

CAFB
93

CAFB/NMED Cell 3 Landfill 5 Soil Cap CQC plan
4/20/93

Stephanie Goddard	NMED/HRMB	827-4308
Carl McConford	2103/CEV Cannon AFB	(505) 784-4348
Andrew Wadsworth	Western Technologies	823-4488
Jim Ward	PIONEER	294-4866
Mark Withrock	US Army Corps of Eng Albuquerque Dist	766-3829
William P. Moats	NMED/HRMB	845-5824
STEVE MAHAN	US ARMY CORPS OF ENG CANNON AFB RES OFF	784-4350
Keith Wylie	US ARMY CORPS OF ENG CANNON AFB	784-3645

At this meeting 3 documents were discussed:

- Attn 1. ① Gene Mahan Head CESWA - CO - CA (415) Memorandum
For Record Subject: Contract No., DACA 47-93-C-0004,
Landfill 5, Cell #3 Geocomposite Soil Cap, Cannon AFB, NM
- Attn 2. ② The Contractors BRC ~~plan~~ ^{Program} was briefly discussed
- Attn 3. ③ And Requirements for Cannon Air Force Base
Construction Quality Assurance (CQA) plan March 1993
was the focus of the remainder of the conversation.

Outcome of mtg US Army COE will provide NMED
with a Contractors QA/QC plan which will meet
NMED's requirements. The COE agreed to provide
the QA/QC plan by 4/27/93

AHM / CAFB
93

CESWA-CO-CA (415)

April 16, 1993

MEMORANDUM FOR RECORD

SUBJECT: Contract No. DACA47-93-C-0004, Landfill #5, Cell #3, Geocomposite Soil Cap; Cannon AFB, New Mexico

QA/QC AND SAFETY MUTUAL UNDERSTANDING MEETING

1. Subject conference was held 13:00 hrs on April 20, 1993, at the office of New Mexico Environmental Division, Santa Fe, NM. An attendance list is attached.
2. Subject meeting stated the purpose, clarified the procedures of Contractor Quality Control and Accident Prevention Plans, and assured that both the government and contractor personnel have a mutual understanding of the tools needed to achieve the level of quality specified in subject contract. The quality concerns and regulatory requirements of New Mexico Environmental Division and the Department of the Air Force were also addressed. A copy of these minutes shall be placed as a supplement to the Quality Control Plan.
3. Proposed changes to the contract were not discussed. All parties were notified that any changes to the contract would have to be submitted in writing through appropriate channels.
4. CORPS OF ENGINEERS organization:
 - a. The Administrative Contracting Officers have the authority to issue certain modifications to the contract as stated by the Contracting Officer's Letter of Authorization. Only the Contracting Officer or Administrative Contracting Officer have the authority to make changes to the contract. Karen Durham-Aguilera, P.E. and William J. McCollam, P.E. are Administrative Contracting Officers for subject contract. *resident Engineer Collins*
 - b. Stephen Mahan is the Project Engineer and will direct the work of the Construction Representative assigned to the project. The Construction Representative, Keith Wylie, will be the points of contact. Day-to-day coordination should be through Mr. Wylie.
 - c. If a contract change or different method is desired seek prior approval from the COE.
 - d. All construction, installation, tests, materials, etc., will be expected to conform to contract unless specifically noted by verbal or written agreements with the COE *ng*

Jim
1

e. COE personnel will only deal with the prime contractor. Prime contractor is required to supervise subcontractors. If a subcontractor and/or supplier wants to discuss the contract with COE personnel, this is permissible only if a representative of the prime contractor is present. Contractor QC personnel and Government QA personnel need to work closely together to achieve common goals.

f. If there is a disagreement or difference of opinion on any aspect of this contract, the Contracting Officer or Administrative Contracting Officer will always listen to the contractor's reasoning. However, the CO/ACO decision is final on any disagreement. The contractor has the right to seek additional compensation if he disagrees with the decision; however, he must proceed with the CO/ACO directive in accordance with the Disputes clause of the contract.

5. Contract Clause I.93, "Inspection of Construction", was read in its entirety.

6. The contractor's Quality Control Plan was discussed, with particular emphasis on the Three Phase Inspection System. The three phases of inspection are: Preparatory, Initial, and Follow-up. The contract requirements are to be divided into clearly defined features of work (generally by spec section). These features should be the same features used in the Job Hazard Analysis. Safety hazards should also be covered at the preparatory meetings.

a. PREPARATORY INSPECTIONS will be held prior to every definable phase of work. The preparatory will cover pertinent shop drawings and tests required. The important parts of the spec will be discussed. Pertinent safety topics will be discussed. Equipment checklists, SWA 704 will be used. Physically inspect work site, and materials to assure compliance. All items mentioned above shall be on hand and ready to go. Shop drawings shall be complete, materials on hand, QC familiar with plans and specs for that phase, and the craftsmen ready to start.

b. INITIAL INSPECTIONS will be done after a representative sample of work is in place. Reaffirm all items covered in preparatory.

c. FOLLOW-UP INSPECTIONS will be accomplished daily as needed. Deficient areas will be noted, and corrective action proposed or taken.

7. QC testing:

a. The original of all test results from an independent lab will be forwarded directly to the CAFB Resident Office by the testing lab, with an information copy to the contractor. Note all tests performed, attach detailed test record.

b. The contract requires a minimum 24 hour notice for any and all tests so COE personnel can attend if they so choose. Tests performed without notice may be subject to retesting.

c. The day a test is performed it will be entered on the daily QC report, with a control number and the results for the test. Test results will be submitted no later than 24 hours after completion of the test; the test report should reference the control number. The results of the test should be recorded on the daily QC report, the day the test is received. The actual test report should be submitted separately, per above para 9a.

8. Daily QC report forms shall have the following information:

a. Numbering to correspond to calendar days, beginning with the Notice to Proceed. Each separate workday day to have a separate report. However, Saturday and Sunday can be submitted on one report if and only if there is no work accomplished during both days. Also, this report combination can include three day holiday weekends if there is no work performed during any of the three days.

b. Submitted daily to Resident Office in original and one copy. The Construction Representative shall obtain the completed forms for the preceding day, each day. However, Friday's QC reports can be submitted on Monday mornings along with the Saturday and Sunday QC reports.

c. Log all instructions given by COE regardless of whether or not you agree with them. If you do not agree so state. This report is meant to be an accurate account of what transpired on the job each day.

d. Include the weather conditions each day. Note how much of the day you consider lost due to weather. Each day where 50% or more is lost, on critical activities only, counts toward anticipated weather delays. The decision as to whether a day is 50% or more lost will be mutual agreement between the QC and QA representative at the close of that day.

e. Note separately for prime and each subcontractor, materials delivered, items installed, number of persons for each trade, equipment on job.

f. Safety items to be included will be covered under Safety Briefing. At east once each month a safety meeting will be held with all Prime and Subcontractor supervisors.

g. Note Preparatory, Initial, and Follow-up inspections; attach forms to daily report.

h. Note the type, location, number of tests, and test results.

9. SHOP DRAWINGS AND SUBMITTALS: The Cannon AFB Resident Office will process your submittals.

a. "Review and Approval of Shop Drawings", Technical Provision Section 01300, paragraphs 1.6 through 1.9, was emphasized.

b. Annotate any deviations; submittal review time may be delayed for deviations due to owner coordination, cost estimates, and possible modification processing prior to approval.

c. The contractor is responsible for completely reviewing each subcontractor and supplier submittal and certifying compliance with the contract documents. DO NOT take it for granted that the supplier, vendor has done his homework with respect to this contract; he may not even have read the spec.

d. Effective construction quality management depends upon assuring that you order the correct materials, not waiting until they arrive at the job site to find out they do not meet the contract.

e. The contractor's submittal register was discussed.

10. Inventory of Installed Property: Log in the materials as it arrives on the job. Do not wait until it is installed. Take serial numbers, model numbers, capacities directly off the nameplate - do not use submittal data. This list will be checked monthly.

11. As-Built drawings are to be maintained continuously, and will be checked monthly by COE personnel as a minimum.

12. CONTRACT CLAUSE # I.64 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS: Pay estimates shall be submitted to the Resident Office no later than Thursday noon on a normal work week.

13. The Contractor is reminded that ONLY the Contracting Officer and the Administrative Contracting Officers have the authority to make changes to the contract, to issue modifications and to grant additional contract completion time for abnormally adverse weather.

14. The Contractor is reminded that all hazardous material containers such as paint, adhesives, sealants, etc. must be removed from the site by the Contractor. These containers cannot be disposed of in Cannon AFB trash dumpsters.

Pioneer Industries Representative

US Army Corps of Engineers
Cannon AFB Resident Office
Representative

CAF B93

CESWA-CO-NA-C

15 October 1993

MEMORANDUM FOR 27 CES/CC

SUBJECT: Contract No. DACA47-93-C-0004, Landfill #5, Cell #3, Geocomposite/Soil Cap, Cannon AFB, New Mexico; Response to New Mexico Environmental Department (NMED) Letter

1. Reference NMED letter dated 30 September 1993, requesting more data for the Landfill #5, Test Cell #3 construction project, informally provided to me by CEEV on 08 October 1993.

2. Response is as follows; item numbers are as stated in referenced letter.

Item 1: Attached are letters from the three testing laboratories involved in this project: Western Technologies Inc., Lydick Laboratories, and Pettigrew & Associates. These letters, signed by a Registered Professional Engineer, certify that tests were performed in compliance with applicable methods.

Item 2: During construction, in-place density tests were taken within six inches of the installed gas vents; all tests verified that the required in-place compaction was achieved. To address NMED's recent letter, attached are density tests taken on 13 October 1993, within one foot of the points where the four gas vents penetrate the landfill cover material. The recent densities must be adjusted for the current percent soil moisture content, in order to compare them with the moisture content/compaction data obtained during actual construction. After this adjustment, the in place soil densities meet or exceed the contract specification requirements.

Item 3: The Sieve Analysis, percent passing, on pages SGV-6, SGV-7, SGV-33, SGV-35, SGV-36, SGV-50, SGV-51, SGV-64, SGV-90, SGV-110, SGV-111, and SGV-112 of the Quality Assurance report, are all in compliance with limits specified in Contract Specification Section 02224, paragraph 1.3.1.1. The Sieve Analyses on pages SGV-32 and SGV-108 were done solely to classify the soils in accordance with ASTM D-2487, and were not intended to serve as gradation analyses.

Item 4: Attached are mill test reports for the Geocomposite Membrane Liner and the Plastic Filter Fabric.

Item 5: Attached is a letter from the Geocomposite Membrane Liner (GML) manufacturer's representative certifying that the surface on which the GML was placed was acceptable.

CESWA-CO-NA-C

15 October 1993

MEMORANDUM FOR 27 CES/CC

SUBJECT: Contract No. DACA47-93-C-0004, Landfill #5, Cell #3, Geocomposite/Soil Cap, Cannon AFB, New Mexico; Response to New Mexico Environmental Department (NMED) Letter

3. Should you have further questions on the above, please call Mr. Steve Mahan or the undersigned at 4-4350 or 4-4351.

FOR THE COMMANDER:



KAREN DURHAM-AGUILERA, P.E.
Resident Engineer
Cannon AFB Resident Office

Enclosures as

CF: CEEV



BRUCE KING
GOVERNOR

State of New Mexico
ENVIRONMENT DEPARTMENT
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-2850

JUDITH M. ESPINOSA
SECRETARY

RON CUREY
DEPUTY SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

September 30, 1993

Colonel William M. Guth
Base Commander, 27 FW/CC
100 South DL Ingram Blvd. Suite 100
Cannon AFB, New Mexico 88103-5214

Re: Closure Certification Cell 3, Landfill 5
NM7572124454

Dear Col. Guth:

The Hazardous and Radioactive Materials Department (HRMB) of the New Mexico Environment Department (NMED) is in receipt of Cannon Air Force Base's (CAFB) closure certifications for Landfill 5, Cell 3 Soil Cap submitted pursuant to HWMR-7 Part VI, 40 CFR § 265.115. After review of the closure work conducted per the approved closure plan and documented in the report entitled: Landfill #5, Cell#3 Soil Cap, Cannon Air Force Base, New Mexico dated August 1993, NMED finds that the closure was conducted substantially in accordance with the approved closure plan, and is hereby conditionally accepting your closure certification with the following conditions:

1. Certified Test Reports

Specification Part 1.4 of Section 02210, Grading and Section 02224, Gas Vent System require certified test reports and analysis showing materials conform to the specified requirements. In addition, the Construction Quality Assurance (CQA) plan under sections I.B.1.b, I.B.2.c, I.C.1.b, I.C.2.a, I.D.1.b, I.F.1.b, I.F.2.a. require that each and all tests performed be certified by a Registered Professional Engineer. CAFB shall provide HRMB with Certifications by a Registered Professional Engineer from the contract laboratories for all tests performed for this project confirming that all tests were conducted in compliance with the applicable methods and that all test results are true and accurate.

CAFB
9/30/93
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2. Density Control

Part 3.5.6 of Section 02210 of the specifications requires one in-place density and one in-place moisture test be performed for hand compacted areas. CAFB must supply the certified test results for the areas of the cover which were trenched and hand compacted in order to install the vertical members of the gas vents.

3. Sieve Analysis

Construction Quality Assurance (CQA) sieve analysis for Section 02224, Gas Vent System, did not conform to Part 1.3.1.1 of the specifications. CAFB must supply evidence that the results for these CQA tests show conformance to the specification.

4. Mill Certificates

Specification Part 1.3 of Section 02245, Geocomposite Membrane Liner, requires that mill test reports accompany the manufacturer's certification of compliance. CAFB shall provide HRMB with the mill test reports.

Specification Part 2.3 of Section 02215, Plastic Filter Fabric, requires that a mill certificate or affidavit be supplied to the Contracting Officer attesting that the geotextile meets the specification requirements. CAFB shall provide HRMB with the test results for the geotextile

Need to Address

Thos Also



for GML

Section 02245, Geocomposite Membrane Liner, requires that an authorized representative of the manufacturer be on-site at the time of writing that the surface on which the geotextile is to be installed is suitable prior to start of GML. CAFB shall provide HRMB with a copy of that

Other instances of non-conformance to the approved closure plan noted were: Construction Quality Control sampling was not conducted at the frequency specified, PVC pipe was not exactly to the specifications, shop drawings for anchorage details were not included, no submittal form showing acceptance of the contractor's as-built drawing was included, and the CQA reports failed to mention the results of pre and post-inspection requirements. NMED has determined that these incidences of non-conformance will not affect our decision to conditionally accept CAFB's closure certification. However, CAFB must supply the information requested in 4.5 within thirty (30) days of your

9/30/93

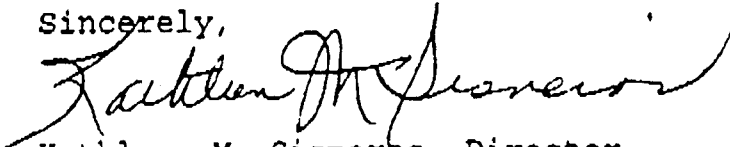
Pg. 3

within the 30 day time limit may result in denial of CAFB's closure certification.

Post-closure care for this hazardous waste management unit begins after completion of closure and continues for thirty (30) years. On September 2, 1992, HRMB issued a Notice of Deficiency for the Post-closure Care Plan submitted as part of your Post-closure Care Permit Application (dated 2/18/92). Pursuant to HWMR-7, 40 CFR § 265.118, CAFB must submit a technically and regulatorily adequate Post-closure Care Plan within ninety (90) days of your receipt of this letter. This new plan must include your responses to the NMED's Notice of Deficiency. Issuance of the Post-closure Care Permit will be scheduled to coincide with investigation results for Landfill 5 conducted under the EPA HSWA permit.

If you have any questions regarding this matter, please contact Ms. Stephanie Stoddard of my staff at 827-4308.

Sincerely,



Kathleen M. Sisneros, Director
Water and Waste Management Division

xc: William K. Honker, U.S. EPA Region 6
Thomas Manning, AFCEE
File



**Western
Technologies
Inc.**

The Quality People
Since 1955

8305 Washington Place, N.E.
Albuquerque, New Mexico 87113
(505) 823-4488 • fax 821-2963

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October 12, 1993

OCT 14 1993

U.S. Army Corps of Engineers
Cannon AFB Resident Office
114 N. Perimeter Road
Cannon AFB, New Mexico 88103-5140

ATTN: Mr. Steve Mahan
Project Engineer

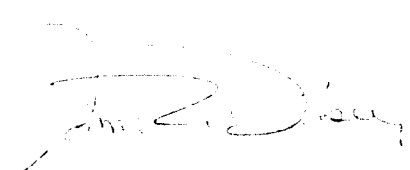
RE: **LANDFILL #5 CELL #3 SOIL CAP CONSTRUCTION MATERIALS TESTING, WT
JOB NO. 3253JJ045**

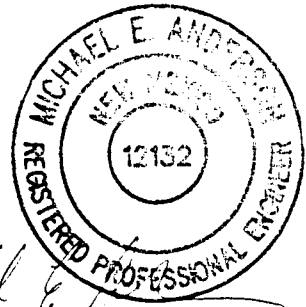

As discussed during our telephone conversation earlier today, Western Technologies Inc. (WT) is submitting this letter regarding the laboratory testing of construction materials used at the referenced project.

All laboratory soils testing conducted by WT in support of the project was performed in compliance with the project specifications (Solicitation No. DACA47-92-B-0045, dated August 1992) and applicable ASTM standards. Results of the testing conducted were forwarded to Pioneer Industries Inc. and the USACE Cannon AFB Resident Office.

If you have any questions or if we can be of further service, please do not hesitate to contact us.

Sincerely,
WESTERN TECHNOLOGIES INC.


John R. Dickey, E.I.
Project Engineer



Michael E. Anderson, P.E.
Director of Engineering

Copies to: Addressee (3)
Pioneer Industries Inc. (1)

10-14-1993 14:35

5053931547

PETTIGREW & ASSOCIATES

P. 02

OCT 14 '93 14:24 PETTIGREW & ASSOCIATES

5057622469

TO:

1
5053931543



PETTIGREW and ASSOCIATES

613 INDUSTRIAL PARK
P.O. BOX 807
CLOVIS, NEW MEXICO 88101
(505) 762-3716

RICHARD R. PETTIGREW, P.E., P.S.
DEBRA P. HICKS, P.E.
WILLIAM M. HICKS, III, P.E.

October 14, 1993

U. S. Army Corps of Engineers
Mr. Steve Mahan
Cannon AFB Resident Office
114 North Perimeter Road
Cannon AFB, NM 88103-5140

RE: Closure Certification Cell 3, Landfill 5
NM7572124454

Dear Mr. Mahan:

In compliance with the Construction Quality Assurance (CQA) plan under section I.B.1.b, I.B.2.c, I.C.1.b, I.C.2.a, I.D.1.b, I.F.1.b, and I.F.2.a, all tests performed for the Closure Certification Cell 3, Landfill 5, NM7572124454, were conducted in substantial compliance with the applicable methods and all test results are true and accurate.

Respectfully Submitted,
PETTIGREW and ASSOCIATES

Debra Hicks, P.E./L.S.I.
N.M. 10871

OCT 12 1993

Lydick

ROBERT L. LYDICK
ROBERT CHAD LYDICK
*Professional Engineer and
Land Surveyor*

ENGINEERS and SURVEYORS
BOX 1386 - 505 762-3771
FAX 505 762-9093
CLOVIS, NEW MEXICO 88101

Registered
New Mexico
Texas - Oklahoma
Colorado

October 8, 1993

Mr. Steve Mahan
U. S. Corps of Engineers
Cannon Air Force Base Resident Office
114 North Perimeter Road
Cannon AFB, New Mexico 88103-5140

RE: Closure Certification Cell 3, Landfill #5
NM7572124454
Cannon Air Force Base, New Mexico

Dear Steve,

I hereby certify that all tests performed for this project by Lydick Engineers Testing Laboratory were conducted in compliance with the applicable methods and that all test results are true and accurate to the best of my knowledge and belief.

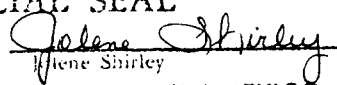
If I can be of further assistance in this matter, please notify.

Very truly yours,

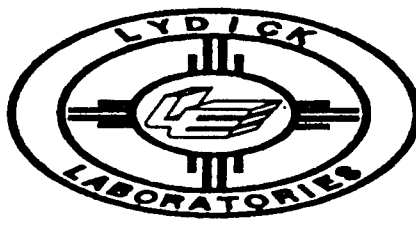


Robert Chad Lydick
P. E. & L. S.



OFFICIAL SEAL
Signature: 
Jolene Shirley
NOTARY PUBLIC - NEW MEXICO
Notary Bond Filed with Secretary of State
My Commission Expires May 6, 1994

FOR: CORP OF ENGINEERS



DATE 10-13-93

PROJECT: LANDFILL #5
CELL # 3 SOIL CAP

TEST NO. 1

LAB NO. CALL NO 001

DENSITY DETERMINATION

LOCATION (STATION) VENT PIPE NO. 1 (NORTH)

TYPE OF MATERIAL EXISTING

DEPTH 6" CONTROL DENSITY, STANDARD MODIFIED 117.3-12.2

NUCLEAR AIR GAP METHOD

DENSITY CPM 3087 (STANDARD COUNT CPM)

MOISTURE CPM 711 (STANDARD COUNT CPM)

TEST #

DENSITY CPM 5551 WET DENSITY (PCF) 94.3 % MOISTURE 5.4

MOISTURE CPM 77 MOISTURE (PCF) 4.8 % REL. DENSITY 76.3

AIR GAP CPM DRY DENSITY (PCF) 89.4

RATIO:

TEST #

DENSITY CPM 5527 WET DENSITY (PCF) 94.5 % MOISTURE 5.5

MOISTURE CPM 78 MOISTURE (PCF) 4.9 % REL. DENSITY 76.4

AIR GAP CPM DRY DENSITY (PCF) 89.5

RATIO:

TEST #

DENSITY CPM WET DENSITY (PCF) % MOISTURE

MOISTURE CPM MOISTURE (PCF) % REL. DENSITY

AIR GAP CPM DRY DENSITY (PCF)

RATIO:

AVERAGE: DRY DENSITY (PCF) 89.5 MOISTURE 5.5 % REL. DENSITY 76.4

BULK DENSITY % DENSITY

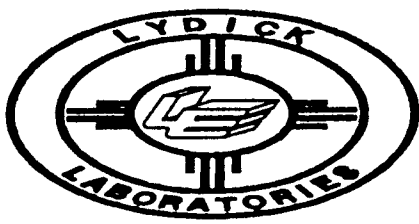
REQUIRED:

TESTED BY Robert Mich

COMPUTED BY

COPIES:

FOR: CORPS OF ENGINEERS



DATE 10-13-93

PROJECT: LANDFILL # 5
CELL # 3 SOIC CAP

TEST NO. 2

LAB NO. CALL # 001

DENSITY DETERMINATION

LOCATION (STATION) VENT PIPE NO. 2

TYPE OF MATERIAL EXISTING COVER

DEPTH 6" CONTROL DENSITY, STANDARD MODIFIED 117.3-12.2

NUCLEAR AIR GAP METHOD

DENSITY CPM (STANDARD COUNT CPM)
MOISTURE CPM (STANDARD COUNT CPM)

TEST #
DENSITY CPM 5875 WET DENSITY (PCF) 92.1 % MOISTURE 4.6
MOISTURE CPM 68 MOISTURE (PCF) 4.1 % REL. DENSITY 75.0
AIR GAP CPM DRY DENSITY (PCF) 88.0
RATIO: _____

TEST #
DENSITY CPM 5876 WET DENSITY (PCF) 92.3 % MOISTURE 4.5
MOISTURE CPM 67 MOISTURE (PCF) 4.0 % REL. DENSITY 75.3
AIR GAP CPM DRY DENSITY (PCF) 88.3
RATIO: _____

TEST #
DENSITY CPM WET DENSITY (PCF) % MOISTURE
MOISTURE CPM MOISTURE (PCF) % REL. DENSITY
AIR GAP CPM DRY DENSITY (PCF)
RATIO: _____

AVERAGE: DRY DENSITY (PCF) 88.2 MOISTURE 4.6 % REL. DENSITY 75.2
BULK DENSITY _____ % DENSITY _____

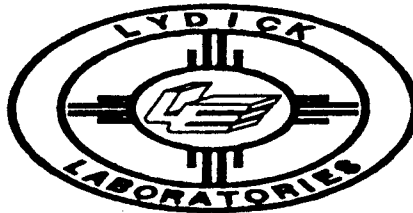
REQUIRED:

TESTED BY Robert Smith

COMPUTED BY _____

COPIES:

FOR: CORPS OF ENGINEERS



DATE 10-13-93

PROJECT: LANDFILL #5
CELL # 3 SOIL CAP

TEST NO. 3

LAB NO. CALL # 001

DENSITY DETERMINATION

LOCATION (STATION) VENT PIPE NO. 3

TYPE OF MATERIAL EXISTING COVER

DEPTH 6" CONTROL DENSITY, STANDARD MODIFIED 117.3-12.2

NUCLEAR AIR GAP METHOD

DENSITY CPM (STANDARD COUNT CPM)

MOISTURE CPM (STANDARD COUNT CPM)

TEST #

DENSITY CPM 5838 WET DENSITY (PCF) 92.3 % MOISTURE 4.4

MOISTURE CPM 66 MOISTURE (PCF) 3.9 % REL. DENSITY 75.4

AIR GAP CPM DRY DENSITY (PCF) 88.4

RATIO:

TEST #

DENSITY CPM 5833 WET DENSITY (PCF) 92.4 % MOISTURE 4.1

MOISTURE CPM 63 MOISTURE (PCF) 3.7 % REL. DENSITY 75.7

AIR GAP CPM DRY DENSITY (PCF) 88.7

RATIO:

TEST #

DENSITY CPM WET DENSITY (PCF) % MOISTURE

MOISTURE CPM MOISTURE (PCF) % REL. DENSITY

AIR GAP CPM DRY DENSITY (PCF)

RATIO:

AVERAGE: DRY DENSITY (PCF) 88.6 MOISTURE 4.3 % REL. DENSITY 75.6

BULK DENSITY % DENSITY

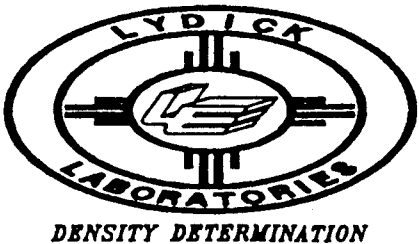
REQUIRED:

TESTED BY Robert Smith

COMPUTED BY

COPIES:

FOR: CORPS OF ENGINEERS
PROJECT: LANDFILL #5
CELL #3 SOIL CAP



DATE 10-13-93
TEST NO. 4
LAB NO. CALL No 001

LOCATION (STATION) VENT PIPE NO. 4
TYPE OF MATERIAL EXISTING COVER
DEPTH 6" CONTROL DENSITY, STANDARD MODIFIED 117.5-12.2

NUCLEAR AIR GAP METHOD

DENSITY CPM (STANDARD COUNT CPM)
MOISTURE CPM (STANDARD COUNT CPM)

TEST #
DENSITY CPM 5293 WET DENSITY (PCF) 96.3 % MOISTURE 3.9
MOISTURE CPM 62 MOISTURE (PCF) 3.6 % REL. DENSITY 79.1
AIR GAP CPM DRY DENSITY (PCF) 92.7
RATIO:

TEST #
DENSITY CPM 5312 WET DENSITY (PCF) 96.1 % MOISTURE 3.9
MOISTURE CPM 62 MOISTURE (PCF) 3.6 % REL. DENSITY 79.0
AIR GAP CPM DRY DENSITY (PCF) 92.6
RATIO:

TEST #
DENSITY CPM WET DENSITY (PCF) % MOISTURE
MOISTURE CPM MOISTURE (PCF) % REL. DENSITY
AIR GAP CPM DRY DENSITY (PCF)
RATIO:

AVERAGE: DRY DENSITY (PCF) 92.7 MOISTURE 3.9 % REL. DENSITY 79.0
BULK DENSITY % DENSITY

REQUIRED: TESTED BY Robert Mice
COPIES: COMPUTED BY

Gundle Lining Systems Inc

Gundle[®]

19103 Gundle Road
Houston, Texas 77073-3598
U.S.A.

Phone: (713) 443-8584
Toll Free: (800) 435-2008
Telex: 188667 GUNDLE HOU
FAX: (713) 876-6010

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October 13, 1993

Corps of Engineers
114 N Perimeter Rd.
Cannon Air Force Base
Cannon, NM 88103-5140

Attention: Mr. Steve Mahan, Project Engineer

Dear Mr. Mahan:

This letter is regarding the Gundseal Geosynthetic Clay Liner (GCL) installation on Cannon Air Force Base in May 1993. To certify the product thickness(s), please refer to the attached final product weight report. The final report was furnished as part of the Quality Control / Quality Assurance documentation for all rolls shipped to the job site.

If you have any questions, please contact me at

Sincerely,



Richard B. Erickson
General Manager - Gundseal

RBE:mh

cc: M. Harris

PG TECHNOLOGY CO.
3150 1ST AVE. SPEARFISH, SD 57783
605-642-0531.FAX: 605-642-0539

GUNSEAL
FINAL PRODUCT WEIGHT

Manufacturing Date: April 22, 1993

TEST RESULTS

a. Average Thickness.....	<u>.212</u>	in.
b. Average Total Weight	<u>1.27</u>	lbs./sq.ft.
Nominal Geomembrane Weight	<u>.2</u>	lbs./sq.ft.
Dentonite Coating Weight	<u>1.07</u>	lbs./sq.ft.

Test Results For

Roll #: 4227 which covers rolls from
#: 4210 to # 4237

ORIGINAL



CERTIFICATION OF COMPLIANCE

I hereby certify that the Carthage Mills FX-40HS
furnished to Hausman Steel Corporation
for incorporation into the Cannon AFB, Landfill #5, Cell #5
project, is in compliance with the Contract Specification for Geotextile
Fabric per section 2.3 as per the attached Minimum Average Roll Values

Carthage Mills

By: Alan L. Ossege
Alan L. Ossege
Title: General Manager

Subscribed and sworn before me this 08th day of Oct., 19 93
at Cincinnati, Hamilton County, Ohio

Seal



Kathryn L. Winters
Kathryn L. Winters
Notary Public

My commission expires July 12, 1998.

Quality Textiles
from
Carthage Mills



FX-40HS Product Data

A Nonwoven Multipurpose Fabric of
100% Polypropylene STAPLE
FILAMENTS, Needle-punched and
HEATSET.

(Fabric Sample)

(Fabric Sample)

Properties

Test Methods

Results

Weight oz/sy ASTM D-3776	4.0
Tensile Strength, lbs. ASTM D-4632	110
Elongation @ Break, % ASTM D-4632	50%
Mullen Burst, psi ASTM D-3786	215
Puncture Strength, lbs. ASTM D-4833	60
Trapezoidal Tear, lbs. ASTM D-4533	50
AOS-U.S. Std. Sieve ASTM D-4751	70
Permittivity, sec-1 ASTM D-4491	2.0
UV Resistance, % Retained (150 hrs) ASTM D-4355	70

#610 P03

TEL NO: 513 761 1222

OCT-11-93 MON 09:12 ID: CARTHAGE MILLS

Gundle Lining Systems Inc

Gundle[®]

19103 Gundle Road
Houston, Texas 77073-3598
U.S.A.

Phone: (713) 443-8564
Toll Free: (800) 435-2008
Telex: 166657 GUNDLE HOU
FAX: (713) 875-8010

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October 13, 1993

Corps of Engineers
114 N Perimeter Rd.
Cannon Air Force Base
Cannon, NM 88103-5140

Attention: Mr. Steve Mahan, Project Engineer

Dear Mr. Mahan:

This letter is regarding the Gundseal Geosynthetic clay liner (GCL) installation on Cannon Air Force Base in May, 1993. As the on site Gundle representative, I certify that the soil sub grade, prior to placement of the liner, was acceptable

If you have any questions, please contact me.

Sincerely,



Richard B. Erickson
General Manager - Gundseal

RBE:mh

cc: M. Harris