(1) (cf)	0.03355	E	WET UNIT WEIGHT = D/A (lbs)	138.9
B	WEIGHT OF SAMPLE & CYLINDER (lbs)	6.00	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	123.7
C	WEIGHT OF CYLINDER (lbs)	~~608.6~~ 1.34	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs)	4.66			

2715.97 2722.17 608.6

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID:

O	WT. OF TARE NO. #215 (grams)	8.3	R	WT. OF WATER = P–Q (grams)	38.7
P	WT. OF WET SOIL & TARE (grams)	362.9	S	WT. OF DRY SOIL = Q–O (grams)	315.9
Q	WT. OF DRY SOIL & TARE (grams)	324.2	T	MOISTURE CONTENT = (R/S)X100 (%)	12.3

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 124.2 (pcf) OPTIMUM MOISTURE CONTENT 12.0 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID:

DELTA MOISTURE CONTENT = T – U		0.7/-0.9	U	FDT MOISTURE CONTENT (%)	11.6/13.2
FDT WET UNIT WT. (pcf)		140.6	V	FDT DRY UNIT WT. (pcf)	124.2
DELTA DRY UNIT WT. = F – V				FDT #	B-189

COMMENTS:

000466

GEOSYNTEC CONSULTANTS

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FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 601341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 26 day June month 2001 year

TEST NO.: FDT #-B-218 / DBCC-9 Sample taken 26/June/2001

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER:

% COMPACTION: 95% MOISTURE CONTENT RANGE: 0% to 3%

FDT LOCATION: FDT - #B-218 West Slope FDT TEST NO.: B-#218

FIELD TEST DATA – ASTM D 2937 QA ID: DLE

A	CYLINDER NO. 01-3 VOLUME[1] (cf)	0.03346	E	WET UNIT WEIGHT = D/A (lbs)	138.4
B	WEIGHT OF SAMPLE & CYLINDER ~~2705.5~~ 2717.6 (lbs)	5.99	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	121.2
C	WEIGHT OF CYLINDER 617.5 gram (lbs)	1.36	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs)	4.63			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DLE

O	WT. OF TARE NO. #211 (grams)	7.9	R	WT. OF WATER = P–Q (grams)	58.2
P	WT. OF WET SOIL & TARE (grams)	475.8	S	WT. OF DRY SOIL = Q–O (grams)	409.7
Q	WT. OF DRY SOIL & TARE (grams)	417.6	T	MOISTURE CONTENT = (R/S)X100 (%)	~~14.2~~ 14.1

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. _____ (pcf) OPTIMUM MOISTURE CONTENT DLE (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: DLE

DELTA MOISTURE CONTENT = T – U		2.1 / 0.6	U	FDT MOISTURE CONTENT (%)	12.1 / 13.6
FDT WET UNIT WT. (pcf)		137.3	V	FDT DRY UNIT WT. (pcf)	120.9
DELTA DRY UNIT WT. = F – V		0.3		FDT #	B-218

COMMENTS:

000467

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FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 4.1

DESCRIPTION: Phase II DATE: 2 day July month 01 year

TEST NO.: DRCC -10

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: Compacted Clay Cap

% COMPACTION: 95% MOISTURE CONTENT RANGE: 0% to 3%

FDT LOCATION: East Slope. FDT TEST NO.: B-250

FIELD TEST DATA - ASTM D 2937 QA ID: DLE

A	CYLINDER NO. 01-2 VOLUME[1] (cf)	0.03359	E	WET UNIT WEIGHT = D/A (lbs)	137.8
B	WEIGHT OF SAMPLE & CYLINDER (lbs)	5.96 (2705.9)	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	122.7
C	WEIGHT OF CYLINDER 605.36 (lbs)	1.33	G		
D	WEIGHT OF WET SAMPLE = B-C (lbs)	4.63			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT - ASTM D 2216 QA ID: DLE

O	WT. OF TARE NO. #206 (grams)	8.3	R	WT. OF WATER = P-Q (grams)	53.9
P	WT. OF WET SOIL & TARE (grams)	501.3	S	WT. OF DRY SOIL = Q-O (grams)	439.1
Q	WT. OF DRY SOIL & TARE (grams)	447.4	T	MOISTURE CONTENT = (R/S)X100 (%)	12.3

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. _____ (pcf) OPTIMUM MOISTURE CONTENT 1 (%)

COMPARISON WITH NUCLEAR GAUGE - ASTM D 2922 AND D 3017 QA ID: DLE

DELTA MOISTURE CONTENT = T - U	0.8 / -0.8	U	FDT MOISTURE CONTENT (%)	11.5 / 13.1
FDT WET UNIT WT. (pcf)	140.7	V	FDT DRY UNIT WT. (pcf)	124.4
DELTA DRY UNIT WT. = F - V	-1.7		FDT # B-250	

COMMENTS:

000468

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FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 10 day July month 2001 year

TEST NO.: FDT - # B 281 Date Sampled 10/July/2001

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

% COMPACTION: 95 MOISTURE CONTENT RANGE: 0% to 3%

FDT LOCATION: NE TOE Repair FDT TEST NO.: B-281

FIELD TEST DATA - ASTM D 2937 QA ID: DLE

A	CYLINDER NO. 01-4 VOLUME(1) 2700.3 gr (cf)	0.03355	E	WET UNIT WEIGHT = D/A (lbs)	137.4
B	WEIGHT OF SAMPLE & CYLINDER (lbs)	5.95	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	118.7
C	WEIGHT OF CYLINDER 608.6 gr (lbs)	1.34	G		
D	WEIGHT OF WET SAMPLE = B-C (lbs)	4.61			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT - ASTM D 2216 QA ID: DLE/CS

O	WT. OF TARE NO. #206 (grams)	8.3	R	WT. OF WATER = P-Q (grams)	71.2
P	WT. OF WET SOIL & TARE (grams)	530.6	S	WT. OF DRY SOIL = Q-O (grams)	451.1
Q	WT. OF DRY SOIL & TARE (grams)	459.4	T	MOISTURE CONTENT = (R/S)X100 (%)	15.8

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. _____ (pcf) OPTIMUM MOISTURE CONTENT _____ (%)

COMPARISON WITH NUCLEAR GAUGE - ASTM D 2922 AND D 3017 QA ID: _____

DELTA MOISTURE CONTENT = T - U	15.8	U	FDT MOISTURE CONTENT (%)	13.5/14.8
FDT WET UNIT WT. (pcf)	136.1	V	FDT DRY UNIT WT. (pcf)	118.6
DELTA DRY UNIT WT. = F - V	0.1		FDT # B-281	

COMMENTS:

000469

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 4.1

DESCRIPTION: PHASE III DATE: 23 day July month 01 year

TEST NO.: DRCC 12

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER: Compacted Clay Cap

% COMPACTION: 95% MOISTURE CONTENT RANGE: 0% to 3%

FDT LOCATION: East Toe Repair FDT TEST NO.: B-300

FIELD TEST DATA – ASTM D 2937 QA ID: TD

A	CYLINDER NO. 01-6 VOLUME(1) (cf)	0.03357	E	WET UNIT WEIGHT = D/A (lbs)	131.90
B	WEIGHT OF SAMPLE & CYLINDER 2613.5 (lbs)	5.76	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	115.8
C	WEIGHT OF CYLINDER 608.26 (lbs)	1.34	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs)	4.42			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01–in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: TD

O	WT. OF TARE NO. 234 (grams)	8.3	R	WT. OF WATER = P–Q (grams)	31.1
P	WT. OF WET SOIL & TARE (grams)	262.7	S	WT. OF DRY SOIL = Q–O (grams)	223.3
Q	WT. OF DRY SOIL & TARE (grams)	231.6	T	MOISTURE CONTENT = (R/S)X100 (%)	13.9 1.1

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. _____ (pcf) OPTIMUM MOISTURE CONTENT TD (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: _____

DELTA MOISTURE CONTENT = T – U	3.0/1.3	U	FDT MOISTURE CONTENT (%)	10.9/12.6
FDT WET UNIT WT. (pcf)	139.5	V	FDT DRY UNIT WT. (pcf)	123.9
DELTA DRY UNIT WT. = F – V	-8.1		FDT #	B-300

COMMENTS:

000470

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VEGETATIVE SOIL LAYER

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG (ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO.: GQ1341 TASK NO.: 4.1

DATE: 09 day Oct month 01 year

SPECIFICATION REQUIREMENTS

SOURCE: East Borrow Area MATERIAL TYPE: (CIRCLE ONE) IMPACTED MATERIAL OTHER: Vebitiate Layer LIFT THICKNESS (CIRCLE ONE) (LOOSE) COMPACTED): ±8

% COMPACTION: 92% MOISTURE RANGE: ~~NA~~ TO ±4% ASTM D 698: A B C (CIRCLE ONE) / ASTM D 1557: A B C

NUCLEAR GAUGE TYPE: Troxler 3440 NUCLEAR GAUGE SERIAL NO. 20979 COR. FACTOR: N/A QA ID: YD

TEST NO.	TEST LOCATION See Sketch	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS							RETEST NO.	RETEST PASS	RETEST FAIL
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RUN. AVG. *			
C-1	E. Toe By Silt Fence	6"/1	CF 01-07	10.4	128.3	8.5	130.9	120.7	94.1	✓		N/A			
C-2	E. Toe 20' off " "	6"/3	CF01-06	11.0	126.6	8.4	127.7	117.3	92.6	—		N/A			
C-3	30' W of STA 4088	6"/2	CF01-07	10.4	128.3	8.9	139.8	128.4	~~101.4~~ 100.1	—		N/A			

COMMENTS: * RUNNING AVERAGE IS FOR LAST TEN TESTS

©GEOSYNTEC CONSULTANTS FILE NO.: 2-20FNM2 CHECKED BY: [illegible]

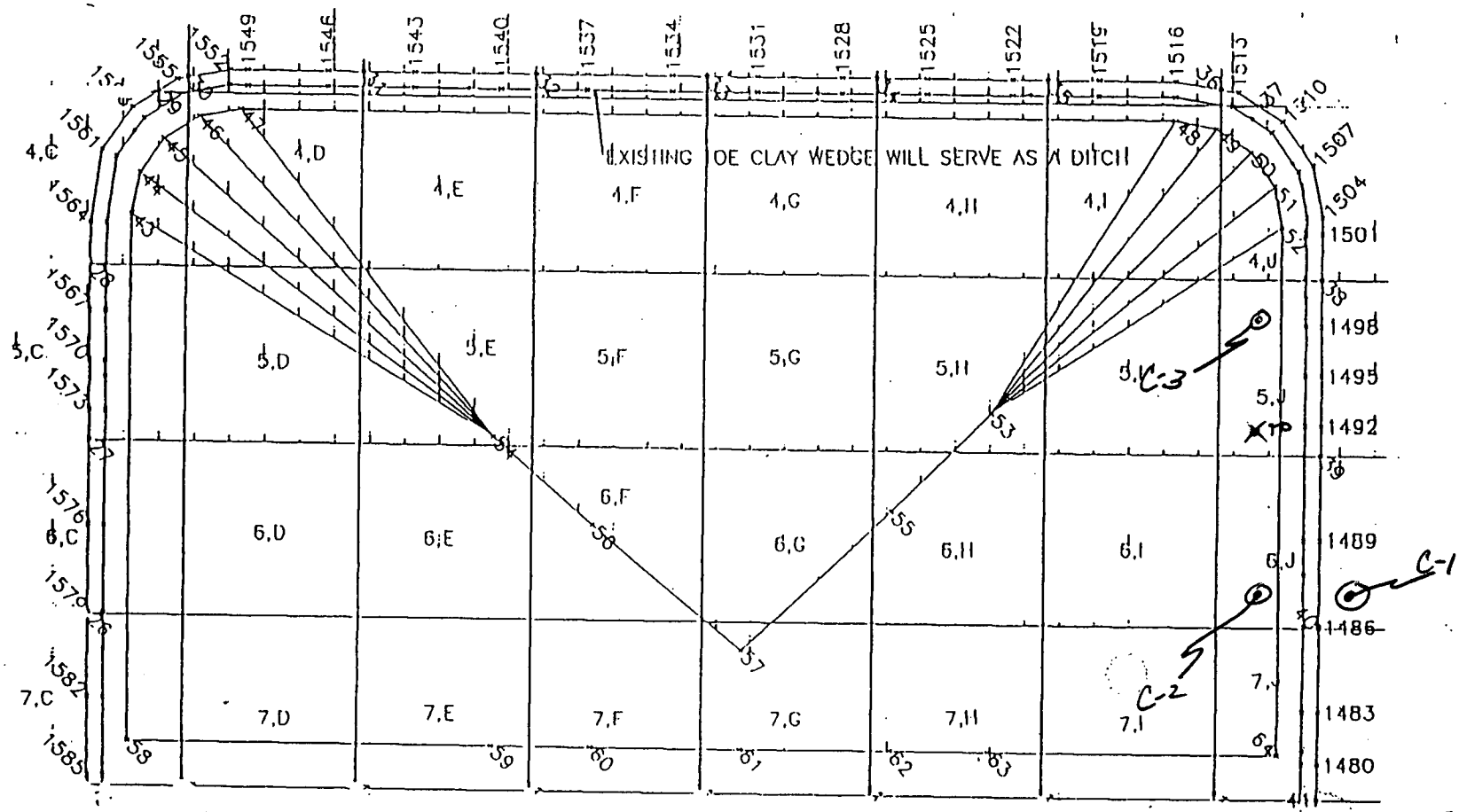
SHEET NO. 1 OF 2

000422

4554

CELL 1

NORTH



Scale: 1" = 100'

NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

9 DAY Oct MONTH 2001 YEAR

SHEET 2 of 2

000473

4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 10 day Oct month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D (698) / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): ~8"

MATERIAL SOURCE: Borrow area gray till MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / (OTHER): Vegetative

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: CL

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
C-4	See Location Map	6"/ 1	CF01-06	11.0	126.6	7.9	126.6	117.3	92.7	✓				
C-5	" " "	6"/ 1	CF01-06	11.0	126.6	10.0	131.8	119.8	94.6	✓				
C-6	" " "	6"/ 1	CF01-06	11.0	126.6	10.2	130.6	118.5	93.6	✓				
C-7	" " "	6"/ 1	CF01-07	10.4	128.3	9.8	135.6	123.5	96.3	✓				

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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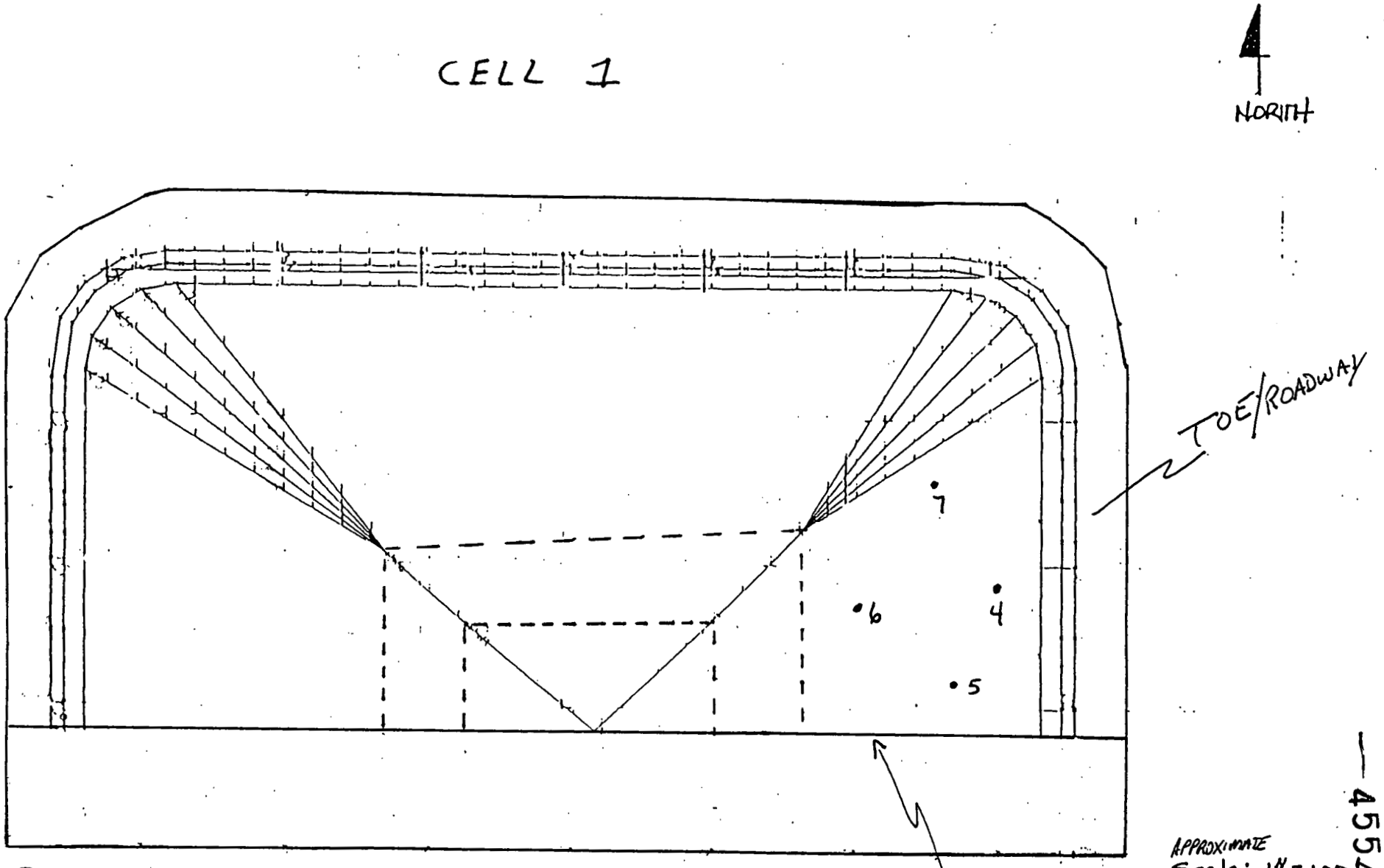
4554

CELL 1



APPROXIMATE
Scale: 1" = 100'

NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

10 DAY Oct MONTH 2001 YEAR

000475

-4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: Ø4.1

DESCRIPTION: Cell #1 Cap Construction

DATE: 11 day Oct month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ~~N/A~~ KS ±4% optimum LIFT THICKNESS (LOOSE / COMPACTED): 1Ø"

MATERIAL SOURCE: borrow area MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER: Vegetative Cover

NUCLEAR GAUGE TYPE: Troxler 344Ø GAUGE SERIAL NO. 2Ø979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
C-8	East Slope	8"/L-2	CFØ1-Ø7	1Ø.4	128.3	8.7	138.2	127.1	99.1	✓	—	—	—	—
C-9	East Slope	8"/L-2	CFØ1-Ø7	1Ø.4	128.3	1Ø.Ø	143.8	13Ø.8	1Ø2.Ø	✓	—	—	—	—
C-1Ø	Top - East Side	8"/L-2	CFØ1-Ø7	1Ø.4	128.3	11.Ø	138.5	124.8	97.3	✓	—	—	—	—
C-11	East Slope	8"/L-1	CFØ1-Ø7	1Ø.4	128.3	1Ø.8	128.4	115.9	9Ø.3	—	✓	C-12	✓	—
C-12	East Slope	8"/L-1	CFØ1-Ø7	1Ø.4	128.3	9.8	14Ø.5	128.Ø	99.8	✓	—	—	—	—
		/												
		/												
		/												
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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

CHECKED BY: CL

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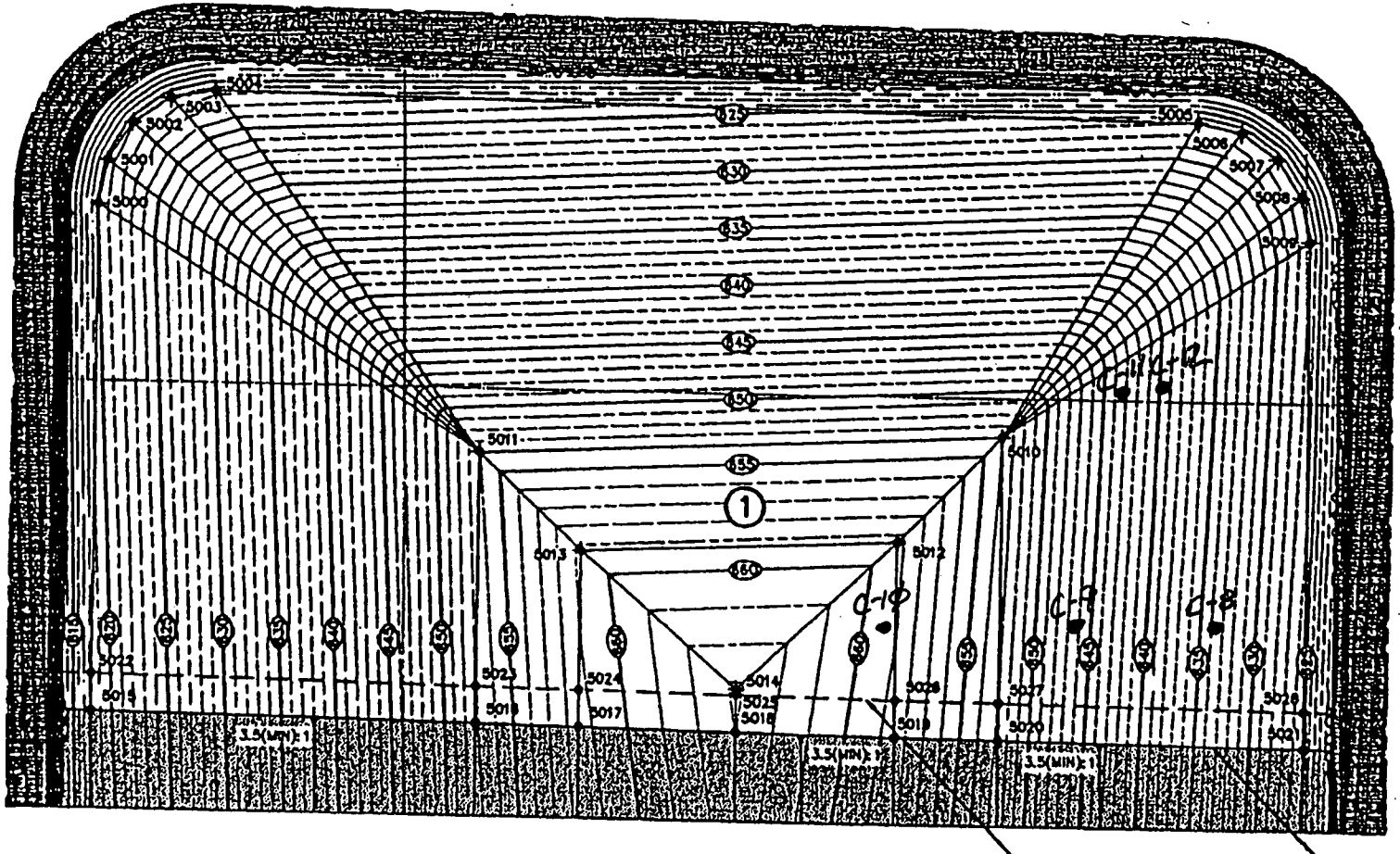
CELL #1 - FINAL COVER

GQ1341 TASK 04.1



DATE: 11 DAY Oct MONTH 200 YEAR

000477

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: Ø4.1

DESCRIPTION: Cell #1 Cap Construction

DATE: 18 day Oct month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% opt LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: Borrow Area MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER: Vegetative Cover

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
C-13	NE Corner Cell 1	1Ø"/L-1	CF-Ø6	11.Ø	126.6	12.Ø	138.7	123.8	~~99.1~~ 97.8	✓	—	—	—	—
C-14	N Slope / NE Corner	1Ø"/L-1	CF-Ø6	11.Ø	126.6	13.1	131.Ø	115.8	~~92.7~~ 91.5	✓	✓	C-51	✓	—
C-15	NE Corner	1Ø"/L-2	CF-Ø6	11.Ø	126.6	11.5	136.7	122.6	~~97.8~~ 96.8	✓	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

©GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: SHEET NO. 1 OF 2

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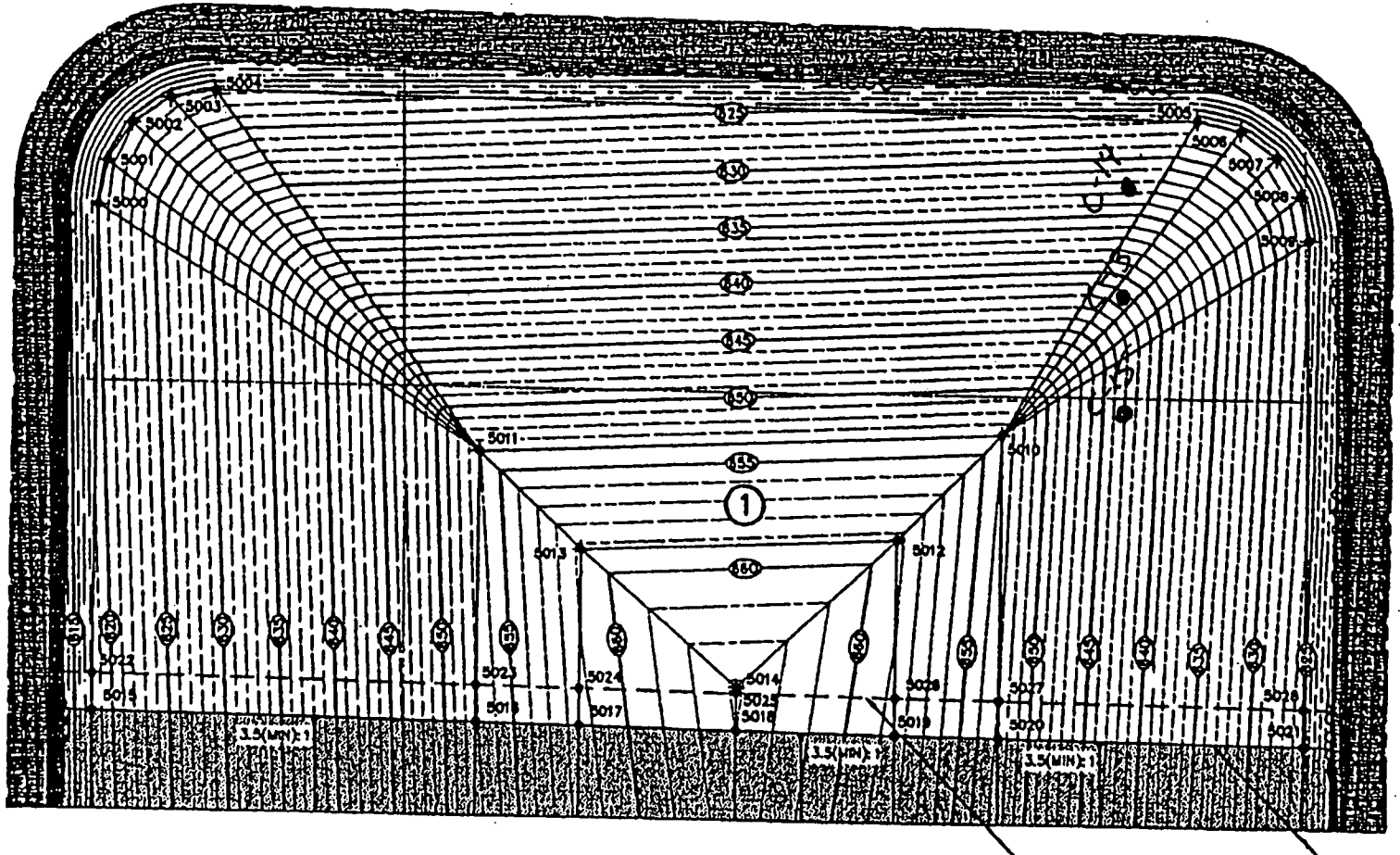
CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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DATE: 18 DAY Oct MONTH 2001 YEAR

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase ~~Test~~

PROJECT NO.: 601341 TASK NO.: 4.1

DATE: 18 day Oct month 01 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ± 3% LIFT THICKNESS (LOOSE/COMPACTED): ±8

MATERIAL SOURCE: Borrow Area

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER: Vegetative Layer

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20779 CORRECTION FACTOR Y = N/A QA ID: YO

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
	See Sketch		SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
C-16		6 / 3	CF0146	11.0	126.6	10.5	138.0	124.9	98.6	✓				
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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

©GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: [illegible]

SHEET NO. 1 OF 2

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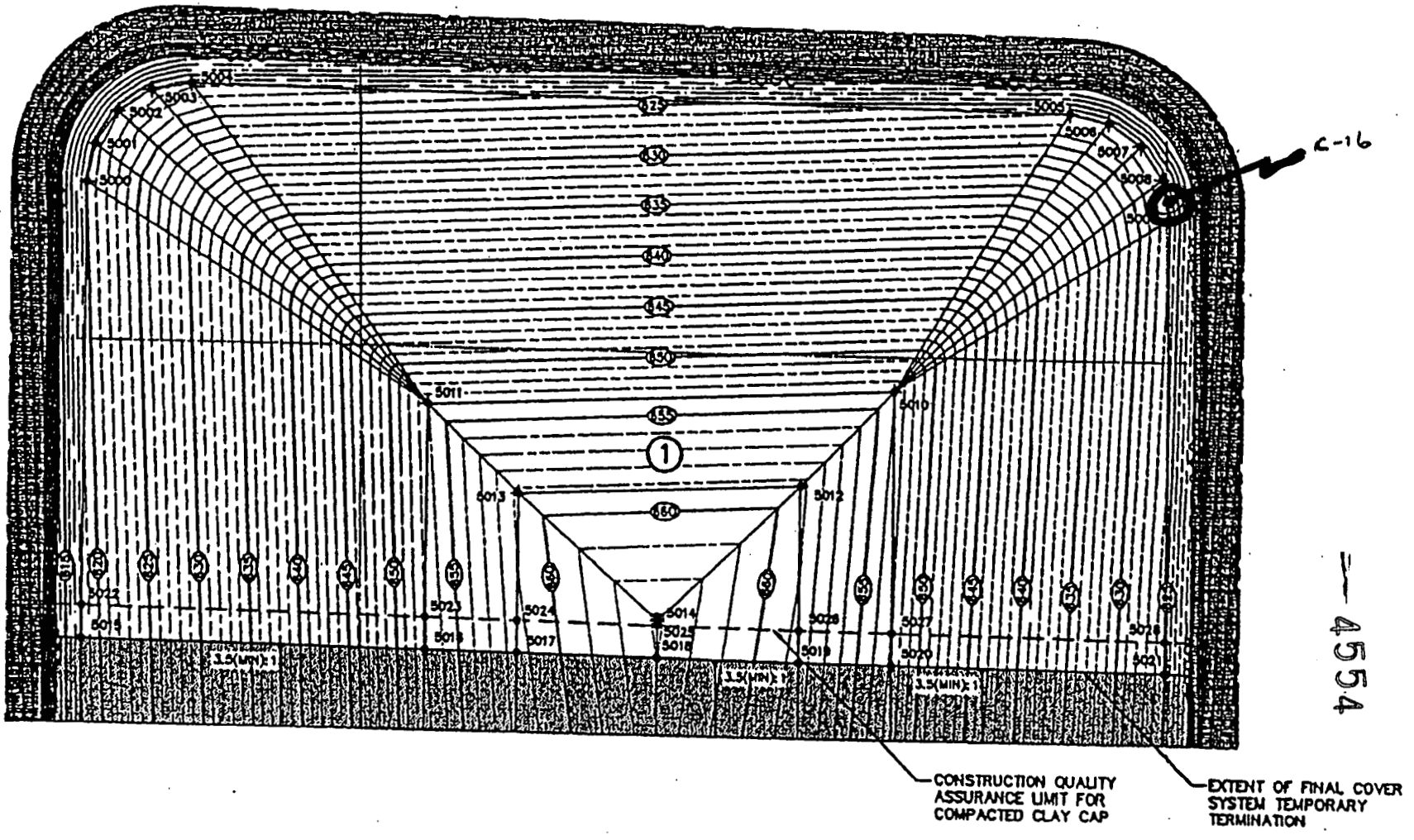
CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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DATE: 18 DAY Oct MONTH 01 YEAR

SHEET No. 05

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 19 day Oct month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: East Borrow Area MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER: Vegetative

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: [illegible]

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
C-17	See location Map	6" / 4	CF01-07	10.4	128.3	10.5	138.9	125.6	97.9	✓				
C-18	" " "	6" / 1	CF01-07	10.4	128.3	8.6	139.1	128.0	99.8	✓				
C-19	" " "	6" / 1	CF01-07	10.4	128.3	10.7	138.3	124.9	97.3	✓				
C-20	" " "	6" / 1	CF01-07	10.4	128.3	8.4	141.9	~~130.3~~ 130.9	~~101.6~~ 102.0	✓				

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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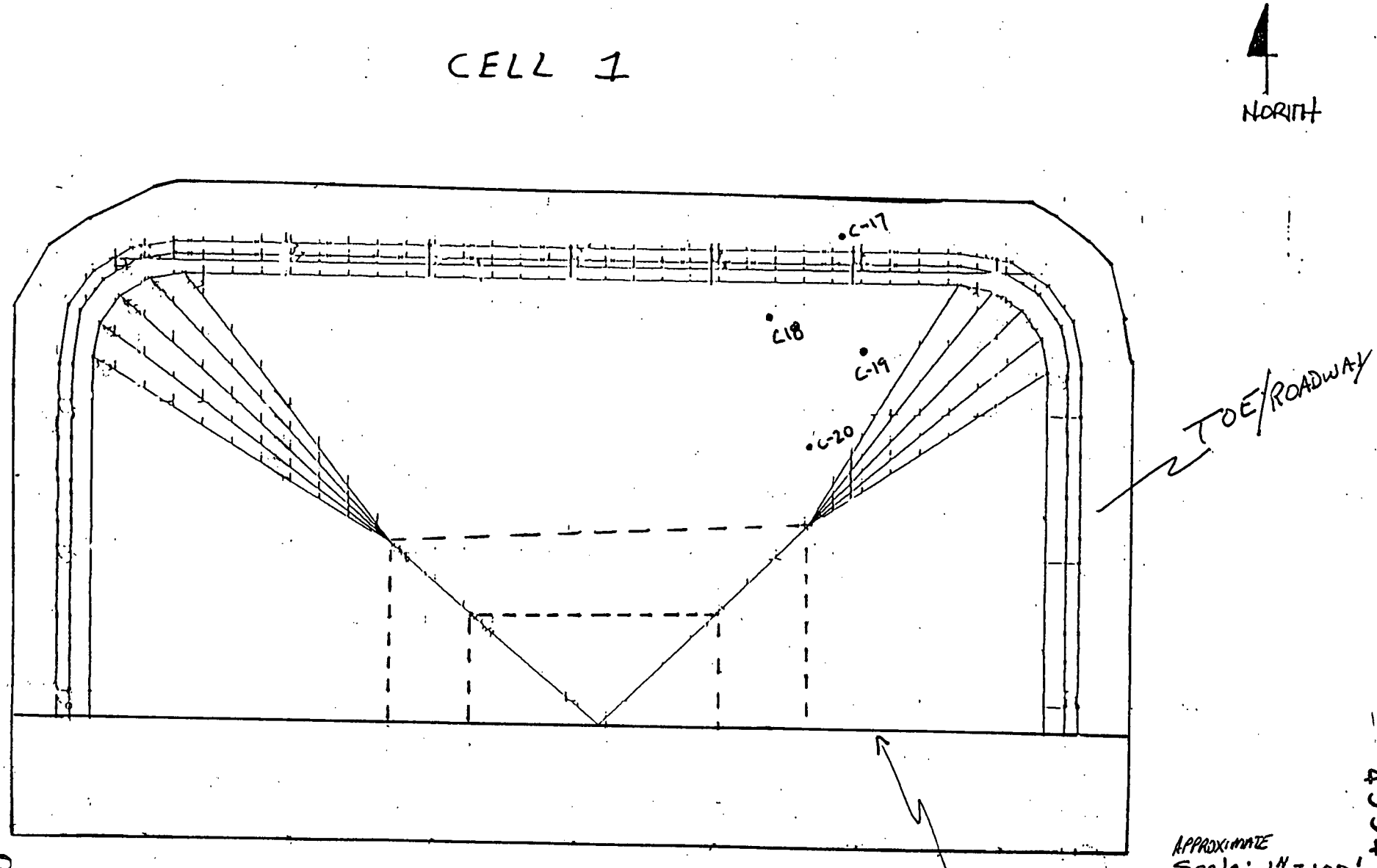
CELL 1



APPROXIMATE
Scale: 1" = 100'

NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

19 DAY Oct MONTH 2001 YEAR

SHEET 2 of 2

4554

000483

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO.: GQ134 TASK NO.: 04.1

DATE: 20 day Oct month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D (698) / ASTM D 1557 92% COMPACTION / (MOISTURE) RANGE: ±4 LIFT THICKNESS (LOOSE)/COMPACTED): 8"

MATERIAL SOURCE: Borrow area

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / (OTHER:) Vegetative Cover

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: CA

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
C-21	See location Map	6"/1	CF-07	10.4	128.3	8.6	133.8	123.2	96.0	✓				
C-22	See location Map	6"/1	↓	↓	↓	9.4	139.1	127.2	99.1	✓				
C-23	See location Map	6"/1	↓	↓	↓	9.4	135.1	123.5	96.3	✓				
C-24	See location Map	6"/1	↓	↓	↓	8.2	138.6	128.1	99.8	✓				
C-25	See location Map	6"/1	↓	↓	↓	10.1	137.6	125.0	97.4	✓				
C-26	See location Map	6"/1	↓	↓	↓	9.6	136.3	124.4	96.9	✓				
C-27	See location Map	6"/1	↓	↓	↓	8.9	135.4	124.3	96.9	✓				
		/												
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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

©GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: CA SHEET NO. 1 OF 2

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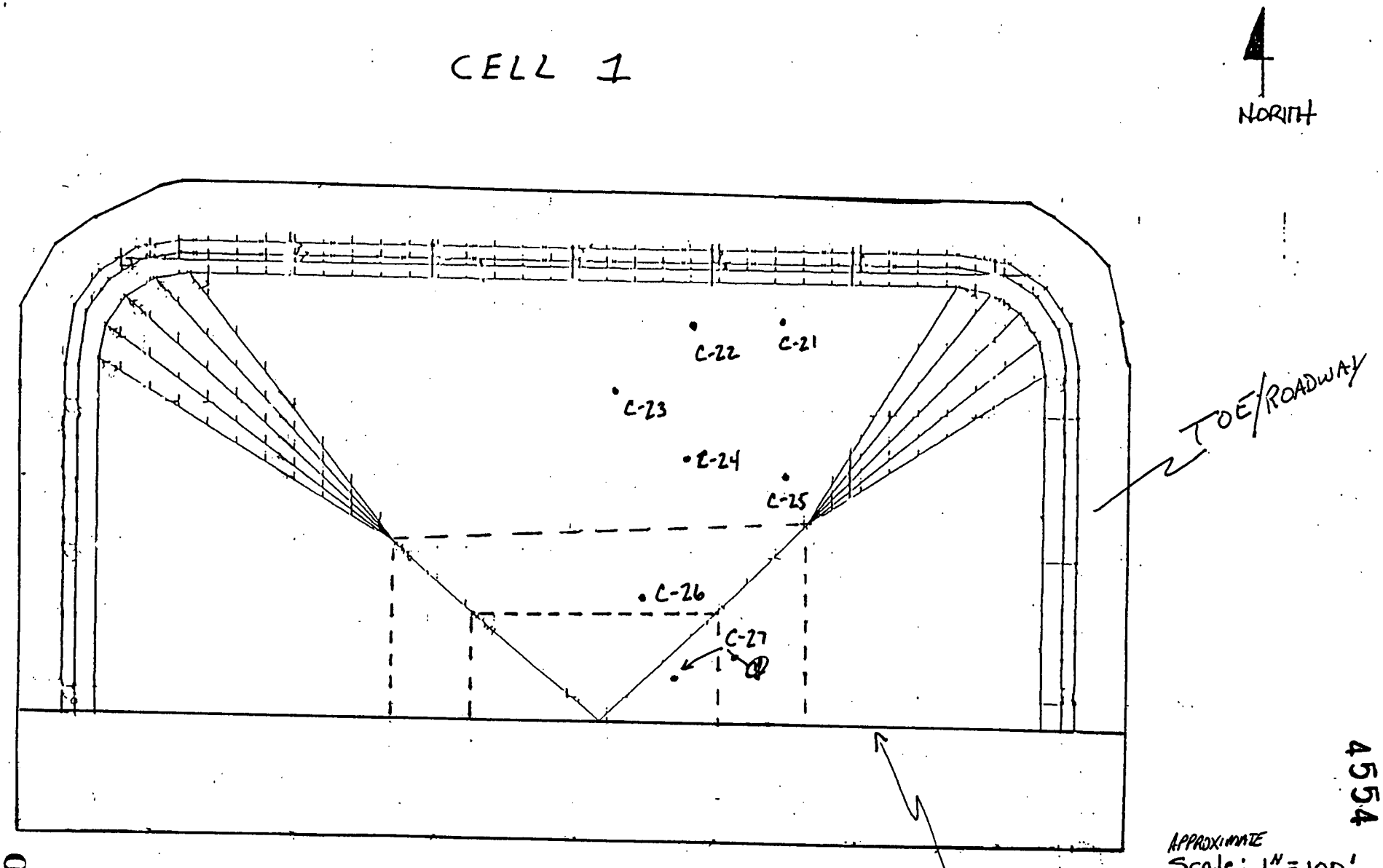
CELL 1



APPROXIMATE
Scale: 1" = 100'

NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

20 DAY Oct MONTH 2001 YEAR

SHEET 1 of 1

4554

000485

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

PROJECT NO.: GQ134 TASK NO.: 041

DATE: 22 day OCT month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS ((LOOSE)/COMPACTED): 8"

MATERIAL SOURCE: BORROW AREA / BROWN & GREY FILL MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY (OTHER:) VEGETATIVE LAYER (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: [illegible]

TEST NO.	TEST LOCATION– SEE ATTACHED SKETCH	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
C-28	WEST SLOPE	8"/L-1	CF-07	10.4	128.3	8.5	141.2	130.2	101.5	P	-	—	-	-
C-29	WEST SLOPE	8"/L-1	CF-07	10.4	128.3	8.1	133.8	123.8	96.5	P	-	—	-	-
C-30	NORTH SLOPE	8"/L-1	CF-07	10.4	128.3	10.5	138.7	125.6	97.9	P	-	—	-	-
C-31	NORTH SLOPE	8"/L-1	CF-07	10.4	128.3	9.6	139.9	127.6	99.5	P	-	—	-	-
C-32	NORTH SLOPE	8"/L-1	CF-07	10.4	128.3	9.0	137.2	125.9	98.1	P	-	—	-	-
C-33	NORTH TOE	8"/L-1	CF-07	10.4	128.3	9.8	142.8	130.0	101.3	P	-	—	-	-
C-34	NORTH TOE	8"/L-1	CF-07	10.4	128.3	8.3	142.9	131.9	102.8	P	-	—	-	-
C-35	WEST SLOPE	8"/L-1	CF-07	10.4	128.3	10.2	139.5	126.6	98.7	P	-	—	-	-
C-36	WEST SLOPE	8"/L-1	CF-07	10.4	128.3	8.9	140.1	128.7	100.3	P	-	—	-	-
C-37	WEST SLOPE	8"/L-1	CF-07	10.4	128.3	9.5	137.4	125.5	97.8	P	-	—	-	-

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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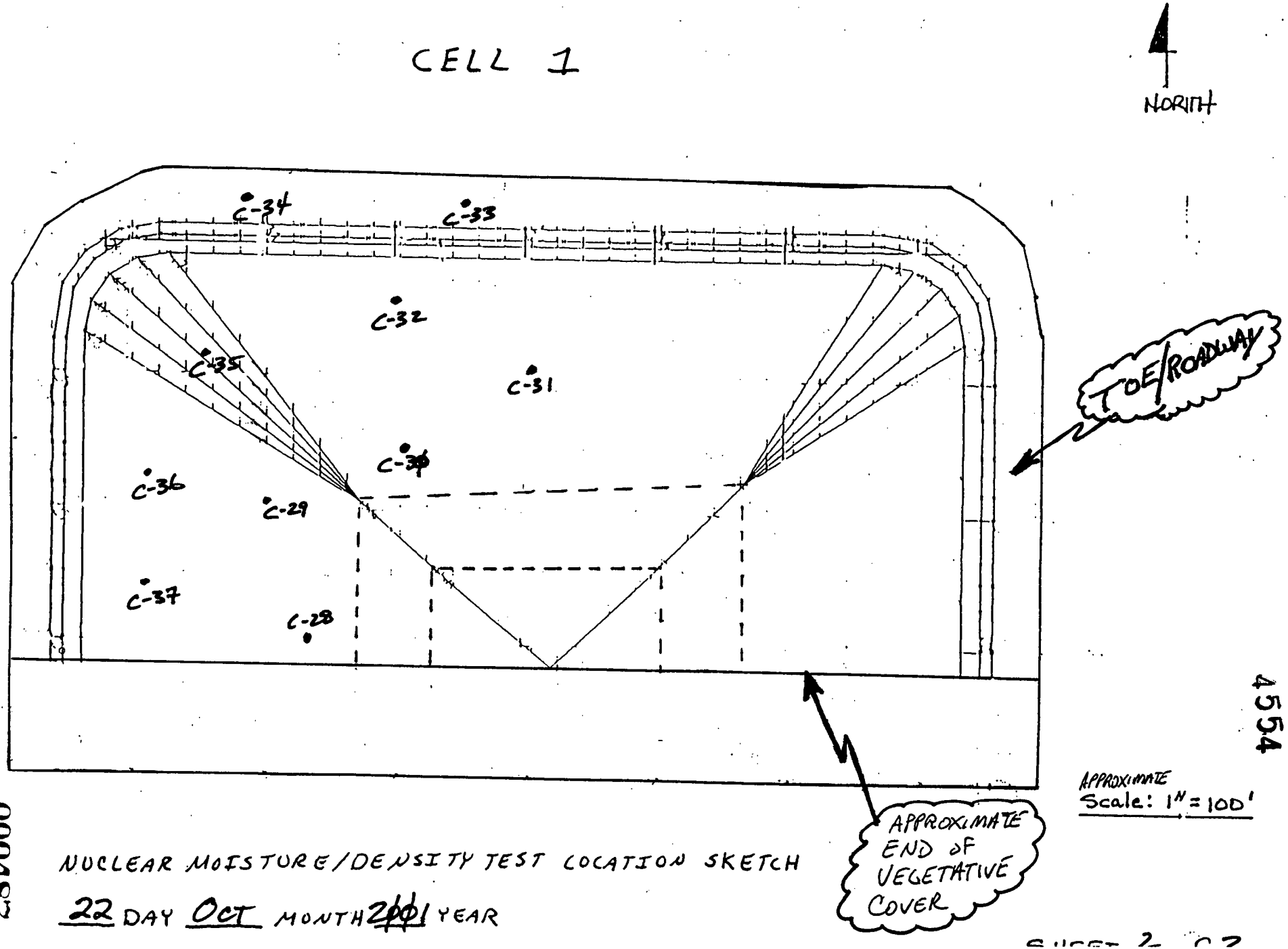
CELL 1



NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

22 DAY Oct MONTH 2001 YEAR

SHEET 2 OF 2

4554

000487

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO.: GQ1341 TASK NO.: 041

DATE: 22 day Oct month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): X

MATERIAL SOURCE: Borrow area MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER: Veg. Cover

NUCLEAR GAUGE TYPE: Troxl. 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: CA

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
38	See location Map	6"/2	CF01-07	10.4	128.3	9.5	137.2	125.3	97.6	✓				
C-39	" " "	6"/2	CF01-07	10.4	128.3	10.6	139.1	125.8	98.0	✓				
C-40	" " "	6"/3	CF01-07	10.4	128.3	8.3	135.4	125.0	97.4	✓				
C-41	" " "	6"/3	CF01-07	10.4	128.3	8.9	136.1	125.0	97.4	✓				
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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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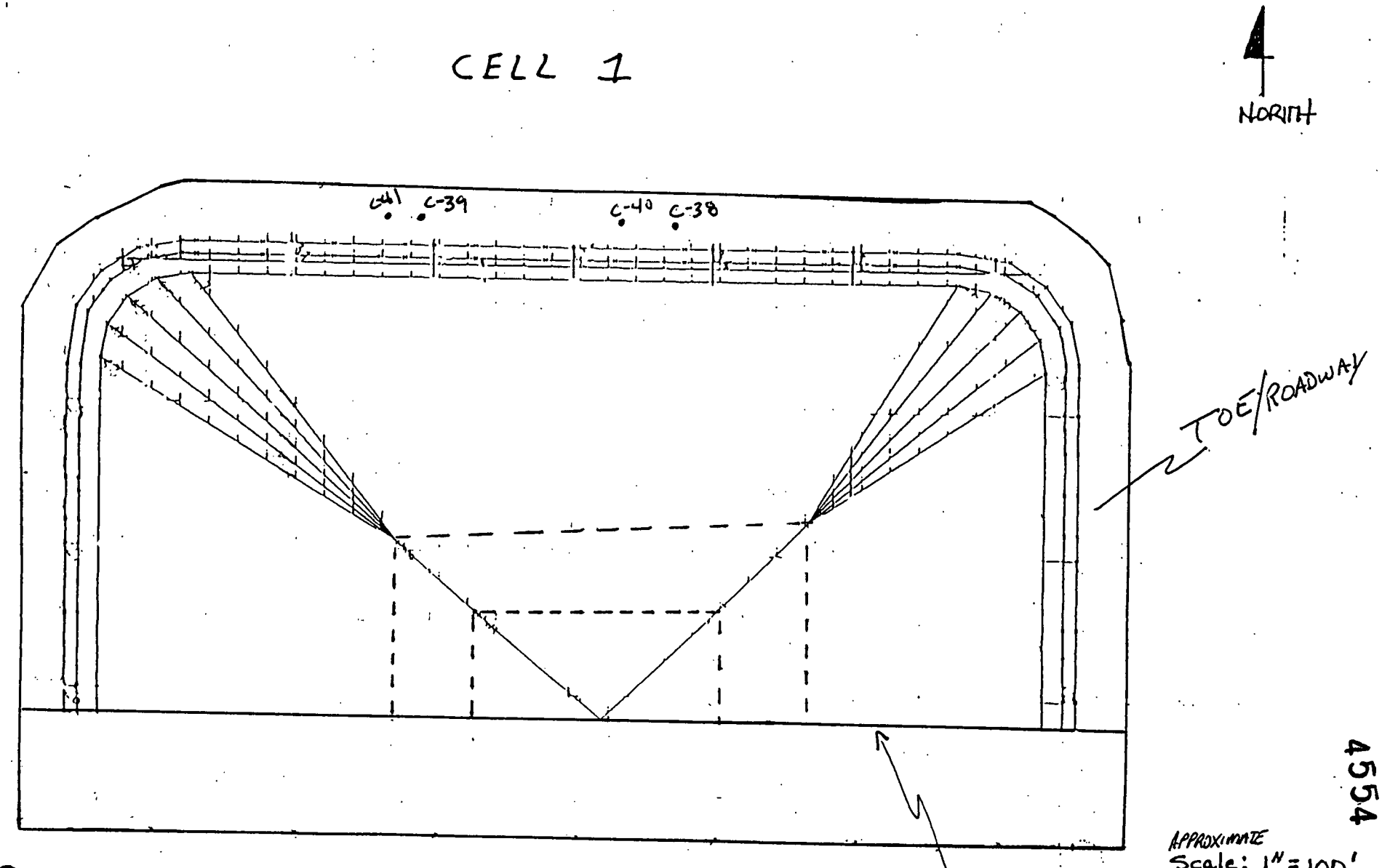
CELL 1



APPROXIMATE
Scale: 1" = 100'

NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

22 DAY Oct MONTH 2001 YEAR

SHEET 2 of 2

4554

000439

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

PROJECT NO.: GQ1341 TASK NO.: 041

DATE: 23 day OCT month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 8"

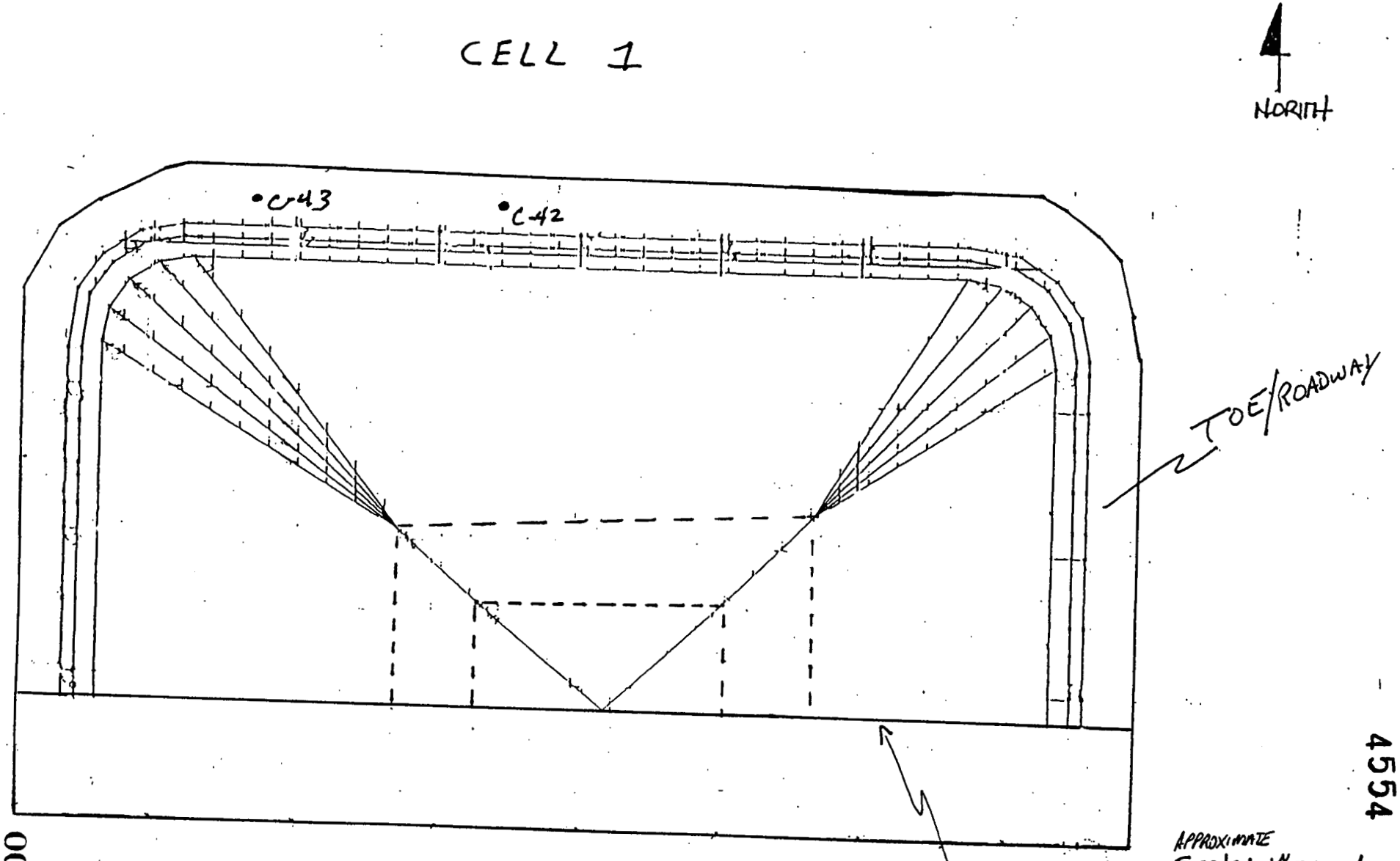
MATERIAL SOURCE: BORROW AREA / BROWN & GRAY TILL MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY (OTHER:) VEGETATIVE LAYER

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: (TBC)

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
C-42	NORTH TOE	L-4/ 6"	~~CE-04~~ CF13	~~10.4~~ 10.2	~~128.3~~ 131.6	10.2	143.3	130.0	~~101.3~~ 98.8	P	–	–	–	–
C-43	NORTH TOE	L-4/ 6"	~~CE-04~~	~~10.4~~	~~128.3~~	9.9	141.9	129.1	~~100.6~~ 98.1	P	–	–	–	–

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

CELL 1



NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

23 DAY OCT MONTH 2001 YEAR

SHEET 2 OF 2

4554

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: CELL #1 CAP CONSTRUCTION

PROJECT NO.: 6Q1341 TASK NO.: Ø4.1

DATE: 26 day OCT month 2ØØ1 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: I4% OPT. LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: BORROW AREA MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER: VEGETATIVE COVER

NUCLEAR GAUGE TYPE: TROXLER 344Ø GAUGE SERIAL NO. 2Ø979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION SEE SKETCH	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
C-44	TOP	6"/2	CF-13 ~~CFØ7~~	10.2 ~~1Ø.9~~	131.6 ~~128.3~~	7.5	143.Ø	133.Ø	~~1Ø3.7~~ 101.0	✓				
C-45	TOP	6"/2	CF-13 ~~CFØ7~~	10.2 ~~1Ø.9~~	131.6 ~~128.3~~	6.9	142.3	133.2	~~1Ø3.8~~ 101.2	✓				
C-46	TOP NE CORNER	6"/2	CF-13 ~~CFØ7~~	10.2 ~~1Ø.4~~	131.6 ~~128.3~~	8.6	136.9	126.Ø	~~98.2~~ 95.8	✓				
C-47	NORTH SLOPE	6"/2	CF-13 ~~CFØ7~~	10.2 ~~1Ø.4~~	131.6 ~~128.3~~	8.1	134.1	124.Ø	~~96.7~~ 94.3	✓				
C-48	NORTH SLOPE	6"/2	CF-13 ~~CFØ7~~	10.2 ~~1Ø.4~~	131.6 ~~128.3~~	8.1	141.5	13Ø.9	~~1Ø2.Ø~~ 99.5	✓				
C-49	NORTH SLOPE	6"/2	CF-13 ~~CFØ7~~	10.2 ~~1Ø.4~~	131.6 ~~128.3~~	8.3	138.5	127.9	~~99.2~~ 97.2	✓				
C-5Ø	NORTH SLOPE	6"/2	CF-13 ~~CFØ7~~	10.2 ~~1Ø.4~~	131.6 ~~128.3~~	7.8	141.Ø	13Ø.8	~~1Ø2.Ø~~ 99.4	✓				
C-51	NE CORNER	6"/1	CF-13 ~~CFØ7~~	10.2 ~~1Ø.4~~	131.6 ~~128.3~~	8.5	137.5	126.7	~~98.8~~ 96.3	✓		C-14	✓	
		/												
		/												

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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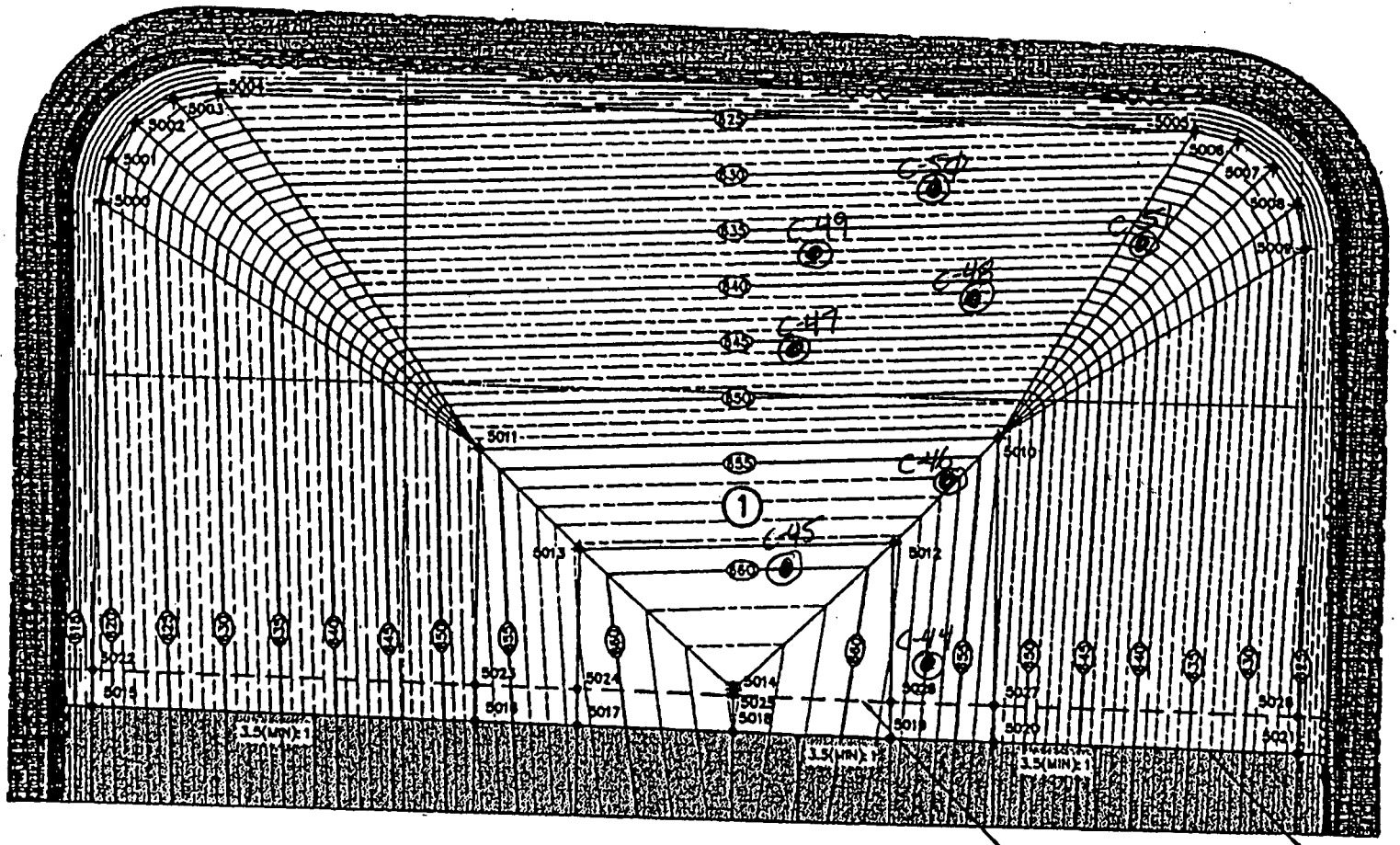
CELL #1 - FINAL COVER

GQ1341 TASK 04.1



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DATE: 26 DAY OCT MONTH 2000 YEAR

SHEET No. 1 of 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 30 day OCT month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: BORROW AREA

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER: VEGETATIVE LAYER

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: TBC/CS

TEST NO.	TEST LOCATION (SEE ATTACHED MAP)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL	
C-52	NORTH SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	9.6	134.3	122.5	~~95.5~~ 93	P	—	—	—	—	*
C-53	NORTH SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	11.7	142.8	127.9	~~99.7~~ 97.1	P	—	—	—	—	**
C-54	NORTH SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	10.2	135.9	123.3	~~96.1~~ 93.7	P	—	—	—	—	
C-55	NORTH SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	11.1	135.6	122.0	~~95.1~~ 92.7	P	—	—	—	—	
C-56	NORTH SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	10.7	138.7	125.3	~~97.7~~ 95.2	P	—	—	—	—	
C-57	NORTH SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	9.7	136.9	124.8	~~97.3~~ 94.8	P	—	—	—	—	
C-58	NORTH SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	10.5	141.9	128.4	~~100.1~~ 97.6	P	—	—	—	—	
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		/													
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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

*VLDT #1 TAKEN AT C-52.

**VLDT #2 TAKEN AT C-53.

©GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: [illegible]

SHEET NO. 1 OF 2

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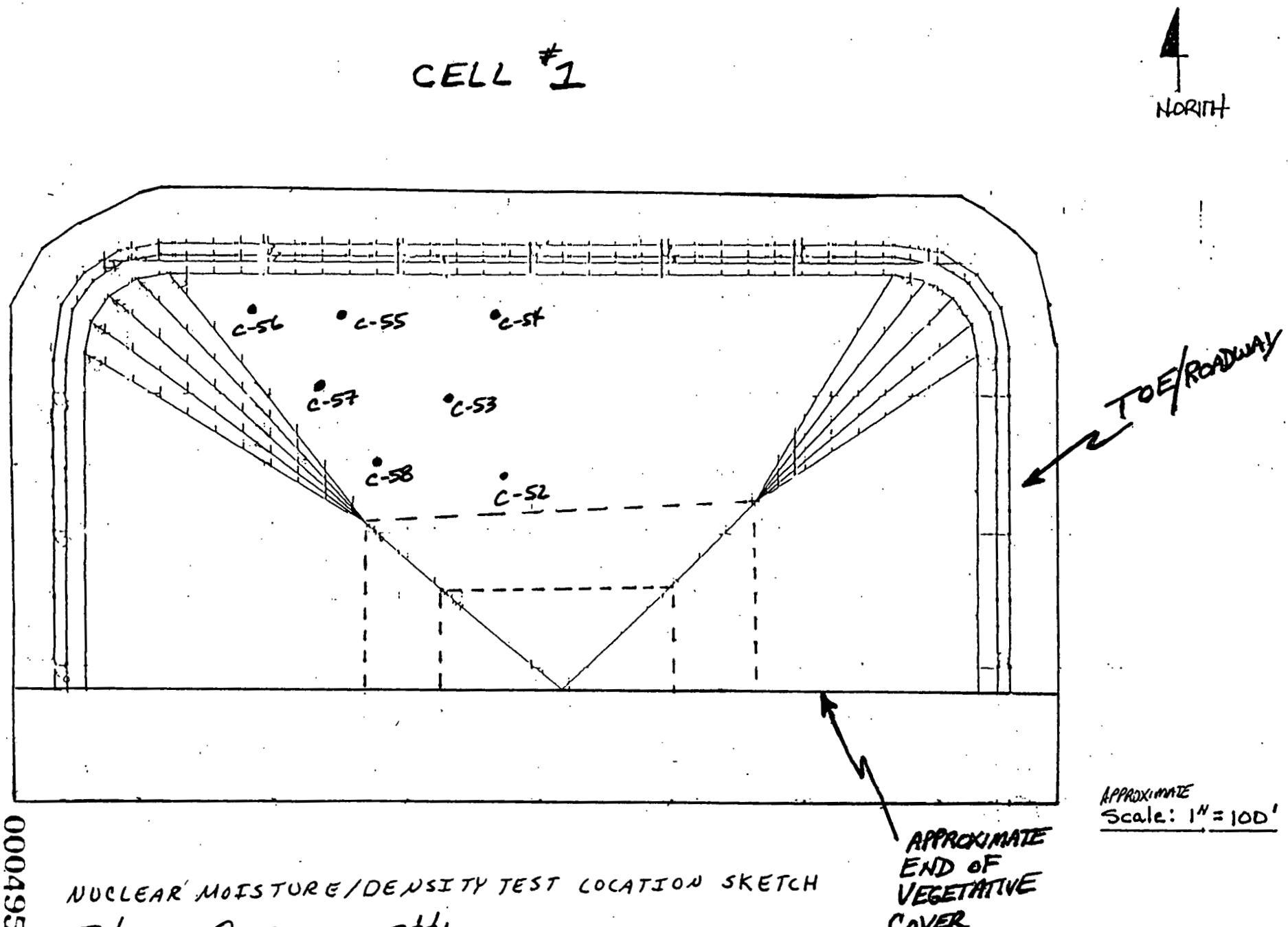
CELL #1



NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

30 DAY OCT MONTH 2001 YEAR

SHEET 2 OF 2

000495

4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

PROJECT NO.: 6Q134 TASK NO.: 04.1

DATE: 30 day OCT month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 8"

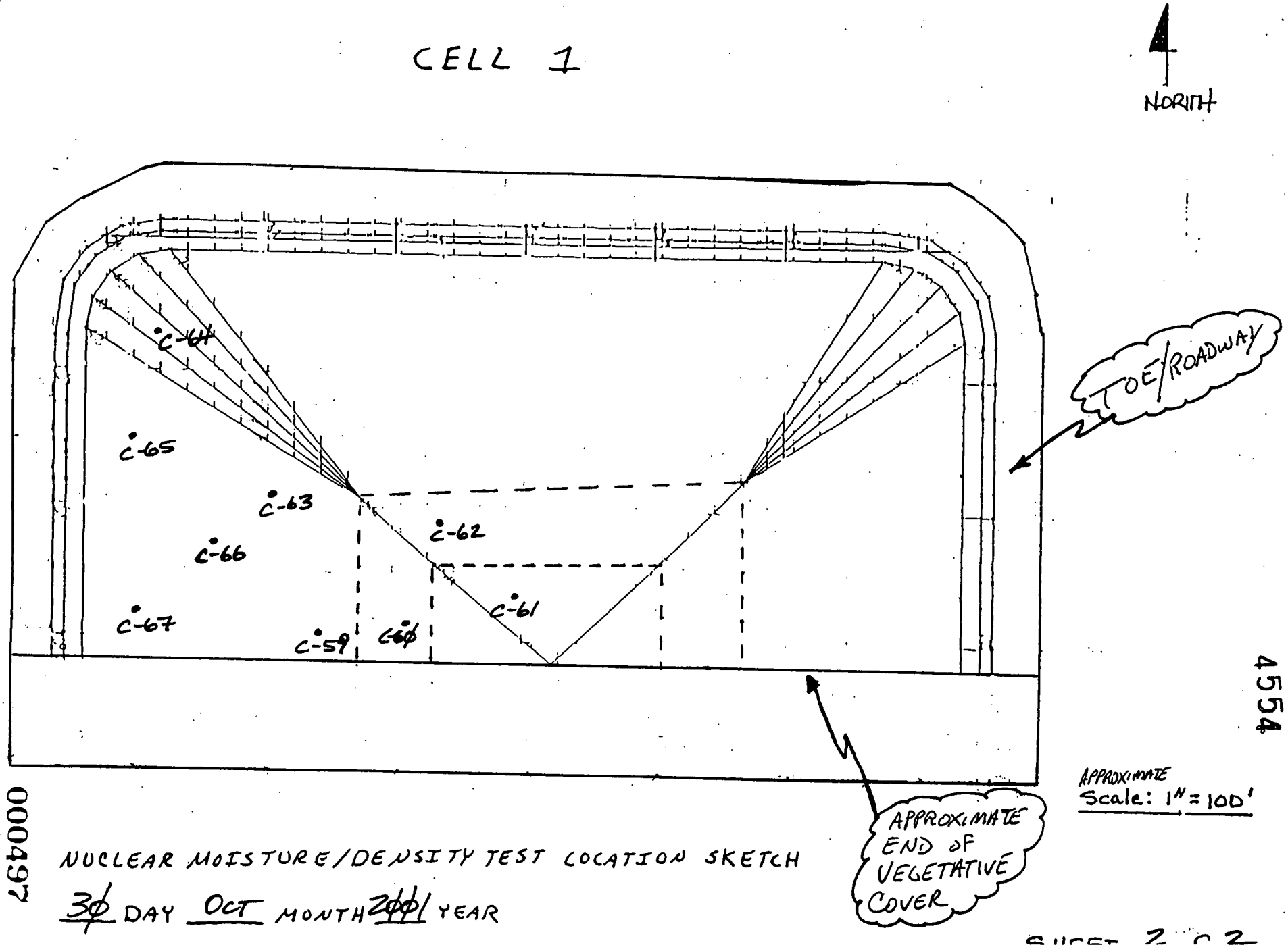
MATERIAL SOURCE: BORROW AREA / GREY TILL MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / (OTHER:) VEGETATIVE LAYER

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: (TBL)

TEST NO.	TEST LOCATION (SEE ATTACHED MAP)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
C-59	WEST SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	11.3	141.7	127.3	~~99.3~~ 96.7	P	—	—	—	—
C-60	TOP OF CELL	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	10.2	142.5	129.2	~~100.7~~ 98.3	P	—	—	—	—
C-61	TOP OF CELL	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	9.3	139.8	127.9	~~99.7~~ 99.2	P	—	—	—	—
C-62	TOP OF CELL	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	10.0	137.2	124.7	~~97.2~~ 94.8	P	—	—	—	—
C-63	WEST SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	11.7	136.1	121.8	~~95.0~~ 92.6	P	—	—	—	—
C-64	WEST SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	10.5	135.5	122.6	~~95.6~~ 93.2	P	—	—	—	—
C-65	WEST SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	9.1	139.9	128.2	~~99.9~~ 97.5	P	—	—	—	—
C-66	WEST SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	9.7	141.6	129.1	~~100.6~~ 98.1	P	—	—	—	—
C-67	WEST SLOPE	6"/L-2	~~CF-07~~ CF-13	~~10.4~~ 10.2	~~128.3~~ 131.6	10.9	140.1	126.3	~~98.4~~ 96.0	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

CELL 1



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000497

NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

30 DAY OCT MONTH 2001 YEAR

SHEET 2 OF 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

PROJECT NO.: 6Q1341 TASK NO.: 041

DATE: 31 day OCT month 2001 year WEDNESDAY

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE / COMPACTED): 8"

MATERIAL SOURCE: BORROW AREA / GRAY HILL MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / (OTHER:) VEGETATIVE LAYER

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: 984

TEST NO.	TEST LOCATION (SEE ATTACHED MAP)	PROBE DEPTH/ LIFT NO.	LAB RESULTS SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
C-68	WEST TOE	L-1/ 6"	CF-13	10.2	131.6	10.4 —	142.1	128.7	97.8	P	—	—	—	—
C-69	WEST TOE	L-1/ 6"	CF-13	10.2	131.6	10.7 —	142.2	128.4	97.6	P	—	—	—	—
C-70	WEST TOE	L-2/ 6"	CF-13	10.2	131.6	10.0 —	142.8	129.8	98.6	P	—	—	—	—
C-71	WEST TOE	L-2/ 6"	CF-13	10.2	131.6	10.4 —	140.4	127.2	96.6	P	—	—	—	—
C-72	WEST TOE	L-3/ 6"	CF-13	10.2	131.6	10.7 —	140.9	127.2	96.6	P	—	—	—	—
C-73	WEST TOE	L-3/ 6"	CF-13	10.2	131.6	10.3 —	143.1	129.7	98.6	P	—	—	—	—

000498

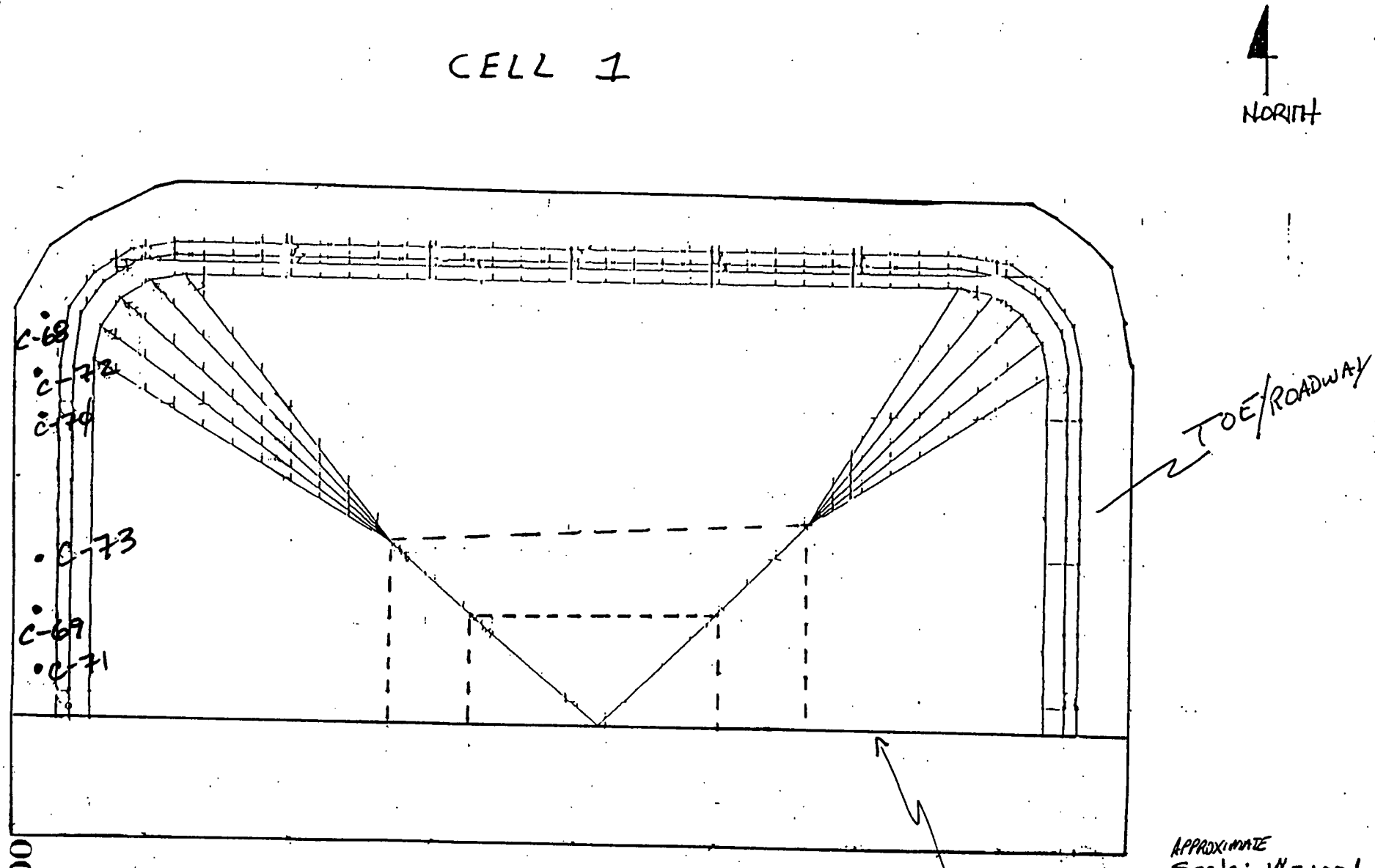
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

©GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: [illegible]

SHEET NO. 1 OF 2

4554

CELL 1



NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

31 DAY OCT MONTH 2001 YEAR

SHEET 2 OF 2

4554

0000499

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

PROJECT NO.: GQ134 TASK NO.: 041

DATE: 01 day Nov month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: BORROW AREA / GRAY TILL MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / (OTHER:) VEGETATIVE LAYER

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: (TBD)

TEST NO.	TEST LOCATION (SEE ATTACHED MAP)	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
C-74	WEST TOE	6"/L-4	CF-13	10.2	131.6	8.6 –	139.7	127.4	96.8	P	–	–	–	–
C-75	WEST TOE	6"/L-4	CF-13	10.2	131.6	12.0 –	137.5	122.7	93.3	P	–	–	–	–

000500

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

©GEOSYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: [signature]

SHEET NO. 1 OF 2

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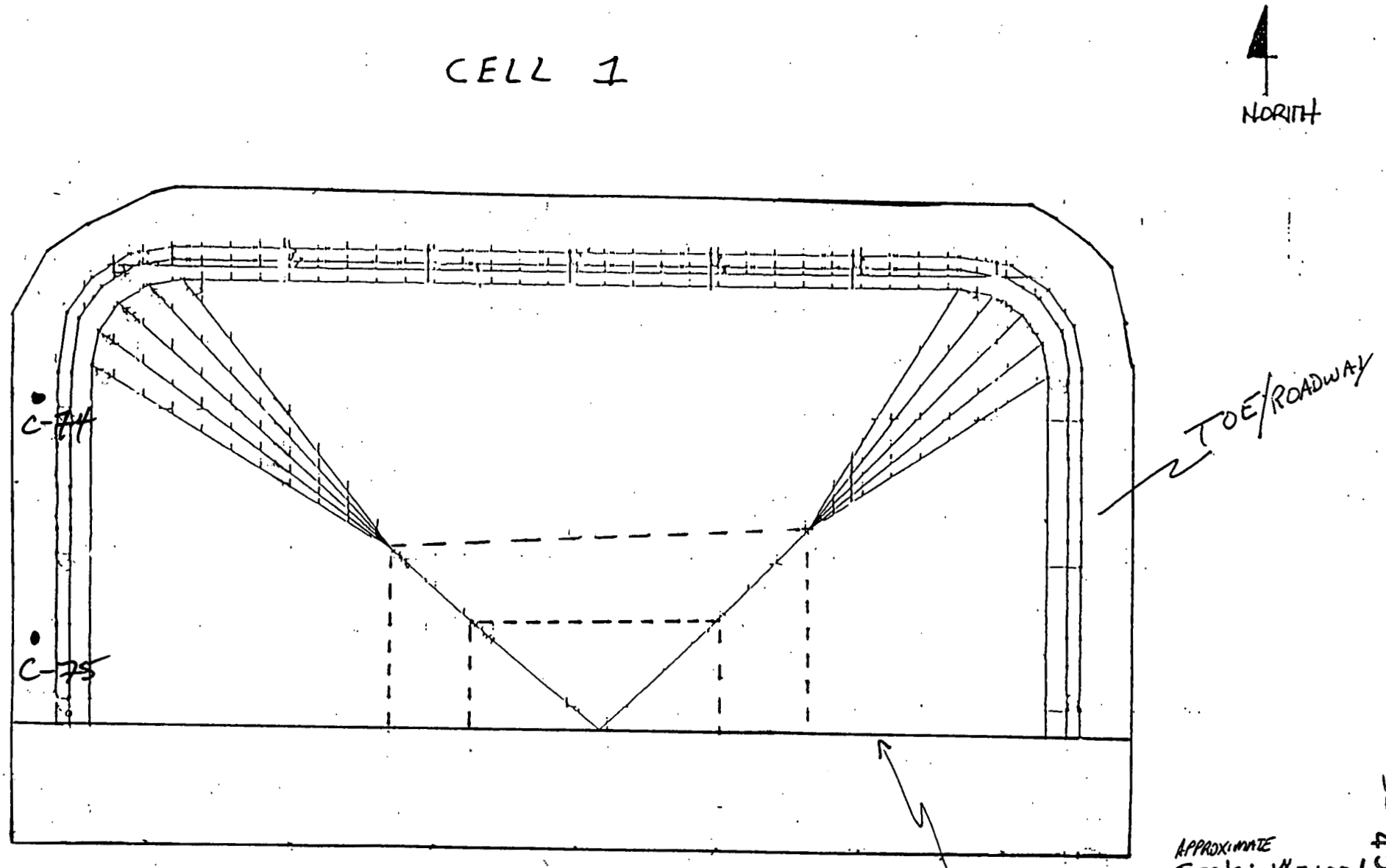
CELL 1



APPROXIMATE
Scale: 1" = 100'

NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

01 DAY Nov MONTH 2001 YEAR

SHEET 2 OF 2

000501

4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 02 day (FRIDAY) NOV month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE / COMPACTED): 8"

MATERIAL SOURCE: ~~BORROW AREA~~ (TOP) (STOCKPILE S.EAST OF CELL 3)

MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / (OTHER: VEGETATIVE LAYER) (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: (DBG)

TEST NO.	TEST LOCATION – (SEE ATTACHED MAP)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
C-76	NORTH SLOPE	L-2/ 6"	CF-15	21.2	102.5	21.9	115.5	94.7	92.4	P	–	–	–	–
C-77	NORTH SLOPE	L-2/ 6"	CF-15	21.2	102.5	22.7	116.2	94.7	92.4	P	–	–	–	–
C-78	NORTH SLOPE	L-2/ 6"	CF-14	15.3	116.6	18.4	128.8	108.0	93.3	P	–	–	–	–

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000502

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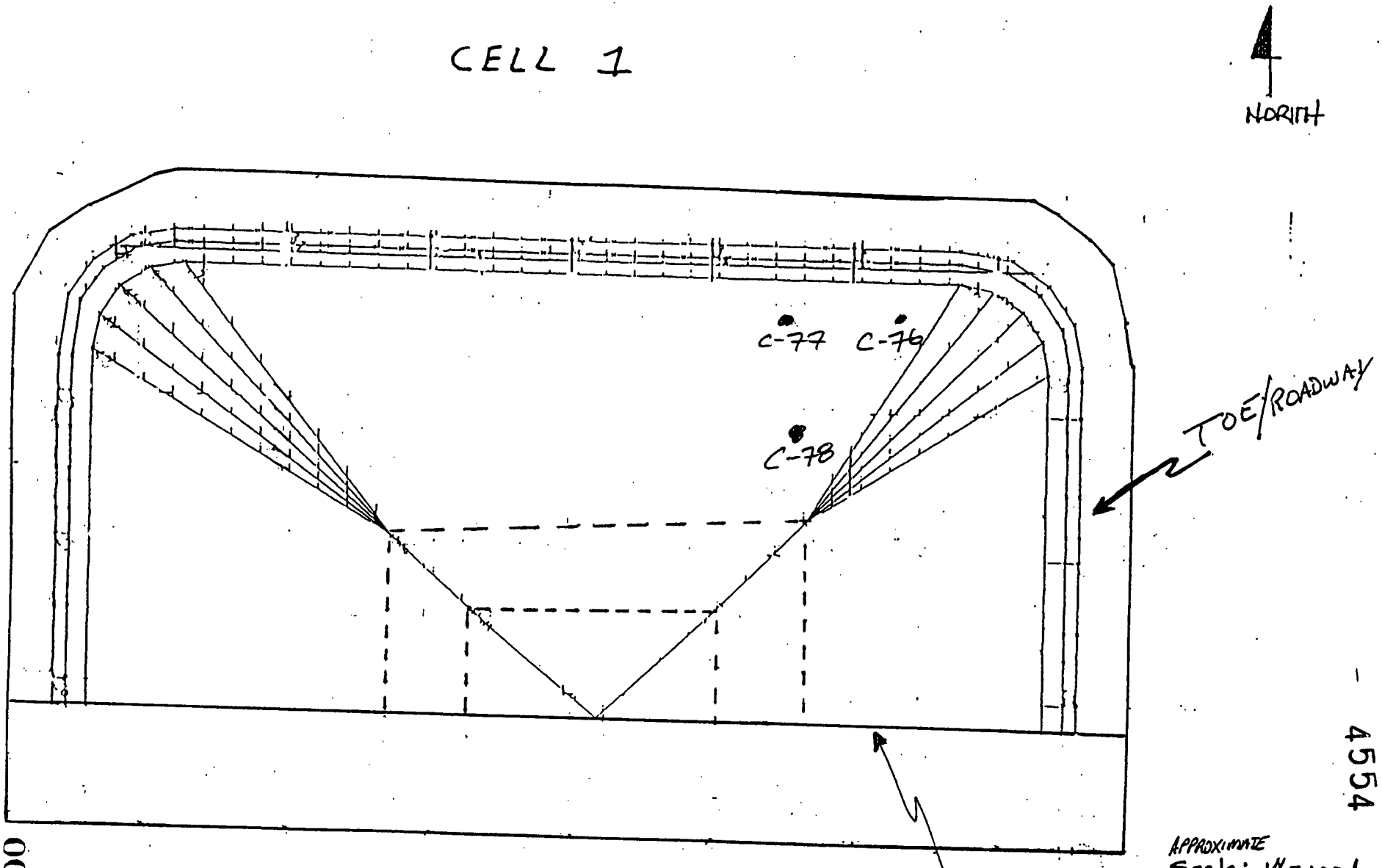
COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

* MORE ROCK ENCOUNTERED HERE.

CELL 1



APPROXIMATE
Scale: 1" = 100'

NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

02 DAY NOV MONTH 91 YEAR

000503

4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

PROJECT NO.: GQ134 TASK NO.: 04.1

DATE: 07 day (WEDNESDAY) NOV month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 92% COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: OSDF-004 STOCKPILE MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY (OTHER: VEGETATIVE LAYER)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: TBD

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST		
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL	
C-79	WEST SLOPE	6"/L-3	CF-15	21.2	102.5	21.8	117.6	96.6	94.2	P	–	–	–	–	
C-80	WEST SLOPE	6"/L-3	CF-15	21.2	102.5	20.5	115.4	95.8	93.5	P	–	–	–	–	
C-81	WEST SLOPE	6"/L-3	CF-15	21.2	102.5	20.8	119.2	98.7	96.3	P	–	–	–	–	
C-82	WEST SLOPE	6"/L-3	CF-15	21.2	102.5	22.1	120.1	98.4	96.0	P	–	–	–	–	
C-83	WEST SLOPE	6"/L-3	CF-15	21.2	102.5	21.5	118.3	97.4	95.0	P	–	–	–	–	
C-84	NORTH SLOPE	6"/L-3	CF-14	15.3	116.6	16.7	125.9	107.9	92.5	P	–	–	–	–	*▲
C-85	NORTH SLOPE	6"/L-3	CF-14	15.3	116.6	17.2	129.4	110.5	94.8	P	–	–	–	–	**
C-86	NORTH SLOPE	6"/L-3	CF-15	21.2	102.5	19.3	119.0	99.8	97.4	P	–	–	–	–	
C-87	NORTH SLOPE	6"/L-3	CF-14	15.3	116.6	18.6	128.8	108.6	93.1	P	–	–	–	–	*
C-88	NORTH SLOPE	6"/L-3	CF-15	21.2	102.5	20.5	121.2	100.6	98.1	P	–	–	–	–	

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

▲ VLDT#4 TAKEN AT C-84.

* ADDITIONAL ROCK ENCOUNTERED HERE.

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SHEET NO. 1 OF 3

004554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

PROJECT NO.: 6Q134 TASK NO.: 04.1

DATE: 07 (WEDNESDAY) day Nov month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE / COMPACTED): 8"

MATERIAL SOURCE: OSDF 004 STOCKPILE MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / (OTHER:) VEGETATIVE LAYER

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: (TBD)

TEST NO.	TEST LOCATION (SEE ATTACHED MAP)	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
C-89	NORTH SLOPE	6"/L-3	CF-15	21.2	102.5	19.8	120.2	100.3	97.9	P	–	–	–	–
C-90	NORTH SLOPE	6"/L-3	CF-15	21.2	102.5	21.2	119.8	98.8	96.4	P	–	–	–	–
C-91	NORTH SLOPE	6"/L-3	CF-15	21.2	102.5	20.1	121.9	101.5	99.0	P	–	–	–	–
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000505

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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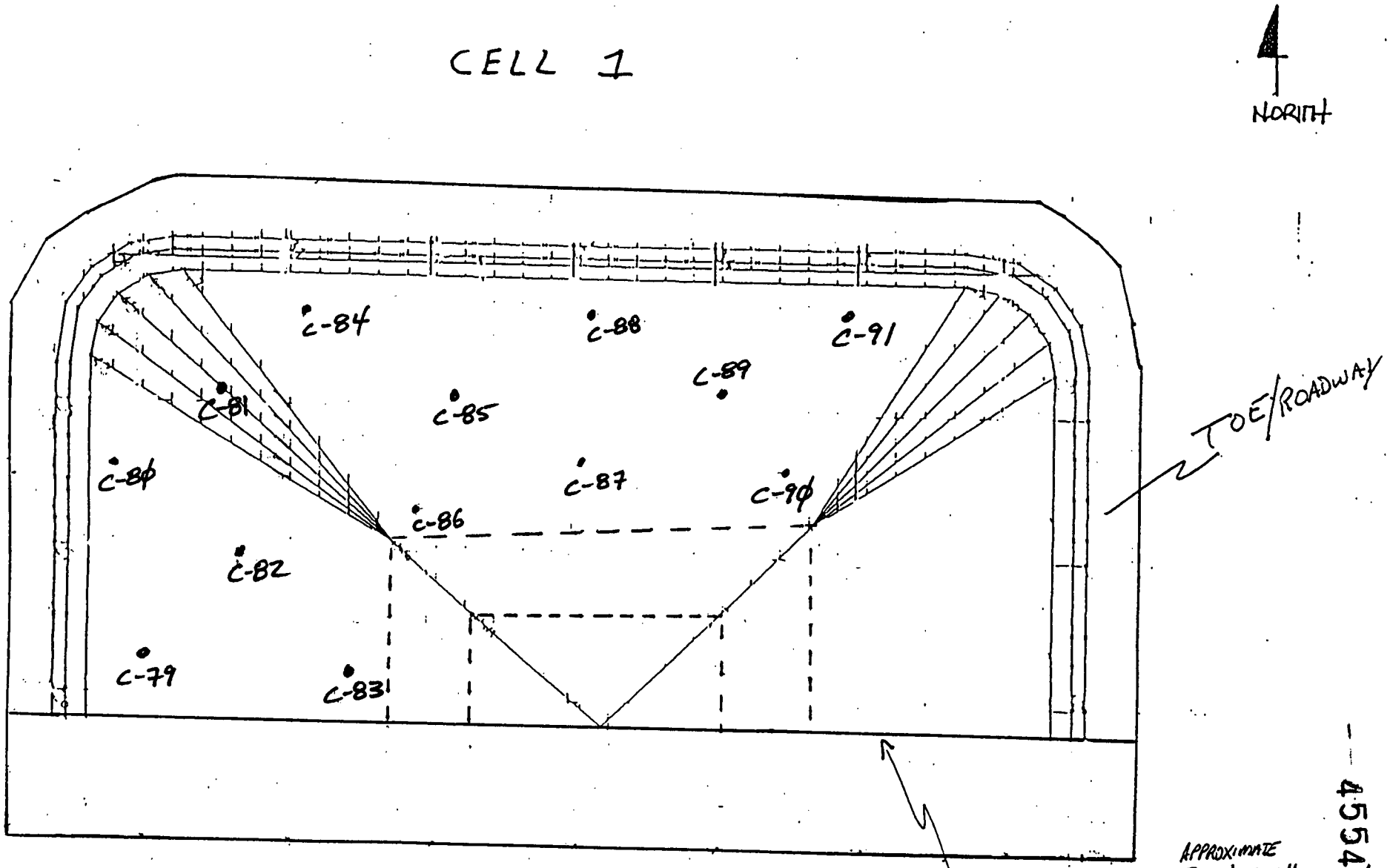
4554

CELL 1



APPROXIMATE
Scale: 1" = 100'

NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

07 DAY Nov MONTH 2001 YEAR

000506

455-40

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

PROJECT NO.: GQ134 TASK NO.: 041

DATE: 08 day (THURSDAY) Nov month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 8"

MATERIAL SOURCE: OSDF-004 STOCKPILE MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY (OTHER:) VEGETATIVE LAYER

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20999 CORRECTION FACTOR Y = NA QA ID: TBR/CS

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
C-92	EAST SLOPE	6"/L-3	CF-15	21.2	102.5	20.1	—	122.1	101.7	99.2	P	—	—	—	—
C-93	EAST SLOPE	6"/L-3	CF-15	21.2	102.5	19.4	—	118.4	99.2	96.8	P	—	—	—	—
C-94	EAST SLOPE	6"/L-3	CF-15	21.2	102.5	19.9	—	120.7	100.7	98.2	P	—	—	—	—
C-95	EAST SLOPE	6"/L-3	CF-15	21.2	102.5	22.4	—	123.5	100.9	98.4	P	—	—	—	—
C-96	EAST SLOPE	6"/L-3	CF-15	21.2	102.5	19.0	—	120.0	100.9	98.4	P	—	—	—	—
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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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000502

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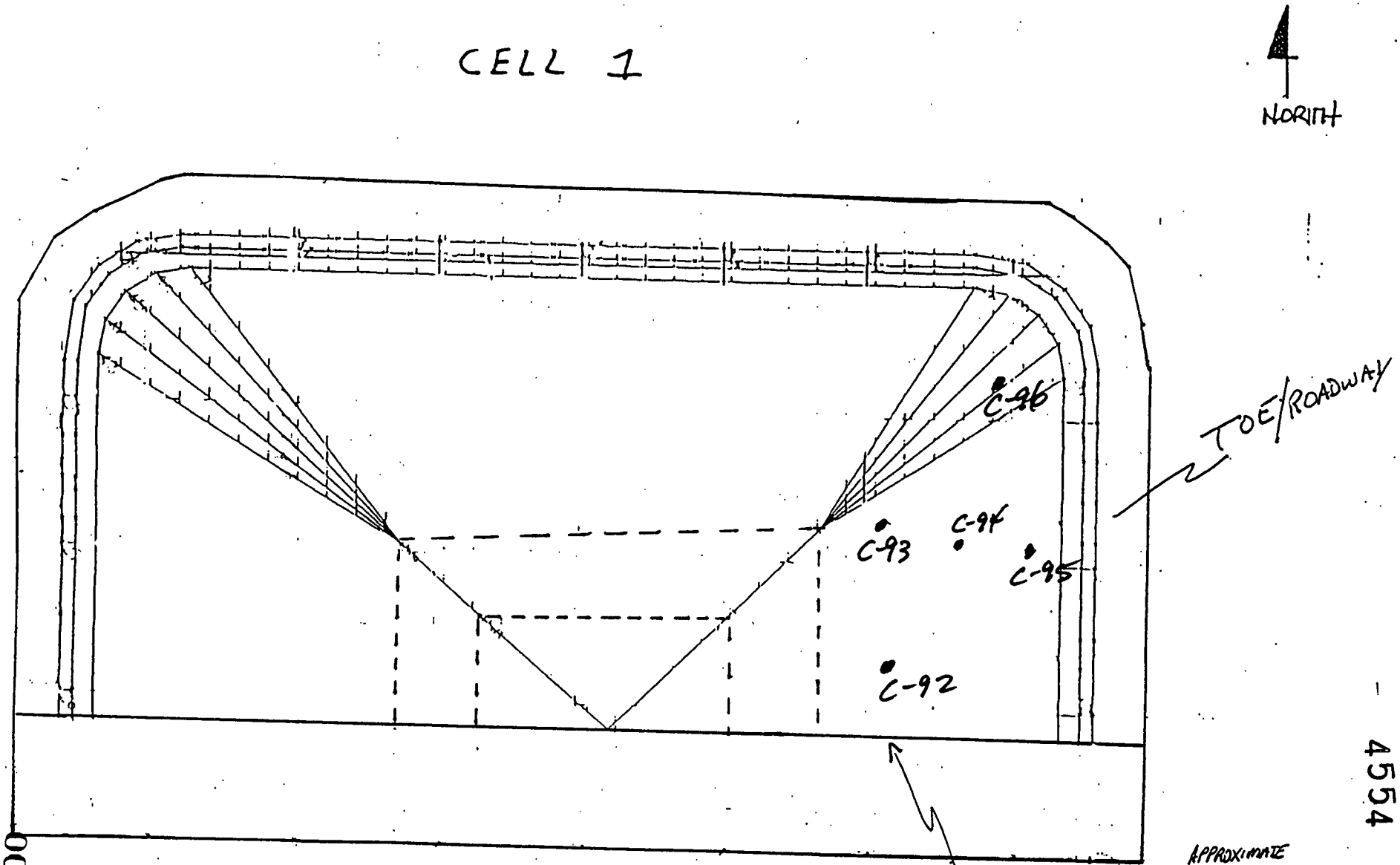
CELL 1



APPROXIMATE
Scale: 1" = 100'

NUCLEAR MOISTURE/DENSITY TEST LOCATION SKETCH

08 DAY Nov MONTH 2001 YEAR

000508

4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Cell #1 Cap Construction

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 9 day Nov month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 92 % COMPACTION / MOISTURE RANGE: ±4% optimum LIFT THICKNESS (LOOSE/COMPACTED): 10"

MATERIAL SOURCE: Stockpile 00-4 MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER: Vegetative Cover

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
KS CØ-97	Top of Cell #1	8"/L-3	CF-15	21.2	102.5	17.8	121.2	103.0	100.5	✓	—		—	—
* KS CØ-98	Top of Cell #1	8"/L-3	CF-15	21.2	102.5	17.3	125.0	106.6	104.0	✓	—		—	—
* KS CØ-99	Top of Cell #1	8"/L-3	CF-15	21.2	102.5	18.9	130.8	110.0	107.3	✓	—		—	—
KS CØ-100	Top of Cell #1	8"/L-3	CF-15	21.2	102.5	20.8	117.3	97.1	94.7	✓	✓		—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

** High rock content.

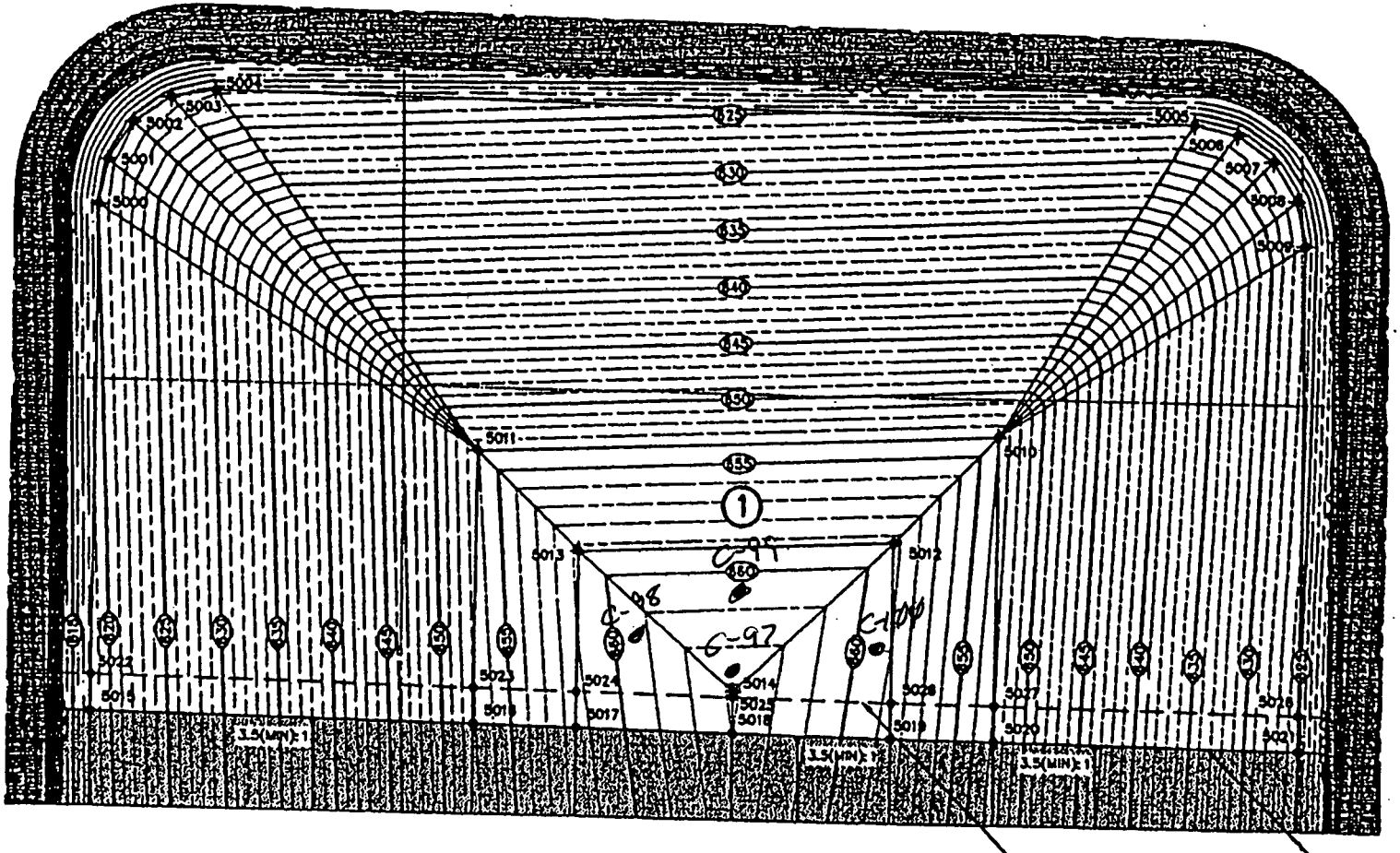
©GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: [signature] SHEET NO. 1 OF 2

000508

4554

CELL #1 - FINAL COVER

GQ1341 TASK 04.1



DATE: 9 DAY NOV MONTH 2001 YEAR

000510

4554

VEGETATIVE SOIL LAYER DRIVE TUBE TEST RESULTS

4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 60134 TASK NO.: 041

DESCRIPTION: Phase III DATE: 7 day Nov month 2001 year

TEST NO.: VLDT - #4

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / (OTHER:) Vegetative layer

% COMPACTION: 92% MOISTURE CONTENT RANGE: ±4 %

FDT LOCATION: FDT TEST NO.: C-84

1923.2 lbs

FIELD TEST DATA – ASTM D 2937 QA ID: DLE/TBY

A	CYLINDER NO. 01-5 VOLUME[1] (cf)	0.03357	E	WET UNIT WEIGHT = D/A 1905.2 gm (lbs)	2.8 lbs/ft³
B	WEIGHT OF SAMPLE & CYLINDER 2536.7 gram (lbs)	5.59 lbs	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	103.4
C	WEIGHT OF CYLINDER 612.1 gram (lbs)	1.35 lbs	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs) 1923.3 grams	4.24			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DLE/TBY

O	WT. OF TARE NO. #11 (grams)	8.1	R	WT. OF WATER = P–Q (grams)	98.0
P	WT. OF WET SOIL & TARE (grams)	550.1	S	WT. OF DRY SOIL = Q–O (grams)	444
Q	WT. OF DRY SOIL & TARE (grams)	452.1	T	MOISTURE CONTENT = (R/S)X100 (%)	22.1

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 116.6 (pcf) OPTIMUM MOISTURE CONTENT 15.3 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: ____

DELTA MOISTURE CONTENT = T – U	5.4	U	FDT MOISTURE CONTENT (%)	16.7
FDT WET UNIT WT. (pcf)	125.9	V	FDT DRY UNIT WT. (pcf)	107.9
DELTA DRY UNIT WT. = F – V	4.5		FDT #	C-84

COMMENTS:

000512

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Cell #1 Cap Construction DATE: 2 day Nov month 2001 year

TEST NO.: 3 (TBV) VLDT #3

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER ~~Top Soil~~ (TBV) VEGETATIVE LAYER

% COMPACTION: 92% MOISTURE CONTENT RANGE: ±4% optimum

FDT LOCATION: C-77 (SEE LOGS) FDT TEST NO.: C-77

FIELD TEST DATA – ASTM D 2937 QA ID: KS

A	CYLINDER NO. 01-5 VOLUME[1] (cf)	0.03357	E	WET UNIT WEIGHT = D/A (lbs)	112.9
B	WEIGHT OF SAMPLE & CYLINDER (lbs)	5.14	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	86.1
C	WEIGHT OF CYLINDER (lbs)	1.35	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs)	3.79			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: TBY

O	WT. OF TARE NO. 1 (grams)	8.3	R	WT. OF WATER = P–Q (grams)	69.6
P	WT. OF WET SOIL & TARE (grams)	301.8	S	WT. OF DRY SOIL = Q–O (grams)	223.9
Q	WT. OF DRY SOIL & TARE (grams)	232.2	T	MOISTURE CONTENT = (R/S)X100 (%)	31.1

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 116.6 (pcf) OPTIMUM MOISTURE CONTENT 15.3 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: KS

DELTA MOISTURE CONTENT = T – U	8.4	U	FDT MOISTURE CONTENT (%)	22.7
FDT WET UNIT WT. (pcf)	116.2	V	FDT DRY UNIT WT. (pcf)	94.7
DELTA DRY UNIT WT. = F – V	-8.6		FDT #	C-77

COMMENTS:

000513

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: G-Q 1341 TASK NO.: 641

DESCRIPTION: Phase III DATE: 30 day Oct month 2001 year

TEST NO.: VL DT- 2

2136.456

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER: Vegetative Layer

% COMPACTION: 92% MOISTURE CONTENT RANGE: ± 4%

FDT LOCATION: Cell 1 Cap FDT TEST NO.: C-53

FIELD TEST DATA – ASTM D 2937 0.03351 QA ID: CL/DLE

A	CYLINDER NO. 01-6 VOLUME[1] (cf)	0.03351	E	WET UNIT WEIGHT = D/A (lbs)	140.6
B	WEIGHT OF SAMPLE & CYLINDER 2744.9 gm (lbs)	6.05	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	124.2
C	WEIGHT OF CYLINDER 608.2 gm (lbs)	1.34	G		
D	WEIGHT OF WET SAMPLE = B-C 2136.5 gm (lbs)	4.71			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DLE

O	WT. OF TARE NO. #20 (grams)	8.3	R	WT. OF WATER = P-Q (grams)	53.7
P	WT. OF WET SOIL & TARE (grams)	467.6	S	WT. OF DRY SOIL = Q-O (grams)	405.6
Q	WT. OF DRY SOIL & TARE (grams)	413.9	T	MOISTURE CONTENT = (R/S)X100 (%)	13.2

1.1

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 128.3 (pcf) OPTIMUM MOISTURE CONTENT 10.4 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: DLE

DELTA MOISTURE CONTENT = T - U	1.5	U	FDT MOISTURE CONTENT (%)	11.7
FDT WET UNIT WT. (pcf)	142.8	V	FDT DRY UNIT WT. (pcf)	127.9
DELTA DRY UNIT WT. = F - V	-3.7		FDT #	C-53

COMMENTS:

000514

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FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 30 day Oct month 2001 year

TEST NO.: VL DT. 1

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / (OTHER:) Vegetative Layer

% COMPACTION: 92 % MOISTURE CONTENT RANGE: ± 4%

FDT LOCATION: C-52 / Cell 1 Cap FDT TEST NO.: C-52

FIELD TEST DATA – ASTM D 2937 QA ID: DCE

A	CYLINDER NO. 015 VOLUME[1] (cf)	0.03357	E	WET UNIT WEIGHT = D/A (lbs)	134.64
B	WEIGHT OF SAMPLE & CYLINDER 2668.9 gm (lbs)	5.87	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	121.2
C	WEIGHT OF CYLINDER 612.1 gm (lbs)	1.35	G		
D	WEIGHT OF WET SAMPLE = B–C 2056.27 gm (lbs)	4.52			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: DCE

O	WT. OF TARE NO. #211 (grams)	7.9	R	WT. OF WATER = P–Q (grams)	45.2
P	WT. OF WET SOIL & TARE (grams)	458.5	S	WT. OF DRY SOIL = Q–O (grams)	405.4
Q	WT. OF DRY SOIL & TARE (grams)	413.3	T	MOISTURE CONTENT = (R/S)X100 (%)	11.1

1.1

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 128.3 (pcf) OPTIMUM MOISTURE CONTENT 10.4 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: DCE

DELTA MOISTURE CONTENT = T – U		1.5	U	FDT MOISTURE CONTENT (%)	9.6
FDT WET UNIT WT. (pcf)		134.3	V	FDT DRY UNIT WT. (pcf)	122.5
DELTA DRY UNIT WT. = F – V		-13.1		FDT #	C-52

COMMENTS:

000515

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TRENCH BACKFILL

COMPACTED FILL

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III / LTS Removal

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 08 day (THURSDAY) Nov month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±4 LIFT THICKNESS (LOOSE/COMPACTED): 10"

MATERIAL SOURCE: SPOILS FROM EXCAVATION MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = NA QA ID: TO

TEST NO.	TEST LOCATION (SEE ATTACHED SKETCH)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
LTR-1	24+75	4"/L-1	LCS-14	17.2	111.0	18.1	125.2	106.0	95.5	P	—	—	—	—
2	24+75	4"/L2	~~LCS-14~~ LCS-6	~~17.7~~ 16.4	~~111.0~~ 115.0	15.9	132.4	114.3	~~100.9~~ 99.3	P	—	—	—	—
3	24+75	4"/L-3	LCS 6	16.4	115.0	15.0	133.2	~~115.8~~	100.7	P	—	—	—	—
4	24+75	4"/L-4	LCS6	16.4	115.0	13.3	133.9	118.2	102.7	P	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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000518

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 9 day Nov month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D (698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±4 LIFT THICKNESS (LOOSE/COMPACTED): 10"

MATERIAL SOURCE: Excavation Spoils MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: [illegible]

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
LTR-5	STA 24+00	/8	LCS-14	17.2	111.0	17.9	127.8	108.4	97.6	✓				
6	STA 24+00	/2	LCS-6	16.4	115.0	15.1	131.4	114.1	99.2	✓				
7	STA 24+00	/3	LCS-6	16.4	115.0	15.1	130.7	113.6	98.8	✓				
8	Sta 24+00	/4	LCS-6	16.4	115.0	16.2	131.1	112.8	98.1	✓				
9	STA 24+00	/5	LCS-14	~~17.2~~ 17.2	111.0	17.5	125.7	107.0	96.4	✓				
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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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000519

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: LTS Removal DATE: 9 day Nov month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 10"

MATERIAL SOURCE: On-Site MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
LTR-10	St 24+00	8"/6	LCS6	16.4	115.0	13.2	135.9	120.0	104.6	P	—	—	—	—
11	St 24+00	8"/7	LCS6	16.4	115.0	15.1	130.3	113.2	98.4	P	—	—	—	—
12	St 24+00	8"/8	LCS6	16.4	115.0	16.3	128.2	110.3	95.9	P	—	—	—	—
13	St 24+00	8"/9	LCS6	16.4	115.0	14.0	134.1	117.6	102.3	P	—	—	—	—
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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: LCS Removal

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 13 day NOV month 2001 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 8"/6"

MATERIAL SOURCE: on-site

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
LTR-14	St. 17+75	6"/L-1	LCS-06	16.4	115.0	14.8	132.0	114.9	99.9	✓	—	—	—	—
15	St. 17+75	6"/L-2	LCS-06	16.4	115.0	14.8	131.5	114.6	99.7	✓	—	—	—	—
16	St. 17+75	6"/L-3	LCS-14	17.2	111.0	16.9	127.1	108.8	98.0	✓	—	—	—	—
17	St. 17+75	6"/L-4	LCS-06	16.4	115.0	16.6	130.1	111.6	97.0	✓	—	—	—	—
18	St. 17+75	6"/L-5	LCS-14	17.2	111.0	17.8	127.6	108.3	97.6	✓	—	—	—	—
19	St. 17+75	6"/L-6	LCS-06	16.4	115.0	16.6	128.4	110.1	95.7	✓	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GR1541 TASK NO.: 04.1

DESCRIPTION: Phase III - LTS Removal

DATE: 15 day Nov month 2001 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 10-12"

MATERIAL SOURCE: On-site/trench spoils MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
LTR-20	~St 15+00	8"/L-1	LCS-06	16.4	115.0	14.3	128.0	112.0	97.4	✓	—	—	—	—
21	~St. 15+00	8"/L-2	LCS-06	16.4	115.0	14.8	131.0	114.1	99.2	✓	—	—	—	—
22	~St. 15+00	8"/L-3	LCS-06	16.4	115.0	16.9	130.0	111.2	96.7	✓	—	—	—	—
23	~St. 15+00	8"/L-4	LCS-14	17.2	111.0	14.7	123.5	107.7	97.0	✓	—	—	—	—
24	~St. 15+00	8"/L-5	LCS-06	16.4	115.0	14.1	126.9	111.2	96.7	✓	—	—	—	—
25	~St 15+00	8"/L-6	LCS-06	16.4	115.0	15.0	129.5	112.6	97.9	✓	—	—	—	—

000522

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

4554

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: Ø4.1

DESCRIPTION: Phase III - LTS Removal

DATE: 2Ø day Nov month 2ØØ1 year

SPECIFICATION REQUIREMENTS: (ASTM D 698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE) COMPACTED): 1Ø"-12"

MATERIAL SOURCE: on-site

MATERIAL TYPE: (CIRCLE ONE) (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 2Ø979 CORRECTION FACTOR Y = N/A QA ID: KS

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
LTR-26	St. 12+75	6"/L-1	CF-8	1Ø.4	126.2	11.4	139.3	125.1	99.1	✓	—	—	—	—
27	St. 12+75	8"/L-2	CF-8	1Ø.4	126.2	11.2	138.2	124.3	98.5	✓	—	—	—	—
28	St. 12+75	8"/L-3	CF-8	1Ø.4	126.2	11.8	137.5	123.Ø	97.5	✓	—	—	—	—
29	St 12+75	8"/L-4	CF-8	1Ø.4	126.2	11.5	139.5	125.1	99.1	✓	—	—	—	—
30	St 12+75	8"/L-5	CF-8	1Ø.4	126.2	12.3	142.3	126.8	1ØØ.5	✓	—	—	—	—
31	St 12+75	8"/L-6	CF-8	1Ø.4	126.2	11.8	136.7	122.3	96.9	✓	—	—	—	—
32	St 12+75	8"/L-7	CF-8	1Ø.4	126.2	11.4	139.9	125.6	99.5	✓	—	—	—	—
33	St 12+75	8"/L-8	CF-8	1Ø.4	126.2	12.1	138.7	123.7	98.Ø	✓	—	—	—	—
34	St 12+75	8"/L-9	CF-8	1Ø.4	126.2	11.9	137.1	122.5	97.1	✓	—	—	—	—
35	St 12+75	8"/L-1Ø	CF-8	1Ø.4	126.2	1Ø.6	135.7	~~122.8~~ 122.7	~~97.3~~ 97.2	✓	—	—	—	—

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ 1341 TASK NO.: 04.1

DESCRIPTION: Phase III - LTS Removal

DATE: 10 day Dec month 2002 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 10"

MATERIAL SOURCE: On-Site

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: Trox 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: BL

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
LTR-36	11+75	8"/1	EP-10	15.3	114.7	14.2	127.3	111.5	97.2	P				
37	11+75	8"/2	EP-10	15.3	114.7	13.9	127.9	112.3	97.9	P				

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

GEO SYNTEC CONSULTANTS FILE NO.: 2-20-FNM CHECKED BY: BL SHEET NO. 1 OF 1

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: Phase II LTS Removal

DATE: 16 day Dec month 2002 year

SPECIFICATION REQUIREMENTS: ASTM D (698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 10"

MATERIAL SOURCE: On Site

MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: (CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 30979 CORRECTION FACTOR Y = N/A QA ID: [illegible]

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (1) (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
UR-38	11+75	8"/3	EP-10	15.3	114.7	14.9	127.4	110.9	96.7	P				
39	11+75	8"/4	EP-10	15.3	114.7	15.7	127.9	110.5	96.4	P				
40	11+75	8"/5	EP-10	15.3	114.7	15.4	126.8	109.9	95.8	P				
		/												
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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Compacted Fill over the VH-5 horizontal monitoring well

PROJECT NO.: G01341 TASK NO.: 04.1

DATE: 15 day Jan month 2002 year

SPECIFICATION REQUIREMENTS: ASTM D (698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 10"

MATERIAL SOURCE: On-site.

MATERIAL TYPE: (CIRCLE ONE) (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: CA

TEST NO.	TEST LOCATION (See location Map)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	FIELD TEST RESULTS: PASS	FIELD TEST RESULTS: FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
41	VH-5	8" / 1	EP10	15.3	114.7	16.3	129.6	111.4	97.2	P				
42	VH-5	8" / 2	EP 10	15.3	114.7	15.4	131.0	113.5	99.0	P				
43	VH-5	8" / 3	EP10	15.3	114.7	16.9	128.2	109.7	95.6	P				
44	VH-5	8" / 4	EP10	15.3	114.7	14.8	130.6	113.8	99.2	P				
		/												
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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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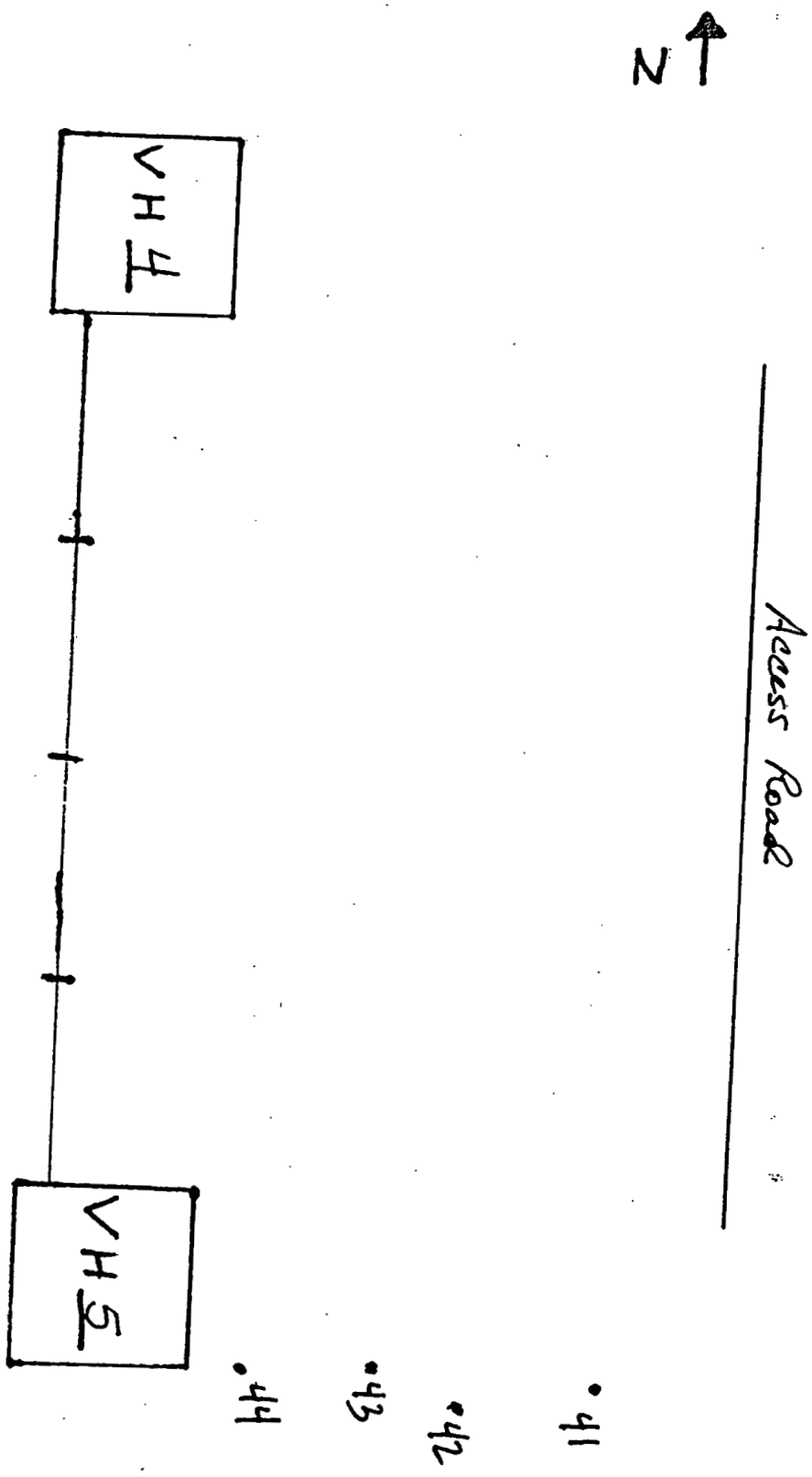

NOT TO SCALE

4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Compacted fill over the VH-4 Monitoring well

PROJECT NO.: G01341 TASK NO.: 04.1

DATE: 18 day Jan month 2002 year

SPECIFICATION REQUIREMENTS: ASTM D (698) / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±4 LIFT THICKNESS (LOOSE/COMPACTED): 10"

MATERIAL SOURCE: ~~Troxler 3440~~ On Site

MATERIAL TYPE: (CIRCLE ONE) (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: GL

TEST NO.	TEST LOCATION (See location Map)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
45	VH-4	8" / 1	EP10	15.3	114.7	14.5	128.9	112.6	98.2	P				
46	VH4	8" / 2	EP6	15.5	112.0	15.6	124.1	107.4	95.9	P				
47	VH-4	8" / 3	EP10	15.3	114.7	16.9	128.7	110.1	96.0	P				
48	VH-4	8" / 4	EP-10	15.3	114.7	16.8	129.1	110.5	96.4	P				

COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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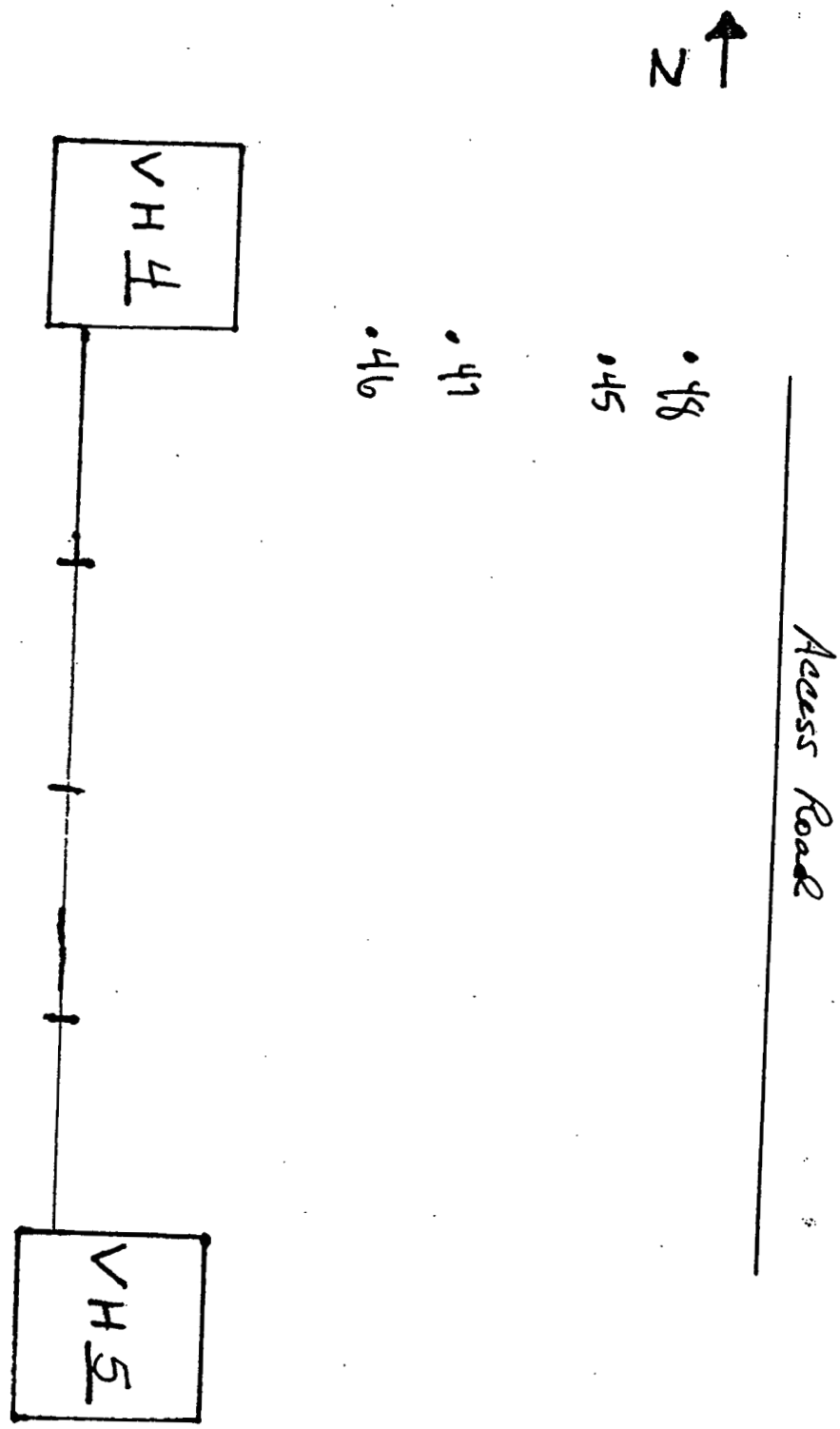
000529



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Compacted fill over VH-4 LCS, LDS, & LCSR VH-4

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 11 day Feb month 2002 year

SPECIFICATION REQUIREMENTS: ASTM D 698 / ASTM D 1557 95 % COMPACTION / MOISTURE RANGE: ±4% LIFT THICKNESS (LOOSE/COMPACTED): 10"

MATERIAL SOURCE: On-Site

MATERIAL TYPE: (CIRCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

NUCLEAR GAUGE TYPE: Troxler 3440 GAUGE SERIAL NO. 20979 CORRECTION FACTOR Y = N/A QA ID: [illegible]

TEST NO.	TEST LOCATION (See location Map)	PROBE DEPTH/ LIFT NO.	LAB RESULTS: SAMPLE NO.	LAB RESULTS: OMC (%)	LAB RESULTS: MAX DRY UNIT WT (PCF)	FIELD TEST RESULTS: FMC (1) (%)	FIELD TEST RESULTS: WET UNIT WT (PCF)	FIELD TEST RESULTS: DRY UNIT WT (PCF)	FIELD TEST RESULTS: PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	RETEST PASS	RETEST FAIL
49	VH-4	8"/1	EP-10	15.3	114.7	15.7	128.8	111.3	97.0	P				
50	VH-4	8"/2	EP-10	15.3	114.7	16.1	128.3	110.6	96.4	P				
51	VH-4	8"/3	EP-10	15.3	114.7	16.3	127.7	109.8	95.7	P				
52	VH-4	8"/4	EP-10	15.3	114.7	16.8	128.9	110.4	96.2	P				
		/												
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COMMENTS: (1) FIELD MOISTURE CONTENT (FMC) = GAUGE READING/CORRECTED MOISTURE (Y)

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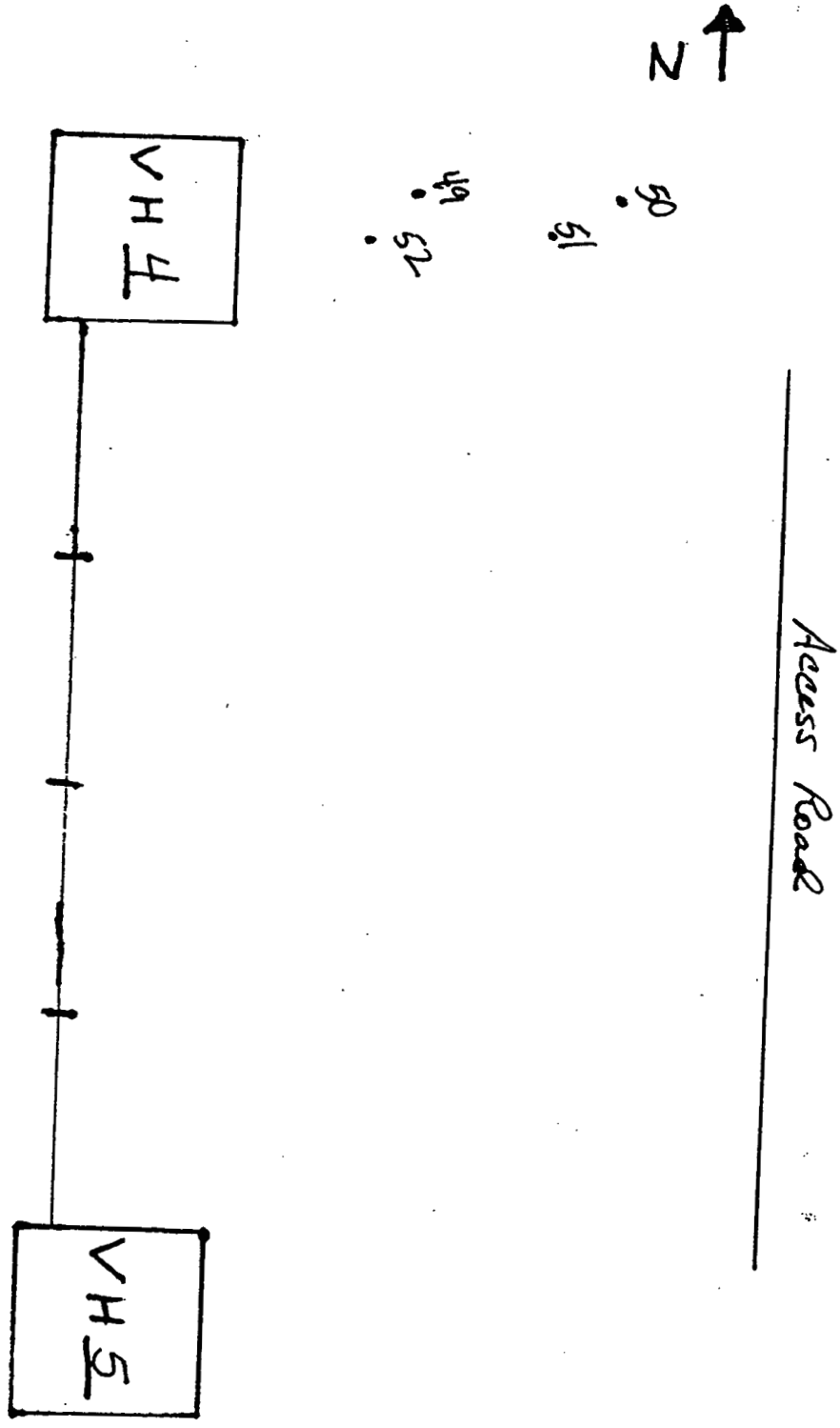

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COMPACTED FILL DRIVE TUBES

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GR1341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 9 day Nov month 2001 year

TEST NO.: LTR DT-1

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER:

% COMPACTION: 95% MOISTURE CONTENT RANGE: ±4%

FDT LOCATION: STA 24+00 FDT TEST NO.: LTR 7

FIELD TEST DATA – ASTM D 2937 QA ID: CA

A	CYLINDER NO. 01-5 VOLUME[1] (cf)	0.03357	E	WET UNIT WEIGHT = D/A (lbs)	129.9
B	WEIGHT OF SAMPLE & CYLINDER (lbs)	5.71	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	112.5
C	WEIGHT OF CYLINDER (lbs)	1.35	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs)	4.36			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01–in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: CA

O	WT. OF TARE NO. 1 (grams)	8.3	R	WT. OF WATER = P–Q (grams)	39.9
P	WT. OF WET SOIL & TARE (grams)	307.8	S	WT. OF DRY SOIL = Q–O (grams)	259.6
Q	WT. OF DRY SOIL & TARE (grams)	267.9	T	MOISTURE CONTENT = (R/S)X100 (%)	15.4

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 115.0 (pcf) OPTIMUM MOISTURE CONTENT 16.4 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: CA

DELTA MOISTURE CONTENT = T – U	0.3	U	FDT MOISTURE CONTENT (%)	15.1
FDT WET UNIT WT. (pcf)	130.7	V	FDT DRY UNIT WT. (pcf)	113.6
DELTA DRY UNIT WT. = F – V	1.1		FDT #	

COMMENTS:

000533

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GR1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 10 day Dec month 2001 year

TEST NO.: LTR DT-2

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) FILL / SUBGRADE / SUBBASE / CLAY / OTHER:

% COMPACTION: 95% MOISTURE CONTENT RANGE: ±4%

FDT LOCATION: 11+75 FDT TEST NO.: LTR-37

FIELD TEST DATA – ASTM D 2937 QA ID: A

A	CYLINDER NO. 01-5 VOLUME[1] (cf)	0.0357	E	WET UNIT WEIGHT = D/A (lbs)	129.3
B	WEIGHT OF SAMPLE & CYLINDER (lbs)	5.69	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	112.3
C	WEIGHT OF CYLINDER (lbs)	1.35	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs)	4.34			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: A

O	WT. OF TARE NO. 11 (grams)	8.1	R	WT. OF WATER = P–Q (grams)	38.3
P	WT. OF WET SOIL & TARE (grams)	299.4	S	WT. OF DRY SOIL = Q–O (grams)	253.0
Q	WT. OF DRY SOIL & TARE (grams)	261.1	T	MOISTURE CONTENT = (R/S)X100 (%)	15.1

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 114.7 (pcf) OPTIMUM MOISTURE CONTENT 15.3 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: A

DELTA MOISTURE CONTENT = T – U		1.1	U	FDT MOISTURE CONTENT (%)	13.9
FDT WET UNIT WT. (pcf)		127.9	V	FDT DRY UNIT WT. (pcf)	112.3
DELTA DRY UNIT WT. = F – V		Ø		FDT #	

COMMENTS:

000534

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FLUOR FERNALD

DETERMINATION OF DENSITY (DRIVE CYLINDER) (ASTM D 2937)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GX01341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Jan month 2001 year

TEST NO.: LTR-DT-3

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: (CIRLCLE ONE) (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER:

% COMPACTION: 95% MOISTURE CONTENT RANGE: ± 4%

FDT LOCATION: ~~LTR-2~~ VH-5 FDT TEST NO.: LTR-44

FIELD TEST DATA – ASTM D 2937 QA ID: CJ

A	CYLINDER NO. 01-06 VOLUME[1] (cf)	0.03351	E	WET UNIT WEIGHT = D/A (lbs)	130.7
B	WEIGHT OF SAMPLE & CYLINDER (lbs)	5.72	F	DRY UNIT WEIGHT = E/[1+(T/100)] (pcf)	112.9
C	WEIGHT OF CYLINDER (lbs)	1.34	G		
D	WEIGHT OF WET SAMPLE = B–C (lbs)	4.38			

NOTE: DRIVE CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-in., AND CALCULATING VOLUME USING AVERAGE HEIGHT AND DIAMETER.

FIELD MOISTURE CONTENT – ASTM D 2216 QA ID: CJ

O	WT. OF TARE NO. 20 (grams)	8.3	R	WT. OF WATER = P–Q (grams)	42.7
P	WT. OF WET SOIL & TARE (grams)	320.1	S	WT. OF DRY SOIL = Q–O (grams)	269.1
Q	WT. OF DRY SOIL & TARE (grams)	277.4	T	MOISTURE CONTENT = (R/S)X100 (%)	15.9

PROCTOR TEST DATA: [L] MAXIMUM DRY UNIT WT. 114.7 (pcf) OPTIMUM MOISTURE CONTENT 15.3 (%)

COMPARISON WITH NUCLEAR GAUGE – ASTM D 2922 AND D 3017 QA ID: CJ

DELTA MOISTURE CONTENT = T – U		1.1	U	FDT MOISTURE CONTENT (%)	14.8
FDT WET UNIT WT. (pcf)		130.6	V	FDT DRY UNIT WT. (pcf)	113.8
DELTA DRY UNIT WT. = F – V		0.9		FDT #	

COMMENTS:

APPENDIX G

GEOSYNTHETIC CONFORMANCE TEST RESULTS

GEOSYNTHETIC CLAY CAP

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

GEOSYNTHETIC CLAY LINER TEST REQUEST FORM

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1029 TASK NO.: 04

DESCRIPTION: ON-SITE DISPOSAL FACILITY YEAR: 2001

SAMPLED: 6/9 day MAR mo SAMPLER ID: DKP/HEM SHIPPED: _____ day _____ mo SHIPPER ID: _____ RECEIVED: _____ day _____ mo LAB ID: _____

MANUFACTURED BY: CETCO SAMPLE SHIPPED VIA: DELIVERED

SITE CONTACT: _____ SITE PHONE: _____ SITE FAX: _____

SAMPLE NO. GCL-	BATCH NO./ ROLL NO.	MASS PER UNIT WEIGHT ASTM D5261 D5993	MOISTURE CONTENT ASTM D2216	FREE SWELL ASTM D5890 GRI-GCL-1	HYDRAULIC CONDUCTIVITY ASTM D5084 GRI-GCL-2 ✓	INDEX FLUX ASTM D5887	FLUID LOSS ASTM D5891	PEEL STRENGTH ASTM D4632 mod.	OTHER DIRECT SHEAR ASTM D6243 ✓
01-01	200110FA3 / 00000714				✓				✓
01-02	761				✓				✓
01-03	811				✓				✓
01-04	862				✓				✓
	000537								

REINFORCED OR NONREINFORCED MATERIAL

COMMENTS/SPECIAL INSTRUCTIONS/DISTRIBUTION: Strikeout nonapplicable items

- INTERNAL & INTERFACE DIRECT SHEAR TESTING IN ACCORDANCE WITH PROCEDURES PREVIOUSLY PROVIDED.
- PLEASE USE GML-01-01 FOR INTERFACE WITH GCL-01-01, GML-01-02 WITH GCL-01-02, GML-01-04 WITH GCL-01-03, GML-01-05 WITH GCL-01-04

GEOSYNTEC CONSULTANTS

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FLUOR FERNALD

MATERIAL INVENTORY

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: G0134 TASK NO.: 1341

DESCRIPTION: Phase III YEAR: 2001

MATERIAL TYPE: Geosynthetic Clay liner MANUFACTURER: Colloid Environmental

INVENTORY			Q.A. CONFORMANCE				Q.C. DOCUMENTS			
DATE (day/mo)	BATCH / ROLL NO.	QA ID	DATE SAMPLED (day/mo)	SAMPLE NO.	PASS/ FAIL	QA ID	DATE RECEIVED (day/mo)	DATE CHECKED (day/mo)	PASS/ FAIL	QA ID
25 May	0733	CS					7 May	7 May	P	CS
25 May	0734	CS					7 May	7 May	P	CS
25 May	0735	CS					7 May	7 May	P	CS
25 May	0754	CS					7 May	7 May	P	CS
25 May	0771	CS					7 May	7 May	P	CS
25 May	0772	CS					7 May	7 May	P	CS
25 May	0785	CS					7 May	7 May	P	CS
25 May	0822	CS					7 May	7 May	P	CS
25 May	0835	CS					7 May	7 May	P	CS
25 May	0859	CS					7 May	7 May	P	CS
25 May	0860	CS					7 May	7 May	P	CS
25 May	0867	CS					7 May	7 May	P	CS
25 May	0869	CS					7 May	7 May	P	CS
25 May	0740	CS					7 May	7 May	P	CS
25 May	0742	CS					7 May	7 May	P	CS
25 May	0748	CS					7 May	7 May	P	CS
25 May	0749	CS					7 May	7 May	P	CS
25 May	0751	CS					7 May	7 May	P	CS
25 May	0756	CS					7 May	7 May	P	CS
25 May	0773	CS					7 May	7 May	P	CS
25 May	0798	CS					7 May	7 May	P	CS
25 May	0799	CS					7 May	7 May	P	CS

AVG. ROLL WIDTH: 15.0' (ft) AVG. ROLL LENGTH: 1500 (ft)

NUMBER OF ROLLS ABOVE: 22 CUMULATIVE NUMBER OF ROLLS: 22

CUMULATIVE AREA: 49,500 (ft^2) NO. OF CONFORMANCE TESTS (page/total): 0 / 3

COMMENTS:

000538

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FLUOR FERNALD

MATERIAL INVENTORY

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III YEAR: 2001

MATERIAL TYPE: GCL MANUFACTURER: Colloid Environmental

INVENTORY			Q.A. CONFORMANCE				Q.C. DOCUMENTS			
DATE (day/mo)	BATCH / ROLL NO.	QA ID	DATE SAMPLED (day/mo)	SAMPLE NO.	PASS/ FAIL	QA ID	DATE RECEIVED (day/mo)	DATE CHECKED (day/mo)	PASS/ FAIL	QA ID
May 25	0802	CS					7 May	7 May	P	CS
25 May	0803	CS					7 May	7 May	P	CS
25 May	0805	CS					7 May	7 May	P	CS
25 May	0808	CS					7 May	7 May	P	CS
25 May	0809	CS					7 May	7 May	P	CS
25 May	0810	CS					7 May	7 May	P	CS
25 May	0811	CS	8 March	GCL-01-03			7 March	7 May	P	CS
25 May	0741	CS					7 May	7 May	P	CS
25 May	0779	CS					7 May	7 May	P	CS
25 May	0780	CS					7 May	7 May	P	CS
25 May	0784	CS					7 May	7 May	P	CS
25 May	0812	CS					7 May	7 May	P	CS
25 May	0813	CS					7 May	7 May	P	CS
25 May	0814	CS					7 May	7 May	P	CS
25 May	0815	CS					7 May	7 May	P	CS
25 May	0816	CS					7 May	7 May	P	CS
25 May	0818	CS					7 May	7 May	P	CS
25 May	0819	CS					7 May	7 May	P	CS
25 May	0820	CS					7 May	7 May	P	CS
25 May	0823	CS					7 May	7 May	P	CS
25 May	0824	CS					7 May	7 May	P	CS
25 May	0825	CS					7 May	7 May	P	CS

AVG. ROLL WIDTH: 15.0 (ft) AVG. ROLL LENGTH: 150.0 (ft)

NUMBER OF ROLLS ABOVE: 22 CUMULATIVE NUMBER OF ROLLS: 44

CUMULATIVE AREA: 99,000 (ft^2) NO. OF CONFORMANCE TESTS (page/total): 1 / 3

COMMENTS:

000539

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

MATERIAL INVENTORY

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III YEAR: 2001

MATERIAL TYPE: GCL MANUFACTURER: Collard Environmental

INVENTORY			Q.A. CONFORMANCE				Q.C. DOCUMENTS			
DATE (day/mo)	BATCH / ROLL NO.	QA ID	DATE SAMPLED (day/mo)	SAMPLE NO.	PASS/ FAIL	QA ID	DATE RECEIVED (day/mo)	DATE CHECKED (day/mo)	PASS/ FAIL	QA ID
25 May	0836	CS					7 May	7 May	P	CS
30 May	0710	CS					7 May	7 May	P	CS
30 May	0711	CS					7 May	7 May	P	CS
30 May	0712	CS					7 May	7 May	P	CS
30 May	0726	CS					7 May	7 May	P	CS
30 May	0728	CS					7 May	7 May	P	CS
30 May	0732	CS					7 May	7 May	P	CS
30 MAY	0739	CS					7 May	7 May	P	CS
30 May	0775	CS					7 May	7 May	P	CS
30 May	0777	CS					7 May	7 May	P	CS
30 May	0787	CS					7 May	7 May	P	CS
30 May	0788	CS					7 May	7 May	P	CS
30 May	0794	CS					7 May	7 May	P	CS
30 May	0795	CS					7 May	7 May	P	CS
30 May	0796	CS					7 May	7 May	P	CS
30 May	0801	CS					7 May	7 May	P	CS
30 MAY	0804	CS					7 May	7 May	P	CS
31 MAY	0694	CS					7 May	7 May	P	CS
31 May	0695	CS					7 May	7 May	P	CS
31 May	0696	CS					7 May	7 May	P	CS
31 May	0700	CS					7 May	7 May	P	CS
31 May	0708	CS					7 May	7 May	P	CS

AVG. ROLL WIDTH: 15.0 (ft) AVG. ROLL LENGTH: 150.0 (ft)

NUMBER OF ROLLS ABOVE: 22 CUMULATIVE NUMBER OF ROLLS: 66

CUMULATIVE AREA: 148,500 (ft^2) NO. OF CONFORMANCE TESTS (page/total): 6 / 3

COMMENTS:

000540

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

MATERIAL INVENTORY

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III YEAR: 2001

MATERIAL TYPE: GCL MANUFACTURER: Colloid Environmental

INVENTORY			Q.A. CONFORMANCE				Q.C. DOCUMENTS			
DATE (day/mo)	BATCH / ROLL NO.	QA ID	DATE SAMPLED (day/mo)	SAMPLE NO.	PASS/ FAIL	QA ID	DATE RECEIVED (day/mo)	DATE CHECKED (day/mo)	PASS/ FAIL	QA ID
31 May	0713 ~~0694~~	CS					7 May	7 May	P	CS
31 May	0727	CS					7 May	7 May	P	CS
31 May	0729	CS					7 May	7 May	P	CS
31 May	0738	CS					7 May	7 May	P	CS
31 May	0743	CS					7 May	7 May	P	CS
31 May	0747	CS					7 May	7 May	P	CS
31 May	0752	CS					7 May	7 May	P	CS
31 May	0755	CS					7 May	7 May	P	CS
31 May	0761	CS	7 March	GCL-01-02		CS	7 May	7 May	P	CS
31 May	0776	CS					7 May	7 May	P	CS
31 May	0789	CS					7 May	7 May	P	CS
8 June	0687	CS					7 May	7 May	P	CS
8 June	0689	CS					7 May	7 May	P	CS
8 June	0691	CS					7 May	7 May	P	CS
8 June	0701	CS					7 May	7 May	P	CS
8 June	0702	CS					7 May	7 May	P	CS
8 June	0703	CS					7 May	7 May	P	CS
8 June	0704	CS					7 May	7 May	P	CS
8 June	0705	CS					7 May	7 May	P	CS
8 June	0706	CS					7 May	7 May	P	CS
8 June	0715	CS					7 May	7 May	P	CS
8 June	0725	CS					7 May	7 May	P	CS

AVG. ROLL WIDTH: 15.0 (ft) AVG. ROLL LENGTH: 150.0 (ft)

NUMBER OF ROLLS ABOVE: 22 CUMULATIVE NUMBER OF ROLLS: 88

CUMULATIVE AREA: 198,000 (ft^2) NO. OF CONFORMANCE TESTS (page/total): 1 / 3

COMMENTS:

000541

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

MATERIAL INVENTORY

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III YEAR: 2001

MATERIAL TYPE: GCL MANUFACTURER: Colloid Environmental

INVENTORY			Q.A. CONFORMANCE				Q.C. DOCUMENTS			
DATE (day/mo)	BATCH / ROLL NO.	QA ID	DATE SAMPLED (day/mo)	SAMPLE NO.	PASS/ FAIL	QA ID	DATE RECEIVED (day/mo)	DATE CHECKED (day/mo)	PASS/ FAIL	QA ID
8 June	0731	CS					7 May	7 May	P	CS
8 June	0737	CS					7 May	7 May	P	CS
8 June	0746	CS					7 May	7 May	P	CS
8 June	0765	CS					7 May	7 May	P	CS
8 June	0774	CS					7 May	7 May	P	CS
22 June	0688	CS					7 May	7 May	P	CS
22 June	0692	CS					7 May	7 May	P	CS
22 June	0693	CS					7 May	7 May	P	CS
22 June	0699	CS					7 May	7 May	P	CS
22 June	0714	CS	6 March	GCL-01-01			7 May	7 May	P	CS
22 June	0730	CS					7 May	7 May	P	CS
22 June	0736	CS					7 May	7 May	P	CS
22 June	0759	CS					7 May	7 May	P	CS
22 June	0768	CS					7 May	7 May	P	CS
22 June	0769	CS					7 May	7 May	P	CS
22 June	0770	CS					7 May	7 May	P	CS
22 June	0790	CS					7 May	7 May	P	CS
22 June	0791	CS					7 May	7 May	P	CS
22 June	0793	CS					7 May	7 May	P	CS
22 June	0834	CS					7 May	7 May	P	CS
22 June	0863	CS					7 May	7 May	P	CS
22 June	0762	CS					7 May	7 May	P	CS

AVG. ROLL WIDTH: 15.0 (ft) AVG. ROLL LENGTH: 150.0 (ft)

NUMBER OF ROLLS ABOVE: 22 CUMULATIVE NUMBER OF ROLLS: 110

CUMULATIVE AREA: ~~274~~ 247,500 (ft^2) NO. OF CONFORMANCE TESTS (page/total): 1 / 13

COMMENTS:

000542

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4554

MATERIAL INVENTORY

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III YEAR: 2001

MATERIAL TYPE: GCL MANUFACTURER: Colloid Environmental

INVENTORY			Q.A. CONFORMANCE				Q.C. DOCUMENTS			
DATE (day/mo)	BATCH / ROLL NO.	QA ID	DATE SAMPLED (day/mo)	SAMPLE NO.	PASS/ FAIL	QA ID	DATE RECEIVED (day/mo)	DATE CHECKED (day/mo)	PASS/ FAIL	QA ID
22 June	0767	CS					7 May	7 May	P	CS
22 June	0832	CS					7 May	7 May	P	CS
22 June	0837	CS					7 May	7 May	P	CS
22 June	0839	CS					7 May	7 May	P	CS
22 June	0842	CS					7 May	7 May	P	CS
22 June	0845	CS					7 May	7 May	P	CS
22 June	0849	CS					7 May	7 May	P	CS
22 June	0850	CS					7 May	7 May	P	CS
22 June	0851	CS					7 May	7 May	P	CS
22 June	0852	CS					7 May	7 May	P	CS
22 June	0856	CS					7 May	7 May	P	CS
22 June	0858	CS					7 May	7 May	P	CS
22 June	0866	CS					7 May	7 May	P	CS
22 June	0868	CS					7 May	7 May	P	CS
22 June	0870	CS					7 May	7 May	P	CS
22 June	0744	CS					7 May	7 May	P	CS
22 June	0745	CS					7 May	7 May	P	CS
22 June	0750	CS					7 May	7 May	P	CS
22 June	0800	CS					7 May	7 May	P	CS
22 June	0817	CS					7 May	7 May	P	CS
22 June	0821	CS					7 May	7 May	P	CS
22 June	0844	CS					7 May	7 May	P	CS

AVG. ROLL WIDTH: 15.0 (ft) AVG. ROLL LENGTH: 150.0 (ft)

NUMBER OF ROLLS ABOVE: 22 CUMULATIVE NUMBER OF ROLLS: 132

CUMULATIVE AREA: 297,000 (ft^2) NO. OF CONFORMANCE TESTS (page/total): 0/3

COMMENTS:

000543

GEOSYNTEC CONSULTANTS

-- 4554

FLUOR FERNALD

MATERIAL INVENTORY

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III YEAR: 2001

MATERIAL TYPE: GCL MANUFACTURER: Colloid Environmental

INVENTORY			Q.A. CONFORMANCE				Q.C. DOCUMENTS			
DATE (day/mo)	BATCH / ROLL NO.	QA ID	DATE SAMPLED (day/mo)	SAMPLE NO.	PASS/ FAIL	QA ID	DATE RECEIVED (day/mo)	DATE CHECKED (day/mo)	PASS/ FAIL	QA ID
22 June	0846	CS					7 May	7 May	P	CS
22 June	0847	CS					7 May	7 May	P	CS
22 June	0853	CS					7 May	7 May	P	CS
22 June	0854	CS					7 May	7 May	P	CS
22 June	0855	CS					7 May	7 May	P	CS
22 June	0857	CS					7 May	7 May	P	CS
22 June	0864	CS					7 May	7 May	P	CS
22 June	0865	CS					7 May	7 May	P	CS
22 June	0871	CS					7 May	7 May	P	CS
22 June	0753	CS					7 May	7 May	P	CS
22 June	0758	CS					7 May	7 May	P	CS
22 June	0763	CS					7 May	7 May	P	CS
22 June	0766	CS					7 May	7 May	P	CS
22 June	0782	CS					7 May	7 May	P	CS
22 June	0783	CS					7 May	7 May	P	CS
22 June	0826	CS					7 May	7 May	P	CS
22 June	0828	CS					7 May	7 May	P	CS
22 June	0829	CS					7 May	7 May	P	CS
22 June	0830	CS					7 May	7 May	P	CS
22 June	0831	CS					7 May	7 May	P	CS
22 June	0833	CS					7 May	7 May	P	CS
22 June	0838	CS					7 May	7 May	P	CS

AVG. ROLL WIDTH: 15.0 (ft) AVG. ROLL LENGTH: 150.0 (ft)

NUMBER OF ROLLS ABOVE: 22 CUMULATIVE NUMBER OF ROLLS: 154

CUMULATIVE AREA: 346,500 (ft^2) NO. OF CONFORMANCE TESTS (page/total): Ø 13

COMMENTS:

000544

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

--4554

MATERIAL INVENTORY

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III YEAR: 2001

MATERIAL TYPE: GCL MANUFACTURER: Colloid Environmental

INVENTORY			Q.A. CONFORMANCE				Q.C. DOCUMENTS			
DATE (day/mo)	BATCH / ROLL NO.	QA ID	DATE SAMPLED (day/mo)	SAMPLE NO.	PASS/ FAIL	QA ID	DATE RECEIVED (day/mo)	DATE CHECKED (day/mo)	PASS/ FAIL	QA ID
22 June	0840	CS					7 May	7 May	P	CS
22 June	0841	CS					7 May	7 May	P	CS

AVG. ROLL WIDTH: 15.0 (ft) AVG. ROLL LENGTH: 15.0 (ft)

NUMBER OF ROLLS ABOVE: 2 CUMULATIVE NUMBER OF ROLLS: 156

CUMULATIVE AREA: 396,000 (ft^2) NO. OF CONFORMANCE TESTS (page/total): Ø / 3

COMMENTS:

000545

PACKING LIST

-- 4554

FERNALD 2001

GCL

ETCO
500 WEST SHORE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 00136
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

MQC Sample

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000687	150.0	15.0	2250.0	2852.0	→ INTERNAL
FA-BENTOMAT ST		SFT	SF	200110FA3 00000688	150.0	15.0	2250.0	2762.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000689	150.0	15.0	2250.0	2745.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000691	150.0	15.0	2250.0	2774.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000692	150.0	15.0	2250.0	2766.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000693	150.0	15.0	2250.0	2755.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000694	150.0	15.0	2250.0	2742.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000695	150.0	15.0	2250.0	2755.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000696	150.0	15.0	2250.0	2838.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000697	150.0	15.0	2250.0	2766.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000698	150.0	15.0	2250.0	2789.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000699	150.0	15.0	2250.0	2785.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000700	150.0	15.0	2250.0	2789.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000701	150.0	15.0	2250.0	2788.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000702	150.0	15.0	2250.0	2776.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000703	150.0	15.0	2250.0	2768.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000704	150.0	15.0	2250.0	2769.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000705	150.0	15.0	2250.0	2815.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000706	150.0	15.0	2250.0	2769.0	→ INTERFACE

PACKING LIST

--4554

CETCO
1500 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO... 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT	
FA-BENTOMAT ST	SFT SF	200110FA3	00000708	150.0	15.0	2250.0	3100.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000710	150.0	15.0	2250.0	2805.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000711	150.0	15.0	2250.0	2761.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000712	150.0	15.0	2250.0	2786.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000713	150.0	15.0	2250.0	2750.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000714	150.0	15.0	2250.0	2751.0	GCL-1
FA-BENTOMAT ST	SFT SF	200110FA3	00000715	150.0	15.0	2250.0	2961.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000725	150.0	15.0	2250.0	2777.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000726	150.0	15.0	2250.0	2738.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000727	150.0	15.0	2250.0	2740.0	
FA BENTOMAT ST	SFT SF	200110FA3	00000728	150.0	15.0	2250.0	2770.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000729	150.0	15.0	2250.0	2742.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000730	150.0	15.0	2250.0	2758.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000731	150.0	15.0	2250.0	2774.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000732	150.0	15.0	2250.0	2746.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000733	150.0	15.0	2250.0	2846.0	Internal
FA-BENTOMAT ST	SFT SF	200110FA3	00000734	150.0	15.0	2250.0	2754.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000735	150.0	15.0	2250.0	2770.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000736	150.0	15.0	2250.0	2768.0	

PACKING LIST

- 4554

CETCO
500 WEST SHORE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138165
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 00136
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000737	150.0	15.0	2250.0	2755.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000738	150.0	15.0	2250.0	2760.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000739	150.0	15.0	2250.0	2751.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000740	150.0	15.0	2250.0	2728.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000741	150.0	15.0	2250.0	2820.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000742	150.0	15.0	2250.0	2794.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000743	150.0	15.0	2250.0	2751.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000744	150.0	15.0	2250.0	2787.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000745	150.0	15.0	2250.0	2778.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000746	150.0	15.0	2250.0	2760.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000747	150.0	15.0	2250.0	2754.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000748	150.0	15.0	2250.0	2744.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000749	150.0	15.0	2250.0	2767.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000750	150.0	15.0	2250.0	2794.0	INTERPACE
FA-BENTOMAT ST		SFT	SF	200110FA3 00000751	150.0	15.0	2250.0	2741.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000752	150.0	15.0	2250.0	2763.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000753	150.0	15.0	2250.0	2770.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000754	150.0	15.0	2250.0	2752.0	
FA-BENTOMAT ST		SFT	SF	200110FA3 00000755	150.0	15.0	2250.0	2727.0	

000548

PACKING LIST

-- 4554

CETCO
500 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSE LINING TECHNOLOGY. INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925 001 00

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
FA-BENTOMAT ST		SFT	SF	200110FA3 00000756	150.0	15.0	2250.0	2784.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000757	150.0	15.0	2250.0	2784.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000758	150.0	15.0	2250.0	2793.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000759	150.0	15.0	2250.0	2871.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000761	150.0	15.0	2250.0	2839.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000762	150.0	15.0	2250.0	2800.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000763	150.0	15.0	2250.0	2851.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000765	150.0	15.0	2250.0	3014.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000766	150.0	15.0	2250.0	3363.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000767	150.0	15.0	2250.0	3265.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000768	150.0	15.0	2250.0	2794.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000769	150.0	15.0	2250.0	2801.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000770	150.0	15.0	2250.0	2828.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000771	150.0	15.0	2250.0	2787.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000772	150.0	15.0	2250.0	2875.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000773	150.0	15.0	2250.0	3024.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000774	150.0	15.0	2250.0	2818.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000775	150.0	15.0	2250.0	2800.0
FA-BENTOMAT ST		SFT	SF	200110FA3 00000776	150.0	15.0	2250.0	2788.0

GCL 01-02

000549

76

PACKING LIST

-- 4554

CETCO
500 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
TRI TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-00

PRODUCT	SIZE U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT	
FA-BENTOMAT ST	SFT SF	200110FA3	00000777	150.0	15.0	2250.0	2864.0	
FA BENTOMAT ST	SFT SF	200110FA3	00000779	150.0	15.0	2250.0	2878.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000780	150.0	15.0	2250.0	2948.0	INTERNAL
FA BENTOMAT ST	SFT SF	200110FA3	00000781	150.0	15.0	2250.0	2794.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000782	150.0	15.0	2250.0	2866.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000783	150.0	15.0	2250.0	2974.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000784	150.0	15.0	2250.0	2765.0	
FA BENTOMAT ST	SFT SF	200110FA3	00000785	150.0	15.0	2250.0	2739.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000787	150.0	15.0	2250.0	2792.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000788	150.0	15.0	2250.0	2801.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000789	150.0	15.0	2250.0	2802.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000790	150.0	15.0	2250.0	2786.0	
FA BENTOMAT ST	SFT SF	200110FA3	00000791	150.0	15.0	2250.0	2829.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000792	150.0	15.0	2250.0	2860.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000793	150.0	15.0	2250.0	2861.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000794	150.0	15.0	2250.0	2844.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000795	150.0	15.0	2250.0	2790.0	INTERFACE
FA-BENTOMAT ST	SFT SF	200110FA3	00000796	150.0	15.0	2250.0	2768.0	
FA-BENTOMAT ST	SFT SF	200110FA3	00000798	150.0	15.0	2250.0	2733.0	

000550

PACKING LIST

-- 4554

CETCO
500 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 00136
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000799	150.0	15.0	2250.0	2759.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000800	150.0	15.0	2250.0	2762.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000801	150.0	15.0	2250.0	2792.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000802	150.0	15.0	2250.0	2745.0	
A-BENTOMAT ST		SFT	SF	200110FA3	00000803	150.0	15.0	2250.0	2851.0	
A BENTOMAT ST		SFT	SF	200110FA3	00000804	150.0	15.0	2250.0	2795.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000805	150.0	15.0	2250.0	2733.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000808	150.0	15.0	2250.0	2460.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000809	150.0	15.0	2250.0	2746.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000810	150.0	15.0	2250.0	2743.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000811	150.0	15.0	2250.0	2819.0	GCL 01-03
FA-BENTOMAT ST		SFT	SF	200110FA3	00000812	150.0	15.0	2250.0	2664.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000813	150.0	15.0	2250.0	2802.0	
FA BENTOMAT ST		SFT	SF	200110FA3	00000814	150.0	15.0	2250.0	2803.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000815	150.0	15.0	2250.0	2870.0	INTERNAL
FA-BENTOMAT ST		SFT	SF	200110FA3	00000816	150.0	15.0	2250.0	2806.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000817	150.0	15.0	2250.0	2825.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000818	150.0	15.0	2250.0	2826.0	
A-BENTOMAT ST		SFT	SF	200110FA3	00000819	150.0	15.0	2250.0	2830.0	

000551

114

PACKING LIST

— 4554

CEICO
500 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000820	150.0	15.0	2250.0	2825.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000821	150.0	15.0	2250.0	2844.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000822	150.0	15.0	2250.0	2833.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000823	150.0	15.0	2250.0	2885.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000824	150.0	15.0	2250.0	2823.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000825	150.0	15.0	2250.0	2820.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000826	150.0	15.0	2250.0	2813.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000828	150.0	15.0	2250.0	2895.0 INTERFACE
FA-BENTOMAT ST		SFT	SF	200110FA3	00000829	150.0	15.0	2250.0	2847.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000830	150.0	15.0	2250.0	2830.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000831	150.0	15.0	2250.0	2814.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000832	150.0	15.0	2250.0	2827.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000833	150.0	15.0	2250.0	2830.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000834	150.0	15.0	2250.0	2831.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000835	150.0	15.0	2250.0	2841.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000836	150.0	15.0	2250.0	2856.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000837	150.0	15.0	2250.0	2825.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000838	150.0	15.0	2250.0	2907.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000839	150.0	15.0	2250.0	2882.0

PACKING LIST

4554

CETCO
1500 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSE LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
FA BENTOMAT ST		SFT	SF	200110FA3	00000840	150.0	15.0	2250.0	2857.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000841	150.0	15.0	2250.0	2840.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000842	150.0	15.0	2250.0	2908.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000844	150.0	15.0	2250.0	2962.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000845	150.0	15.0	2250.0	2841.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000846	150.0	15.0	2250.0	2860.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000847	150.0	15.0	2250.0	2933.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000849	150.0	15.0	2250.0	3010.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000850	150.0	15.0	2250.0	2927.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000851	150.0	15.0	2250.0	2960.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000852	150.0	15.0	2250.0	2943.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000853	150.0	15.0	2250.0	2925.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000854	150.0	15.0	2250.0	2940.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000855	150.0	15.0	2250.0	2912.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000856	150.0	15.0	2250.0	2893.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000857	150.0	15.0	2250.0	2946.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000858	150.0	15.0	2250.0	3067.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000859	150.0	15.0	2250.0	2894.0
FA-BENTOMAT ST		SFT	SF	200110FA3	00000860	150.0	15.0	2250.0	2900.0

PACKING LIST

4554

CETCO
500 WEST SHURE DRIVE
ARLINGTON HEIGHTS IL 60004

ORDER NO:.. 000138155
ORDER DATE: 2/08/2001
SHIP DATE:. 3/08/2001

SOLD TO: 001376
GSF LINING TECHNOLOGY, INC.
19103 GUNDLE ROAD

HOUSTON TX 77073

SHIP FROM:. FAIRMOUNT AMERICAN CO
FRT TERMS:. PREPAID & ADD
SHIP VIA:. NATIONWIDE

SHIP TO: 46
FLUOR DANIEL FERNALD
OPTION 1 CELL 1 COVER SYSTEM
7400 WILLEY ROAD

HARRISON OH 45030

PO: 2925-001-OD

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000862	150.0	15.0	2250.0	2677.0	GCL 01-04
FA-BENTOMAT ST		SFT	SF	200110FA3	00000863	150.0	15.0	2250.0	2617.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000864	150.0	15.0	2250.0	2780.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000865	150.0	15.0	2250.0	2904.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000866	150.0	15.0	2250.0	2927.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000867	150.0	15.0	2250.0	2815.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000868	150.0	15.0	2250.0	2986.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000869	150.0	15.0	2250.0	2937.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000870	150.0	15.0	2250.0	2873.0	
FA-BENTOMAT ST		SFT	SF	200110FA3	00000871	150.0	15.0	2250.0	2871.0	

ORDER TOTALS..... 364500.0 457123.0

TOTAL ITEMS..... 162

000554

162

HYDRAULIC CONDUCTIVITY TEST RESULTS

Golder Associates Inc.

3730 Chamblee Tucker Road
Atlanta, GA USA 30341
Telephone (770) 496-1893
Fax (770) 934-9476

Golder Associates

May 1, 2001 013-3175

GeoSyntec Consultants, Inc.
1100 Lake Hearn Drive, Suite 200
Atlanta, Georgia 30342

Attn: Mr. David K. Phillips, P.E.

RE: GEOSYNTHETIC CLAY LINER LABORATORY TESTING
FLUOR FERNALD, INC. – OSDF CONSTRUCTION

Dear Mr. Phillips:

Please find the attached results of the geosynthetic clay liner laboratory testing performed by our laboratory located in Atlanta, Georgia. There were three tests conducted: permeability of a Geosynthetic Clay Liner (GCL), internal direct shear of a GCL and interface direct shear between a GCL and a geomembrane. The testing was performed in accordance with the ASTM methods listed below as indicated by GeoSyntec Consultants, Inc. (GeoSyntec).

- ASTM D5084 "Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter"
- ASTM D6243 "Test Method for Determining the Internal and Interface Shear Resistance of Geosynthetic Clay Liner by the Direct Shear Method"

We received 5 Geosynthetic Clay Liner (GCLs) samples and 5 geomembrane samples listed. The list indicates the Geosyntec Sample identification, the batch/roll number and the date received.

GCL-01-01	200110FA3/00000714	March 7
GCL-01-02	200110FA3/00000761	March 9
GCL-01-03	200110FA3/00000811	March 9
GCL-01-04	200110FA3/00000862	March 9
GCL-01-02A	200110FA3/00000761	April 9
GM-01-01	B62189/114110160	February 16
GM-01-02	B62189/114110180	February 16
GM-01-03	B62189/114110172	February 16
GM-01-04	B62185/114110085	February 16
GM-01-05	B62185/114110081	February 16

OFFICES IN AUSTRALIA, CANADA, GERMANY, HUNGARY, ITALY, SWEDEN, UNITED KINGDOM, UNITED STATES

We have provided the individual data pages for each sample with the test method listed above, which lists the values of each specimen tested. Sample GCL-01-02A was a retest for permeability of GCL-01-02. GM-01-03 was not used in any testing and was kept as a spare sample. The interface direct shear testing was conducted between the samples listed below at the directive of GeoSyntec.

GCL-01-01 versus GM-01-01
GCL-01-02 versus GM-01-02
GCL-01-03 versus GM-01-04
GCL-01-04 versus GM-01-05

The laboratory testing relates only to the samples tested in this report.

Golder Associates Inc. is very pleased to have the opportunity to perform the laboratory testing for you. If you need additional information, have any questions, or if we can be of any service, please contact us at (770) 492-8280.

Sincerely,

GOLDER ASSOCIATES INC.

Henry Mock

Henry Mock
Laboratory Manager & Associate

HM:hm

GEOSYNTEC/FLUOR FERNALD/GA
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classi-fication	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
GCL-01-01	GCL	-	-	-	-	-	-	-	-	-	-	-	-	-	24.5	-	3.4E-09	-
GCL-01-02	GCL	-	-	-	-	-	-	-	-	-	-	-	-	-	17.1	-	6.5E-09	-
GCL-01-02R	GCL	-	-	-	-	-	-	-	-	-	-	-	-	-	16.5	-	6.2E-09	-
GCL-01-02A	GCL	-	-	-	-	-	-	-	-	-	-	-	-	-	13.5	-	2.1E-09	-
GCL-01-03	GCL	-	-	-	-	-	-	-	-	-	-	-	-	-	17.8	-	4.4E-09	-
GCL-01-04	GCL	-	-	-	-	-	-	-	-	-	-	-	-	-	16.6	-	3.1E-09	-

ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (LI)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES: T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

000558

4554

FLOW PUMP #1

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/GA		
PROJECT NUMBER	013-3175		
SAMPLE ID	GCL-01-01	-	-
SAMPLE TYPE			

BOARD #	6
CELL #	6
Flow Pump Speed	9
Technician	DA

COMMENTS

Sample Data, Initial			
Height, inches	0.218	B-Value, f	-
Diameter, inches	4.000	Cell Pres.	85.0
Area, cm²	81.07	Bot. Pres.	80.0
Volume, cm³	44.89	Top Pres.	80.0
Mass, g	48.49	Tot. B.P.	80.0
Moisture Content, %	24.45	Head, max.	149.82
Dry Density, pcf	54.16	Head, min.	149.82
Spec. Gravity	2.500	Max. Grad.	192.76
Volume Solids, cm³	15.59	Min. Grad.	192.76
Volume Voids, cm³	29.31		
Void Ratio	1.88		
Saturation, %			

Sample Data, Final	
Height, inches	0.306
Diameter, inches	4.134
Area, cm²	86.60
Volume, cm³	67.31
Mass, g	89.56
Moisture Content, %	129.85
Dry Density, pcf	36.12
Volume Solids, cm³	15.59
Volume Voids, cm³	51.72
Void Ratio	3.32
Saturation, %	

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	48.49	146.13
Wt Soil & Tare, f	g	38.96	95.89
Wt Tare	g	0.00	57.20
Wt Moisture Lost	g	9.53	50.24
Wt Dry Soil	g	38.96	38.69
Water Content	%	24.45%	129.85%

DESCRIPTION

GCL

Flow Pump Rate 5.70E-05 cm³/sec

USCS -

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
3/11/01	36961	13	10	20.1	0	0	0	0	2.13	149.82	192.76	3.4E-09
3/11/01	36961	13	15	20.1	5	5	300	300	2.13	149.82	192.76	3.4E-09
3/11/01	36961	13	20	20.1	5	10	300	600	2.13	149.82	192.76	3.4E-09
3/11/01	36961	13	25	20.1	5	15	300	900	2.13	149.82	192.76	3.4E-09 *
3/11/01	36961	13	30	20.1	5	20	300	1200	2.13	149.82	192.76	3.4E-09 *
3/11/01	36961	13	35	20.1	5	25	300	1500	2.13	149.82	192.76	3.4E-09 *
3/11/01	36961	13	40	20.1	5	30	300	1800	2.13	149.82	192.76	3.4E-09 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 3.4E-09 cm/sec **

DATE 3/11/01
CHECK
REVIEW

000559

4554

FLOW PUMP #1

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/GA		
PROJECT NUMBER	013-3175		
SAMPLE ID	GCL-01-02	-	-
SAMPLE TYPE	GCL		

BOARD #	3
CELL #	3
Flow Pump Speed	11
Technician	DA/JS

COMMENTS

Sample Data, Initial			
Height, inches	0.238	B-Value, f	
Diameter, inches	4.000	Cell Pres.	85.0
Area, cm²	81.07	Bot. Pres.	80.0
Volume, cm³	49.01	Top Pres.	80.0
Mass, g	51.43	Tot. B.P.	80.0
Moisture Content, %	17.06	Head, max.	26.73
Dry Density, pcf	55.94	Head, min.	26.73
Spec. Gravity		Max. Grad.	25.60
Volume Solids, cm³	17.57	Min. Grad.	25.60
Volume Voids, cm³	31.44		
Void Ratio	1.79		
Saturation, %			

Sample Data, Final	
Height, inches	0.411
Diameter, inches	4.179
Area, cm²	88.49
Volume, cm³	92.38
Mass, g	116.05
Moisture Content, %	164.14
Dry Density, pcf	29.68
Volume Solids, cm³	17.57
Volume Voids, cm³	74.81
Void Ratio	4.26
Saturation, %	

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	51.43	229.84
Wt Soil & Tare, f	g	43.93	157.88
Wt Tare	g	0.00	114.04
Wt Moisture Lost	g	7.50	71.96
Wt Dry Soil	g	43.93	43.84
Water Content	%	17.06%	164.14%

DESCRIPTION

GCL

Flow Pump Rate 1.50E-05 cm³/sec

USCS -

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
3/28/01	36978	7	5	20.9	0	0	0	0	0.38	26.73	25.60	6.5E-09
3/28/01	36978	7	10	20.9	5	5	300	300	0.38	26.73	25.60	6.5E-09
3/28/01	36978	7	15	20.9	5	10	300	600	0.38	26.73	25.60	6.5E-09
3/28/01	36978	7	20	20.9	5	15	300	900	0.38	26.73	25.60	6.5E-09 *
3/28/01	36978	7	25	20.9	5	20	300	1200	0.38	26.73	25.60	6.5E-09 *
3/28/01	36978	7	30	20.9	5	25	300	1500	0.38	26.73	25.60	6.5E-09 *
3/28/01	36978	7	35	20.9	5	30	300	1800	0.38	26.73	25.60	6.5E-09 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 6.5E-09 cm/sec **

DATE 3/28/01
CHECK
REVIEW

000560

-454

Golder Associates Inc.

FLEXIBLE WALL TRI-AXIAL PERMEABILITY
ASTM D5084
METHOD C, FALLING HEAD W/INCREASING TAILWATER PRESSURE

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/GA		Using Pipettes Only	YES	COMMENTS
PROJECT NUMBER	013-3175		Using Pipettes & Burrettes	NO	
SAMPLE ID	GCL-01-02R	-	BOARD # 7	TECH PWM	
SAMPLE TYPE	GCL		CELL # 7	DATE 3/29/01	

Sample Data, Initial

Height, inches	0.258		
Diameter, inches	4.000	B-Value,f	-
Area, cm^2	81.07	Cell Pres	85.00
Volume, cm^3	53.13	Bot. Pres.	82.00
Mass, g	39.49	Top Pres.	80.00
Moisture Content, %	16.46	Head, cm	140.68
Dry Density, pcf	39.83	Max. Grad.	185.24
Spec. Gravity		Min. Grad.	142.18
Volume Solids, cm^3	13.56	Max. E.S.	5.00
Volume Voids, cm^3	39.56	Min. E.S.	3.00
Void Ratio	2.92		
Saturation			

Sample Data, Final

Height, inches	0.347
Diameter, inches	4.075
Area, cm^2	84.14
Volume, cm^3	74.16
Mass, g	94.46
Moisture Content %	178.68
Dry Density, pcf	28.52
Saturation	
Inflow Volume per (1 cc)	1.00
Outflow Volume per (1 cc)	1.00

Water Contents	Initial	Final
Wt soil&tare, i	39.49	208.54
Wt soil&tare, f	33.91	147.95
Wt Tare	0.00	114.04
Wt Moisture Lost	5.58	60.59
Wt Dry Soil	33.91	33.91
Water Content	16.46%	178.68%

DESCRIPTION: GCL

USCS:

TIME FUNCTION			READINGS			TIME IN MINUTES & SECONDS						VOLUME		PERMEABILITY
DATE	HOUR	MIN	Inflow (cc)	Outflow (cc)	Temp.	dt (min)	dt (sec)	dt, acc (sec)	Head (cm)	(H1/H2) (inc.)	Gradient	Inflow (cc)	Outflow (cc)	@ 20 Degrees C (cm/sec)
3/30/01	8	0	0.00	25.00	22.2	0.0	0	0	163.27		185.24	0.00	0.00	0.0
3/30/01	9	45	1.10	24.10	22.2	105.0	6300	6300	161.46	1.01	183.19	1.10	0.90	8.61E-09
3/30/01	10	55	1.70	23.60	22.2	70.0	4200	10500	160.47	1.01	182.07	0.60	0.50	7.17E-09
3/30/01	13	22	3.00	22.60	22.2	147.0	8820	19320	158.39	1.01	179.71	1.30	1.00	7.20E-09
3/30/01	15	0	3.90	21.80	23.6	98.0	5880	25200	156.85	1.01	177.96	0.90	0.80	7.79E-09
3/30/01	16	0	4.50	21.40	23.6	60.0	3600	28800	155.95	1.01	176.94	0.60	0.40	7.54E-09
3/31/01	10	10	13.50	13.50	20.3	1090.0	65400	94200	140.68	1.11	159.61	9.00	7.90	8.06E-09
3/31/01	10	11	0.00	25.00	20.3	1.0	60	94260	163.27	0.86	185.24	0.00	0.00	0.0
3/31/01	14	46	2.50	22.80	20.6	275.0	16500	110760	159.02	1.03	180.43	2.50	2.20	8.11E-09
3/31/01	16	6	3.30	22.20	20.6	80.0	4800	115560	157.76	1.01	178.99	0.80	0.60	8.44E-09
4/2/01	8	22	22.10	5.10	19.6	2416.0	144960	260520	125.32	1.26	142.18	18.80	17.10	8.26E-09
4/2/01	9	9	0.00	25.00	19.6	47.0	2820	263340	163.27	0.77	185.24	0.00	0.00	0.0
4/2/01	15	25	2.80	22.80	20.3	376.0	22560	285900	158.75	1.03	180.12	2.80	2.20	6.36E-09
4/3/01	8	40	9.50	17.00	19.7	1035.0	62100	348000	147.46	1.08	167.30	6.70	5.80	6.17E-09
4/3/01	15	43	12.10	14.70	20.0	423.0	25380	373380	143.03	1.03	162.28	2.60	2.30	6.19E-09

Inflow Rate	0.000128
Outflow Rate	0.000112
Outflow/Inflow Ratio	0.87

PERMEABILTIY REPORTED AS 6.2E-09 cm/sec

DATE 3/30/01
CHECK
REVIEW

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

FLEXIBLE WALL TRIAXIAL PERMEABILITY
ASTM D 5084
METHOD C, FALLING HEAD W/INCREASING TAILWATER PRESSURE

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/GA			Using Pipettes Only	YES	COMMENTS	
PROJECT NUMBER	013-3175			Using Pipettes & Burrettes	NO		
SAMPLE ID	GCL-01-02A		-	OARD # 10	TECH KBG		
SAMPLE TYPE	GCL			CELL # 10	DATE 4/12/01		

Sample Data, Initial				Sample Data, Final		Water Contents	Initial Trimmings	Final Partial Sample
Height, inches	0.256			Height, inches	0.333	Wt soil&tare, i	44.53	208.42
Diameter, inches	4.000	B-Value,f	-	Diameter, inches	4.200	Wt soil&tare, f	38.26	152.22
Area, cm^2	81.07	Cell Pres	85.00	Area, cm^2	89.38	Wt Tare	0.00	113.96
Volume, cm^3	52.72	Bot. Pres.	82.00	Volume, cm^3	75.60	Wt Moisture Lost	6.27	56.20
Mass, g	44.53	Top Pres.	80.00	Mass, g	94.46	Wt Dry Soil	38.26	38.26
Moisture Content, %	16.39	Head, cm	140.68	Moisture Content %	146.89	Water Content	16.39%	146.89%
Dry Density, pcf	45.29	Max. Grad.	194.04	Dry Density, pcf	31.58			
Spec. Gravity	2.500	Min. Grad.	184.06	Saturation				
Volume Solids, cm^3	15.30	Max. E.S.	5.00	Inflow Volume per (1 cc)	1.03			
Volume Voids, cm^3	37.41	Min. E.S.	3.00	Outflow Volume per (1 cc	1.02			
Void Ratio	2.44							
Saturation								

DESCRIPTION: GCL

USCS:

TIME FUNCTION			READINGS			TIME IN MINUTES & SECONDS						VOLUME		PERMEABILITY
DATE	HOUR	MIN	Inflow (cc)	Outflow (cc)	Temp.	dt (min)	dt (sec)	dt, acc (sec)	Head (cm)	(H1/H2) (inc.)	Gradient	Inflow (cc)	Outflow (cc)	@ 20 Degrees C (cm/sec)
4/12/01	16	45	0.00	25.00	20.4	0.0	0	0	164.13		194.04	0.00	0.00	0.0
4/13/01	8	1	3.50	21.40	18.5	916.0	54960	54960	157.61	1.04	186.34	3.62	3.72	3.42E-09
4/13/01	9	1	3.60	21.30	18.9	60.0	3600	58560	157.42	1.00	186.12	0.10	0.10	1.49E-09
4/13/01	10	1	3.80	21.10	19.5	60.0	3600	62160	157.06	1.00	185.69	0.21	0.21	2.94E-09
4/13/01	11	1	4.00	21.00	20.1	60.0	3600	65760	156.78	1.00	185.36	0.21	0.10	2.17E-09
4/13/01	12	1	4.20	20.90	20.7	60.0	3600	69360	156.51	1.00	185.04	0.21	0.10	2.14E-09 *
4/13/01	13	5	4.30	20.70	20.9	64.0	3840	73200	156.23	1.00	184.71	0.10	0.21	2.02E-09 *
4/13/01	14	0	4.50	20.60	20.9	55.0	3300	76500	155.96	1.00	184.39	0.21	0.10	2.33E-09 *
4/13/01	15	8	4.60	20.40	20.9	68.0	4080	80580	155.68	1.00	184.06	0.10	0.21	1.90E-09 *

Inflow Rate	0.000059
Outflow Rate	0.000059
Outflow/Inflow Rati	1.00

PERMEABILTIY REPORTED AS 2.1E-09 cm/sec

DATE 4/12/01
CHECK
REVIEW

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

Golder Associates Inc.

000562

4554

FLOW PUMP #1

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/GA
PROJECT NUMBER	013-3175
SAMPLE ID	GCL-01-03 - -
SAMPLE TYPE	

BOARD #	4
CELL #	4
Flow Pump Speed	9
Technician	DA

COMMENTS

Sample Data, Initial			
Height, inches	0.254	B-Value, f	-
Diameter, inches	4.000	Cell Pres.	85.0
Area, cm²	81.07	Bot. Pres.	80.0
Volume, cm³	52.31	Top Pres.	80.0
Mass, g	49.45	Tot. B.P.	80.0
Moisture Content, %	17.82	Head, max.	123.10
Dry Density, pcf	50.07	Head, min.	123.10
Spec. Gravity	2.500	Max. Grad.	151.45
Volume Solids, cm³	16.79	Min. Grad.	151.45
Volume Voids, cm³	35.52		
Void Ratio	2.12		
Saturation, %			

Sample Data, Final	
Height, inches	0.320
Diameter, inches	4.088
Area, cm²	84.68
Volume, cm³	68.83
Mass, g	98.40
Moisture Content, %	134.45
Dry Density, pcf	38.05
Volume Solids, cm³	16.79
Volume Voids, cm³	52.04
Void Ratio	3.10
Saturation, %	

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	49.45	183.36
Wt Soil & Tare, f	g	41.97	126.93
Wt Tare	g	0.00	84.96
Wt Moisture Lost	g	7.48	56.43
Wt Dry Soil	g	41.97	41.97
Water Content	%	17.82%	134.45%

DESCRIPTION

GCL

Flow Pump Rate 5.70E-05 cm³/sec

USCS -

TIME FUNCTIONS, SECONDS								dP					
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)	
3/20/01	36970	13	0	20.6	0	0	0	0	1.75	123.10	151.45	4.4E-09	
3/20/01	36970	13	5	20.6	5	5	300	300	1.75	123.10	151.45	4.4E-09	
3/20/01	36970	13	10	20.6	5	10	300	600	1.75	123.10	151.45	4.4E-09	
3/20/01	36970	13	15	20.6	5	15	300	900	1.75	123.10	151.45	4.4E-09	*
3/20/01	36970	13	20	20.6	5	20	300	1200	1.75	123.10	151.45	4.4E-09	*
3/20/01	36970	13	25	20.6	5	25	300	1500	1.75	123.10	151.45	4.4E-09	*
3/20/01	36970	13	30	20.6	5	30	300	1800	1.75	123.10	151.45	4.4E-09	*

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 4.4E-09 cm/sec **

DATE 3/20/01
CHECK
REVIEW

000563

4554

Golder Associates Inc.

FLOW PUMP #1

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/GA
PROJECT NUMBER	013-3175
SAMPLE ID	GCL-01-04 - -
SAMPLE TYPE	

BOARD #	4
CELL #	4
Flow Pump Speed	11
Technician	DA

COMMENTS

Sample Data, Initial			
Height, inches	0.238	B-Value, f	-
Diameter, inches	4.000	Cell Pres.	85.0
Area, cm²	81.07	Bot. Pres.	80.0
Volume, cm³	49.01	Top Pres.	80.0
Mass, g	48.71	Tot. B.P.	80.0
Moisture Content, %	16.61	Head, max.	45.02
Dry Density, pcf	53.18	Head, min.	45.02
Spec. Gravity	2.500	Max. Grad.	53.71
Volume Solids, cm³	16.71	Min. Grad.	53.71
Volume Voids, cm³	32.30		
Void Ratio	1.93		
Saturation, %			

Sample Data, Final	
Height, inches	0.330
Diameter, inches	4.187
Area, cm²	88.83
Volume, cm³	74.46
Mass, g	98.67
Moisture Content, %	136.21
Dry Density, pcf	35.01
Volume Solids, cm³	16.71
Volume Voids, cm³	57.75
Void Ratio	3.46
Saturation, %	

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	48.71	183.39
Wt Soil & Tare, f	g	41.77	126.82
Wt Tare	g	0.00	85.29
Wt Moisture Lost	g	6.94	56.57
Wt Dry Soil	g	41.77	41.53
Water Content	%	16.61%	136.21%

DESCRIPTION

GCL

Flow Pump Rate 1.50E-05 cm³/sec

USCS -

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
3/20/01	36970	9	20	20.5	0	0	0	0	0.64	45.02	53.71	3.1E-09
3/20/01	36970	9	25	20.5	5	5	300	300	0.64	45.02	53.71	3.1E-09
3/20/01	36970	9	30	20.5	5	10	300	600	0.64	45.02	53.71	3.1E-09
3/20/01	36970	9	35	20.5	5	15	300	900	0.64	45.02	53.71	3.1E-09 *
3/20/01	36970	9	40	20.5	5	20	300	1200	0.64	45.02	53.71	3.1E-09 *
3/20/01	36970	9	45	20.5	5	25	300	1500	0.64	45.02	53.71	3.1E-09 *
3/20/01	36970	9	50	20.5	5	30	300	1800	0.64	45.02	53.71	3.1E-09 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 3.1E-09 cm/sec **

DATE 3/20/01
CHECK
REVIEW

000564

-- 4554

DIRECT SHEAR TEST RESULTS

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TEST PROCEDURES AND CONDITIONS
TEST SERIES NUMBER: 01-01I

Test Specimen Configuration (from top to bottom) and Placement Conditions:

- upper shear box: rigid substrate with textured steel gripping surface;
- Bentomat ST GCL (Sample No. GCL-01-01 (Lot No.200110FA3/Roll No.00000714)). GCL's initial moisture content was 24.9%. GCL's final moisture content ranged from 53.6 to 91.9% for the test series; and
- lower shear box: rigid substrate with textured steel gripping surface.

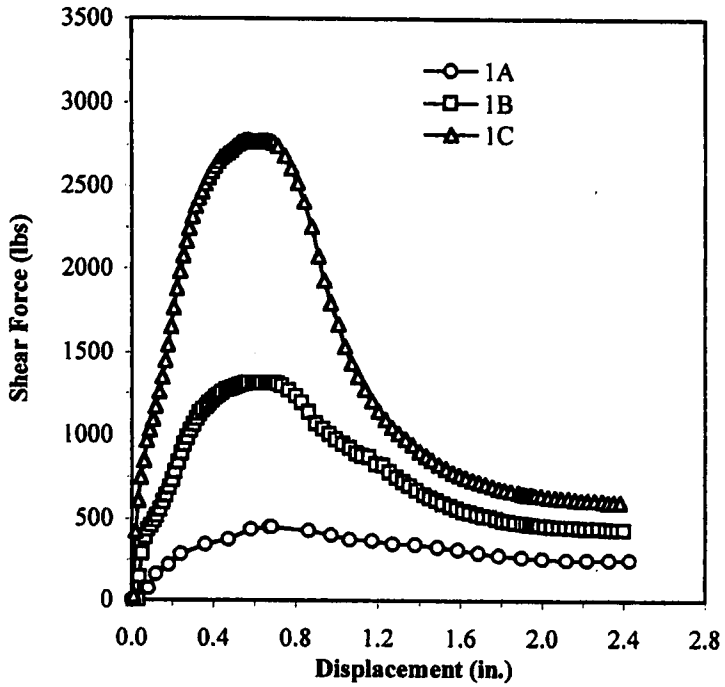
Designated Shear Plane: Within GCL

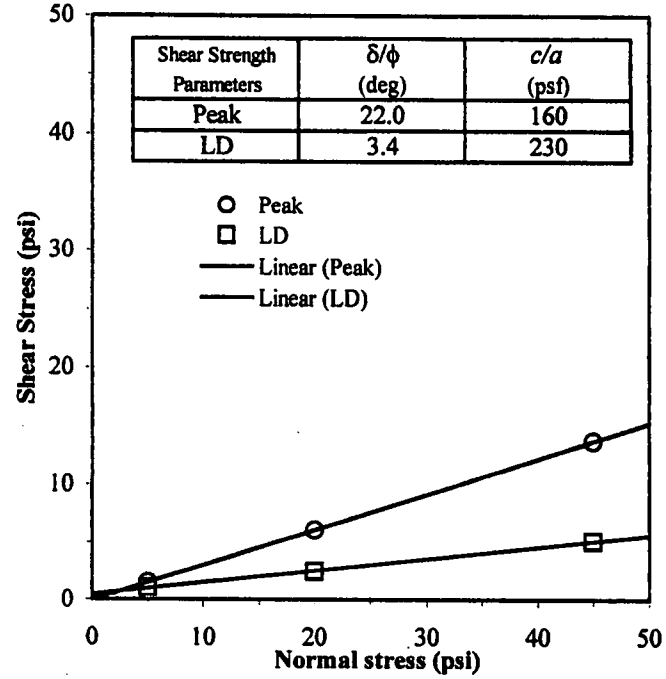
Test Procedures for Each Normal Stress Condition:

- A fresh GCL specimen was trimmed from the bulk sample of the GCL and placed between two rigid wooden substrates with textured steel gripping surfaces. The ends of each geotextile were then sandwiched between a second rigid wooden substrate prior to testing. The entire test specimen was then placed in the shear box to provide confinement for the exposed bentonite component. The textured steel gripping surfaces were employed to minimize slippage between each geotextile component of the GCL and rigid wood substrate, therefore providing a relatively uniform transfer of shear load onto the GCL specimen.
- Soaking conditions: The GCL specimen was soaked in tap water for 7 days (168 hours) under a normal stress of 3 psi.
- Consolidation conditions: After the 7-day (168-hours) soaking period, the tap water was drained, and the GCL specimen was consolidated for 2 days (48 hours) under each test normal stress.
- Test normal stresses: 5, 20, and 45 psi.
- Constant shear displacement rate: 0.004 in/min.
- The direction of shear for each internal direct shear test was in the direction of manufacture (machine direction) of the GCL sample.
- Each test was sheared until a minimum total shear displacement of 2 in. was achieved.

FLUOR FERNALD, INC. - OSDF CONSTRUCTION
INTERNAL DIRECT SHEAR TESTING (ASTM D 6243)

Test Series 01-01I: Internal strength of Bentomat ST GCL (Sample No. GCL-01-01 (Lot No. 200110FA3/Roll No. 00000714)) under soaked, consolidated, and slow shear conditions





Shear Strength Parameters	δ/ϕ (deg)	c/a (psf)
Peak	22.0	160
LD	3.4	230

Test No.	Shear Box Size (in. x in.)	Normal Stress (psi)	Shear Rate (in./min)	Soaking		Consolidation		GCL		Shear Stress Measured		Shear Stress Specified		Failure Mode
				Stress (psi)	Time (hour)	Stress (psi)	Time (hour)	ω_i (%)	ω_f (%)	τ_p (psi)	τ_{LD} (psi)	τ_p (psi)	τ_{LD} (psi)	
1A	12 x 12	5.0	0.004	3	168	5	48	24.9	91.9	3.16	1.76	1.53	1.06	(1)
1B	12 x 12	20.0	0.004	3	168	20	48	24.9	76.0	9.12	3.02	6.11	2.46	(1)
1C	12 x 12	45.0	0.004	3	168	45	48	24.9	53.6	19.29	4.20	13.76	5.13	(1)

Notes: (1) Partial separation of the GCL was observed at the normal stress of 5 psi and complete separation was oberved at the normal stresses of 20 and 45 psi.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. The large-displacement (LD) shear strength was calcualted using the shear force measured at 2 inches of displacement. The test results relate only to the samples and laboratory conditions tested.

Golder Associates

DATE OF TEST:	7 to 17 March 2001
FIGURE NO.	C-1
PROJECT NO.	013-3175
DOCUMENT NO.	F0101
FILE NO.	

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TEST PROCEDURES AND CONDITIONS
TEST SERIES NUMBER: 01-01G

Test Specimen Configuration (from top to bottom) and Placement Conditions:

- upper shear box: rigid substrate with textured steel gripping surface;
- Bentomat ST GCL (Sample No. GCL-01-01 (Lot No.200110FA3/Roll No.00000714)) with woven geotextile against geomembrane (see below). GCL's initial moisture content was 24.9%. GCL's final moisture content ranged from 45.3 to 82.2% for the test series;
- 80-mil GSE Hyperfrictionflex geomembrane (Sample No.GM-01-01 (Lot No.B62189/Roll No.114110160)); and
- lower shear box: supporting substrate.

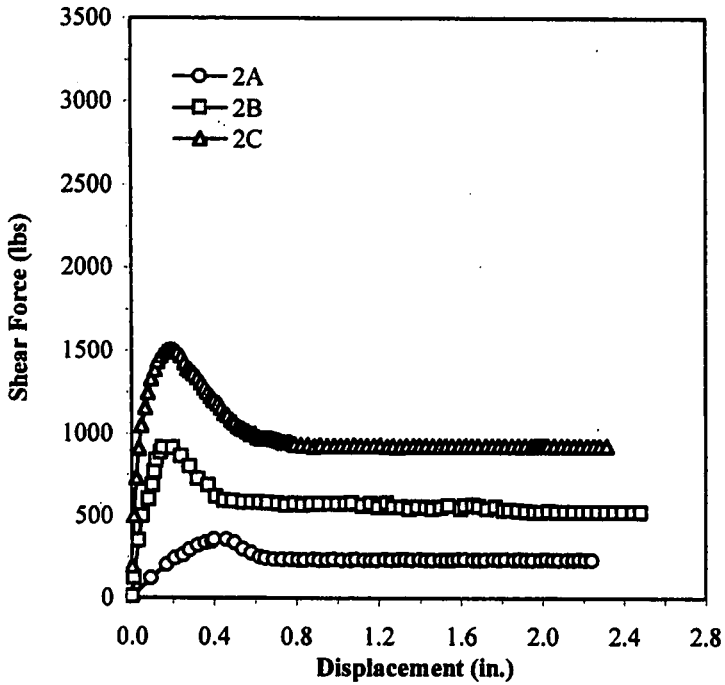
Test Interface: GCL against geomembrane

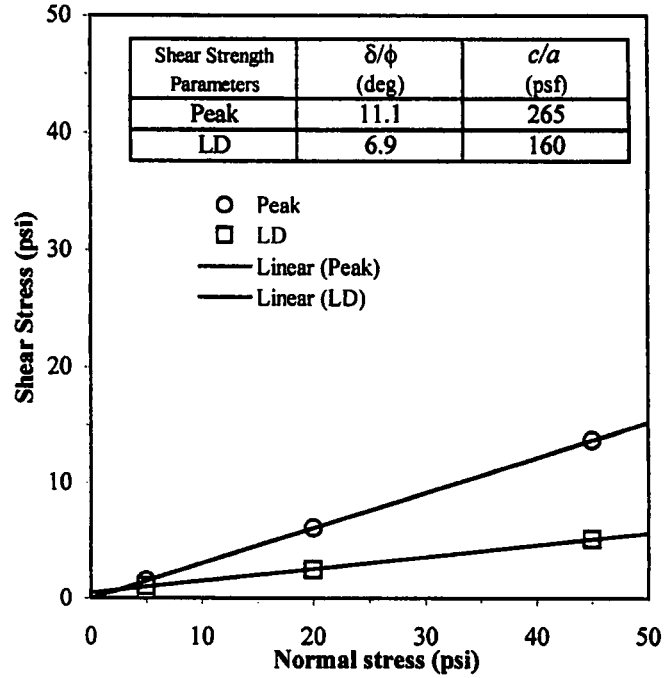
Test Procedures for Each Normal Stress Condition:

- A fresh specimen of geomembrane was trimmed from the bulk sample and attached to the lower shear box with mechanical compression clamps.
- A fresh specimen of GCL was trimmed from the bulk sample and attached to the upper shear box with mechanical compression clamps. The GCL was oriented so that the woven geotextile component of the GCL was in contact with the geomembrane.
- A rigid substrate with a textured steel gripping surface was placed on top of the GCL. The textured steel gripping surface was used to minimize slippage between the upper geotextile component of the GCL and rigid wooden substrate, therefore providing a relatively uniform transfer of shear load onto the test interface.
- Soaking conditions: The entire test specimen was soaked in tap water for 7 days (168 hours) under a normal stress of 3 psi.
- Consolidation conditions: After the 7-day (168-hour) soaking period, the tap water was drained, and the entire test specimen was consolidated for 2 day (48 hours) under each test normal stress.
- Test normal stresses: 5, 20, and 45 psi.
- Constant shear displacement rate: 0.004 in/min.
- The direction of shear for each interface direct shear test was in the direction of manufacture (machine direction) of the geosynthetic samples.
- Each test was sheared until a minimum total shear displacement of 2 in. was achieved.

FLUOR FERNALD, INC. - OSDF CONSTRUCTION
INTERFACE DIRECT SHEAR TESTING (ASTM D 6243)

Test Series 01-01G: Bentomat ST GCL (Sample No. GCL-01-01 (Lot No. 200110FA3/Roll No. 00000714)) against 60-mil GSE HyperFrictionFlex geomembrane (Sample No. GM-01-01 (Lot No. B62189/Roll No. 114110160)) under soaked, consolidated, and slow shear conditions





Shear Strength Parameters	δ/ϕ (deg)	c/a (psf)
Peak	11.1	265
LD	6.9	160

Test No.	Shear Box Size (in. x in.)	Normal Stress (psi)	Shear Rate (in./min)	Soaking		Consolidation		GCL		Shear Stress Measured		Shear Stress Specified		Failure Mode
				Stress (psi)	Time (hour)	Stress (psi)	Time (hour)	ω_i (%)	ω_f (%)	τ_p (psi)	τ_{LD} (psi)	τ_p (psi)	τ_{LD} (psi)	
2A	12 x 12	5.0	0.004	3	168	5	48	24.9	82.2	2.47	1.62	1.53	1.06	(1)
2B	12 x 12	20.0	0.004	3	168	20	48	24.9	66.8	6.35	3.63	6.11	2.46	(1)
2C	12 x 12	45.0	0.004	3	168	45	48	24.9	45.3	10.46	6.47	13.76	5.13	(1)

Notes: (1) Sliding (i.e., shear failure) occurred at the GCL-geomembrane interface in each test.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. The large-displacement (LD) shear strength was calcualted using the shear force measured at 2 inches of displacement. The test results relate only to the samples and laboratory conditions tested.

000569

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DATE OF TEST:	10 to 20 March 2001
FIGURE NO.	C-2
PROJECT NO.	013-3175
DOCUMENT NO.	F0101
FILE NO.	

4554

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TEST PROCEDURES AND CONDITIONS
TEST SERIES NUMBER: 01-02I

Test Specimen Configuration (from top to bottom) and Placement Conditions:

- upper shear box: rigid substrate with textured steel gripping surface;
- Bentomat ST GCL (Sample No. GCL-01-02 (Lot No.200110FA3/Roll No.00000761)). GCL's initial moisture content was 17.1%. GCL's final moisture content ranged from 48.3 to 99.3% for the test series; and
- lower shear box: rigid substrate with textured steel gripping surface.

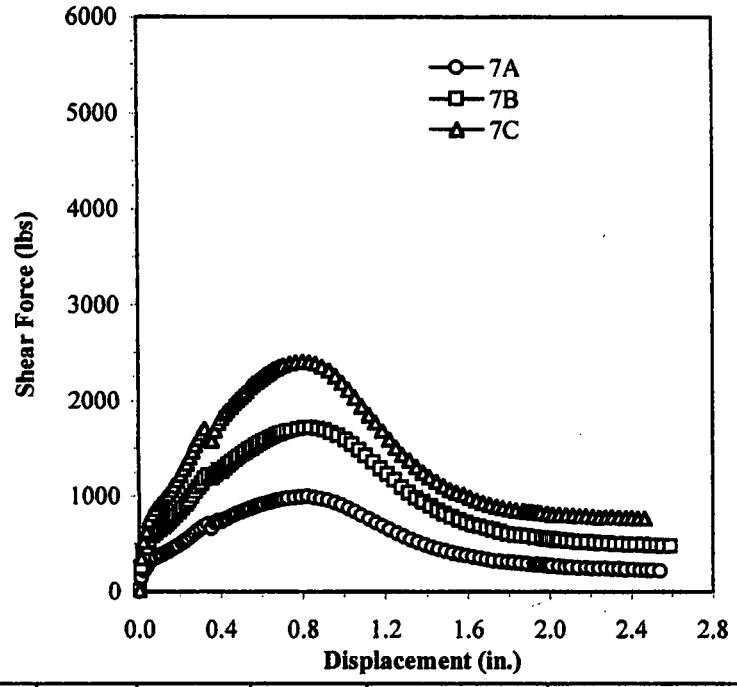
Designated Shear Plane: Within GCL

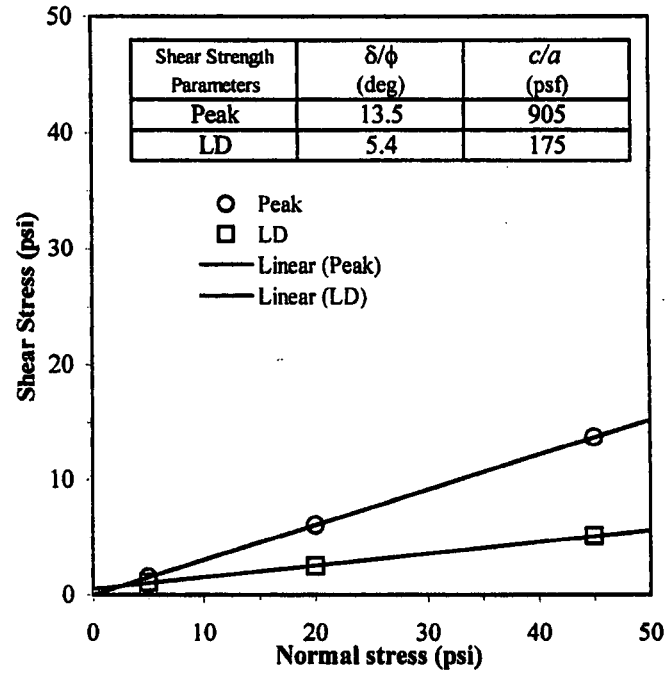
Test Procedures for Each Normal Stress Condition:

- A fresh GCL specimen was trimmed from the bulk sample of the GCL and placed between two rigid wooden substrates with textured steel gripping surfaces. The ends of each geotextile were then sandwiched between a second rigid wooden substrate prior to testing. The entire test specimen was then placed in the shear box to provide confinement for the exposed bentonite component. The textured steel gripping surfaces were employed to minimize slippage between each geotextile component of the GCL and rigid wood substrate, therefore providing a relatively uniform transfer of shear load onto the GCL specimen.
- Soaking conditions: The GCL specimen was soaked in tap water for 7 days (168 hours) under a normal stress of 3 psi.
- Consolidation conditions: After the 7-day (168-hour) soaking period, the tap water was drained, and the GCL specimen was consolidated for 2 days (48 hours) under each test normal stress.
- Test normal stresses: 5, 20, and 45 psi.
- Constant shear displacement rate: 0.004 in/min.
- The direction of shear for each internal direct shear test was in the direction of manufacture (machine direction) of the GCL sample.
- Each test was sheared until a minimum total shear displacement of 2 in. was achieved.

FLUOR FERNALD, INC. - OSDF CONSTRUCTION
INTERNAL DIRECT SHEAR TESTING (ASTM D 6243)

Test Series 01-02I: Internal strength of Bentomat ST GCL (Sample No. GCL-01-02 (Lot No. 200110FA3/Roll No. 00000761)) under soaked, consolidated, and slow shear conditions





Test No.	Shear Box Size (in. x in.)	Normal Stress (psi)	Shear Rate (in./min)	Soaking Stress (psi)	Soaking Time (hour)	Consolidation Stress (psi)	Consolidation Time (hour)	GCL ω_i (%)	GCL ω_f (%)	Shear Stress Measured τ_p (psi)	Shear Stress Measured τ_{LD} (psi)	Shear Stress Specified τ_p (psi)	Shear Stress Specified τ_{LD} (psi)	Failure Mode
7A	12 x 12	5.0	0.004	3	168	5	48	17.1	99.3	6.94	1.53	1.53	1.06	(1)
7B	12 x 12	20.0	0.004	3	168	20	48	17.1	88.5	11.92	3.31	6.11	2.46	(1)
7C	12 x 12	45.0	0.004	3	168	45	48	17.1	48.3	16.74	5.34	13.76	5.13	(1)

Notes: (1) Complete separation of the GCL was oberved after each test.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. The large-displacement (LD) shear strength was calcualted using the shear force measured at 2 inches of displacement. The test results relate only to the samples and laboratory conditions tested.

Golder Associates

DATE OF TEST:	21 to 31 March 2001
FIGURE NO.	C-1
PROJECT NO.	013-3175
DOCUMENT NO.	F0102
FILE NO.	

000571

— 4554

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TEST PROCEDURES AND CONDITIONS
TEST SERIES NUMBER: 01-02G

Test Specimen Configuration (from top to bottom) and Placement Conditions:

- upper shear box: rigid substrate with textured steel gripping surface;
- Bentomat ST GCL (Sample No. GCL-01-02 (Lot No.200110FA3/Roll No.00000761)) with woven geotextile against geomembrane (see below). GCL's initial moisture content was 17.1%. GCL's final moisture content ranged from 55.4 to 94.9% for the test series;
- 80-mil GSE Hyperfrictionflex geomembrane (Sample No.GM-01-02 (Lot No.B62189/Roll No.114110180)); and
- lower shear box: supporting substrate.

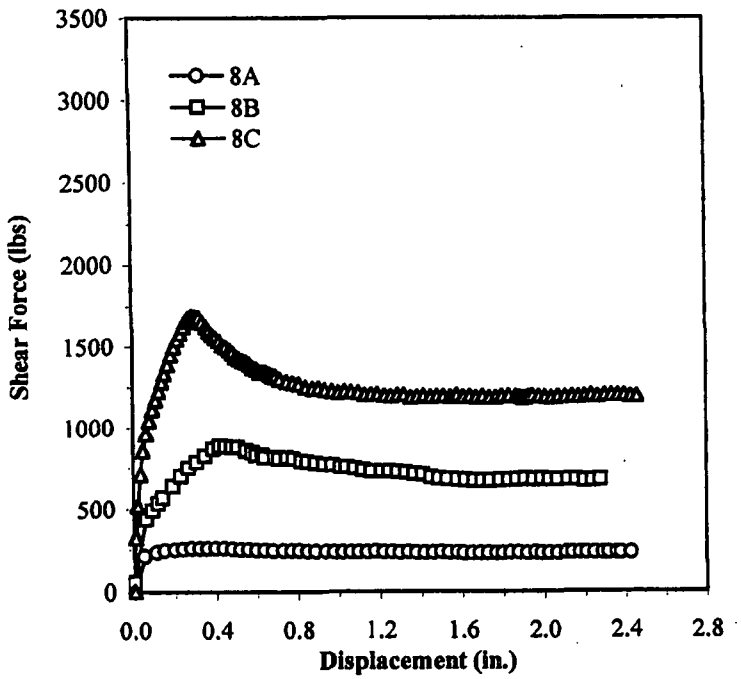
Test Interface: GCL against geomembrane

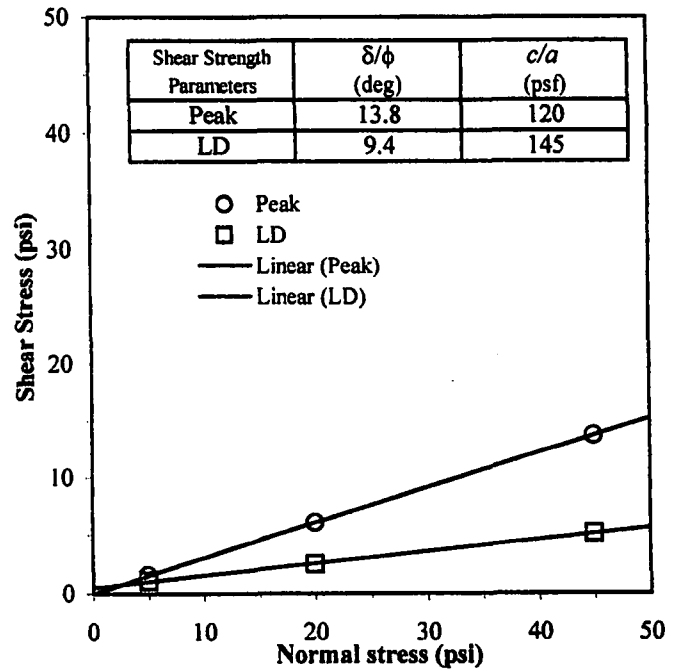
Test Procedures for Each Normal Stress Condition:

- A fresh specimen of geomembrane was trimmed from the bulk sample and attached to the lower shear box with mechanical compression clamps.
- A fresh specimen of GCL was trimmed from the bulk sample and attached to the upper shear box with mechanical compression clamps. The GCL was oriented so that the woven geotextile component of the GCL was in contact with the geomembrane.
- A rigid substrate with a textured steel gripping surface was placed on top of the GCL. The textured steel gripping surface was used to minimize slippage between the upper geotextile component of the GCL and rigid wooden substrate, therefore providing a relatively uniform transfer of shear load onto the test interface.
- Soaking conditions: The entire test specimen was soaked in tap water for 7 days (168 hours) under a normal stress of 3 psi.
- Consolidation conditions: After the 7-day (168-hour) soaking period, the tap water was drained, and the entire test specimen was consolidated for 2 days (48 hours) under each test normal stress.
- Test normal stresses: 5, 20, and 45 psi.
- Constant shear displacement rate: 0.004 in/min.
- The direction of shear for each interface direct shear test was in the direction of manufacture (machine direction) of the geosynthetic samples.
- Each test was sheared until a minimum total shear displacement of 2 in. was achieved.

FLUOR FERNALD, INC. - OSDF CONSTRUCTION
INTERFACE DIRECT SHEAR TESTING (ASTM D 6243)

Test Series 01-02G: Bentomat ST GCL (Sample No. GCL-01-02 (Lot No. 200110FA3/Roll No. 00000761)) against 60-mil GSE HyperFrictionFlex geomembrane (Sample No. GM-01-02 (Lot No. B62189/Roll No. 114110080)) under soaked, consolidated, and slow shear conditions





Shear Strength Parameters	δ/ϕ (deg)	c/a (psf)
Peak	13.8	120
LD	9.4	145

Test No.	Shear Box Size (in. x in.)	Normal Stress (psi)	Shear Rate (in./min)	Soaking		Consolidation		GCL		Shear Stress Measured		Shear Stress Specified		Failure Mode
				Stress (psi)	Time (hour)	Stress (psi)	Time (hour)	ω_i (%)	ω_f (%)	τ_p (psi)	τ_{LD} (psi)	τ_p (psi)	τ_{LD} (psi)	
8A	12 x 12	5.0	0.004	3	168	5	48	17.1	94.9	1.81	1.60	1.53	1.06	(1)
8B	12 x 12	20.0	0.004	3	168	20	48	17.1	78.9	6.15	4.69	6.11	2.46	(1)
8C	12 x 12	45.0	0.004	3	168	45	48	17.1	55.4	11.74	8.30	13.76	5.13	(1)

Notes: (1) Sliding (i.e., shear failure) occurred at the GCL-geomembrane interface in each test.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. The large-displacement (LD) shear strength was calcualted using the shear force measured at 2 inches of displacement. The test results relate only to the samples and laboratory conditions tested.

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DATE OF TEST:	24 March to 3 April 2001
FIGURE NO.	C-2
PROJECT NO.	013-3175
DOCUMENT NO.	F0102
FILE NO.	

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TEST PROCEDURES AND CONDITIONS
TEST SERIES NUMBER: 01-03I

Test Specimen Configuration (from top to bottom) and Placement Conditions:

- upper shear box: rigid substrate with textured steel gripping surface;
- Bentomat ST GCL (Sample No. GCL-01-03 (Lot No.200110FA3/Roll No.00000811)). GCL's initial moisture content was 17.8%. GCL's final moisture content ranged from 48.4 to 95.2% for the test series; and
- lower shear box: rigid substrate with textured steel gripping surface.

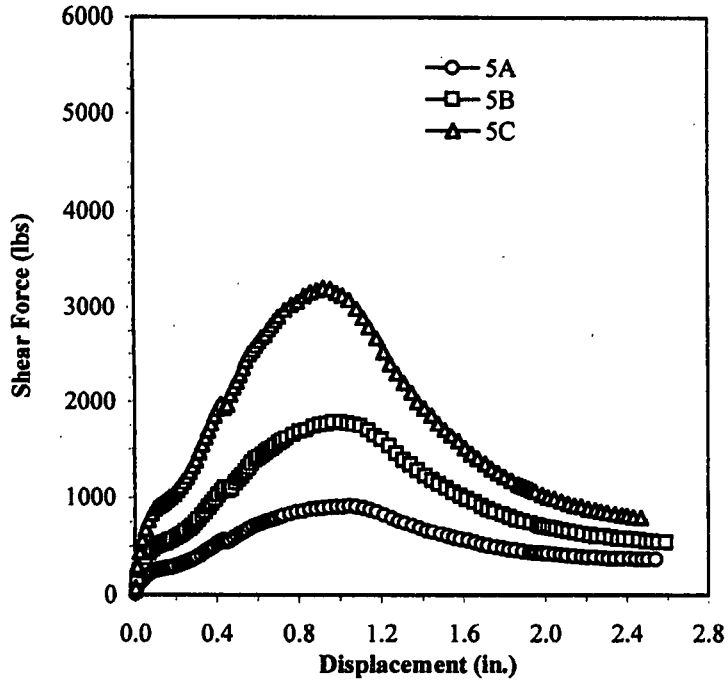
Designated Shear Plane: Within GCL

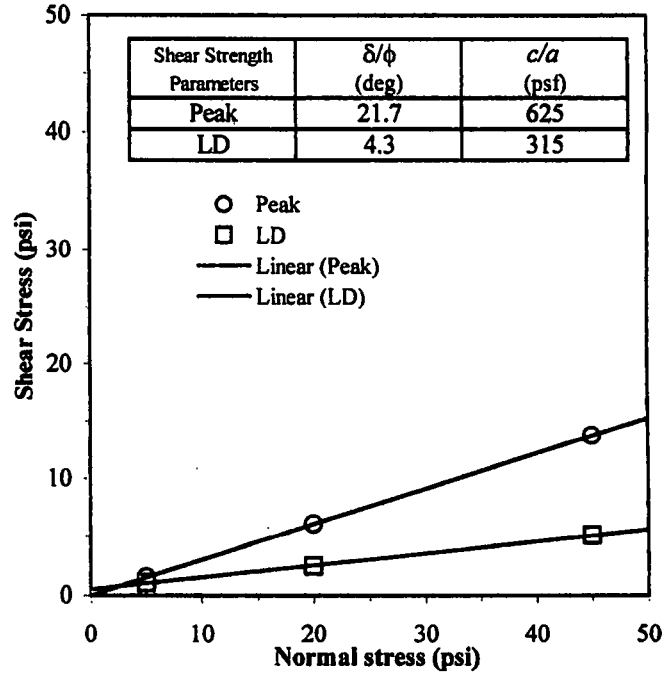
Test Procedures for Each Normal Stress Condition:

- A fresh GCL specimen was trimmed from the bulk sample of the GCL and placed between two rigid wooden substrates with textured steel gripping surfaces. The ends of each geotextile were then sandwiched between a second rigid wooden substrate prior to testing. The entire test specimen was then placed in the shear box to provide confinement for the exposed bentonite component. The textured steel gripping surfaces were employed to minimize slippage between each geotextile component of the GCL and rigid wood substrate, therefore providing a relatively uniform transfer of shear load onto the GCL specimen.
- Soaking conditions: The GCL specimen was soaked in tap water for 7 days (168 hours) under a normal stress of 3 psi.
- Consolidation conditions: After the 7-day (168- hour) soaking period, the tap water was drained, and the GCL specimen was consolidated for 2 days (48 hours) under each test normal stress.
- Test normal stresses: 5, 20, and 45 psi.
- Constant shear displacement rate: 0.004 in/min.
- The direction of shear for each internal direct shear test was in the direction of manufacture (machine direction) of the GCL sample.
- Each test was sheared until a minimum total shear displacement of 2 in. was achieved.

FLUOR FERNALD, INC. - OSDF CONSTRUCTION
INTERNAL DIRECT SHEAR TESTING (ASTM D 6243)

Test Series 01-03I: Internal strength of Bentomat ST GCL (Sample No. GCL-01-03 (Lot No. 200110FA3/Roll No. 00000811)) under soaked, consolidated, and slow shear conditions





Shear Strength Parameters	δ/ϕ (deg)	c/a (psf)
Peak	21.7	625
LD	4.3	315

Test No.	Shear Box Size (in. x in.)	Normal Stress (psi)	Shear Rate (in./min)	Soaking		Consolidation		GCL		Shear Stress Measured		Shear Stress Specified		Failure Mode
				Stress (psi)	Time (hour)	Stress (psi)	Time (hour)	ω_i (%)	ω_f (%)	τ_p (psi)	τ_{LD} (psi)	τ_p (psi)	τ_{LD} (psi)	
5A	12 x 12	5.0	0.004	3	168	5	48	17.8	95.2	6.28	2.51	1.53	1.06	(1)
5B	12 x 12	20.0	0.004	3	168	20	48	17.8	84.2	12.38	3.74	6.11	2.46	(1)
5C	12 x 12	45.0	0.004	3	168	45	48	17.8	48.4	22.25	5.55	13.76	5.13	(1)

Notes: (1) Complete separation of the GCL was oberved after each test.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. The large-displacement (LD) shear strength was calcualted using the shear force measured at 2 inches of displacement. The test results relate only to the samples and laboratory conditions tested.

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DATE OF TEST:	17 to 27 March 2001
FIGURE NO.	C-1
PROJECT NO.	013-3175
DOCUMENT NO.	F0103
FILE NO.	

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TEST PROCEDURES AND CONDITIONS
TEST SERIES NUMBER: 01-03G

Test Specimen Configuration (from top to bottom) and Placement Conditions:

- upper shear box: rigid substrate with textured steel gripping surface;
- Bentomat ST GCL (Sample No. GCL-01-03 (Lot No.200110FA3/Roll No.00000811)) with woven geotextile against geomembrane (see below). GCL's initial moisture content was 17.8%. GCL's final moisture content ranged from 65.2 to 91.4% for the test series;
- 80-mil GSE Hyperfrictionflex geomembrane (Sample No.GM-01-04 (Lot No.B62185/Roll No.114110085)); and
- lower shear box: supporting substrate.

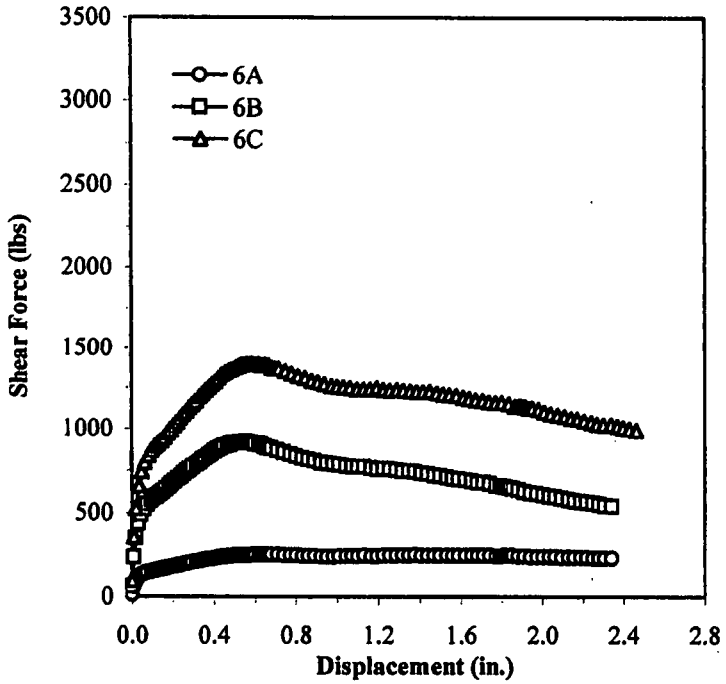
Test Interface: GCL against geomembrane

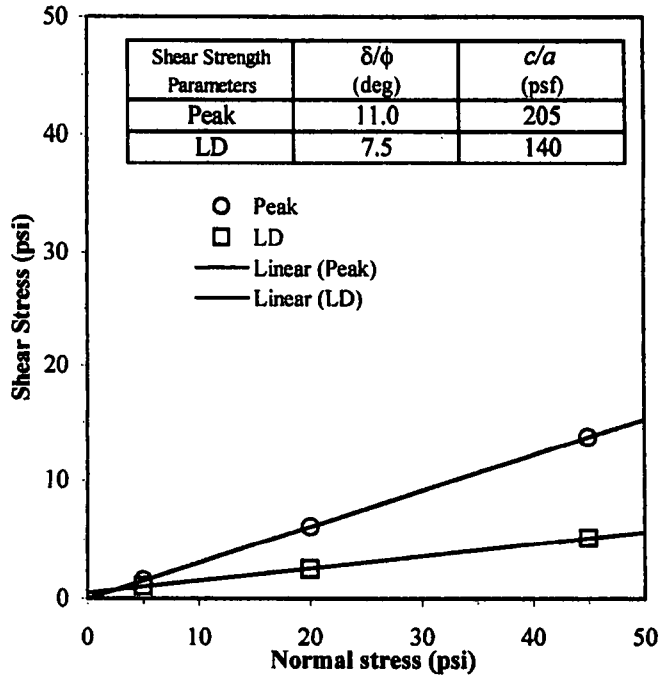
Test Procedures for Each Normal Stress Condition:

- A fresh specimen of geomembrane was trimmed from the bulk sample and attached to the lower shear box with mechanical compression clamps.
- A fresh specimen of GCL was trimmed from the bulk sample and attached to the upper shear box with mechanical compression clamps. The GCL was oriented so that the woven geotextile component of the GCL was in contact with the geomembrane.
- A rigid substrate with a textured steel gripping surface was placed on top of the GCL. The textured steel gripping surface was used to minimize slippage between the upper geotextile component of the GCL and rigid wooden substrate, therefore providing a relatively uniform transfer of shear load onto the test interface.
- Soaking conditions: The entire test specimen was soaked in tap water for 7 days (168 hours) under a normal stress of 3 psi.
- Consolidation conditions: After the 7-day (168-hour) soaking period, the tap water was drained, and the entire test specimen was consolidated for 2 day (48 hours) under each test normal stress.
- Test normal stresses: 5, 20, and 45 psi.
- Constant shear displacement rate: 0.004 in/min.
- The direction of shear for each interface direct shear test was in the direction of manufacture (machine direction) of the geosynthetic samples.
- Each test was sheared until a minimum total shear displacement of 2 in. was achieved.

FLUOR FERNALD, INC. - OSDF CONSTRUCTION
INTERFACE DIRECT SHEAR TESTING (ASTM D 6243)

Test Series 01-03G: Bentomat ST GCL (Sample No. GCL-01-03 (Lot No. 200110FA3/Roll No. 00000811)) against 60-mil GSE HyperFrictionFlex geomembrane (Sample No. GM-01-04 (Lot No. B62185/Roll No. 114110085)) under soaked, consolidated, and slow shear conditions





Shear Strength Parameters	δ/ϕ (deg)	c/a (psf)
Peak	11.0	205
LD	7.5	140

Test No.	Shear Box Size (in. x in.)	Normal Stress (psi)	Shear Rate (in./min)	Soaking		Consolidation		GCL		Shear Stress Measured		Shear Stress Specified		Failure Mode
				Stress (psi)	Time (hour)	Stress (psi)	Time (hour)	ω_i (%)	ω_f (%)	τ_p (psi)	τ_{LD} (psi)	τ_p (psi)	τ_{LD} (psi)	
6A	12 x 12	5.0	0.004	3	168	5	48	17.8	91.4	1.70	1.58	1.53	1.06	(1)
6B	12 x 12	20.0	0.004	3	168	20	48	17.8	76.2	6.39	3.74	6.11	2.46	(1)
6C	12 x 12	45.0	0.004	3	168	45	48	17.8	65.2	9.72	6.89	13.76	5.13	(1)

Notes: (1) Sliding (i.e., shear failure) occurred at the GCL-geomembrane interface in each test.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. The large-displacement (LD) shear strength was calcualted using the shear force measured at 2 inches of displacement. The test results relate only to the samples and laboratory conditions tested.

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DATE OF TEST:	19 to 29 March 2001
FIGURE NO.	C-2
PROJECT NO.	013-3175
DOCUMENT NO.	F0103
FILE NO.	

000577

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TEST PROCEDURES AND CONDITIONS
TEST SERIES NUMBER: 01-04I

Test Specimen Configuration (from top to bottom) and Placement Conditions:

- upper shear box: rigid substrate with textured steel gripping surface;
- Bentomat ST GCL (Sample No. GCL-01-04 (Lot No.200110FA3/Roll No.00000862)). GCL's initial moisture content was 16.6%. GCL's final moisture content ranged from 45.2 to 95.9% for the test series; and
- lower shear box: rigid substrate with textured steel gripping surface.

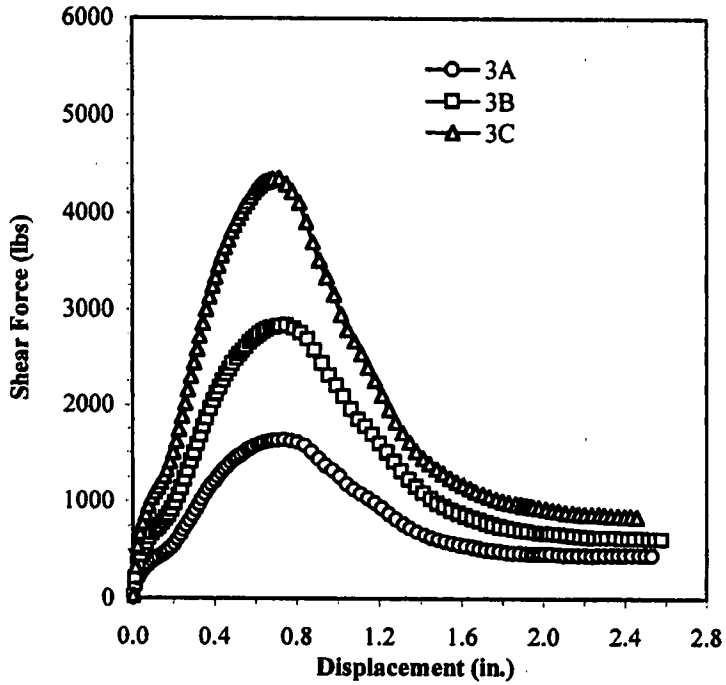
Designated Shear Plane: Within GCL

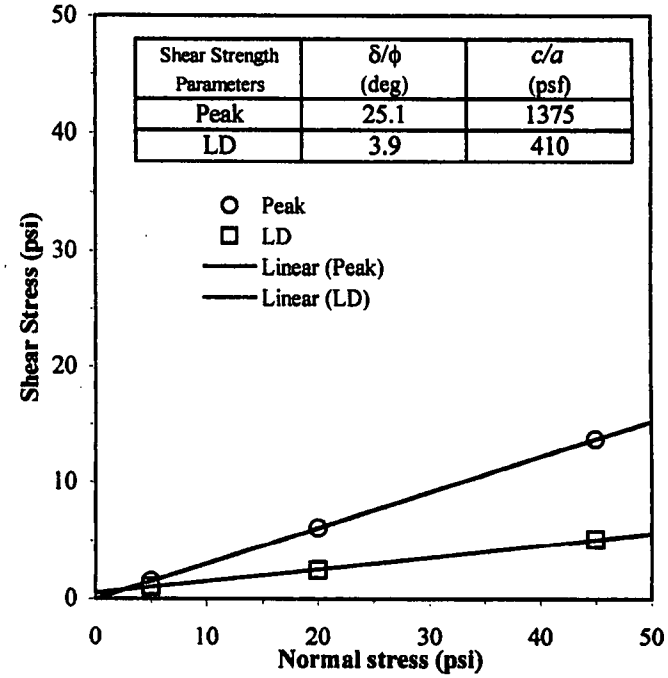
Test Procedures for Each Normal Stress Condition:

- A fresh GCL specimen was trimmed from the bulk sample of the GCL and placed between two rigid wooden substrates with textured steel gripping surfaces. The ends of each geotextile were then sandwiched between a second rigid wooden substrate prior to testing. The entire test specimen was then placed in the shear box to provide confinement for the exposed bentonite component. The textured steel gripping surfaces were employed to minimize slippage between each geotextile component of the GCL and rigid wood substrate, therefore providing a relatively uniform transfer of shear load onto the GCL specimen.
- Soaking conditions: The GCL specimen was soaked in tap water for 7 days (168 hours) under a normal stress of 3 psi.
- Consolidation conditions: After the 7-day (168-hour) soaking period, the tap water was drained, and the GCL specimen was consolidated for 2 days (48 hours) under each test normal stress.
- Test normal stresses: 5, 20, and 45 psi.
- Constant shear displacement rate: 0.004 in/min.
- The direction of shear for each internal direct shear test was in the direction of manufacture (machine direction) of the GCL sample.
- Each test was sheared until a minimum total shear displacement of 2 in. was achieved.

FLUOR FERNALD, INC. - OSDF CONSTRUCTION
INTERNAL DIRECT SHEAR TESTING (ASTM D 6243)

Test Series 01-04l: Internal strength of Bentomat ST GCL (Sample No. GCL-01-04 (Lot No. 200110FA3/Roll No. 00000862)) under soaked, consolidated, and slow shear conditions





Shear Strength Parameters	δ/ϕ (deg)	c/a (psf)
Peak	25.1	1375
LD	3.9	410

Test No.	Shear Box Size (in. x in.)	Normal Stress (psi)	Shear Rate (in./min)	Soaking Stress (psi)	Soaking Time (hour)	Consolidation Stress (psi)	Consolidation Time (hour)	GCL ω_i (%)	GCL ω_f (%)	Shear Stress Measured τ_p (psi)	Shear Stress Measured τ_{LD} (psi)	Shear Stress Specified τ_p (psi)	Shear Stress Specified τ_{LD} (psi)	Failure Mode
3A	12 x 12	5.0	0.004	3	168	5	48	16.6	95.9	11.37	3.14	1.53	1.06	(1)
3B	12 x 12	20.0	0.004	3	168	20	48	16.6	63.8	19.71	4.27	6.11	2.46	(1)
3C	12 x 12	45.0	0.004	3	168	45	48	16.6	45.2	30.27	5.89	13.76	5.13	(1)

Notes: (1) Complete separation of the GCL was oberved after each test.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. The large-displacement (LD) shear strength was calcualted using the shear force measured at 2 inches of displacement. The test results relate only to the samples and laboratory conditions tested.

000579

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DATE OF TEST:	12 to 22 March 2001
FIGURE NO.	C-1
PROJECT NO.	013-3175
DOCUMENT NO.	F0104
FILE NO.	

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TEST PROCEDURES AND CONDITIONS
TEST SERIES NUMBER: 01-04G

Test Specimen Configuration (from top to bottom) and Placement Conditions:

- upper shear box: rigid substrate with textured steel gripping surface;
- Bentomat ST GCL (Sample No. GCL-01-04 (Lot No.200110FA3/Roll No.00000862)) with woven geotextile against geomembrane (see below). GCL's initial moisture content was 16.6%. GCL's final moisture content ranged from 61.0 to 84.8% for the test series;
- 80-mil GSE Hyperfrictionflex geomembrane (Sample No.GM-01-05 (Lot No.B62185/Roll No.114110081)); and
- lower shear box: supporting substrate.

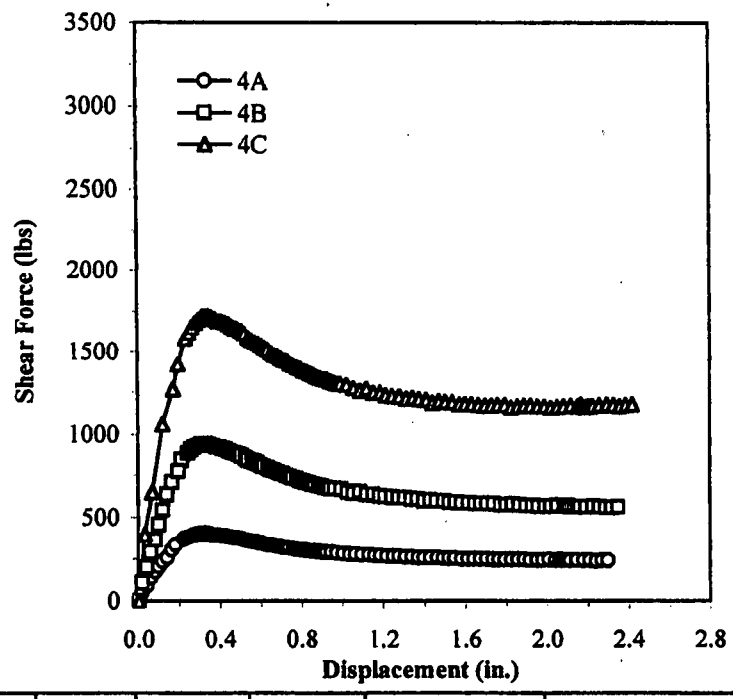
Test Interface: GCL against geomembrane

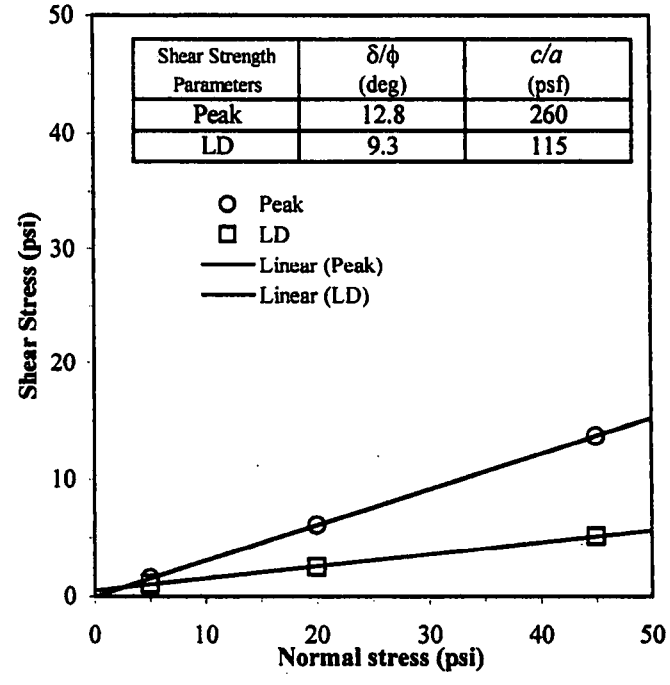
Test Procedures for Each Normal Stress Condition:

- A fresh specimen of geomembrane was trimmed from the bulk sample and attached to the lower shear box with mechanical compression clamps.
- A fresh specimen of GCL was trimmed from the bulk sample and attached to the upper shear box with mechanical compression clamps. The GCL was oriented so that the woven geotextile component of the GCL was in contact with the geomembrane.
- A rigid substrate with a textured steel gripping surface was placed on top of the GCL. The textured steel gripping surface was used to minimize slippage between the upper geotextile component of the GCL and rigid wooden substrate, therefore providing a relatively uniform transfer of shear load onto the test interface.
- Soaking conditions: The entire test specimen was soaked in tap water for 7 days (168 hours) under a normal stress of 3 psi.
- Consolidation conditions: After the 7-day (168 hour) soaking period, the tap water was drained, and the entire test specimen was consolidated for 2 days (48 hours) under each test normal stress.
- Test normal stresses: 5, 20, and 45 psi.
- Constant shear displacement rate: 0.004 in/min.
- The direction of shear for each interface direct shear test was in the direction of manufacture (machine direction) of the geosynthetic samples.
- Each test was sheared until a minimum total shear displacement of 2 in. was achieved.

FLUOR FERNALD, INC. - OSDF CONSTRUCTION
INTERFACE DIRECT SHEAR TESTING (ASTM D 6243)

Test Series 01-04G: Bentomat ST GCL (Sample No. GCL-01-04 (Lot No. 200110FA3/Roll No. 00000862)) against 60-mil GSE HyperFrictionFlex geomembrane (Sample No. GM-01-05 (Lot No. B62185/Roll No. 114110081)) under soaked, consolidated, and slow shear conditions





Shear Strength Parameters	δ/ϕ (deg)	c/a (psf)
Peak	12.8	260
LD	9.3	115

Test No.	Shear Box Size (in. x in.)	Normal Stress (psi)	Shear Rate (in./min)	Soaking		Consolidation		GCL		Shear Stress Measured		Shear Stress Specified		Failure Mode
				Stress (psi)	Time (hour)	Stress (psi)	Time (hour)	ω_i (%)	ω_f (%)	τ_p (psi)	τ_{LD} (psi)	τ_p (psi)	τ_{LD} (psi)	
4A	12 x 12	5.0	0.004	3	168	5	48	16.6	84.8	2.81	1.69	1.53	1.06	(1)
4B	12 x 12	20.0	0.004	3	168	20	48	16.6	75.5	6.55	3.92	6.11	2.46	(1)
4C	12 x 12	45.0	0.004	3	168	45	48	16.6	61.0	11.96	8.19	13.76	5.13	(1)

Notes: (1) Sliding (i.e., shear failure) occurred at the GCL-geomembrane interface in each test.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. The large-displacement (LD) shear strength was calcualted using the shear force measured at 2 inches of displacement. The test results relate only to the samples and laboratory conditions tested.

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DATE OF TEST:	14 to 24 March 2001
FIGURE NO.	C-2
PROJECT NO.	013-3175
DOCUMENT NO.	F0104
FILE NO.	

GEOMEMBRANE CAP

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

GEOMEMBRANE TEST REQUEST FORM

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: ON-SITE DISPOSAL FACILITY PROJECT NO.: GQ1029 TASK NO.: 04.1

SAMPLED: 13 day FEB mo SAMPLER ID: DKP SHIPPED: 13 day FEB mo SHIPPER ID: DKP RECEIVED: ____ day ____ mo LAB ID: ____ YEAR: 2001

MANUFACTURED BY: GSE Lining Technologies, Inc

SITE CONTACT: Collin Sukow SITE PHONE: (513) 648-3419 3418 SITE FAX: (513) 648-3415

SAMPLE NO. GM-	BATCH NO./ ROLL NO.	TENSILE ASTM D638	DENSITY ASTM D792 D1505	MELT INDEX ~~ASTM D1238~~ DKP	THICKNESS ASTM ~~D5199/D751~~ ~~D5193~~ D5994 DKP	CARBON BLACK CONTENT ASTM D1603	CARBON DISP. ASTM ~~D3815~~ D5596 DKP	TEAR RESISTANCE ~~ASTM D1004C~~ DKP	PUNCTURE RESISTANCE ~~FTMS 101C METHOD 2065~~ DKP	ESCR/NCTL SINGLE POINT ~~ASTM D5397 D1693 GRI-GM5~~ DKP	OTHER DKP
		SPECIFIC GRAVITY									
01-01	B62189/114110160	✓	✓		✓	✓	✓				
01-02	B62189/114110180	✓	✓		✓	✓	✓				
01-03	B62189/114110172	✓	✓		✓	✓	✓				
01-04	B62185/114110085	✓	✓		✓	✓	✓				
01-05	B62185/114110081	✓	✓		✓	✓	✓				

SMOOTH OR TEXTURED MATERIAL

COMMENTS/SPECIAL INSTRUCTIONS/DISTRIBUTION: Strikeout nonapplicable items

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SHEET NO. ____ OF ____

000583

4554

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

-- 4554

MATERIAL INVENTORY

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ 1341 TASK NO.: 04.1

DESCRIPTION: Phase III YEAR: 2001

MATERIAL TYPE: GeoMembrane (60 mil) MANUFACTURER: GSE

INVENTORY			Q.A. CONFORMANCE				Q.C. DOCUMENTS			
DATE (day/mo)	BATCH / ROLL NO.	QA ID	DATE SAMPLED (day/mo)	SAMPLE NO.	PASS/ FAIL	QA ID	DATE RECEIVED (day/mo)	DATE CHECKED (day/mo)	PASS/ FAIL	QA ID
23 April 01	114110 068	CS					23 Feb	3 March	P	CS
	079	CS							P	CS
	085	CS	13 Feb	01-04	P	CS			P	CS
	161	CS							P	CS
	166	CS							P	CS
	168	CS							P	CS
	170	CS							P	CS
	171	CS							P	CS
	175	CS							P	CS
	176	CS							P	CS
	178	CS							P	CS
	081	CS	13 Feb	01-05	P	CS			P	CS
	117	CS							P	CS
	118	CS							P	CS
	135	CS							P	CS
	154	CS							P	CS
	155	CS							P	CS
	156	CS							P	CS
	162	CS							P	CS
	163	CS							P	CS
	177	CS							P	CS
	180	CS	13 Feb	01-02	P	CS			P	CS

AVG. ROLL WIDTH: 23.5 (ft) AVG. ROLL LENGTH: 470 (ft)

NUMBER OF ROLLS ABOVE: 22 CUMULATIVE NUMBER OF ROLLS: 22

CUMULATIVE AREA: 245,058 (ft^2) NO. OF CONFORMANCE TESTS (page/total): 3 / 3

COMMENTS:

000584

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4554

MATERIAL INVENTORY

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: Phase III YEAR: 2001

MATERIAL TYPE: Geomembrane (60 mil) MANUFACTURER: GSE

INVENTORY			Q.A. CONFORMANCE				Q.C. DOCUMENTS			
DATE (day/mo)	BATCH / ROLL NO.	QA ID	DATE SAMPLED (day/mo)	SAMPLE NO.	PASS/ FAIL	QA ID	DATE RECEIVED (day/mo)	DATE CHECKED (day/mo)	PASS/ FAIL	QA ID
23 April	114110 - 181	CS					23 Feb	3 March	P	CS
24 April	114110 050	CS							P	CS
	080	CS							P	CS
	082	CS							P	CS
	106	CS							P	CS
	136	CS							P	CS
	160	CS	13 Feb	01-01	P	CS			P	CS
	172	CS	13 Feb	01-03	P	CS			P	CS
	174	CS							P	CS
	179	CS							P	CS
	115123212*	CS								

AVG. ROLL WIDTH: 23.5 (ft) AVG. ROLL LENGTH: 472.2 (ft)

NUMBER OF ROLLS ABOVE: 10 CUMULATIVE NUMBER OF ROLLS: 32

CUMULATIVE AREA: 356,025 (ft^2) NO. OF CONFORMANCE TESTS (page/total): 2 / 5

COMMENTS: * Smooth Geomembrane for cub-sheets, Not included in Summary Totals

000585

GeoTesting Express, Inc.
2004 E. RANDOL MILL, SUITE 512
ARLINGTON, TX 76011
817-861-9090 (FAX) 817-861-5400

4554

February 28, 2001

Collin Sulkow

GeoSyntec Consultants
Attn: David K. Phillips
1100 Lake Hearn Drive Suite 200
Atlanta, GA 30342--1523

DKP 8 March 01

RE: Client Job - Fluor-Fernald Contract 95PS005028 #20103
GTX Project Number: GSC 3622.003

Dear Mr. Phillips:

One (1) sample was received for testing on 02/15/01. The sample was identified as follows:

SAMPLE I.D.	GTX COMMENTS
Sample #01-03 Roll # 114110172	GMT

The sample was tested in accordance with the test methods listed below:

ASTM D 638, (As modified by NSF 54, Annex A), "Test Method for Tensile Properties Of Plastics"

ASTM D 1505, "Test Method for Density Of Plastics By The Density-Gradient Technique"

ASTM D 1603, "Test Method for Carbon Black in Olefin Plastics"

ASTM D 5596, "Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics"

ASTM D 5994, "Standard Test Method for Measuring Core Thickness of Textured Geomembrane"

All tests were performed at 73° F ± 3° with a relative humidity of 50% ± 5. Conditioning of the samples, before testing, is standard 40 hours at test temperature and relative humidity unless waived by the client.

The sample material was submitted by GeoSyntec Consultants. GeoTesting Express of Texas, Inc. has no specific knowledge as to conditioning, origin, sampling procedure, special use of material, or purpose of material. The testing listed herein is based upon accepted industry practice as well as by the test method listed. GeoTesting Express of Texas, Inc. neither accepts nor makes claim as to final use and purpose of the material. Results presented apply only to the items tested.

TENSILE/ELONGATION
ASTM D 638

Grip Separation: 2.5 in.
Gauge Length:Yld. 1.3 in. Brk.2.0 in.
Test Speed: 2.0 ipm
Test Condition: 73° F± 3.6°/50% RH ± 5%
Tested: 02/27/01

Preparation of Sample: Pneumatic Press
Specimen Type: Type IV
Conditioning: 40 hours

		Tensile Strength				Elongation			
		YIELD		BREAK		YIELD		BREAK	
Sample	Specimen Number	MD lb / in.	CD lb / in.	MD lb / in.	CD lb / in.	MD %	CD %	MD %	CD %
Sample #01-03	1	136	135	294	294	17	17	900	919
Roll #114110172	2	138	137	317	302	18	18	950	938
	3	143	142	314	307	16	16	938	938
	4	140	139	300	296	17	16	863	875
	5	140	139	298	296	17	17	913	907
	AVG	139	138	305	299	17	17	913	915
	S.D.	2.8	2.7	10.3	5.5	0.7	0.8	34.2	26.0

DENSITY
ASTM D 1505

Tested: 02/13/01

SAMPLE NO.	DENSITY (g/cm^3) 1	2	3	AVG
Sample #01-03 Roll # 144110172	0.944	0.944	0.944	0.944

CARBON BLACK CONTENT
ASTM D 1603

Tested: 02/27/01

SAMPLE I.D.	CONTENT (%)		AVG.
Sample #01-03 Roll # 144110172	2.5	2.5	2.5

000587

CARBON BLACK DISPERSION
ASTM D 5596

Tested: 02/28/01

SAMPLE I.D.	Specimen Number	Rf_1*	Rf_2*
Sample #01-03 Roll #11410172	1	Category 1	Category 1
	2	Category 1	Category 1
	3	Category 1	Category 1
	4	Category 1	Category 1
	5	Category 1	Category 1

***Rf: Random field of view.**

THICKNESS
ASTM D 5994

Type of apparatus: Mitutoyo Digimatic Indicator
Pressure foot: 60^0 Tapered point with 0.03 in radius
Loading Time: 5 s
Tested: 02/27/01

SAMPLE I.D.	Thickness (mil)
Sample #01-03 Roll #114110172	62.7
	64.4
	65.2
	64.9
	61.3
	61.8
	61.4
	63.1
	61.6
	62.9
AVG.	62.9
S.D.	1.5
RANGE	61.3 - 64.9

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If there are any questions, please contact us.

Respectfully,

Neelam Asher

Neelam Asher
Laboratory Manager

GeoTesting Express, Inc.
2004 E. RANDOL MILL, SUITE 512
ARLINGTON, TX 76011
817-861-9090 (FAX) 817-861-5400

February 14, 2001

GeoSyntec Consultants
Attn: David Phillips
1100 Lake Hearn Drive, Suite 200
Atlanta, Georgia 30342–1523

RE: Client Job - Fluor Fernald Project # 20103
GTX Project Number: GSC 3622.001

Dear Mr. Phillips:

Four (4) samples were received for testing on 02/08/01. The samples were identified as follows:

SAMPLE I.D.	GTX COMMENTS
Roll # 114110050	GMT
Roll # 114110118	GMT
Roll # 114110163	GMT
Roll # 114110177	GMT

The samples were tested in accordance with the test methods listed below:

ASTM D 638, (As modified by NSF 54, Annex A), "Test Method for Tensile Properties Of Plastics"

ASTM D 1004, "Test Method for Initial Tear Resistance Of Plastic Film And Sheeting"

ASTM D 1505, "Test Method for Density Of Plastics By The Density-Gradient Technique"

ASTM D 1603, "Test Method for Carbon Black in Olefin Plastics"

ASTM D 4833, "Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products"

ASTM D 5596, "Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics"

ASTM D 5994, "Standard Test Method for Measuring Core Thickness of Textured Geomembrane"

GRI GM12, "Standard Test Method for Asperity Measurement of Textured Geomembranes"

The sample material was submitted by GeoSyntec Consultants. GeoTesting Express of Texas, Inc. has no specific knowledge as to conditioning, origin, sampling procedure, special use of material, or purpose of material. The testing listed herein is based upon accepted industry practice as well as by the test method listed. GeoTesting Express of Texas, Inc. neither accepts nor makes claim as to final use and purpose of the material. Results presented apply only to the items tested.

TENSILE/ELONGATION
ASTM D 638

Grip Separation: 2.5 in.
Gauge Length: Yld. 1.3 in. Brk.2.0 in.
Test Speed: 2.0 ipm
Test Condition: 73° F± 3.6°/50% RH ± 5%
Tested:

Preparation of Sample: Pneumatic Press
Specimen Type: Type IV
Conditioning: 40 hours

		Tensile Strength				Elongation			
		YIELD		BREAK		YIELD		BREAK	
Sample	Specimen Number	MD lb / in.	CD lb / in.	MD lb / in.	CD lb / in.	MD %	CD %	MD %	CD %
Roll # 114110050	1	144	145	299	300	17	17	900	888
	2	148	146	312	290	17	18	919	869
	3	148	144	296	312	16	17	831	938
	4	162	159	320	306	17	17	904	875
	5	152	147	306	315	17	17	881	935
	AVG	151	148	307	305	17	17	887	901
	S.D.	6.7	6.3	9.6	10.0	0.4	0.5	33.9	33.1

		Tensile Strength				Elongation			
		YIELD		BREAK		YIELD		BREAK	
Sample	Specimen Number	MD lb / in.	CD lb / in.	MD lb / in.	CD lb / in.	MD %	CD %	MD %	CD %
Roll # 114110118	1	144	144	300	302	18	17	900	900
	2	151	148	282	312	17	16	825	919
	3	148	143	300	275	17	17	894	838
	4	162	166	314	316	17	17	897	869
	5	147	146	315	276	18	15	919	831
	AVG	150	149	302	296	17	16	887	871
	S.D.	7.0	9.4	13.4	19.8	0.5	0.7	36.0	38.2

TENSILE/ELONGATION
ASTM D 638

Grip Separation: 2.5 in.
Gauge Length:Yld. 1.3 in. Brk.2.0 in.
Test Speed: 2.0 ipm
Test Condition: 73° F± 3.6°/50% RH ± 5%
Tested:

Preparation of Sample: Pneumatic Press
Specimen Type: Type IV
Conditioning: 40 hours

		Tensile Strength				Elongation			
		YIELD		BREAK		YIELD		BREAK	
	Specimen	MD	CD	MD	CD	MD	CD	MD	CD
Sample	Number	lb / in.	lb / in.	lb / in.	lb / in.	%	%	%	%
Roll # 114110163	1	143	140	295	283	17	17	875	869
	2	150	142	278	287	17	17	812	875
	3	146	142	312	282	18	18	925	850
	4	157	158	313	333	16	17	888	944
	5	146	141	319	288	17	16	938	888
	AVG	148	144	303	295	17	17	888	885
	S.D.	5.7	7.8	16.8	21.8	0.7	0.7	49.2	35.6

		Tensile Strength				Elongation			
		YIELD		BREAK		YIELD		BREAK	
	Specimen	MD	CD	MD	CD	MD	CD	MD	CD
Sample	Number	lb / in.	lb / in.	lb / in.	lb / in.	%	%	%	%
Roll # 114110177	1	140	138	298	279	18	18	900	862
	2	144	142	305	313	18	18	912	952
	3	143	142	317	312	19	19	952	944
	4	160	156	321	314	17	17	906	912
	5	141	141	297	286	18	17	904	869
	AVG	145	144	308	301	18	18	915	908
	S.D.	8.1	6.9	11.1	17.1	0.7	0.8	21.2	41.2

TEAR RESISTANCE
ASTM D 1004

Type Tensometer: Instron 1133 Modified
Preparation of Sample:Pneumatic Press from Sample

Conditioning: 40 Hours
Test Condition: 73° F± 3.6° @ 50% RH ± 5%

Tested: 02/14/01

SAMPLE I.D.	Specimen Number	Thickness MD (mil.)	Thickness CD (mil.)	Tear Resistance MD (lb.)	Tear Resistance CD (lb.)
Roll # 114110050	1	63.8	65.5	52.2	56.2
	2	65.7	62.2	57.5	55.6
	3	64.9	62.3	53.5	52.8
	4	64.5	63.0	63.9	65.0
	5	66.5	60.2	55.8	52.8
	6	66.4	64.3	58.9	52.4
	7	62.9	61.0	52.9	54.1
	8	63.0	65.3	53.0	53.1
	9	63.9	63.2	58.9	57.3
	10	66.4	62.9	54.8	54.7
	AVG.	64.8	63.0	56.1	55.4
	S.D.	1.4	1.7	3.7	3.7

SAMPLE I.D.	Specimen Number	Thickness MD (mil.)	Thickness CD (mil.)	Tear Resistance MD (lb.)	Tear Resistance CD (lb.)
Roll # 114110118	1	64.1	66.5	52.7	54.7
	2	61.9	63.7	53.7	54.9
	3	65.2	65.1	58.3	53.5
	4	65.1	67.3	57.0	57.4
	5	65.8	66.9	54.5	55.0
	6	61.7	66.7	54.9	52.8
	7	65.5	63.7	54.1	55.1
	8	61.7	65.9	57.4	54.3
	9	66.2	61.4	56.7	58.1
	10	67.9	61.8	55.4	53.54
	AVG.	64.5	64.9	55.5	54.9
	S.D.	2.1	2.1	1.8	1.7

TEAR RESISTANCE
ASTM D 1004

Type Tensometer: Instron 1133 Modified
Preparation of Sample:Pneumatic Press from Sample

Conditioning: 40 Hours
Test Condition: 73° F± 3.6° @ 50% RH ± 5%

Tested: 02/14/01

SAMPLE I.D.	Specimen Number	Thickness MD (mil.)	Thickness CD (mil.)	Tear Resistance MD (lb.)	Tear Resistance CD (lb.)
Roll # 114110163	1	64.4	62.8	52.5	52.4
	2	62.3	65.7	55.5	55.0
	3	60.0	63.0	51.6	54.4
	4	63.3	65.2	63.1	56.7
	5	65.0	64.6	50.9	53.3
	6	65.1	62.9	53.5	53.8
	7	64.8	62.2	51.9	53.5
	8	64.1	62.8	54.1	53.5
	9	65.4	61.7	56.6	58.7
	10	63.7	60.7	56.6	52.4
	AVG.	63.8	63.2	54.6	54.4
	S.D.	1.6	1.6	3.6	2.0

SAMPLE I.D.	Specimen Number	Thickness MD (mil.)	Thickness CD (mil.)	Tear Resistance MD (lb.)	Tear Resistance CD (lb.)
Roll # 114110177	1	64.1	63.3	49.6	52.0
	2	62.2	63.0	54.5	54.0
	3	62.4	66.3	52.4	52.1
	4	63.0	62.6	57.5	58.0
	5	66.9	62.6	53.8	51.9
	6	62.4	64.8	55.4	52.7
	7	63.0	61.3	53.4	53.4
	8	64.4	62.2	50.7	53.3
	9	61.2	63.7	56.9	59.1
	10	62.2	62.5	53.0	53.8
	AVG.	63.2	63.3	53.74	54.0
	S.D.	1.6	1.4	2.5	2.5

DENSITY
ASTM D 1505

Tested: 02/13/01

SAMPLE NO.	DENSITY (g/cm³) 1	2	3	AVG
Roll # 114110050	0.944	0.944	0.944	0.944
Roll # 114110118	0.945	0.945	0.945	0.945
Roll # 114110163	0.944	0.944	0.944	0.944
Roll # 114110177	0.944	0.944	0.944	0.944

CARBON BLACK CONTENT
ASTM D 1603

Tested: 02/13/01

SAMPLE I.D.	CONTENT (%)		AVG.
Roll # 114110050	2.5	2.6	2.6
Roll # 114110118	2.6	2.6	2.6
Roll # 114110163	2.5	2.5	2.5
Roll # 114110177	2.5	2.5	2.5

PUNCTURE RESISTANCE
ASTM D 4833

Method of holding the test specimens: Rectangular clamp attachment

Tested: 02/14/01

SAMPLE I.D.	FORCE (lb_F)
Roll # 114110050	126
	129
	132
	134
	137
	137
	136
	136
	137
	136
	137
	138
	139
	138
	137
AVG.	135
S.D.	3.6
C.V. (%)	2.7

PUNCTURE RESISTANCE
ASTM D 4833

Method of holding the test specimens: Rectangular clamp attachment

Tested: 02/14/01

SAMPLE I.D.	FORCE (lb_F)
Roll # 114110118	135
	138
	136
	136
	134
	137
	138
	135
	137
	136
	136
	135
	135
	134
	136
AVG.	136
S.D.	1.2
C.V. (%)	0.9

PUNCTURE RESISTANCE
ASTM D 4833

Method of holding the test specimens: Rectangular clamp attachment

Tested: 02/14/01

SAMPLE I.D.	FORCE (lb_F)
Roll # 114110163	140
	140
	136
	140
	138
	144
	148
	137
	137
	137
	133
	131
	136
	132
	138
AVG.	138
S.D.	4.4
C.V. (%)	3.2

000599

PUNCTURE RESISTANCE
ASTM D 4833

Method of holding the test specimens: Rectangular clamp attachment

Tested: 02/14/01

SAMPLE I.D.	FORCE (lb_F)
Roll # 114110177	135
	138
	135
	136
	132
	128
	135
	136
	136
	135
	136
	133
	133
	142
	130
AVG.	135
S.D.	3.3
C.V. (%)	2.4

000600

CARBON BLACK DISPERSION
ASTM D 5596

Tested: 02/14/01

SAMPLE I.D.	Specimen Number	Rf_1*	Rf_2*
Roll # 114110050	1	Category 1	Category 1
	2	Category 1	Category 1
	3	Category 1	Category 1
	4	Category 1	Category 1
	5	Category 1	Category 1

***Rf: Random field of view.**

SAMPLE I.D.	Specimen Number	Rf_1*	Rf_2*
Roll # 114110118	1	Category 1	Category 1
	2	Category 1	Category 1
	3	Category 1	Category 1
	4	Category 1	Category 1
	5	Category 1	Category 1

***Rf: Random field of view.**

SAMPLE I.D.	Specimen Number	Rf_1*	Rf_2*
Roll # 114110163	1	Category 1	Category 1
	2	Category 1	Category 1
	3	Category 1	Category 1
	4	Category 1	Category 1
	5	Category 1	Category 1

***Rf: Random field of view.**

CARBON BLACK DISPERSION
ASTM D 5596

Tested: 02/14/01

SAMPLE I.D.	Specimen Number	Rf_1*	Rf_2*
Roll # 114110177	1	Category 1	Category 1
	2	Category 1	Category 1
	3	Category 1	Category 1
	4	Category 1	Category 1
	5	Category 1	Category 1

***Rf: Random field of view.**

THICKNESS
ASTM D 5994

Type of apparatus: Mitutoyo Digimatic Indicator
Pressure foot: 60^0 Tapered point with 0.031 in radius
Loading Time: 5 s
Tested: 02/13/01

SAMPLE I.D.	Thickness (mil)
Roll # 114110050	65.2
	62.3
	63.7
	62.9
	64.0
	63.9
	64.6
	64.0
	62.4
	60.5
AVG.	63.3
S.D.	1.4
C.V.(%)	2.1

THICKNESS
ASTM D 5994

Type of apparatus: Mitutoyo Digimatic Indicator
Pressure foot: 60° Tapered point with 0.031 in radius
Loading Time: 5 s
Tested: 02/13/01

SAMPLE I.D.	Thickness (mil)
Roll # 114110118	60.7
	62.5
	62.2
	62.7
	63.3
	63.3
	60.0
	63.6
	64.6
	61.8
AVG.	62.5
S.D.	1.4
C.V.(%)	2.2

SAMPLE I.D.	Thickness (mil)
Roll # 114110163	60
	66.4
	65.2
	64.5
	62.7
	64.4
	60.3
	63.0
	63.7
	61.3
AVG.	63.1
S.D.	2.1
C.V.(%)	3.3

THICKNESS
ASTM D 5994

Type of apparatus: Mitutoyo Digimatic Indicator
Pressure foot: 60^0 Tapered point with 0.031 in radius
Loading Time: 5 s
Tested: 02/13/01

SAMPLE I.D.	Thickness (mil)
Roll # 114110177	63.0
	63.0
	61.3
	62.2
	60.3
	61.3
	62.4
	63.5
	63.6
	63.2
AVG.	62.4
S.D.	1.1
C.V.(%)	1.8

ASPERITY MEASUREMENT OF TEXTURED GEOMEMBRANES GRI-GM 12

Testing Machine: Mitutoyo Digimatic Indicator
Contact Point: 0.05 in. tapered to point
Tested: 02/14/01

Specimen size: 4 in. x 4 in.
Loading Time Interval: 5s

SAMPLE ID	SPECIMEN #	Asperity Height (mil) FRONT SIDE	BACK SIDE
Roll # 114110050	1	11	12
	2	13	11
	3	12	12
	4	12	13
	5	12	15
	6	15	13
	7	17	13
	8	13	15
	9	11	10
	10	14	12
	AVG.	13	13
	S.D.	1.9	1.6
	C.V. (%)	14.6	12.3

SAMPLE ID	SPECIMEN #	Asperity Height (mil) FRONT SIDE	BACK SIDE
Roll # 114110118	1	14	11
	2	14	11
	3	10	13
	4	10	14
	5	10	14
	6	14	15
	7	13	14
	8	14	13
	9	13	15
	10	13	14
	AVG.	13	13
	S.D.	1.8	1.4
	C.V. (%)	13.8	10.8

ASPERITY MEASUREMENT OF TEXTURED GEOMEMBRANES GRI-GM 12

Testing Machine: Mitutoyo Digimatic Indicator
Contact Point: 0.05 in. tapered to point
Tested: 02/14/01

Specimen size: 4 in. x 4 in.
Loading Time Interval: 5s

SAMPLE ID	SPECIMEN #	Asperity Height (mil) FRONT SIDE	BACK SIDE
Roll # 114110163	1	11	16
	2	11	17
	3	11	18
	4	11	16
	5	16	17
	6	13	18
	7	16	15
	8	14	14
	9	14	17
	10	16	13
	AVG.	13	16
	S.D.	2.2	1.7
	C.V. (%)	16.9	10.6

SAMPLE ID	SPECIMEN #	Asperity Height (mil) FRONT SIDE	BACK SIDE
Roll # 114110177	1	10	17
	2	15	17
	3	14	10
	4	15	14
	5	13	16
	6	14	17
	7	16	17
	8	15	17
	9	13	17
	10	15	16
	AVG.	14	16
	S.D.	1.7	2.3
	C.V. (%)	12.1	14.4

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If there are any questions, please contact us.

Respectfully,

Neelam Asher

Neelam Asher
Laboratory Manager

GEOTEXTILE

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

GEOTEXTILE TEST SUMMARY REQUEST FORM

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: ON-SITE DISPOSAL FACILITY PROJECT NO.: GQ1029 TASK NO.: 04

SAMPLED: 15 day MAR mo SAMPLER ID: NM SHIPPED: 16 day MAR mo SHIPPER ID: TNS RECEIVED: ____ day ____ mo LAB ID: ____ YEAR: 2001

MANUFACTURED BY: TNS MILLS SAMPLE SHIPPED VIA: FED EX

SITE CONTACT: ____ SITE PHONE: ____ SITE FAX: ____

SAMPLE NO. GT-	~~ROLL NO.~~/ BATCH NO.	MASS/ AREA ASTM ~~D3776~~ D5261	THICKNESS ASTM D1777 D5199	GRAB TENSILE ASTM D4632	TRAP TEAR ASTM D4533	MULLEN BURST ASTM D3786	AOS ASTM D4751	PERMITIVITY ASTM D4491	WIDE-WIDTH TENSILE ASTM D4595	WIDE-STRIP SEAM ASTM D4884	STRIP TENSILE ASTM D1682 D5035	PUNCTURE ASTM D4833	OTHER
01-01	2000 81127	✓		✓	✓	✓	✓	✓				✓	
01-02	2000 81140	✓		✓	✓	✓	✓	✓				✓	
01-03	2000 81151	✓		✓	✓	✓	✓	✓				✓	
01-04	2000 81174	✓		✓	✓	✓	✓	✓				✓	
01-05	2000 81189	✓		✓	✓	✓	✓					✓	

~~WOVEN OR~~ NONWOVEN MATERIAL

COMMENTS/SPECIAL INSTRUCTIONS/DISTRIBUTION: Strike out nonapplicable items

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SHEET NO. 1 OF 1

GeoTesting Express, Inc.
2004 E. RANDOL MILL, SUITE 512
ARLINGTON, TX 76011
817-861-9090 (FAX) 817-861-5400

April 4, 2001

GeoSyntec Consultants
Attn: David K. Phillips
1100 Lake Hearn Drive Suite 200
Atlanta, GA 30342-1523

RE: Client Job - Fluor-Fernald Contract 95PS005028 #20103
GTX Project Number: GSC 3622.004 **Revised to correcet for ASTM D3786, ASTM D4632, and ASTM D5261.**

Dear Mr. Phillips:

Five (5) samples were received for testing on 03/19/01. The samples were identified as follows:

SAMPLE I.D.	GTX COMMENTS
Roll #200081127, Sample #01-01	GT
Roll #200081140, Sample #01-02	GT
Roll #200081151, Sample #01-03	GT
Roll #200081174, Sample #01-04	GT
Roll #200081189, Sample #01-05	GT

The samples were tested in accordance with the test methods listed below:

ASTM D 3786, "Test Method for Hydraulic Bursting Strength Of Knitted Goods And Nonwoven Fabrics - Diaphragm Strength Tester Method"

ASTM D 4491, "Test Method for Water Permeability of Geotextiles by Permittivity"

ASTM D 4533, "Test Method for Trapezoid Tearing Strength of Geotextiles"

ASTM D 4632, "Test Method for Breaking Load and Elongation of Geotextiles (Grab Method)"

ASTM D 4751, "Test Method for Determining Apparent Opening Size of a Geotextile"

ASTM D 4833, "Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products"

All tests were performed at 73° F ± 3° with a relative humidity of 50% ± 5. Conditioning of the samples, before testing, is standard 40 hours at test temperature and relative humidity unless waived by the client.

The sample material was submitted by GeoSyntec Consultants. GeoTesting Express of Texas, Inc. has no specific knowledge as to conditioning, origin, sampling procedure, special use of material, or purpose of material. The testing listed herein is based upon accepted industry practice as well as by the test method listed. GeoTesting Express of Texas, Inc. neither accepts nor makes claim as to final use and purpose of the material. Results presented apply only to the items tested.

MULLEN BURST
ASTM D 3786

Equipment: Motor Driven Hydraulic Diaphragm Bursting Tester

Tested: 03/21/01

SAMPLE I.D.	Reading	Tare	Burst Strength (psi)
Roll #200081127	440	10	430
Sample #01-01	430	10	420
	390	10	380
	400	10	390
	395	10	385
	395	10	385
	350	10	340
	370	10	360
	440	10	430
	415	10	305
AVG	403	10	393
S.D.	29.5	0.0	29.5
C.V. (%)	7.3	0.0	7.5

SAMPLE I.D.	Reading	Tare	Burst Strength (psi)
Roll #200081140	400	10	390
Sample #01-02	380	10	370
	375	10	365
	360	10	350
	430	10	420
	380	10	370
	400	10	390
	350	10	340
	450	10	440
	350	10	340
AVG	388	10	378
S.D.	33.1	0.0	33.1
C.V. (%)	8.5	0.0	8.8

MULLEN BURST
ASTM D 3786

Equipment: Motor Driven Hydraulic Diaphragm Bursting Tester

Tested: 03/21/01

SAMPLE I.D.	Reading	Tare	Burst Strength (psi)
Roll #200081151	380	10	370
Sample #01-03	350	10	340
	395	10	385
	335	10	325
	330	10	320
	350	10	340
	400	10	390
	325	10	315
	380	10	370
	465	10	455
AVG	371	10	361
S.D.	42.7	0.0	42.7
C.V. (%)	11.5	0.0	11.8

SAMPLE I.D.	Reading	Tare	Burst Strength (psi)
Roll #200081174	360	10	350
Sample #01-04	365	10	355
	365	10	355
	390	10	380
	380	10	370
	390	10	380
	365	10	355
	360	10	350
	420	10	410
	460	10	450
AVG	386	10	376
S.D.	32.3	0.0	32.3
C.V. (%)	8.4	0.0	8.6

MULLEN BURST
ASTM D 3786

Equipment: Motor Driven Hydraulic
Diaphragm Bursting Tester

Tested: 03/21/01

SAMPLE I.D.	Reading	Tare	Burst Strength (psi)
Roll #200081189	760	10	750
Sample #01-05	800	10	790
	670	10	660
	710	10	700
	710	10	700
	800	10	790
	770	10	760
	685	10	675
	765	10	755
	735	10	725
AVG	741	10	731
S.D.	45.8	0.0	45.8
C.V. (%)	6.2	0.0	6.3

PERMITTIVITY BY CONSTANT HEAD TEST
ASTM D 4491

Preparation of Sample: Textile as received
Head of Water: 50mm

Specimen Type: Presoaked Textile

Tested: 03/21/01

SAMPLE I.D.	PERMITTIVITY (s^{-1})
Roll #200081127	1.63
Sample #01-01	1.56
	1.65
	1.46
AVG.	1.58
S.D.	0.09
C.V. (%)	5.70

SAMPLE I.D.	PERMITTIVITY (s^{-1})
Roll #200081140	1.40
Sample #01-02	4.74
	1.62
	1.39
AVG.	1.54
S.D.	0.17
C.V. (%)	11.04

PERMITTIVITY BY CONSTANT HEAD TEST
ASTM D 4491

Preparation of Sample: Textile as received
Head of Water: 50mm.

Specimen Type: Presoaked Textile

Tested: 03/21/01

SAMPLE I.D.	PERMITTIVITY (s^{-1})
Roll #200081151	1.78
Sample #01-03	1.81
	1.83
	1.52
AVG.	1.74
S.D.	0.15
C.V. (%)	8.62

SAMPLE I.D.	PERMITTIVITY (s^{-1})
Roll #200081174	1.25
Sample #01-04	1.73
	1.59
	1.45
AVG.	1.51
S.D.	0.21
C.V. (%)	13.91

TRAPAZOID TEAR
ASTM D 4533

Tested: 03/21/01

CONDITION OF THE SPECIMENS: DRY

SAMPLE I.D.	Tear Strength (lb_F) MD	CD
Roll #200081127	96	153
Sample #01-01	97	92
	105	202
	91	145
	121	154
	83	136
	121	155
	106	134
	114	112
	89	149
AVG.	102	143
S.D.	13.3	29.0
C.V. (%)	13.0	20.3

SAMPLE I.D.	Tear Strength (lb_F) MD	CD
Roll #200081140	76	130
Sample #01-02	76	118
	101	113
	112	150
	90	108
	82	187
	126	243
	132	183
	111	108
	81	108
AVG.	99	145
S.D.	20.8	45.9
C.V. (%)	21.1	31.7

TRAPAZOID TEAR
ASTM D 4533

Tested: 03/21/01

CONDITION OF THE SPECIMENS: DRY

SAMPLE I.D.	Tear Strength (lb_F) MD	CD
Roll #200081151	119	157
Sample #01-03	106	122
	108	146
	109	125
	110	149
	89	142
	86	135
	94	178
	106	154
	121	145
AVG.	105	145
S.D.	11.7	16.2
C.V. (%)	11.2	11.2

SAMPLE I.D.	Tear Strength (lb_F) MD	CD
Roll #200081174	88	146
Sample #01-04	84	166
	82	168
	87	165
	86	164
	101	156
	131	171
	129	131
	98	126
	103	123
AVG.	99	152
S.D.	17.9	18.7
C.V. (%)	18.1	12.3

TRAPAZOID TEAR
ASTM D 4533

Tested: 03/21/01

CONDITION OF THE SPECIMENS: DRY

SAMPLE I.D.	Tear Strength (lb_F) MD	CD
Roll #200081189	134	291
Sample #01-05	164	208
	170	233
	168	259
	181	250
	172	220
	187	238
	204	250
	156	242
	208	233
AVG.	174	242
S.D.	22.0	22.7
C.V. (%)	12.6	9.4

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BREAKING STRENGTH & APPARENT ELONGATION
ASTM D 4632

Condition of specimens : Dry
Tested: 03/21/01

Type of testing machine : J J Instruments / M50K
Type of padding used in jaws : None

SAMPLE I.D.	Break Strength (lb_F) MD	Break Strength (lb_F) CD	Apparent Break Elongation (%) MD	Apparent Break Elongation (%) CD
Roll #200081127	255	335	92	74
Sample #01-01	262	321	83	71
	250	341	87	75
	237	317	85	83
	227	307	83	83
	227	281	83	75
	240	307	83	69
	210	270	79	66
	290	303	75	81
	215	301	83	83
AVG.	241	308	73	76
S.D.	24.0	21.9	4.5	6.3
C.V. (%)	9.9	7.1	6.1	8.2

SAMPLE I.D.	Break Strength (lb_F) MD	Break Strength (lb_F) CD	Apparent Break Elongation (%) MD	Apparent Break Elongation (%) CD
Roll #2000811140	168	228	69	75
Sample #01-02	209	250	77	73
	200	239	69	73
	199	240	73	75
	215	249	77	74
	215	255	69	73
	229	269	73	78
	214	244	67	78
	289	302	67	92
	250	264	58	83
AVG.	219	254	70	77
S.D.	32.5	20.7	5.6	6.0
C.V. (%)	14.8	8.0	8.0	7.8

BREAKING STRENGTH & APPARENT ELONGATION
ASTM D 4632

Condition of specimens : Dry
Tested: 03/21/01

Type of testing machine : J J Instruments / M50K
Type of padding used in jaws : None

SAMPLE I.D.	Break Strength (lb_F) MD	Break Strength (lb_F) CD	Apparent Break Elongation (%) MD	Apparent Break Elongation (%) CD
Roll #200081151	220	246	85	83
Sample #01-03	226	232	81	88
	202	262	85	81
	204	280	77	77
	216	298	96	85
	195	264	79	79
	263	277	90	77
	238	273	87	77
	215	273	77	83
	237	233	81	85
AVG.	222	264	84	82
S.D.	20.3	21.2	6.1	3.9
C.V. (%)	9.2	8.0	7.2	4.8

SAMPLE I.D.	Break Strength (lb_F) MD	Break Strength (lb_F) CD	Apparent Break Elongation (%) MD	Apparent Break Elongation (%) CD
Roll #200081174	231	320	83	73
Sample #01-04	198	310	75	73
	230	355	87	75
	203	284	92	67
	253	234	83	77
	227	289	79	71
	251	326	87	77
	261	307	83	76
	200	273	69	79
	262	264	77	83
AVG.	232	296	82	75
S.D.	24.9	34.7	6.7	4.4
C.V. (%)	10.8	11.7	8.2	5.9

BREAKING STRENGTH & APPARENT ELONGATION
ASTM D 4632

Condition of specimens : Dry
Tested: 03/21/01

Type of testing machine : J J Instruments / M50K
Type of padding used in jaws : None

SAMPLE I.D.	Break Strength (lb_F) MD	Break Strength (lb_F) CD	Apparent Break Elongation (%) MD	Apparent Break Elongation (%) CD
Roll #200081189	400	560	77	83
Sample #01-05	423	509	79	81
	403	479	71	77
	432	479	73	81
	427	483	77	83
	409	461	75	81
	463	505	75	79
	474	504	73	81
	447	451	75	89
	530	511	83	92
AVG.	441	494	76	83
S.D.	39.8	30.9	3.4	4.5
C.V. (%)	9.0	6.3	4.5	5.5

APPARENT OPENING SIZE
ASTM D 4751

Tested: 03/21/01 - 03/22/01

SAMPLE I.D.	Bead Size Range (mm)	Average of 5 Specimens AOS (mm) = O_{95}	Sieve Number
Roll #200081127, Sample #01-01	0.106-0.150	0.150	100
Roll #200081140, Sample #01-02	0.106-0.150	0.150	100
Roll #200081151, Sample #01-03	0.106-0.150	0.150	100
Roll #200081174, Sample #01-04	0.106-0.150	0.150	100
Roll #200081189, Sample #01-05	0.075-0.075	<0.075	200

PUNCTURE RESISTANCE
ASTM D 4833

Method of holding the test specimens: Rectangular clamp attachment

Tested: 03/21/01

SAMPLE I.D.	FORCE (lb_F)
Roll #200081127	124
Sample #01-01	136
	144
	157
	119
	145
	153
	115
	103
	126
	147
	110
	157
	145
	134
AVG.	134
S.D.	17.6
C.V. (%)	13.1

PUNCTURE RESISTANCE
ASTM D 4833

Method of holding the test specimens: Rectangular clamp attachment

Tested: 03/21/01

SAMPLE I.D.	FORCE (lb_F)
Roll #200081140	161
Sample #01-02	116
	113
	144
	96
	132
	92
	138
	126
	152
	156
	111
	133
	134
	141
AVG.	130
S.D.	20.7
C.V. (%)	15.9

PUNCTURE RESISTANCE
ASTM D 4833

Method of holding the test specimens: Rectangular clamp attachment

Tested: 03/21/01

SAMPLE I.D.	FORCE (lb_F)
Roll #200081151	137
Sample #01-03	145
	133
	140
	131
	97
	115
	142
	118
	138
	150
	100
	183
	136
	137
AVG.	133
S.D.	20.8
C.V. (%)	15.6

PUNCTURE RESISTANCE
ASTM D 4833

Method of holding the test specimens: Rectangular clamp attachment

Tested: 03/21/01

SAMPLE I.D.	FORCE (lb_F)
Roll #200081174	117
Sample #01-04	110
	126
	120
	104
	148
	133
	137
	145
	153
	137
	120
	173
	143
	120
AVG.	132
S.D.	18.3
C.V. (%)	13.7

PUNCTURE RESISTANCE
ASTM D 4833

Method of holding the test specimens: Rectangular clamp attachment

Tested: 03/21/01

SAMPLE I.D.	FORCE (lb_F)
Roll #200081189	260
Sample #01-05	261
	251
	278
	250
	260
	271
	286
	267
	285
	284
	284
	303
	262
	253
AVG.	270
S.D.	15.7
C.V. (%)	5.8

MASS / UNIT AREA
ASTM D 5261

Tested: 03/21/01

SPECIMEN SIZE: 6 in. x 6 in.
SHAPE: Square

SAMPLE I.D.	Mass Per Unit Area (oz / yd^2)
Roll #200081127	9.0
Sample #01-01	9.1
	8.8
	8.7
	7.9
	7.8
	8.1
	8.7
	9.5
	9.2
AVG.	8.7
S.D.	0.6
C.V.	6.7

SAMPLE I.D.	Mass Per Unit Area (oz / yd^2)
Roll #200081140	7.4
Sample #01-02	7.5
	7.8
	7.2
	8.3
	7.4
	8.6
	8.0
	9.6
	8.4
AVG.	8.0
S.D.	0.7
C.V. (%)	9.1

MASS / UNIT AREA
ASTM D 5261

Tested: 03/21/01

SPECIMEN SIZE: 6 in. x 6 in.
SHAPE: Square

SAMPLE I.D.	Mass Per Unit Area (oz / yd^2)
Roll #200081151	7.8
Sample #01-03	8.0
	8.1
	7.9
	8.0
	7.9
	8.8
	8.8
	9.7
	10.5
AVG.	8.5
S.D.	0.9
C.V. (%)	10.4

SAMPLE I.D.	Mass Per Unit Area (oz / yd^2)
Roll #200081174	7.8
Sample #01-04	8.0
	8.1
	7.9
	8.0
	7.9
	8.8
	8.8
	9.7
	10.5
AVG.	8.5
S.D.	0.9
C.V. (%)	10.4

MASS / UNIT AREA
ASTM D 5261

Tested: 03/21/01

SPECIMEN SIZE: 6 in. x 6 in.
SHAPE: Square

SAMPLE I.D.	Mass Per Unit Area (oz / yd^2)
Roll #200081189	17.9
Sample #01-05	17.4
	17.1
	16.8
	16.2
	17.5
	16.6
	17.1
	17.5
	17.6
AVG.	17.2
S.D.	0.5
C.V. (%)	3.0

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If there are any questions, please contact us.

Respectfully,

Neelam Asher

Neelam Asher
Laboratory Manager

000630

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APPENDIX H

CONTRACTOR'S CERTIFICATION OF ACCEPTANCE OF SUBGRADE SURFACE

CERTIFICATE OF ACCEPTANCE SUBGRADE SURFACE

INSTALLER	PROJECT
NAME: Istre Company	NAME: Phase III - Cell #1 Cap Construction
ADDRESS:	LOCATION: Fernald, OH
INSTALLER AUTHORIZED REPRESENTATIVE: Jerry Istre	OWNER: Fluor Fernald / DOE

I, The undersigned, duly authorized representive of Istre Company do hereby accept the surface on which the geosynthetics will be installed and shall be responsible for maintaining the suitability of this surface, in accordance with the project specifications. (i.e., The contractor shall not install the geosynthetics until the subgrade surface is acceptable. Installation of the geosynthetics will be considered acceptance of the subgrade.)

PRIMARY: CAP ☒ SECONDARY: ☐ OTHER: ☐

DATE	PANEL NOS.	SIGNATURE
3 July 2001	P-1 + P-2	
6 July 2001	P-3, P-4, + P-5	
7 July 2001	P-6	
10 July 2001	P-7, P-8, + P-9	
11 July 2001	P-10, P-11, P-12, P-13, P-14, P-15, + P-16	
12 July 2001	P-18 thru P-22	
13 July 2001	P-23	
14 July 2001	~~P-17~~ & P-24 thru P-26	
17 July 2001	P-27 + P-28	
24 July 2001	P-29 thru P-31	
25 July 2001	P-32 + P-33	
27 July 2001	P-34 thru P-38	
01 AUG 2001	P-39 THRU P-45	
02 AUG 2001	P-46 THRU P-50	
7 Aug 2001	P-51 thru P-53	
8 Aug 2001	P-54 thru P-63	

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CERTIFICATE OF ACCEPTANCE SUBGRADE SURFACE

INSTALLER	PROJECT
NAME: Istre Company	NAME: Phase III - Cell #1 Cap Construction
ADDRESS:	LOCATION: Fernald, OH
INSTALLER AUTHORIZED REPRESENTATIVE: Jerry Istre	OWNER: Fluor Fernald / DOE

I, The undersigned, duly authorized representive of Istre Company do hereby accept the surface on which the geosynthetics will be installed and shall be responsible for maintaining the suitability of this surface, in accordance with the project specifications. (i.e., The contractor shall not install the geosynthetics until the subgrade surface is acceptable. Installation of the geosynthetics will be considered acceptance of the subgrade.)

PRIMARY: CAP ☒ SECONDARY: ☐ OTHER: ☐

DATE	PANEL NOS.	SIGNATURE
11 Aug 2001	P-64 thru P-68	[signature]

000633

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