06.12-8/01/00-00944

Landfill Closure Certification Report

Landfill Cap
CD Landfill
Naval Base
Norfolk, Virginia

Prepared for

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia

Contract No. N62470-95-D-6007
CTO-0080

August 2000

Prepared by

CH2MHILL

Baker
Environmental, Inc.

CDM
Federal Programs Corp.

TABLE OF CONTENTS

Section		Page
1.0	Introduction	1
	1.1 Cover Construction Procedures	2
	1.2. Construction Quality Assurance Activities	3
	1.2.1 Leveling and Bedding Layers	3
	1.2.2 LLDPE Flexible Membrane Cover (FMC)	3
	1.2.3 Composite Drainage Net (CDN)	4
	1.2.4 Protective Cover Layer	4
	1.2.5 Topsoil, Surface Drainage, Access Roads, and Fence	5
	1.2.6 Groundwater Monitoring Wells	5
2.0	Final Construction Inspection	7
3.0	Design Modification	9
4.0	As-Built Drawings	11
5.0	Conclusion	12

Appendices

Appendix A Soils Test Results
Appendix B LLDPE Flexible Membrane Cover QC Documentation
Appendix C Composite Drainage Net Certification
Appendix D As-Built Drawings

1.0 Introduction

This report documents the construction quality assurance (CQA) activities performed during construction of the final cover of the CD Landfill at the Naval Station, Norfolk, Virginia. This work was carried out in accordance with the CQA Plan prepared for the project in April 1999. The drawings and specifications referred to in this document are Naval Facilities Engineering Command (NAVFAC) drawings numbered 4388643 through 4388672, and specification number 05-98-8816, entitled *Landfill Cap for the CD Landfill at the Naval Base, Norfolk, Virginia.*

Each of the following participants had major responsibilities in accomplishing the closure of the landfill:

Navy (Owner)	NAVFACENGCOM Norfolk, Virginia Zane Perry, ROICC Sewells Point
Design and CQA Engineer	CH2M HILL Herndon, VA Anthony Tomlin, Project Manager Stewart L. Barnes, Senior Engineer Anthony Tomlin, Stewart L. Barnes, Resident QA Observers
Contractor	Grace Industries, Inc. (Grace) Lehigh Valley, PA Gary Souilliard, QC Manager
Geomembrane & CDN Installer	GeoPacific Lining, Inc. Seattle, Washington Kirk Lilleskare, Project Manager
Geomembrane Testing Lab	Precision Geosynthetic Laboratory (PGL) Orange, CA
CDN Testing Lab	TRI Environmental, Inc. Austin, TX
Soil Testing Subconsultant	ECS, Ltd. Chesapeake, VA

As the construction quality assurance (CQA) engineer, CH2M HILL was responsible for submittal reviews, periodic site inspections, engineering during construction, and certification of the closure. The Navy's construction contracting office was responsible for day-to-day inspections and enforcement of construction quality control (CQC). The data and information collected herein are the basis for the landfill closure certification by a Virginia registered professional engineer. CH2M HILL observed and inspected the following activities:

- Surface preparation for bedding layer (waste grading)
- Bedding layer placement
- Flexible membrane cover (FMC) installation
- Composite drainage net (CDN) installation
- Vegetative support layer/protective cover placement
- Topsoil placement
- Erosion and sedimentation prevention measures
- Landfill structures (i.e. downchutes, roads, fences, culverts, etc.)
- Relocation of existing groundwater monitoring wells

CH2M HILL reviewed and approved the following types of submittals:

- Soil test results from laboratory and field
- Aggregate test results (rip-rap and gravel)
- Material certifications (fencing, geotextile, silt fence, etc.)
- Geomembrane test results and certifications
- Geomembrane installation quality control records
- Composite drainage net (CDN) certifications
- Seed certifications

1.1 Cover Construction Procedures

The CD Landfill cap consists of a multi-layered system of geosynthetics and soil designed to satisfy the landfill closure criteria of the Virginia State Solid Waste Disposal Facility Standards. The closure criteria, § 5.2.E.1.a., state that the facility must be closed in a manner that minimizes the need for further maintenance, and controls, minimizes or eliminates the post-closure escape of uncontrolled leachate, surface runoff, decomposition gas migration, or waste decomposition products to the groundwater, surface water, or to the atmosphere. In order to achieve these criteria, the cap design conformed to the guidelines listed under § 5.2.E.1.b.(1) of the Virginia State Solid Waste Disposal Facility Standards.

Cap construction began with final grading of the waste and installation of an earthfill leveling layer. This was followed by the installation of the geomembrane barrier layer. The layer consists of a 40-mil linear low-density polyethylene (LLDPE) flexible membrane cover (FMC) underlain by a 6-inch bedding layer to provide an adequate surface to support the cover material. The bedding material specified was classified per ASTM D 2487 as SC, SM, or SP with not more than 15 percent passing by weight passing ASTM D 1140, No. 200 sieve, and maximum particle size not exceeding 3/8-inches.

Following the installation of the barrier layer, the geocomposite drainage layer was installed. The geocomposite drainage layer consists of a composite drainage net (CDN),

which is constructed of a synthetic drainage net with filter fabric bonded on top and bottom. Without the use of the CDN, infiltration can cause excess moisture conditions above the FMC. This eventually leads to slope stability problems. The CDN keeps water from being trapped above the FMC by providing a lateral drainage path for water that has infiltrated through the topsoil and vegetative support layers. The lateral drainage from the CDN is collected in a gravel drain along the toe of the landfill slope. From the gravel drain, water is released along the landfill perimeter by means of corrugated HDPE pipes.

The CDN was covered with a minimum of 24 inches of protective cover soil. The top six inches of the required cover soil consists of topsoil. The topsoil is natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch in diameter, brush, weeds, and other material detrimental to plant growth. The topsoil was seeded per the specifications. The remaining 18 inches is of a vegetative support layer consisting of onsite material with ASTM D 2487 classification of SC, SM, or SP with not more than 15 percent passing by weight passing ASTM D 1140, No. 200 sieve.

1.2 Construction Quality Assurance Activities

In accordance with the CQA Plan, a CH2M HILL representative provided observation of cap construction activities listed above. At least one CH2M HILL representative was on site weekly between May 19, 1999, and November 5, 1999, and on a biweekly basis between November 8 and December 15, 1999. Specific oversight activities are summarized below.

1.2.1 Leveling and Bedding Layers

Leveling and bedding layer placement was done by the prime contractor, Grace Industries, Inc. (Grace). CH2M HILL verified that samples and test results of the bedding material met the requirements of the specifications. Laboratory test results for the bedding material and other soils used for cap construction are included in Appendix A. CH2M HILL also reviewed the results of in-situ density testing of the bedding material by nuclear density gauge and sand cone. Field test results are also included in Appendix A. Areas that failed density testing or proof rolling were reworked, or excavated and backfilled with suitable material. In addition, CH2M HILL spot checked final grades and inspected the final surface to ensure it was smooth and free of rocks larger than 3/8 inch prior to installation of the LLDPE FMC. Hand picking the bedding material was required to remove large rocks and debris.

1.2.2 LLDPE Flexible Membrane Cover (FMC)

In accordance with the CQA Plan, CH2M HILL reviewed LLDPE FMC submittals, during, and after the installation of the FMC. These contractor submittals included qualifications of the membrane manufacturer and installer, factory test results and certification that the geomembrane conformed with the specifications, the installer's QC plan, a panel layout drawing and details, and certificates of subgrade acceptance from GeoPacific Lining, Inc. (GeoPacific), the liner installer.

During installation of the LLDPE FMC, CH2M HILL observed panel deployment, seaming, repair operations, and vacuum and pressure testing. Any defects, mechanical damage, or fusion welding burn-throughs were marked for repair and brought to the attention of the liner installer. Collection of destructive samples was the responsibility of Grace's QC

Manager. Additionally, handling and storage procedures were observed, and recommendations made in order to meet specifications.

Upon completion of the installation, CH2M HILL reviewed final QC submittals, including seam test results, certifications, warranties, and record drawings. All LLDPE FMC QC documentation is included in Appendix B. Record drawings of the installation are contained in the project records.

1.2.3 Composite Drainage Net (CDN)

In accordance with the CQA Plan, CH2M HILL reviewed CDN submittals prior to installation. GeoPacific was also the CDN installer. These submittals included qualifications of the CDN installer and manufacturer, factory test results and certification that the CDN conformed to specifications, and the installer's QC plan.

During installation of the CDN, CH2M HILL conducted surface inspections of the deployed panels and panel seams. Any defects, or mechanical damage, were marked for repair and brought to the attention of the CDN installer. Additionally, handling and storage procedures were observed, and recommendations made in order to meet specifications.

During the initial stages of CDN deployment, GeoPacific had difficulty in meeting the specifications on the installation of the CDN. In some cases, less that the specified 4 inches of overlap was observed between panels. In other cases, less than the specified number of ties were used to attach adjacent panels. In one instance, adjacent CDN panels were not overlapped properly or tied at all, resulting in ponding water following a rain event. Additionally, improper panel orientation (panels running along slope instead of up slope) was observed, and the CDN was observed to run short of the anchor trench in several locations. These problems were brought to the attention of Grace, and were corrected by reseaming and repositioning of panels. Subsequent CDN placement was done in accordance with the specifications.

Upon completion of the installation, CH2M HILL reviewed the final QC submittals, specifically the material certifications. CDN QC documentation is included in Appendix C.

1.2.4 Protective Cover Layer

CH2M HILL verified that laboratory test results of the protective cover layer material met the requirements of the specifications, observed placement of the protective cover over the CDN, and observed in-situ testing of the layer.

Grace provided thickness control for the protective cover layer and the overlying 6-inch topsoil layer with grade stakes set to provide both a minimum total thickness of 18-inches of fill above the CDN and final design grades. Grace took care that placement of the grade stakes did not damage the liner or CDN. The resulting protective soil layer thickness was at least 18-inches thick, and the topsoil layer at least 6-inches thick. In general, the minimum-required total thickness of the cap above the CDN was achieved.

CH2M HILL also verified the frequency of laboratory moisture-density tests on the material. Field and laboratory test results for the protective cover layer are included in Appendix A.

1.2.5 Topsoil, Surface Drainage, Access Road, and Fence

CH2M HILL observed the initial placement activities for topsoil and temporary seeding on the cap. The Contractor performed these activities during the months of November and December 1999. CH2M HILL also reviewed contractor submittals to verify that the related materials conformed to the project's material specifications.

While placing topsoil, Grace began construction of permanent structures and features of the project. These features included perimeter fencing, access roads, rip-rap and gabion channel protection. The final dressing and grading of the perimeter channels was also performed. CH2M HILL inspected depths, dimensions, and configurations of these features for conformance with those shown on the project drawings. Overall, Grace met the intent of the design drawings and specifications. Most of the problems found by CH2M HILL were of a minor nature; Grace corrected all problems to the satisfaction of the Navy and CH2M HILL. Problems that were corrected by design change or variance are discussed in Section 3.0, Design Modifications.

1.2.6 Groundwater Monitoring Wells

CH2M HILL observed the abandonment and relocation of three groundwater monitoring wells at the CD Landfill. The wells were relocated to make them more accessible for sampling. The monitoring wells are identified by the names MW-05B, MW-05C, and MW-06B.

The monitoring wells were abandoned by IMS in July 1999, by pumping a cement/bentonite grout into the wells until the entire length of well screen and riser were filled. Following the well grouting, the PVC and steel protective well casings were cut off below grade. The surface materials, including the protective well casings and concrete pads were removed from the site.

In December 1999, CH2M HILL observed the relocation of groundwater monitoring wells MW-05B, MW-05C, and MW-06B by Parrot Wolf, Inc. Monitoring wells MW-05B and MW-05C were installed approximately 50 feet to the northeast of their original locations, along the eastern end of the North Access Road. Monitoring well MW-06B was installed approximately 50 feet south of its original location along the dirt road adjacent to the South Perimeter Channel.

Shallow monitoring wells MW-05B and MW-06B were constructed as Type II wells to depths of 24 feet and 28 feet, respectively, to monitor the groundwater quality at the base of the shallow Columbia Aquifer. The monitoring wells were constructed of two-inch diameter, Schedule 40, flush-joint threaded PVC well casing with a 10-foot long 0.010- inch slot screen.

Monitoring well MW-05C was constructed as a Type III monitoring well to a depth of 57 feet to monitor the groundwater quality at the upper portion of the deeper Yorktown Aquifer. This type of well construction "cases off" the shallow aquifer to prevent downward migration of contaminants into the deeper Yorktown Aquifer. This monitoring well is also constructed of a two-inch diameter, Schedule 40, flush-joint threaded PVC well casing with a 10-foot long 0.010 inch slot screen. This construction was installed inside a six-inch diameter steel well casing that extends to a depth of 40 feet.

Completed wells included a steel well cover to protect the PVC well and four protective bollards filled with concrete. The protective casings and bollards were secured with 4-foot by 4-foot concrete pads. Each protective casing was secured with a padlock.

2.0 Final Construction Inspection

CH2M HILL conducted two major inspections as part of the final closure and acceptance of the landfill project. The timing of the project's completion necessitated the need for two inspections. Due to severe weather patterns along the East Coast in 1999, Grace was forced to delay construction into the winter months. By early December, Grace was nearing completion of the project, but was unable to place permanent seeding in the cold weather. Therefore Grace applied temporary seeding to the site, demobilized for the winter, and returned in May 2000 to complete the few remaining work items and permanently seed the site. CH2M HILL performed the first of the two final inspections after the winter demobilization in December and the second after the permanent seeding in June 2000. The inspections are discussed below.

The purpose of performing two inspections as part of the final closure and acceptance process was two-fold. First, CH2M HILL wanted to establish whether Grace had completed all major work items per the design before they permanently seeded. Waiting until after the permanent seeding activity would have meant that any corrective work would have disturbed the grass. Second, Grace would know in advance what, if any, problems needed to be resolved before mobilizing in the spring. Therefore, Grace could better anticipate their costs above what was needed for the permanent seeding. Since major design issues were addressed in the December inspection, CH2M HILL and the Navy were able to accept the construction in June without a long list of rework items or contracting disputes with Grace.

2.1 December Inspection

On December 15, 1999, CH2M HILL conducted a site inspection of CD Landfill. The purpose of the inspection was to ascertain compliance of the work with the design and document work and rework items that should be addressed in the next construction season.

CH2M HILL found that Grace had constructed all major design components and had met the overall intent of the design. However there were a few work items that Grace needed to address in the spring. These items were presented to Grace as a punchlist for final acceptance of the site. Items that Grace was asked to address in the spring were as follows:

1. The downstream ends of two channels running down the landfill side slopes (downchutes) were not constructed per the final grading plan. The downstream ends should have been placed at or within a few inches of the receiving channel's bottom elevation. Instead the downstream ends were constructed at an elevation greater than 12-inches higher than the receiving channel bottom. The situation could cause undermining of the downchute's toe by flow in the receiving channel and consequent failure of the downchute's gabion channel lining. Though rip-rap was placed around the downchute's toe to defend against such undermining, Grace was required to grout in the area to better protect the Navy's investment.

2. Topsoil did not meet the Project Specification requirement that the topsoil contain no rocks larger than 1-inch in diameter and/or debris. The contractor was required to remove the objectionable material before beginning the permanent seeding process.

3. A portion of the liner and drainage net anchor trench was exposed by erosion and the CDN appears damaged. Grace was required to make all needed geosynthetic repairs and redirect run-off to the near-by downchute.

4. The South Perimeter Channel construction was incomplete. Grace was required to construct the uniform channel cross-section and place temporary erosion control matting.

5. Silt fence installed on the cap appeared to have been set deep enough to penetrate the liner. Grace was required to determine whether there had been penetrations and to repair any penetrations found.

6. Grades along the North Access Road were uneven and the road was rutted in spots. Grace was required to bring the road and surrounding ground up to final grade

7. Areas where the contractor spilled equipment fuel on the ground needed to be excavated and the soil removed to an appropriate disposal facility. Grace was required to comply with a directive from the Navy.

2.2 *June Inspection*

On June 15, 2000, CH2M HILL performed the second and final inspection of the landfill. Grace had complied with punchlist work items. The only deviations are as follows:

1. The topsoil used consisted of both off-site borrow materials and stripped material. A majority of the stripped material did not meet the topsoil requirements of the specifications because it contained rocks larger than 1-inch in diameter and wood debris. Because it was on-site material and the debris was not detrimental to the design, this portion of the specification was waived.

2. Grace did not plant wild flower seeds per design. This item will be completed in the future. Since this item is an aesthetic feature, and not relevant to the long term integrity of the landfill cap, CH2M HILL does not consider it as an infraction of the design intent for the cover system as presented in Section 1.1.

3.0 Design Modification

There were four changes to the original design:

- The edge of liner location was changed along Seabee Road,
- Preliminary grades were raised in the landfill area west of Seabee Road,
- The cap configuration under the fence post foundations was changed, and
- The outlet elevations of a number of the channels running down the landfill side slopes (downchutes) were changed.

Each of these modifications are discussed below. Design modifications are reflected on the as-built drawings in Appendix D.

3.1 Edge of Liner Location

The original design called for the construction of 5-ft wide paved shoulders on either side of Seabee Road, and the FMC and CDN would terminate at the edge of these new shoulders. After mobilizing on-site, Grace observed the amount of traffic on Seabee Road, and felt that laying liner so close to an open roadway would be an undue hazard to workers. To address this concern and met the intent of the design, CH2M HILL redesigned the edge of liner along Seabee Road.

CH2M HILL designed the area for wider shoulders and to preserve the existing sidewalk east of the road. Shoulders on both sides of the road were widened to 10-ft to give Grace a greater buffer between the workers and traffic. On the east side of the road, the shoulder terminated adjacent to the existing sidewalk. Instead on demolishing the sidewalk as called for in the original design, it was left intact and the liner was terminated adjacent to the sidewalk. By extending the asphalt shoulders, CH2M HILL was able to allay safety concerns while maintaining a barrier (asphalt or FMC) over the landfill area.

3.2 Raised Preliminary Grades

While preparing the landfill surface for deployment of liner, Grace did not anticipate the need to redistribute on-site cut material over the landfill foot. On the east side of Seabee Road, Grace applied borrow soil from an off-site source. After placing the material, Grace realized they would not have enough volume in the remaining areas to be graded to disperse cut material from on-site. CH2M HILL and the Navy agreed to allow Grace to place the cut materials on the north side of the landfill area west of Seabee Road. This had the consequence of raising the grades from two percent to five percent slopes, but positive and controllable drainage patterns were maintained.

3.3 Cap Configuration Below Fence

To place the fence along the east side of Seabee Road in the original design, CH2M HILL required that the FMC and CDN be placed a minimum of 1-ft below the bottom of the fence post foundation and that the CDN drained towards the western site perimeter. This design required Grace to cut into the landfill approximately 3-ft in some areas. To alleviate some of the excavation, Grace requested that the CDN not be drained to the west. Instead of cutting the landfill to provide slope for the CDN to drain west, Grace cut the area as needed to

allow for a 1-ft minimum separation between the fence post foundations and the CDN. The CDN in this constructed low spot was drained to the north and south by means of a gravel and HDPE pipe drain, similar to the toe drains along the landfill perimeter.

3.4 Downchute Outlet Elevations

As noted in Section 2.1, above, the contractor did not construct two downchutes in accordance with the final grading plans. This error was due to inaccurate surveying.

Since the liner system was already deployed, CH2M HILL decided it would be more cost effective to work with the error. The error does not change the intent of the design, because positive drainage is maintained from the downchutes to the receiving channel and the liner system is still protected.

The one problem that could occur due to the higher elevations is undermining of the gabion outlet apron by flow in the receiving channels. Grace provided rip-rap along the edge of the apron to deter undermining. CH2M HILL required Grace to increase the protection by grouting the rip-rap along the apron edges. CH2M HILL believes these measures will keep undermining problems from occurring.

4.0 As-Built Drawings

Appendix D contains the as-built topographic drawings produced by Patton, Harris, Rust & Associates and the liner as-built drawing produced by GeoPacific.

Major features shown on the liner as-built drawing include the following:

- Panel numbering and orientation,
- Location and types of repairs, and
- Locations of destructive test sampling.

Major features shown on the pre-liner stage topographic map include the following:

- Limits of liner are shown.
- Spot elevations of constructed grade are shown with proposed design contours for comparison purposes.
- Surveyor provided information on time period in which survey information was gathered.

Major features shown on the final stage topographic map include the following:

- Constructed edge of pavement along Seabee Road,
- Constructed fence line along Seabee Road and north side of landfill,
- Gravel access road locations,
- Extent of rip-rap,
- Culvert locations and invert elevations,
- Diversion berm locations,
- Top and toe of slope in main stormwater channels, and
- Spot elevations of constructed grade are shown with proposed design contours for comparison purposes.

5.0 Conclusion

On the basis of the information provided in this report, I hereby certify that the CD Landfill at the Naval Station Norfolk, Virginia has been closed in substantial conformance with requirements of the approved closure plan, landfill closure drawings, specifications, and the CQA plan. Known deviations from strict conformance have been noted in this report and do not, in the opinion of this engineer, detract from the overall performance and design objectives of the project.

Anthony S. Tomlin, P.E.
VA P.E. #033977

Appendix A

Soil Test Results

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO.	TRANSMITTAL NO.	DATE
N62470-98-C-8816	55	10-4-99

FROM CONTRACTOR: Grace Industries INC
4th N.C. Div. Fac Eng. Command

PROJECT TITLE AND LOCATION: Landfill Cap for CD Landfill
NAVAL Base
Norfolk VA.

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
79	Section 02921 2.3.4	Topsoil Composition	7	A	
				C	AS FCH2MHILL 5OCT99

CONTRACTOR'S COMMENTS

* ~~I hereby certify that the (material) (equipment) (article)~~ shown marked in this submittal and proposed to be incorporated in Contract Number N62470-98-C-8816, is in compliance with the contract drawings and specification, can be installed in allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager _____, Date 10-4-99
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature)

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
5OCT99		

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

Approval of fertilizer composition is dependent on approval of topsoil.

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	5OCT99	

09/23/99	6122	013874	YORK	00		UNSPECIFIED
DATE	LAB NO.	SERIAL NO.	COUNTY	ACRES	FIELD	SOIL

AGRICULTURAL ANALYTICAL SERVICES LABORATORY
COLLEGE OF AGRICULTURAL SCIENCES
THE PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY PARK, PA 16802
(814 863-0841)

SOIL TEST REPORT FOR:

GRACE INDUSTRIES
6993 SILVERCREST RD
NAZARETH PA 18064

COPY SENT TO:

00000

SOIL NUTRIENT LEVELS:

		LOW / MEDIUM / HIGH / EXCESSIVE
Soil pH		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Phosphate	(P_2O_5)	XX
Potash	(K_2O)	XXXXXXXX
Magnesium	(MgO)	XXXXXXXXXXXXXXXXX
Calcium	(CaO)	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

RECOMMENDATIONS FOR: *WOODLOT,MIXED,TO PLANT*

See Back For Comments

PH ADJUSTMENT LB/100 SQ.FT.

CALCITIC LIMESTONE (0-3% MG): NONE

MG AND CALCIUM ADJUSTMENT LB/100 SQ.FT.

(MgSO4) EPSOM SALTS: NONE — 1,2

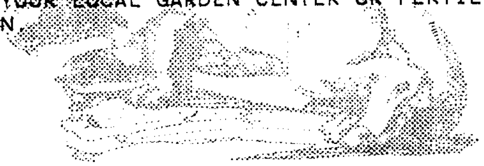
(CaSO4) GYPSUM: NONE — 3,4

PLANT NUTRIENT NEEDS: LBS/100 SQ.FT.

5-10-10		5-10-5		10-10-10
2.5	+	NONE	+	NONE
0-46-0		**21-53-0**		**UREA**
1.0	+	NONE	+	NONE

MESSAGES:

* THE ABOVE LIME AND FERTILIZER RECOMMENDATIONS ARE FOR THIS SOIL SAMPLE AND THIS SEASON ONLY. PLANT NUTRIENT RECOMMENDATIONS ARE FOR FERTILIZERS CONTAINING SPECIFIC RATIOS OF NITROGEN (N), PHOSPHATE (P205) AND POTASH (K20). AS AN EXAMPLE 5-10-10 CONTAINS 5% N, 10% P205, AND 10% K20. IF FERTILIZERS WITH THE RATIOS SHOWN ARE NOT AVAILABLE, CONTACT YOUR LOCAL GARDEN CENTER OR FERTILIZER SUPPLIER FOR THE APPROPRIATE SUBSTITUTION.



LABORATORY RESULTS:

7.0	24	0.0	0.26	1.7	13.5	15.5	1.6	11.0	87.0
SOIL pH	P lb/A	ACIDITY	K	Mg	Ca	CEC	K	Mg	Ca
		EXCHANGEABLE CATIONS (meq/100 g)					% SATURATION		

OTHER TESTS:

SOIL09 TREES: ORNAMENTALS,XMAS,WOODLOT

C O M M E N T S

To be most effective, all recommended limestone and/or fertilizer should be incorporated 6 to 8 inches into the soil prior to planting. If plants or crop is established, apply recommended materials to the surface and water area well.

2. If 11 to 20 pounds of limestone are recommended, divide the amount by two and apply in two applications six months apart. If 21 or more pounds are recommended, divide the amount by three and make three applications at six month intervals.

3. If 3 or more pounds of $MgSO_4$ (Epsom salts) are recommended, divide the amount by two and make separate applications at four month intervals. If an alternative magnesium source is used, apply an amount equal to the equivalent of 10.5% Mg in $MgSO_4$; only one application should be needed.

4. Lime and fertilizer are recommended in pounds of material per each 100 square feet of area to be treated. Use the following conversions to convert from pounds per 100 square feet to other units or area sizes:

   pounds per 100 sq. ft. x 10 = pounds per 1000 sq. ft.
   pounds per 100 sq. ft. x 435 = pounds per acre

5. Lime and fertilizer are recommended in pounds of material per each 100 sq. ft. of area. For band length or number of spots (individual trees) that can be treated with the recommended amounts shown; use the following equations:

   Band lenght in ft. = (100 sq. ft.) / (Band width in ft.)
   Individual plants (spots) = (100 sq. ft.) / (area of circle)
   area of circle in sq. ft. = 1.0 ft. dia. = 0.75 sq. ft.
   1.5 ft. dia. = 1.75 sq. ft.
   2.0 ft. dia. = 3.00 sq. ft.
   3.0 ft. dia. = 7.00 sq. ft.

6. Amount of sulfur needed to lower soil pH to optimum level.
   (See front of report for soil pH and optimum pH)

FROM CURRENT SOIL PH	TO OPTIMUM SOIL PH	SULFUR (lb/100 sq ft)	FROM CURRENT SOIL PH	TO OPTIMUM SOIL PH	SULFUR (lb/100 sq ft)
8.0	7.5	0.50	7.0	6.5	0.75
	7.0	1.00		6.0	1.25
	6.5	2.00		5.5	2.50
	6.0	3.00			
	5.5	4.00			
7.5	7.0	0.75	6.5	6.0	1.00
	6.5	1.25		5.5	1.75
	6.0	2.50			
	5.5	3.50	6.0	5.5	1.50

Apply sulfur at the above rates for a loam soil. On heavier soils (silt loams) use one third more than the amount shown. On lighter soils (sandy loams) use one-half of the amounts shown.

If aluminum or ferrous sulfate is used to lower pH, multiply the above amounts by 2.5. Follow the same suggestions as above for soil types. If 4 or more pounds are needed, divide the amount in half and make two applications six months apart.

LIMING MATERIAL CONVERSION TABLE

FOR COMMERCIAL FRUITS AND VEGETABLES, LAWN, LANDSCAPE PLANTS, WOODLOT, CHRISTMAS TREES, AND GREENHOUSE CROPS

The limestone recommendation is based on using material equivalent in neutralizing power to 100% calcium carbonate limestone. The recommendations are in pounds of calcium carbonate equivalent (CCE) per 100 sq. ft. The use of any liming material not equivalent in neutralizing power to pure calcium carbonate limestone (100% CCE) must be adjusted to apply enough liming material to neutralize the acidity in your soil. All agricultural liming materials sold in Pennsylvania are legally labeled with their calcium carbonate equivalent (CCE). The amount required to supply the recommended amount of CCE for your soil may be calculated either as explained below or read directly from the table.

Liming material must be ground fine enough to be effective. Pennsylvania law requires that both agricultural and industrial by-products limestone meet the following standards:

95% through a 20 mesh per inch screen
60% through a 60 mesh per inch screen
50% through a 100 mesh per inch screen

Granular limestone (lawn and garden limestone) must meet the following minimum standards:

95% through a 20 mesh per inch sieve
40% through a 60 mesh per inch sieve
30% through a 100 mesh per inch sieve

Calculation of Actual Lime Requirement:

$$\text{Actual Liming Material Required} = \frac{\text{Soil Test Limestone Recommendation}}{\text{CCE of liming material}} \times 100$$

Example: If your Soil Test Recommendation states – "* * * limestone – Apply 4 lbs. of calcium carbonate equivalent dolomitic limestone per 100 sq. ft.", and the Liming Material Label states "Calcium Carbonate Equivalent (CCE) = 80%", then the Actual Liming Material Required is 4/80 x 100 = 5 lbs. liming material per 100 sq ft.

The calculations assume that you are using a material that at least meets the minimum fineness standard. The finer the limestone, the quicker the response. When growing short-season, specialty, greenhouse, vegetable, and fruit crops it is advisable to apply the finest lime available even though it may be more expensive than coarser materials.

Using the conversion table: Find your soil test limestone recommendation value in the left hand column and then read across the table on that line until you come to the column headed by the % CCE nearest to that of your liming material. The number at that point is the pounds of liming material required to meet the limestone recommendation on your soil test.

For example: If it is suggested that you apply 10 pounds CCE per 100 sq. ft. and the liming material you plan to use contains 85% CCE you would need 11.8 pounds of the material you chose to obtain sufficient neutralizing power in your soil.

Because there is no advantage gained by applying more than 10 pounds of CCE per 100 sq. ft. in any one application, this is divided into three sections suggesting how the total liming material required may be split for most efficient use. (See the right hand column).

Pounds per 100 sq. ft. of CCE Recommended on Your Soil Test.	Percent Calcium Carbonate Equivalent (% CCE) of Your Liming Material								Divide Total CCE by the following No of Applications
	70	75	80	85	90	95	100	105	
1	1.4	1.3	1.3	1.2	1.1	1.1	1.0	1.0	
2	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.9	
3	4.3	4.0	3.8	3.5	3.3	3.2	3.0	2.9	
4	5.7	5.3	5.0	4.7	4.4	4.2	4.0	3.8	
5	7.1	6.7	6.3	5.9	5.6	5.3	5.0	4.8	1
6	8.6	8.0	7.5	7.1	6.7	6.3	6.0	5.7	
7	10.0	9.3	8.8	8.2	7.8	7.4	7.0	6.7	
8	11.4	10.7	10.0	9.4	8.9	8.4	8.0	7.6	
9	12.9	12.0	11.3	10.6	10.0	9.5	9.0	8.6	
10	14.3	13.3	12.5	11.8	11.1	10.5	10.0	9.5	
11	15.7	14.7	13.8	12.9	12.2	11.6	11.0	10.5	
12	17.1	16.0	15.0	14.1	13.3	12.6	12.0	11.4	
13	18.6	17.3	16.3	15.3	14.4	13.7	13.0	12.4	
14	20.0	18.7	17.5	16.5	15.6	14.7	14.0	13.3	
15	21.4	20.0	18.8	17.7	16.7	15.8	15.0	14.3	2
16	22.9	21.3	20.0	18.8	17.8	16.8	16.0	15.2	
17	24.3	22.7	21.3	20.0	18.9	17.9	17.0	16.2	
18	25.7	24.0	22.5	21.2	20.0	19.0	18.0	17.1	
19	27.1	25.3	23.8	22.4	21.1	20.0	19.0	18.1	
20	28.6	26.7	25.0	23.5	22.2	21.1	20.0	19.1	
21	30.0	28.0	26.3	24.7	23.3	22.1	21.0	20.0	
22	31.4	29.3	27.5	25.8	24.4	23.2	22.0	21.0	
23	32.9	30.7	28.8	27.1	25.6	24.2	23.0	21.9	3
24	34.3	32.0	30.0	28.2	26.7	25.3	24.0	22.9	
25	35.7	33.3	31.3	29.4	27.8	26.3	25.0	23.8	

To convert value into pounds per cubic yard (for greenhouse use) multiply the appropriate value in the above table by 2; to convert to a 1000 sq. ft. rate, multiply the value by 10. Prepared by P. A. Ferretti, D. Beegle, C. M. Ritter, D. J. Wolnick; in consultation with R. H. Cole, W. R. Fortney, C. W. Haeseler, J. R. Nuss, M. D.

MAGNESIUM CONVERSION TABLE

FOR COMMERCIAL FRUITS AND VEGETABLES, WOODLOT AND CHRISTMAS TREES

If the magnesium level was found to be too low or out of balance with the other nutrients an application of magnesium is recommended. There are a number of materials that can be used. If both limestone and magnesium are required it will be most economical, generally, to use a limestone containing magnesium. The amount of the various materials needed to supply the magnesium recommendation can be determined from the following table.

Row application of special fertilizer containing 2 to 4 percent magnesium may be used if soil levels of magnesium are low. This may reduce magnesium problems for the current year. However, this will not correct low magnesium levels in the soil as too little is applied. For example, an application of 500 lbs. of fertilizer containing 2% Mg will supply only 10 lbs. of magnesium. To benefit from an application of such small amounts, it must be applied in the row.

Annual application of magnesium material should not be necessary for most crops if soil test recommendations are followed.

APPROXIMATE POUNDS OF MATERIALS (nearest 5 lbs.) REQUIRED

For a Magnesium recommendation of	Emjeo (17% Mg)	Epsom Salt (11% Mg)	K-Mag (11% Mg)	Limestone (10% MgO) (6% Mg)	Limestone (15% MgO) (9% Mg)	Limestone (20% MgO) (12% Mg)	Magox (50% Mg)	Magnesium Sulfate (10% Mg)	Sul-Po-Mag (11% Mg)
40 lbs. Mg. use	230	360	360	650	450	350	80	360	360
50 lbs. Mg. use	295	450	450	850	550	400	100	450	450
60 lbs. Mg. use	350	540	540	1000	650	500	120	540	540
70 lbs. Mg. use	410	640	640	1200	800	600	140	640	640
80 lbs. Mg. use	470	730	730	1300	900	650	160	730	730
90 lbs. Mg. use	530	820	820	1500	1000	750	180	820	820
100 lbs. Mg. use	590	910	910	1700	1100	850	200	910	910
125 lbs. Mg. use	735	1140	1140	2000	1400	1000	250	1140	1140
150 lbs. Mg. use	880	1360	1360	2500	1600	1250	300	1360	1360
175 lbs. Mg. use	1030	1590	1590	3000	2000	1500	350	1590	1590
200 lbs. Mg. use	1180	1820	1820	3300	2200	1650	400	1820	1820
240 lbs. Mg. use	1410	2180	2180	4000	2700	2000	480	2180	2180

$Mg \times 1.6 = MgO \quad MgO \times 0.6 = Mg$

09/23/99	6122	013874	YORK	00		UNSPECIFIED
DATE	LAB NO.	SERIAL NO.	COUNTY	ACRES	FIELD	SOIL

AGRICULTURAL ANALYTICAL SERVICES LABORATORY
COLLEGE OF AGRICULTURAL SCIENCES
THE PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY PARK, PA 16802
(814 863-0841)

SOIL TEST REPORT FOR:

GRACE INDUSTRIES
6993 SILVERCREST RD
NAZARETH PA 18064

COPY SENT TO:

00000

SOIL NUTRIENT LEVELS:

		LOW / MEDIUM / HIGH / EXCESSIVE
Soil pH		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Phosphate	(P_2O_5)	XX
Potash	(K_2O)	XXXXXXXX
Magnesium	(MgO)	XXXXXXXXXXXXXXXXXX
Calcium	(CaO)	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

RECOMMENDATIONS FOR: *WOODLOT,MIXED,TO PLANT*

See Back For Comments

PH ADJUSTMENT LB/100 SQ.FT.

CALCITIC LIMESTONE (0-3% MG): NONE

MG AND CALCIUM ADJUSTMENT LB/100 SQ.FT.

(MgSO4) EPSOM SALTS: NONE — 1,2

(CaSO4) GYPSUM: NONE — 3,4

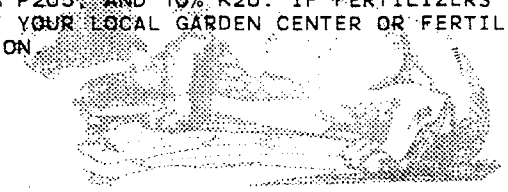
PLANT NUTRIENT NEEDS: LBS/100 SQ.FT.

5-10-10		5-10-5		10-10-10
2.5	+	NONE	+	NONE

0-46-0		21-53-0		UREA
1.0	+	NONE	+	NONE

MESSAGES:

* THE ABOVE LIME AND FERTILIZER RECOMMENDATIONS ARE FOR THIS SOIL SAMPLE AND THIS SEASON ONLY. PLANT NUTRIENT RECOMMENDATIONS ARE FOR FERTILIZERS CONTAINING SPECIFIC RATIOS OF NITROGEN (N), PHOSPHATE (P205) AND POTASH (K20). AS AN EXAMPLE 5-10-10 CONTAINS 5% N, 10% P205 AND 10% K20. IF FERTILIZERS WITH THE RATIOS SHOWN ARE NOT AVAILABLE, CONTACT YOUR LOCAL GARDEN CENTER OR FERTILIZER SUPPLIER FOR THE APPROPRIATE SUBSTITUTION.



LABORATORY RESULTS:

7.0	24	0.0	0.26	1.7	13.5	15.5	1.6	11.0	87.0
SOIL pH	P lb/A	ACIDITY	K	Mg	Ca	CEC	K	Mg	Ca
		EXCHANGEABLE CATIONS (meq/100 g)					% SATURATION		

OTHER TESTS:

SOIL09 TREES: ORNAMENTALS,XMAS,WOODLOT

C O M M E N T S

To be most effective, all recommended limestone and/or fertilizer should be incorporated 6 to 8 inches into the soil prior to planting. If plants or crop is established, apply recommended materials to the surface and water area well.

2. If 11 to 20 pounds of limestone are recommended, divide the amount by two and apply in two applications six months apart. If 21 or more pounds are recommended, divide the amount by three and make three applications at six month intervals.

3. If 3 or more pounds of $MgSO_4$ (Epsom salts) are recommended, divide the amount by two and make separate applications at four month intervals. If an alternative magnesium source is used, apply an amount equal to the equivalent of 10.5% Mg in $MgSO_4$; only one application should be needed.

4. Lime and fertilizer are recommended in pounds of material per each 100 square feet of area to be treated. Use the following conversions to convert from pounds per 100 square feet to other units or area sizes:

   pounds per 100 sq. ft. x 10 = pounds per 1000 sq. ft.
   pounds per 100 sq. ft. x 435 = pounds per acre

5. Lime and fertilizer are recommended in pounds of material per each 100 sq. ft. of area. For band length or number of spots (individual trees) that can be treated with the recommended amounts shown; use the following equations:

   Band lenght in ft. = (100 sq. ft.) / (Band width in ft.)
   Individual plants (spots) = (100 sq. ft.) / (area of circle)
   area of circle in sq. ft. = 1.0 ft. dia. = 0.75 sq. ft.
   1.5 ft. dia. = 1.75 sq. ft.
   2.0 ft. dia. = 3.00 sq. ft.
   3.0 ft. dia. = 7.00 sq. ft.

6. Amount of sulfur needed to lower soil pH to optimum level.
   (See front of report for soil pH and optimum pH)

FROM CURRENT SOIL PH	TO OPTIMUM SOIL PH	SULFUR (lb/100 sq ft)	FROM CURRENT SOIL PH	TO OPTIMUM SOIL PH	SULFUR (lb/100 sq ft)
8.0	7.5	0.50	7.0	6.5	0.75
	7.0	1.00		6.0	1.25
	6.5	2.00		5.5	2.50
	6.0	3.00			
	5.5	4.00			
7.5	7.0	0.75	6.5	6.0	1.00
	6.5	1.25		5.5	1.75
	6.0	2.50			
	5.5	3.50	6.0	5.5	1.50

Apply sulfur at the above rates for a loam soil. On heavier soils (silt loams) use one third more than the amount shown. On lighter soils (sandy loams) use one-half of the amounts shown.

If aluminum or ferrous sulfate is used to lower pH, multiply the above amounts by 2.5. Follow the same suggestions as above for soil types. If 4 or more pounds are needed, divide the amount in half and make two applications six months apart.

LIMING MATERIAL CONVERSION TABLE

FOR COMMERCIAL FRUITS AND VEGETABLES, LAWN, LANDSCAPE PLANTS, WOODLOT, CHRISTMAS TREES, AND GREENHOUSE CROPS

The limestone recommendation is based on using material equivalent in neutralizing power to 100% calcium carbonate limestone. The recommendations are in pounds of calcium carbonate equivalent (CCE) per 100 sq. ft. The use of any liming material not equivalent in neutralizing power to pure calcium carbonate limestone (100% CCE) must be adjusted to apply enough liming material to neutralize the acidity in your soil. All agricultural liming materials sold in Pennsylvania are legally labeled with their calcium carbonate equivalent (CCE). The amount required to supply the recommended amount of CCE for your soil may be calculated either as explained below or read directly from the table.

Liming material must be ground fine enough to be effective. Pennsylvania law requires that both agricultural and industrial by-products limestone meet the following standards:

95% through a 20 mesh per inch screen
60% through a 60 mesh per inch screen
50% through a 100 mesh per inch screen

Granular limestone (lawn and garden limestone) must meet the following minimum standards:

95% through a 20 mesh per inch sieve
40% through a 60 mesh per inch sieve
30% through a 100 mesh per inch sieve

Calculation of Actual Lime Requirement:

$$\text{Actual Liming Material Required} = \frac{\text{Soil Test Limestone Recommendation}}{\text{CCE of liming material}} \times 100$$

Example: If your Soil Test Recommendation states – "* * * limestone – Apply 4 lbs. of calcium carbonate equivalent dolomitic limestone per 100 sq. ft.", and the Liming Material Label states "Calcium Carbonate Equivalent (CCE) = 80%", then the Actual Liming Material Required is 4/80 x 100 = 5 lbs. liming material per 100 sq ft.

The calculations assume that you are using a material that at least meets the minimum fineness standard. The finer the limestone, the quicker the response. When growing short-season, specialty, greenhouse, vegetable, and fruit crops it is advisable to apply the finest lime available even though it may be more expensive than coarser materials.

Using the conversion table: Find your soil test limestone recommendation value in the left hand column and then read across the table on that line until you come to the column headed by the % CCE nearest to that of your liming material. The number at that point is the pounds of liming material required to meet the limestone recommendation on your soil test.

For example: If it is suggested that you apply 10 pounds CCE per 100 sq. ft. and the liming material you plan to use contains 85% CCE you would need 11.8 pounds of the material you chose to obtain sufficient neutralizing power in your soil.

Because there is no advantage gained by applying more than 10 pounds of CCE per 100 sq. ft. in any one application, this is divided into three sections suggesting how the total liming material required may be split for most efficient use. (See the right hand column).

Pounds per 100 sq. ft. of CCE Recommended on Your Soil Test.	Percent Calcium Carbonate Equivalent (% CCE) of Your Liming Material								Divide Total CCE by the following No of Applications
	70	75	80	85	90	95	100	105	
1	1.4	1.3	1.3	1.2	1.1	1.1	1.0	1.0	
2	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.9	
3	4.3	4.0	3.8	3.5	3.3	3.2	3.0	2.9	
4	5.7	5.3	5.0	4.7	4.4	4.2	4.0	3.8	
5	7.1	6.7	6.3	5.9	5.6	5.3	5.0	4.8	1
6	8.6	8.0	7.5	7.1	6.7	6.3	6.0	5.7	
7	10.0	9.3	8.8	8.2	7.8	7.4	7.0	6.7	
8	11.4	10.7	10.0	9.4	8.9	8.4	8.0	7.6	
9	12.9	12.0	11.3	10.6	10.0	9.5	9.0	8.6	
10	14.3	13.3	12.5	11.8	11.1	10.5	10.0	9.5	
11	15.7	14.7	13.8	12.9	12.2	11.6	11.0	10.5	
12	17.1	16.0	15.0	14.1	13.3	12.6	12.0	11.4	
13	18.6	17.3	16.3	15.3	14.4	13.7	13.0	12.4	
14	20.0	18.7	17.5	16.5	15.6	14.7	14.0	13.3	
15	21.4	20.0	18.8	17.7	16.7	15.8	15.0	14.3	2
16	22.9	21.3	20.0	18.8	17.8	16.8	16.0	15.2	
17	24.3	22.7	21.3	20.0	18.9	17.9	17.0	16.2	
18	25.7	24.0	22.5	21.2	20.0	19.0	18.0	17.1	
19	27.1	25.3	23.8	22.4	21.1	20.0	19.0	18.1	
20	28.6	26.7	25.0	23.5	22.2	21.1	20.0	19.1	
21	30.0	28.0	26.3	24.7	23.3	22.1	21.0	20.0	
22	31.4	29.3	27.5	25.8	24.4	23.2	22.0	21.0	
23	32.9	30.7	28.8	27.1	25.6	24.2	23.0	21.9	3
24	34.3	32.0	30.0	28.2	26.7	25.3	24.0	22.9	
25	35.7	33.3	31.3	29.4	27.8	26.3	25.0	23.8	

To convert value into pounds per cubic yard (for greenhouse use) multiply the appropriate value in the above table by 2; to convert to a 1000 sq. ft. rate, multiply the value by 10. Prepared by P. A. Ferretti, D. Beegle, C. M. Ritter, D. J. Wolnick; in consultation with R. H. Cole, W. R. Fortney, C. W. Haeseler, J. R. Nuss, M. D.

MAGNESIUM CONVERSION TABLE

FOR COMMERCIAL FRUITS AND VEGETABLES, WOODLOT AND CHRISTMAS TREES

If the magnesium level was found to be too low or out of balance with the other nutrients an application of magnesium is recommended. There are a number of materials that can be used. If both limestone and magnesium are required it will be most economical, generally, to use a limestone containing magnesium. The amount of the various materials needed to supply the magnesium recommendation can be determined from the following table.

Row application of special fertilizer containing 2 to 4 percent magnesium may be used if soil levels of magnesium are low. This may reduce magnesium problems for the current year. However, this will not correct low magnesium levels in the soil as too little is applied. For example, an application of 500 lbs. of fertilizer containing 2% Mg will supply only 10 lbs. of magnesium. To benefit from an application of such small amounts, it must be applied in the row.

Annual application of magnesium material should not be necessary for most crops if soil test recommendations are followed.

APPROXIMATE POUNDS OF MATERIALS (nearest 5 lbs.) REQUIRED

For a Magnesium recommendation of	Emjeo (17% Mg)	Epsom Salt (11% Mg)	K-Mag (11% Mg)	Limestone (10% MgO) (6% Mg)	Limestone (15% MgO) (9% Mg)	Limestone (20% MgO) (12% Mg)	Magox (50% Mg)	Magnesium Sulfate (10% Mg)	Sul-Po-Mag (11% Mg)
40 lbs. Mg. use	230	360	360	650	450	350	80	360	360
50 lbs. Mg. use	295	450	450	850	550	400	100	450	450
60 lbs. Mg. use	350	540	540	1000	650	500	120	540	540
70 lbs. Mg. use	410	640	640	1200	800	600	140	640	640
80 lbs. Mg. use	470	730	730	1300	900	650	160	730	730
90 lbs. Mg. use	530	820	820	1500	1000	750	180	820	820
100 lbs. Mg. use	590	910	910	1700	1100	850	200	910	910
125 lbs. Mg. use	735	1140	1140	2000	1400	1000	250	1140	1140
150 lbs. Mg. use	880	1360	1360	2500	1600	1250	300	1360	1360
175 lbs. Mg. use	1030	1590	1590	3000	2000	1500	350	1590	1590
200 lbs. Mg. use	1180	1820	1820	3300	2200	1650	400	1820	1820
240 lbs. Mg. use	1410	2180	2180	4000	2700	2000	480	2180	2180

$Mg \times 1.6 = MgO$ $MgO \times 0.6 = Mg$

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO.	TRANSMITTAL NO.	DATE
N62470-98-C-8816	56	10/13/99

FROM CONTRACTOR: GRACE INDUSTRIES INC.

Atlantic Div. Fac. Eng. Command

PROJECT TITLE AND LOCATION: LANDFILL CAP for CD LANDFILL NAVAL BASE Norfolk VA.

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
070	02315 1.6	OFF SITE TOPSOIL ANALYSIS	7	A	
		ELBOW FARMS, CHESAPEAKE VA.		RA	ASI CH2M HILL 5NOV99

CONTRACTOR'S COMMENTS

* I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number N62470-98-C-8816, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager _____, Date 10/13/99.
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature)

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
20OCT99		

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	5NOV99	

GRACE INDUSTRIES, INC.

P.O. Box 21777, Lehigh Valley, PA 18002 • (610) 837-4100 • Fax (610) 837-4105

13 October 1999

Mr. Zane Perry
Atlantic Division Facilities Engineering Command
Contracting Office
Building Z-140
Suite 309 Sewells Point
9342 Virginia Avenue
Norfolk, Virginia 23511-3689

RE: Topsoil Analytical Results
Landfill Cap for CD Landfill, Naval Base
Norfolk, VA
N62470-98-C-8816

Dear Mr. Perry,

Grace Industries, Inc. (GII) has reviewed the analytical results for the topsoil sample submitted to Quanterra Environmental Laboratory. The results have been received and are below the thresholds established for their respective tests in Addendum 001, page 3, Section 1.6. Therefore, please allow this notice to serve as certification for clean materials.

Sincerely,

GRACE INDUSTRIES, INC.

Gary Souilliard
QC Manager

Topsoil

QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Grace Industries Inc

Lot #: A9J080146 LANDFILL CAP FOR CD LANDFILL Date Reported: 10/13/99

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
Client Sample ID: NNB-TS-001					
Sample #: 001 Date Sampled: 09/14/99 11:35 Date Received: 09/15/99 Matrix: SOLID					
Extractable Petroleum Hydrocarbons					Reviewed
TPH (Extractables)	18	3.7	mg/kg	SW846 8015B	
Results and reporting limits have been adjusted for dry weight.					
Volatile Petroleum Hydrocarbons					Reviewed
TPH (Purgeables)	ND	120	ug/kg	SW846 8015B	
Results and reporting limits have been adjusted for dry weight.					
Inorganic Analysis					Reviewed
Total Residue as Percent Solids	81.4	0.10	%	MCAWW 160.3 MOD	
Results and reporting limits have been adjusted for dry weight.					

QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Grace Industries Inc

Lot #: A9I160149 LANDFILL CAP FOR CD LANDFILL Date Reported: 9/29/99

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
Client Sample ID: NNB-WC-002					
Sample #: 002 Date Sampled: 09/14/99 09:20 Date Received: 09/15/99 Matrix: SOLID					
Semivolatile Organic Compounds by GC/MS TCLP					Reviewed
o-Cresol	0.097	0.050	mg/L	SW846 8270C	
m-Cresol & p-Cresol	ND	0.10	mg/L	SW846 8270C	
1,4-Dichlorobenzene	ND	0.050	mg/L	SW846 8270C	
2,4-Dinitrotoluene	ND	0.050	mg/L	SW846 8270C	
Hexachlorobenzene	ND	0.050	mg/L	SW846 8270C	
Hexachlorobutadiene	ND	0.050	mg/L	SW846 8270C	
Hexachloroethane	ND	0.050	mg/L	SW846 8270C	
Nitrobenzene	ND	0.050	mg/L	SW846 8270C	
Pentachlorophenol	ND	0.10	mg/L	SW846 8270C	
Pyridine	ND	0.10	mg/L	SW846 8270C	
2,4,5-Trichlorophenol	ND	0.050	mg/L	SW846 8270C	
2,4,6-Trichlorophenol	ND	0.050	mg/L	SW846 8270C	
Inorganic Analysis					In Review
Cyanide, Total	ND	0.50	mg/kg	SW846 9012A	
Corrosivity	6.9	1.0	pH Units	SW846 9045A	
Pensky-Martens Method for Determining Ignitability	>180		deg F	SW846 1010	
Acid-insoluble Sulfide	ND	50	mg/kg	SW846 9030A	
Total Residue as Percent Solids	88.0	0.10	%	MCAWW 160.3 MOD	

Results and reporting limits have been adjusted for dry weight.

Client Sample ID: NNB-TS-001

Sample #: 003 Date Sampled: 09/14/99 11:35 Date Received: 09/15/99 Matrix: SOLID

Inductively Coupled Plasma (ICP) Metals TCLP						Reviewed
Silver	TCLP	ND	0.50	mg/L	SW846 6010B	
Arsenic	TCLP	ND	0.50	mg/L	SW846 6010B	
Barium	TCLP	ND	10.0	mg/L	SW846 6010B	
Cadmium	TCLP	ND	0.10	mg/L	SW846 6010B	

(Continued on next page)

QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Grace Industries Inc

Lot #: A9I160149 LANDFILL CAP FOR CD LANDFILL Date Reported: 9/29/99

Topsoil

Client Sample ID: NNB-TS-001

Sample #: 003 Date Sampled: 09/14/99 11:35 Date Received: 09/15/99 Matrix: SOLID

PARAMETER		RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
Chromium	TCLP	ND	0.50	mg/L	SW846 6010B	
Lead	TCLP	ND	0.50	mg/L	SW846 6010B	
Selenium	TCLP	ND	0.25	mg/L	SW846 6010B	
Mercury in Liquid Waste (Manual Cold-Vapor) TCLP						Reviewed
Mercury	TCLP	ND	0.0020	mg/L	SW846 7470A	
Volatiles by GC						Reviewed
Benzene		ND	1.2	ug/kg	SW846 8021B	
Ethylbenzene		ND	1.2	ug/kg	SW846 8021B	
Toluene		ND	1.2	ug/kg	SW846 8021B	
Xylenes (total)		ND	1.2	ug/kg	SW846 8021B	

Results and reporting limits have been adjusted for dry weight.

Organochlorine Pesticides TCLP						In Review
Lindane		ND	0.00050	mg/L	SW846 8081A	
Endrin		ND	0.00050	mg/L	SW846 8081A	
Heptachlor		ND	0.00050	mg/L	SW846 8081A	
Heptachlor epoxide		ND	0.00050	mg/L	SW846 8081A	
Methoxychlor		ND	0.0010	mg/L	SW846 8081A	
Toxaphene		ND	0.020	mg/L	SW846 8081A	
Chlordane (technical)		ND	0.0050	mg/L	SW846 8081A	
PCBs by SW-846 8082						In Review
Aroclor 1016		ND	41	ug/kg	SW846 8082	
Aroclor 1221		ND	41	ug/kg	SW846 8082	
Aroclor 1232		ND	41	ug/kg	SW846 8082	
Aroclor 1242		ND	41	ug/kg	SW846 8082	
Aroclor 1248		ND	41	ug/kg	SW846 8082	
Aroclor 1254		ND	41	ug/kg	SW846 8082	
Aroclor 1260		20 J	41	ug/kg	SW846 8082	

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

(Continued on next page)

QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Grace Industries Inc

Lot #: A9I160149 LANDFILL CAP FOR CD LANDFILL Date Reported: 9/29/99

Top Soil

Client Sample ID: NNB-TS-001

Sample #: 003 Date Sampled: 09/14/99 11:35 Date Received: 09/15/99 Matrix: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
PCBs by SW-846 8082					In Review

Mixture of more than one aroclor may be present. The best pattern match has been quantitated.

Chlorinated Herbicides by GC TCLP					In Review
2,4-D	ND	0.50	mg/L	SW846 8151A	
2,4,5-TP (Silvex)	ND	0.10	mg/L	SW846 8151A	
Volatile Organics by GC/MS TCLP					Reviewed
Benzene	ND	0.050	mg/L	SW846 8260B	
Carbon tetrachloride	ND	0.050	mg/L	SW846 8260B	
Chlorobenzene	ND	0.050	mg/L	SW846 8260B	
Chloroform	ND	0.050	mg/L	SW846 8260B	
1,2-Dichloroethane	ND	0.050	mg/L	SW846 8260B	
1,1-Dichloroethylene	ND	0.050	mg/L	SW846 8260B	
Methyl ethyl ketone	ND	0.20	mg/L	SW846 8260B	
Tetrachloroethylene	ND	0.050	mg/L	SW846 8260B	
Trichloroethylene	ND	0.050	mg/L	SW846 8260B	
Vinyl chloride	ND	0.10	mg/L	SW846 8260B	
Semivolatile Organic Compounds by GC/MS TCLP					Reviewed
o-Cresol	ND	0.050	mg/L	SW846 8270C	
m-Cresol & p-Cresol	ND	0.10	mg/L	SW846 8270C	
1,4-Dichlorobenzene	ND	0.050	mg/L	SW846 8270C	
2,4-Dinitrotoluene	ND	0.050	mg/L	SW846 8270C	
Hexachlorobenzene	ND	0.050	mg/L	SW846 8270C	
Hexachlorobutadiene	ND	0.050	mg/L	SW846 8270C	
Hexachloroethane	ND	0.050	mg/L	SW846 8270C	
Nitrobenzene	ND	0.050	mg/L	SW846 8270C	
Pentachlorophenol	ND	0.10	mg/L	SW846 8270C	
Pyridine	ND	0.10	mg/L	SW846 8270C	
2,4,5-Trichlorophenol	ND	0.050	mg/L	SW846 8270C	
2,4,6-Trichlorophenol	ND	0.050	mg/L	SW846 8270C	

(Continued on next page)

QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Grace Industries Inc

Lot #: A9I160149 LANDFILL CAP FOR CD LANDFILL Date Reported: 9/29/99

Client Sample ID: NNB-TS-001

Sample #: 003 Date Sampled: 09/14/99 11:35 Date Received: 09/15/99 Matrix: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
Inorganic Analysis					In Review
Cyanide, Total	ND	0.50	mg/kg	SW846 9012A	
Corrosivity	4.5	1.0	No Units	SW846 9045A	
Pensky-Martens Method for Determining Ignitability	>180		deg F	SW846 1010	
Acid-insoluble Sulfide	ND	100	mg/kg	SW846 9030A	
Total Organic Halogens	ND	250	mg/kg	SW846 9020A	
Total Recoverable Petroleum Hydrocarbons	72	12	mg/kg	MCAWW 418.1	
Total Residue as Percent Solids	81.4	0.10	%	MCAWW 160.3 MOD	

Results and reporting limits have been adjusted for dry weight.

GRACE INDUSTRIES, INC.

P.O. Box 21777, Lehigh Valley, PA 18002 • (610) 837-4100 • Fax (610) 837-4105

13 October 1999

Mr. Zane Perry
Atlantic Division Facilities Engineering Command
Contracting Office
Building Z-140
Suite 309 Sewells Point
9342 Virginia Avenue
Norfolk, Virginia 23511-3689

RE: Topsoil Analytical Results
Landfill Cap for CD Landfill, Naval Base
Norfolk, VA
N62470-98-C-8816

Dear Mr. Perry,

Grace Industries, Inc. (GII) has reviewed the analytical results for the topsoil sample submitted to Quanterra Environmental Laboratory. The results have been received and are below the thresholds established for their respective tests in Addendum 001, page 3, Section 1.6. Therefore, please allow this notice to serve as certification for clean materials.

Sincerely,

GRACE INDUSTRIES, INC.

Gary Souilliard
QC Manager

Topso-?

QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Grace Industries Inc

Lot #: A9J080146 LANDFILL CAP FOR CD LANDFILL Date Reported: 10/13/99

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
Client Sample ID: NNB-TS-001					
Sample #: 001 Date Sampled: 09/14/99 11:35 Date Received: 09/15/99 Matrix: SOLID					
Extractable Petroleum Hydrocarbons					Reviewed
TPH (Extractables)	18	3.7	mg/kg	SW846 8015B	
Results and reporting limits have been adjusted for dry weight.					
Volatile Petroleum Hydrocarbons					Reviewed
TPH (Purgeables)	ND	120	ug/kg	SW846 8015B	
Results and reporting limits have been adjusted for dry weight.					
Inorganic Analysis					Reviewed
Total Residue as Percent Solids	81.4	0.10	%	MCAWW 160.3 MOD	
Results and reporting limits have been adjusted for dry weight.					

QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Grace Industries Inc

Lot #: A9I160149 LANDFILL CAP FOR CD LANDFILL Date Reported: 9/29/99

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Client Sample ID: NNB-WC-002				
Sample #: 002 Date Sampled: 09/14/99 09:20 Date Received: 09/15/99 Matrix: SOLID				
Semivolatile Organic Compounds by GC/MS TCLP				Reviewed
o-Cresol	0.097	0.050	mg/L	SW846 8270C
m-Cresol & p-Cresol	ND	0.10	mg/L	SW846 8270C
1,4-Dichlorobenzene	ND	0.050	mg/L	SW846 8270C
2,4-Dinitrotoluene	ND	0.050	mg/L	SW846 8270C
Hexachlorobenzene	ND	0.050	mg/L	SW846 8270C
Hexachlorobutadiene	ND	0.050	mg/L	SW846 8270C
Hexachloroethane	ND	0.050	mg/L	SW846 8270C
Nitrobenzene	ND	0.050	mg/L	SW846 8270C
Pentachlorophenol	ND	0.10	mg/L	SW846 8270C
Pyridine	ND	0.10	mg/L	SW846 8270C
2,4,5-Trichlorophenol	ND	0.050	mg/L	SW846 8270C
2,4,6-Trichlorophenol	ND	0.050	mg/L	SW846 8270C
Inorganic Analysis				In Review
Cyanide, Total	ND	0.50	mg/kg	SW846 9012A
Corrosivity	6.9	1.0	No Units	SW846 9045A
Pensky-Martens Method for Determining Ignitability	>180		deg F	SW846 1010
Acid-insoluble Sulfide	ND	50	mg/kg	SW846 9030A
Total Residue as Percent Solids	88.0	0.10	%	MCAWW 160.3 MOD

Results and reporting limits have been adjusted for dry weight.

Client Sample ID: NNB-TS-001

Sample #: 003 Date Sampled: 09/14/99 11:35 Date Received: 09/15/99 Matrix: SOLID

Inductively Coupled Plasma (ICP) Metals TCLP						Reviewed
Silver	TCLP	ND	0.50	mg/L	SW846 6010B	
Arsenic	TCLP	ND	0.50	mg/L	SW846 6010B	
Barium	TCLP	ND	10.0	mg/L	SW846 6010B	
Cadmium	TCLP	ND	0.10	mg/L	SW846 6010B	

(Continued on next page)

QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Grace Industries Inc

Lot #: A9I160149 LANDFILL CAP FOR CD LANDFILL Date Reported: 9/29/99

Topsoil

Client Sample ID: NNB-TS-001

Sample #: 003 Date Sampled: 09/14/99 11:35 Date Received: 09/15/99 Matrix: SOLID

PARAMETER		RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
Chromium	TCLP	ND	0.50	mg/L	SW846 6010B	
Lead	TCLP	ND	0.50	mg/L	SW846 6010B	
Selenium	TCLP	ND	0.25	mg/L	SW846 6010B	
Mercury in Liquid Waste (Manual Cold-Vapor)			TCLP			Reviewed
Mercury	TCLP	ND	0.0020	mg/L	SW846 7470A	
Volatiles by GC						Reviewed
Benzene		ND	1.2	ug/kg	SW846 8021B	
Ethylbenzene		ND	1.2	ug/kg	SW846 8021B	
Toluene		ND	1.2	ug/kg	SW846 8021B	
Xylenes (total)		ND	1.2	ug/kg	SW846 8021B	

Results and reporting limits have been adjusted for dry weight.

Organochlorine Pesticides TCLP						In Review
Lindane		ND	0.00050	mg/L	SW846 8081A	
Endrin		ND	0.00050	mg/L	SW846 8081A	
Heptachlor		ND	0.00050	mg/L	SW846 8081A	
Heptachlor epoxide		ND	0.00050	mg/L	SW846 8081A	
Methoxychlor		ND	0.0010	mg/L	SW846 8081A	
Toxaphene		ND	0.020	mg/L	SW846 8081A	
Chlordane (technical)		ND	0.0050	mg/L	SW846 8081A	
PCBs by SW-846 8082						In Review
Aroclor 1016		ND	41	ug/kg	SW846 8082	
Aroclor 1221		ND	41	ug/kg	SW846 8082	
Aroclor 1232		ND	41	ug/kg	SW846 8082	
Aroclor 1242		ND	41	ug/kg	SW846 8082	
Aroclor 1248		ND	41	ug/kg	SW846 8082	
Aroclor 1254		ND	41	ug/kg	SW846 8082	
Aroclor 1260		20 J	41	ug/kg	SW846 8082	

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

(Continued on next page)

QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Grace Industries Inc

Lot #: A9I160149 LANDFILL CAP FOR CD LANDFILL Date Reported: 9/29/99

Top Soil

Client Sample ID: NNB-TS-001

Sample #: 003 Date Sampled: 09/14/99 11:35 Date Received: 09/15/99 Matrix: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
PCBs by SW-846 8082					In Review

Mixture of more than one aroclor may be present. The best pattern match has been quantitated.

Chlorinated Herbicides by GC TCLP					In Review
2,4-D	ND	0.50	mg/L	SW846 8151A	
2,4,5-TP (Silvex)	ND	0.10	mg/L	SW846 8151A	
Volatile Organics by GC/MS TCLP					Reviewed
Benzene	ND	0.050	mg/L	SW846 8260B	
Carbon tetrachloride	ND	0.050	mg/L	SW846 8260B	
Chlorobenzene	ND	0.050	mg/L	SW846 8260B	
Chloroform	ND	0.050	mg/L	SW846 8260B	
1,2-Dichloroethane	ND	0.050	mg/L	SW846 8260B	
1,1-Dichloroethylene	ND	0.050	mg/L	SW846 8260B	
Methyl ethyl ketone	ND	0.20	mg/L	SW846 8260B	
Tetrachloroethylene	ND	0.050	mg/L	SW846 8260B	
Trichloroethylene	ND	0.050	mg/L	SW846 8260B	
Vinyl chloride	ND	0.10	mg/L	SW846 8260B	
Semivolatile Organic Compounds by GC/MS TCLP					Reviewed
o-Cresol	ND	0.050	mg/L	SW846 8270C	
m-Cresol & p-Cresol	ND	0.10	mg/L	SW846 8270C	
1,4-Dichlorobenzene	ND	0.050	mg/L	SW846 8270C	
2,4-Dinitrotoluene	ND	0.050	mg/L	SW846 8270C	
Hexachlorobenzene	ND	0.050	mg/L	SW846 8270C	
Hexachlorobutadiene	ND	0.050	mg/L	SW846 8270C	
Hexachloroethane	ND	0.050	mg/L	SW846 8270C	
Nitrobenzene	ND	0.050	mg/L	SW846 8270C	
Pentachlorophenol	ND	0.10	mg/L	SW846 8270C	
Pyridine	ND	0.10	mg/L	SW846 8270C	
2,4,5-Trichlorophenol	ND	0.050	mg/L	SW846 8270C	
2,4,6-Trichlorophenol	ND	0.050	mg/L	SW846 8270C	

(Continued on next page)

QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Grace Industries Inc

Lot #: A9I160149 LANDFILL CAP FOR CD LANDFILL Date Reported: 9/29/99

Client Sample ID: NNB-TS-001

Sample #: 003 Date Sampled: 09/14/99 11:35 Date Received: 09/15/99 Matrix: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
Inorganic Analysis					In Review
Cyanide, Total	ND	0.50	mg/kg	SW846 9012A	
Corrosivity	4.5	1.0	No Units	SW846 9045A	
Pensky-Martens Method for Determining Ignitability	>180		deg F	SW846 1010	
Acid-insoluble Sulfide	ND	100	mg/kg	SW846 9030A	
Total Organic Halogens	ND	250	mg/kg	SW846 9020A	
Total Recoverable Petroleum Hydrocarbons	72	12	mg/kg	MCAWW 418.1	
Total Residue as Percent Solids	81.4	0.10	%	MCAWW 160.3 MOD	

Results and reporting limits have been adjusted for dry weight.

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO	TRANSMITTAL NO.	DATE
N62470-98-C-8816	050A	6/16/99

FROM CONTRACTOR: GRACE INDUSTRIES, INC. LANTDIV. FAC. ENG. COMMAND

PROJECT TITLE AND LOCATION: LANDFILL CAP FOR CO LANDFILL NAVAL BASE NORFOLK VA.

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
72	02315 3.10.2.1	Select Material Proctor	7	A	
				RA	AST CHZMHILL 21JUN99

CONTRACTOR'S COMMENTS

" I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with ~~Contract Number N62470-98-C-8816~~, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager _____, Date 6/16/99.
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature)

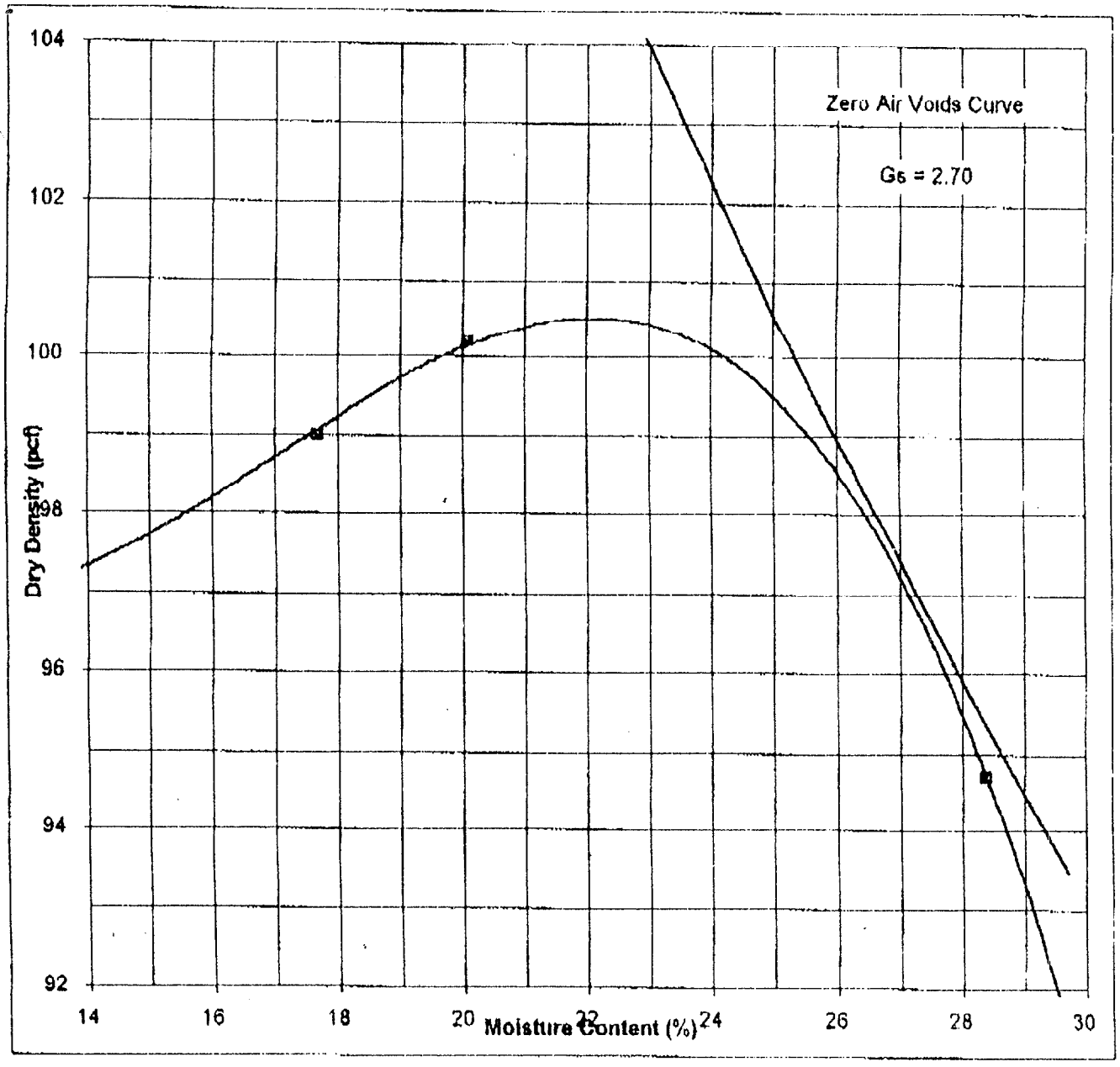
DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
16JUN99		

☑ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	21JUN99	



Sample No.	S-3	Natural Moisture Content	
Street		Percent Passing No. 200 Sieve	7.8
Station		Percent Retained on No. 4 Sieve	
Liquid Limit (LL)		Percent Retained on 3/4" Sieve	
Plastic Limit (PL)	Nonplastic	Maximum Dry Density (pcf)	100.5
Plasticity Index (PI)		Optimum Moisture Content (%)	20.7
Liquidity Index (LI)		Corr. Maximum Dry Density (pcf)	100.5
Description	Orangish tan SAND, with Marine Shell Fragments	Corr. Optimum Moisture Content (%)	20.7
Classification	SP-SM	Percent (%) Gravel as Tested	0.0
Specific Gravity	2.70	Percent (%) Gravel Total	
Test Standard	ASTM D 698	Test Method	A

Project: C.D. Landfill Cap

Project No.: N3447

Date: 6-15-99

Engineering Consulting Services, Ltd

Chesapeake, Virginia

Moisture Density Relationship Curve

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO	TRANSMITTAL NO.	DATE
[illegible]		[illegible]

FROM CONTRACTOR: [illegible]

TO: [illegible]

PROJECT TITLE AND LOCATION: [illegible]

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO.	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
[illegible]	[illegible]	[illegible]	7	A	[illegible]
				RA	[illegible]

CONTRACTOR'S COMMENTS

I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with ~~Contract Number N62470-98-C-8816, is in compliance with the~~ contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager [signature], Date 6/16/99
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature) [illegible]

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
[illegible]		

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	[illegible]	[illegible]

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 6/8/99

TECHNICIAN: John Smith **QC MANAGER:** G.C.S.

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
1 C-4-C	104.5/97.1	6.9%	95%	P
2 C-3-D	105.1/97.7	5.7%	95%	P
3 C-4-A	105.7/98.4	7.2%	95%	P
4 D-5-A	101.6/94.5	6.5%	95%	P
5 D-5-B	110.5/102.8	6.2%	95%	P
6 C-5-C	105.6/98.2	6.8%	95%	P
7 B-4-D	105.2/97.8	6.7%	95%	P
8 B-5-C	103.38/96.1	6.9%	95%	P
9 C-4-A	ASTM D-1556 - SAmple TAKEN to LAB.			

with new proctor

PAGE 1 **OF** 1

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: Landfill Cap - Grace JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 6-8-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: S. Smith

TEST NO.	1	2	3	4	5	6	7	8
DENSITY COUNT								
MOISTURE COUNT								
MOIST. CONTENT (pcf)	6.9	5.7	7.2	6.1	6.4	6.7	6.6	6.6
WET DENSITY (pcf)	104.5	103.9	106.[illegible]	101.1	109.7	105.4	104.9	103.3
DRY DENSITY (pcf)	97.6	98.2	98.9	95.0	103.3	98.7	98.3	96.6
PERCENT COMPACTION	SEE BELOW 104.45	105.10	105.78	101.61	110.47	105.59	105.17	103.3
STANDARD PROCTOR MODIFIED PROCTOR	93.5	93.5	93.5	93.5	93.5	93.5	93.5	93.5
OPT. WATER CONTENT	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
LIFT, ELEVATION, OR SOIL MARK	1st Lift	→						
MOISTURE CONTENT %	7.05	5.78	7.24	6.46	6.24	6.8	6.72	6.8
PROBE DEPTH (inch)	6"	6"	6"	6"	6"	6"	6"	6"

LOCATION DIAGRAM:

REMARKS:

See Attached Map

LAB NOTES: RECALCULATED % COMPACTION
(BASED ON 100.5 pcf max. dry density)

TEST NO:	1*	2	3	4	5	6	7	8
% COMPACTION:	97.1	97.7	98.4	94.5	102.8	98.2	97.8	96.1

MARGINAL FAILURE

SAND CONE @ THIS TEST SITE:
[illegible] @ 6.6% moist

Engineering Consulting Services, Ltd.

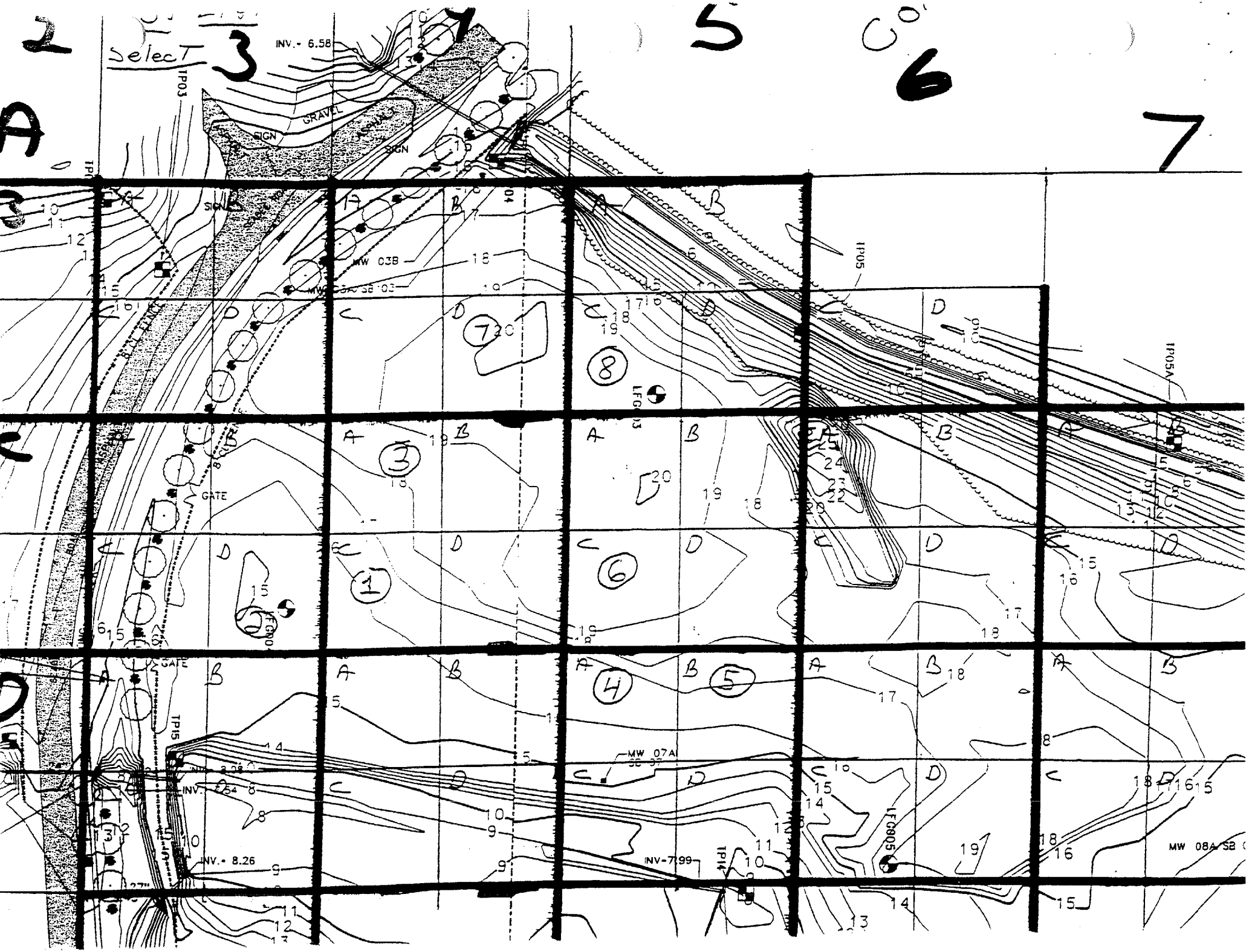
ASTM D1556 Sand C. Field Worksheet

Project: Landfill Cap - Grace	Field Kit # 3 Sand Calib 90.62 pcf	Date 5-8-99
Location: NORFOLK	Wt. of Sand in Cone & Plate 1 lbs.	Job No. N3447 Technician: TS.

Area Tested: C4-C Grid Coordinates

Test Number	1		RECALC.			
Location	C4-C					
Lift / Elevation	1st lift					
Volume Wt of Bottle & Cone, Before	5990.4					
Wt of Bottle & Cone, After	2745.8					
a) Wt. of Sand in hole, cone, & plate	4244.6					
b) Wt. of Sand in cone & plate	1666.6					
c) Wt. of Sand in hole (a - b)	2578.0	5.6835 lbs				
d) Volume of hole: c / Sand Calib = cu.ft.		.0627				
Density e) Wt. of Sample & Tare	2938.5					
f) Wt. of Tare	12.9					
g) Wt. of Sample (e - f)	2925.6	6.4448 lbs				
h) Wet Density: g/d = pcf		102.87				
i) Dry Density: h/ (1 + q) =pcf		96.48	→ 96.48			
j) Max. Dry Density (Proctor) =pcf		93.5	100.5			
k) % Compaction: (i/j) x 100		103.2%	96.0%			
Moisture Tare No.	Cooler					
l) Wt. of Sample & Tare, wet	1108.0					
m) Wt. of Sample & Tare, Dry	1052.8					
n) Wt. of Water lost: (l - m)	55.2					
o) Wt. of Tare	218.5					
p) Wt. of Dry soil: (m - o)	834.3					
q) % Moisture: (n / p) x 100	6.62%		6.6%			

L:\FORMS\SNDCONE.doc


Select
INV.- 6.58
GRAVEL
SIGN
TP03
MW 03B
TP05
TP05A
GATE
TP15
INV.- 8.26
MW 07A
INV-7.99
TP14
MW 08A SB

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO	TRANSMITTAL NO.	DATE
N62470-[illegible]	[illegible]	7/12/99

FROM CONTRACTOR: [illegible]

TO: [illegible]

PROJECT TITLE AND LOCATION: [illegible]

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO.	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
73	02315 [illegible]	[illegible]	7	A	[illegible]
				RA	[illegible] 26JUL99

CONTRACTOR'S COMMENTS

* I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number N62470-98-C-8816, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager [signature] Date 7/12/99
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature) [signature]

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
19JUL99	[signature]	

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	26JUL99	[signature]

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

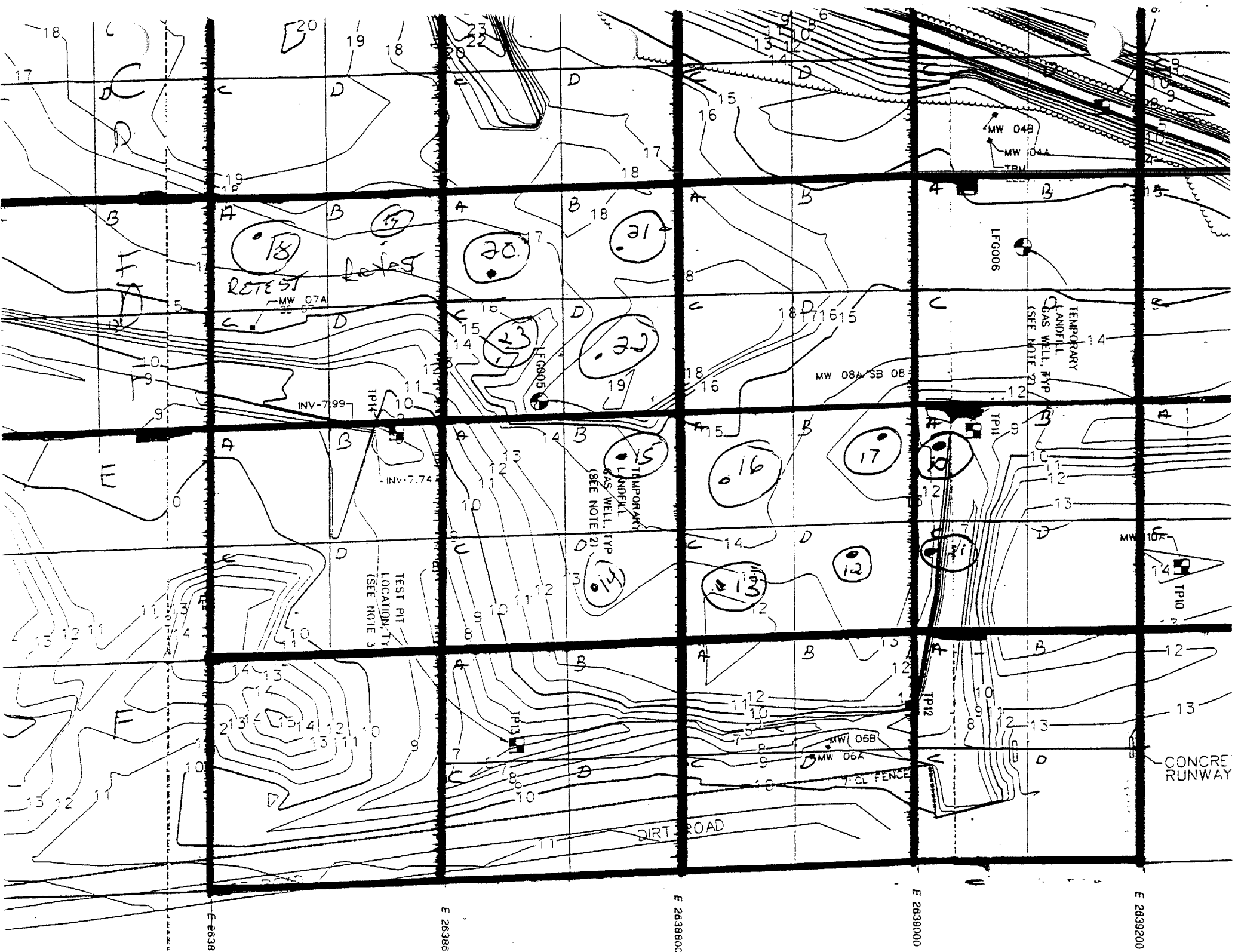
FIELD COMPACTION LOG **DATE:** 6/30/99

TECHNICIAN: John Smith **QC MANAGER:** G.L.S.

	GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL	
10	E 8-A	99.1%	9.47	95%	P	
11	E 8-C	99.84%	9.45	95	P	
12	E 7-D	97.82%	7.47	95	P	
13	E 7-C	102.43	9.40	95	P	
14	E 6-D	99.73	13.31	95	P	
15	E 6-B	98.38	10.60	95	P	
16	E 7-A	98.56	11.41	95	P	
17	E 7-B	101.24	9.67	95	P	
18	D 5-A	98.81	8.50	95	P	Retest PER LANE
19	D 5-B	98.12	8.48	95	P	Retest
20	D 6-A	100.07	6.78	95	P	
21	D 6-B	100.33	7.83	95	P	
22	D 6-D	105.66	9.68	95	P	
23	D 6-2	99.04	9.72	95	P	
24	E 7-A	ASTM D-1556 - SAND CONE				SAND CONE

All TESTS AT 1 min.

PAGE____ OF ____



MW 04B
MW 04A
LFG006
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
MW 08A/SB 08
TP11
MW 10A
TP10
TP12
MW 06B
MW 06A
7' CL FENCE
CONCRE
RUNWAY
DIRT ROAD
LFG005
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
TEST PIT LOCATION, TY (SEE NOTE 3
TP13
TP14
INV-7.99
INV-7.74
MW 07A
RETEST
Retest
E 2638
E 26386
E 2638800
E 2639000
E 2639200

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: LANDFILL CAP JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 6-30-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: _____ CLIENT: _____ TECH: Jonathan Smith

	10	11	12	13	[redacted]	14 [redacted]	15 [redacted]
TEST NO.	1	2	3	4	[redacted]	5	6
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	10.1	9.5	7.3	9.7	[redacted]	13.3	10.5
WET DENSITY (pcf)	117.1	109.8	105.6	112.6	[redacted]	113.5	109.3
DRY DENSITY (pcf)	107.0	100.3	98.3	102.9	[redacted]	100.2	98.9
PERCENT COMPACTION	99.01	99.84	97.82	102.43		99.73	98.38
STANDARD PROCTOR MODIFIED PROCTOR	100.5						
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	9.47	9.45	7.47	9.4	[redacted]	13.31	10.60
PROBE DEPTH (inch)	6"	6"	6"	6"	[redacted]	6"	6"

LOCATION DIAGRAM: E6-A E8-C E7-D E7-C E6-D E6-B E-7-A REMARKS:

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: LAND FILL CAP JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 6-30-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	16	17	18	19	20	21	22
TEST NO.	7	8	9	10	11	12	13
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	11.3	9.8	8.4	8.4	6.8	7.9	10.3
WET DENSITY (pcf)	110.3	111.6	107.7	107.0	107.4	108.7	116.4
DRY DENSITY (pcf)	99.0	101.7	99.3	98.6	100.6	100.8	106.2
PERCENT COMPACTION	98.56	101.24	98.81	98.12	100.07	100.33	105.66
STANDARD PROCTOR MODIFIED PROCTOR	105.5						
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	11.41	9.67	8.5	8.48	6.78	7.83	9.68
PROBE DEPTH (inch)	6"						
LOCATION DIAGRAM:	E 7-B	D5-A Retest	D5-B ReTest	D6-A	D6-B	D6-B	

REMARKS: D8-C

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: LANDFILL CAP JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 6/30/99 G.C.S. D.C.

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Gvale CLIENT: _____ TECH: J. Smith

TEST NO.	23 14						
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	9.7						
WET DENSITY (pcf)	109.2						
DRY DENSITY (pcf)	99.5						
PERCENT COMPACTION	99.04						
STANDARD PROCTOR MODIFIED PROCTOR	100.5						
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	9.72						
PROBE DEPTH (inch)	6"						

LOCATION DIAGRAM: E7-A

REMARKS:

Engineering Consulting Services, Ltd.

ASTM D1556 Sand Cone Field Worksheet

Project: LANDFILL CAP - Grace	Field Kit # ____ Sand Calib. 90.6 pcf	Date 6-30-99
Location: NORFOLK	Wt. of Sand in Cone & Plate: 1470.6 lbs.	Job No. N3047 Technician: J.S.

Area Tested: E7-A Grid Coordinates

Test Number	2					
Location	E7-A					
Lift / Elevation	1st Lift					
Volume						
Wt of Bottle & Cone, Before	7041.4					
Wt of Bottle & Cone, After	3401.7					
a) Wt. of Sand in hole, cone, & plate	3639.7					
b) Wt. of Sand in cone & plate	1470.6					
c) Wt. of Sand in hole (a - b)	4.7820					
d) Volume of hole: c / Sand Calib = cu.ft.	.0527					
Density						
e) Wt. of Sample & Tare	2707.1					
f) Wt. of Tare	12.9					
g) Wt. of Sample (e - f)	5.9396					
h) Wet Density: g/d = pcf	112.70					
i) Dry Density: h/ (1 + q) =pcf	100.07					
j) Max. Dry Density (Proctor) =pcf	100.5					
k) % Compaction: (i/j) x 100	99.57	OK (circled)				
Moisture						
Tare No.	M513K					
l) Wt. of Sample & Tare, wet	803.4					
m) Wt. of Sample & Tare, Dry	738.3					
n) Wt. of Water lost: (l - m)	65.1					
o) Wt. of Tare	222.2					
p) Wt. of Dry soil: (m - o)	516.1					
q) % Moisture: (n / p) x 100	12.61					

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

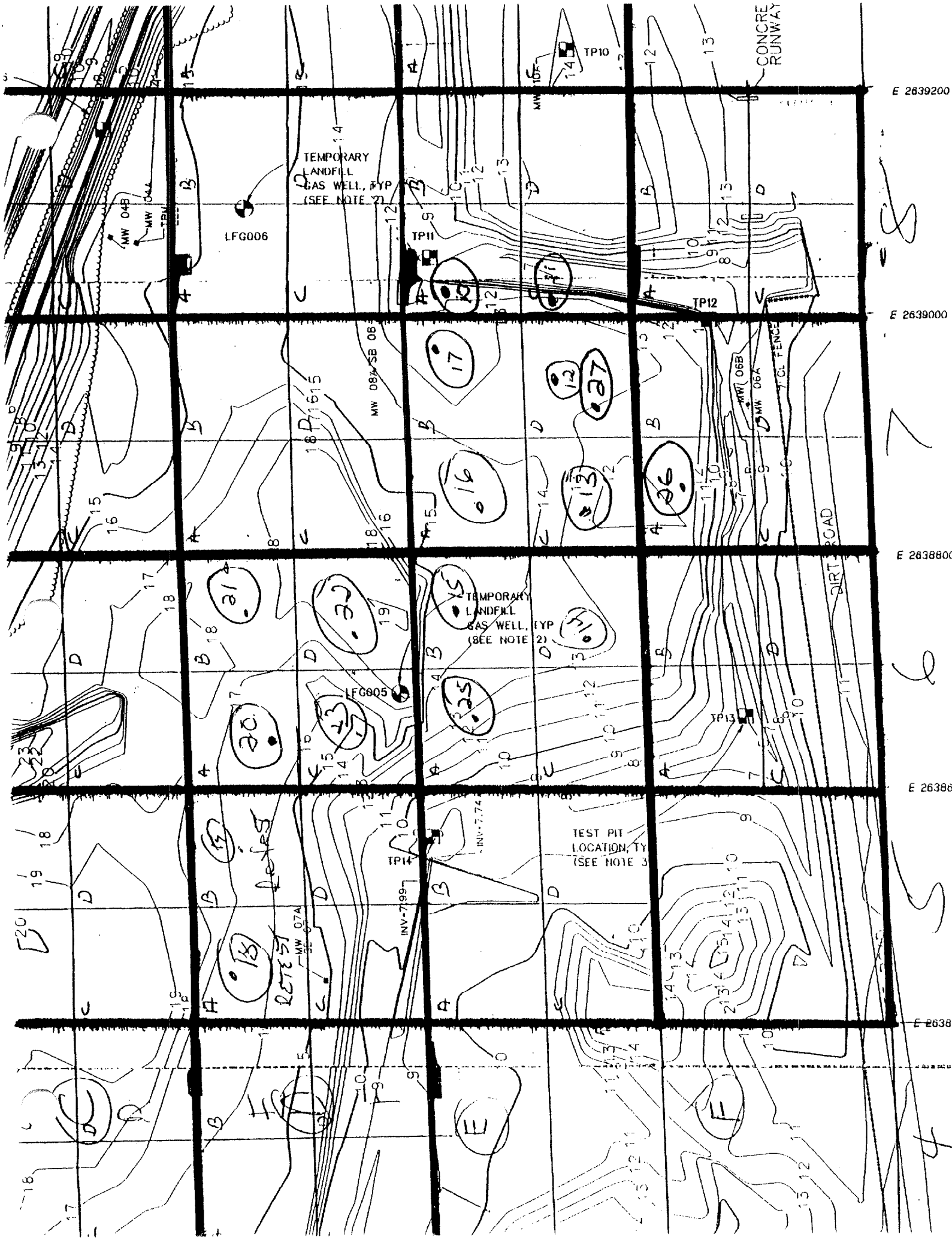
FIELD COMPACTION LOG **DATE:** 7/1/99

TECHNICIAN: J. Smith **QC MANAGER:** GCS

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
25 E6-A	102.55	11.19	95	P
26 E7-A	95.95	11.90	95	P
27 E7-D	99.02	9.11	95	P
28 E7-D	SAND CONE	ASTM D-1556		
29 F7-A	SAND CONE	ASTM D-1556		

PAGE_____ **OF** _____

All tests 60 Sec.


CONCRETE RUNWAY
TP10
MW 10F
E 2639200
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
LFG006
MW 04B
TP11
TP12
E 2639000
MW 08A
SB 08
MW 06B
MW 06A
CL FENCE
DIRT ROAD
E 2638800
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
LFG005
TP13
E 26386
TP14
INV=7.74
INV=7.99
TEST PIT LOCATION, TYP (SEE NOTE 3)
MW 07A
E 2638

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: Landfill CAP JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-1-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grale CLIENT: _____ TECH: J. Smith

	25	26	27				
TEST NO.	1	2	3				
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	11.5	11.5	9.1				
WET DENSITY (pcf)	114.6	107.9	108.6				
DRY DENSITY (pcf)	103.1	96.4	99.5				
PERCENT COMPACTION	102.55	95.95	99.02				
STANDARD PROCTOR MODIFIED PROCTOR	100.5	100.5	100.5				
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	11.19	11.90	9.11				
PROBE DEPTH (inch)	6"	6"					

LOCATION DIAGRAM: E6-A E7-A E7-D

REMARKS:

Engineering Consulting Services, Ltd.

ASTM D1556 Sand Cone Field Worksheet

Project: LANDFILL CAP- Grade	Field Kit # ____ Sand Calib. 90.62 pcf	Date 7-2-99
Location: NORFOLK	Wt. of Sand in Cone & Plate ____ lbs.	Job No. N3447 Technician: J.S.

Area Tested: Grid Coordinates E7-D + [redacted]

F7-A Correct #.

Test Number	3	4				
Location	E7-D	E7-C				
Lift / Elevation	[redacted]	first Lift				
Volume						
Wt of Bottle & Cone, Before	6736.1	6734.3				
Wt of Bottle & Cone, After	2847.5	3133.5				
a) Wt. of Sand in hole, cone, & plate	3888.6	3600.8				
b) Wt. of Sand in cone & plate	1666.6	1470.6				
c) Wt. of Sand in hole (a - b)	4.3946	4.6962				
d) Volume of hole: c / Sand Calib = cu.ft.	.0540	.0518				
Density						
e) Wt. of Sample & Tare	2728.0	2621.4				
f) Wt. of Tare	12.9	12.9				
g) Wt. of Sample (e - f)	5.9857	5.7508				
h) Wet Density. g/d = pcf	110.84	111.00				
I) Dry Density: h/ (1 + q) =pcf	101.61	97.13				
j) Max. Dry Density (Proctor) =pcf	100.5	100.5				
k) % Compaction: (i/j) x 100	OK 101.1	96.65	OK			
Moisture						
Tare No.	AnaKin	Tuna				
l) Wt. of Sample & Tare, wet	730.6	700.2				
m) Wt. of Sample & Tare, Dry	688.1	640.8				
n) Wt. of Water lost: (l - m)	42.5	59.4				
o) Wt. of Tare	220.2	225.1				
p) Wt. of Dry soil: (m - o)	467.9	415.7				
q) % Moisture: (n / p) x 100	9.08	14.28				

L:/FORMS/SNDCONE.doc.

Note: Listed AS E7-C
Actual is F7-A per Q.C. Records!

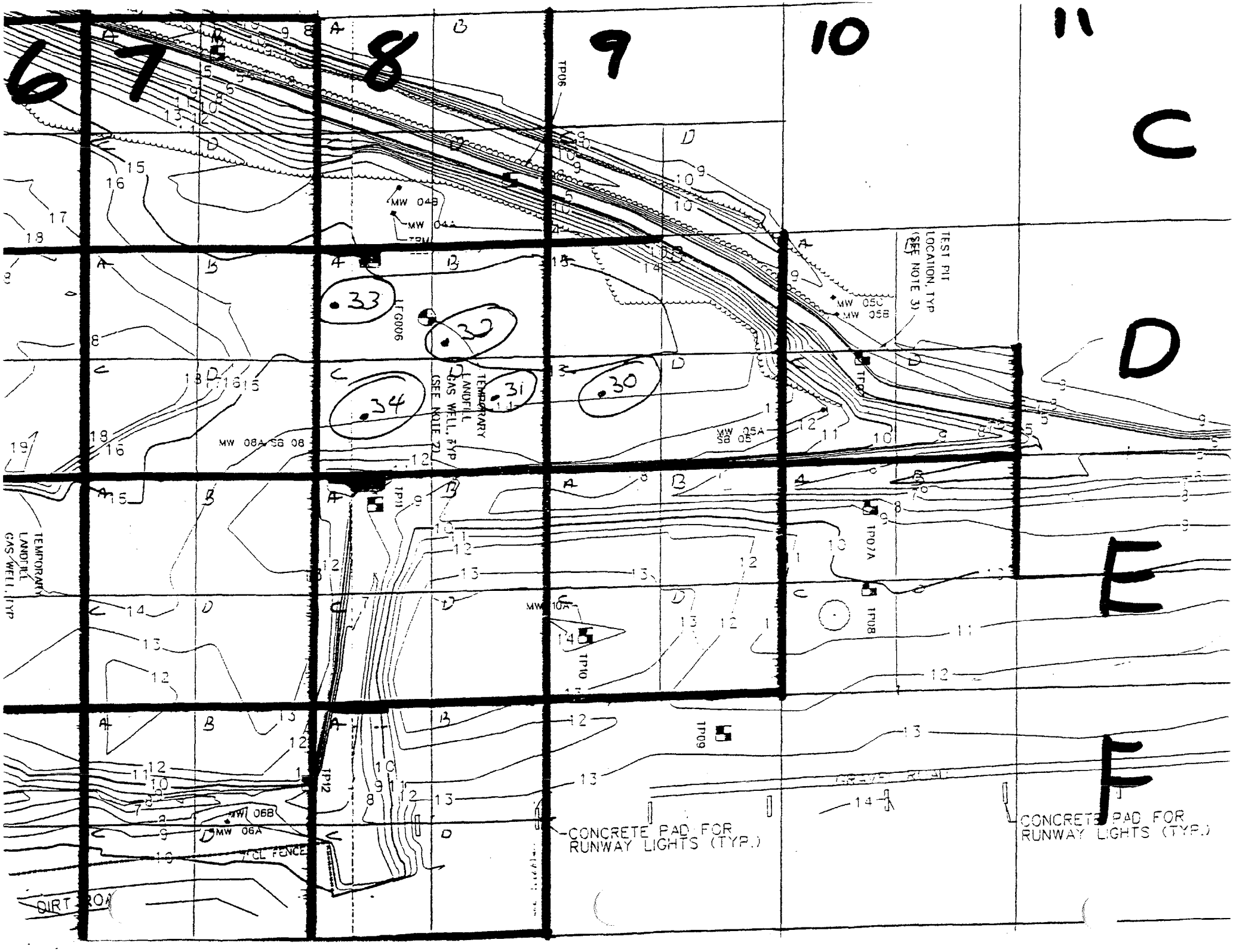
GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 7/8/99

TECHNICIAN: J. Smith **QC MANAGER:** G.C.S.

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL	
30 D9-C	102.43	15.10	95	P	
31 D8-D	95.33	16.21	95	P	
32 D8-B	98.39	11.29	95	P	
33 D8-A	100.57	14.43	95	P	
34 D8-C	97.71	20.84	95	P	(A)
35 E6-C	96.81	10.16	95	P	
36 C3-C	96.60	7.84	95	P	
37 C4-A	97.97	9.20	95	P	2nd 1st
38 B4-C	106.89	12.93	95	P	
39 B3-D	104.06	11.63	95	P	
40 B4-A	99.05	9.73	95	P	
41 B4-B	101.37	9.97	95	P	
42 B4-D	98.17	8.50	95	P	2nd 1st

PAGE_____ OF _____



6
7
8
9
10
11
C
D
E
F
TP06
MW 04B
MW 04A
TEST PIT LOCATION, TYP (SEE NOTE 3)
MW 05C
MW 05B
LFG006
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
MW 08A SB 08
MW 05A SB 05
TP11
TP07A
TP08
TEMPORARY LANDFILL GAS WELL, TYP
MW 10A
TP10
TP09
TP12
MW 06B
MW 06A
CL FENCE
DIRT ROA
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: N31147
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-8-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	30	31	32	33	34	35	
TEST NO.	1	2	3	4	5	6	
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	15.5	15.5	11.2	14.6	20.5	9.9	
WET DENSITY (pcf)	118.5	111.3	110.0	115.6	118.6	107.2	
:Y DENSITY (pcf)	102.9	95.8	98.9	101.1	97.71	97.3	
PERCENT COMPACTION	102.43	95.33	96.39	100.57	98.2	96.81	
STANDARD PROCTOR MODIFIED PROCTOR	100.5	100.5	100.5	100.5	100.5	10.16	
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	15.10	16.21	11.29	14.43	20.84	10.16	
PROBE DEPTH (inch)	6"	6"	6"	6"	6"	6"	
LOCATION DIAGRAM:	D9-C	D8-D	D8-B	D8-A	D8-C	E6-C	REMARKS:

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: W 3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-8-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	36	37	38	39	40	41	42
TEST NO.	7	8	9	10	11	12	13
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	7.6	9.1	13.9	12.2	9.7	10.2	8.4
WET DENSITY (pcf)	104.7	107.5	121.3	116.7	109.2	112.0	107.0
DRY DENSITY (pcf)	97.1	98.4	107.4	104.6	99.5	101.9	98.6
PERCENT COMPACTION	96.60	97.97	106.89	104.06	99.05	101.37	98.17
STANDARD PROCTOR MODIFIED PROCTOR	100.5	100.5	100.5	100.5	100.5	100.5	
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK	2nd lift	2nd lift	1st lift				2nd lift
MOISTURE CONTENT %	7.84	9.20	12.98	11.63	9.73	9.97	8.50
PROBE DEPTH (inch)	6"	6"	6"	6"	6"	6"	6"

LOCATION DIAGRAM: C3-C C4-A B4-C B3-D B4-A B4-B REMARKS: B4-D

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO	TRANSMITTAL NO	DATE
N62470-98-C-8816	0028	7-14-99

FROM CONTRACTOR: Grace Industries, Inc

TO: Atlantic Division, Naval Facilities Command

PROJECT TITLE AND LOCATION: Land Clearing Phase II, Naval Base, Dig Gate, VA.

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO.	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
13	02315 2.Part 3	Density Tests	7	A	
				RA	26JUL99

CONTRACTOR'S COMMENTS

I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number N62470-98-C-8816, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager (Signature) [signature] Date 7-14-99.

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature) [signature]

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
19JUL99		

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	26JUL99	[signature]

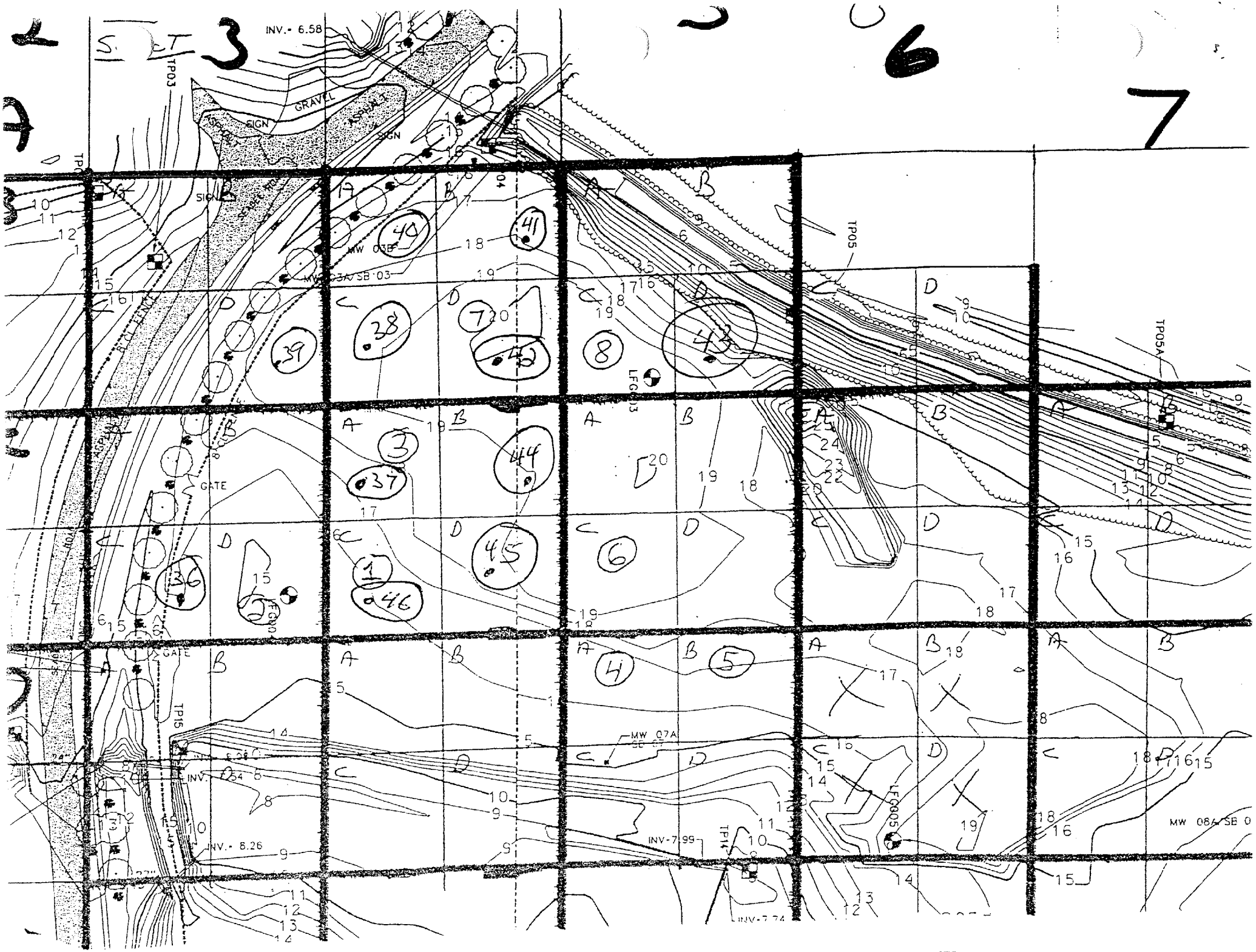
GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 7/9/99

TECHNICIAN: John Smith **QC MANAGER:** G.L.S.

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL	
43 B5-D	96.96	12.36	95	P	
44 C4-B	96.87	8.13	95	P	
45 C4-D	100.07	8.64	95	P	
46 C4-C	99.69	7.93	95	P	2ND L-8P

PAGE_____ **OF** _____


SHEET 3
INV.- 6.58
TP03
GRAVEL
ASPHALT
SIGN
TP05
TP05A
MW 03B
MW 03A/SB 03
LFG003
GATE
TP15
INV.- 8.26
MW 07A
SB 07
LFG005
TP14
INV-7.99
INV-7.74
MW 08A/SB 0

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: 3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-9-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	(43)	(44)	(45)	(46)			
TEST NO.	1	2	3	(4)			
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	12.0	7.9	8.7	7.9			
WET DENSITY (pcf)	109.5	105.3	109.2	108.1			
DRY DENSITY (pcf)	97.4	97.3	100.5	100.2			
PERCENT COMPACTION	96.96	96.87	100.07	99.69			
STANDARD PROCTOR MODIFIED PROCTOR	100.5	100.5	100.5	100.5			
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK	1st Lift	→	→	2nd Lift			
MOISTURE CONTENT %	12.36	8.13	8.64	7.93			
PROBE DEPTH (inch)	6"	6"	6"	6"			

LOCATION DIAGRAM: B5-D C4-B C4-D C4-C 2nd Lift

REMARKS:

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO	TRANSMITTAL NO.	DATE
N62470-98-C-8816	[illegible]	7-21-99

FROM CONTRACTOR: GRACE INDUSTRIES, INC

TO: [illegible] Div Fac. Eng. Command

PROJECT TITLE AND LOCATION: [illegible] Naval Base Norfolk VA.

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

- [x] Contractor Approved
- [ ] OICC Approval
- [ ] Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO.	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
73	[illegible]	[illegible]	7	A	
		[illegible]		RA	[illegible] 26 JUL 99

CONTRACTOR'S COMMENTS

* I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number N62470-98-C-8816, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager [signature], Date 7-21-99.
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature) [signature]

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
26 JUL 99		

- [ ] Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.
- [ ] Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	[illegible]	[signature]

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

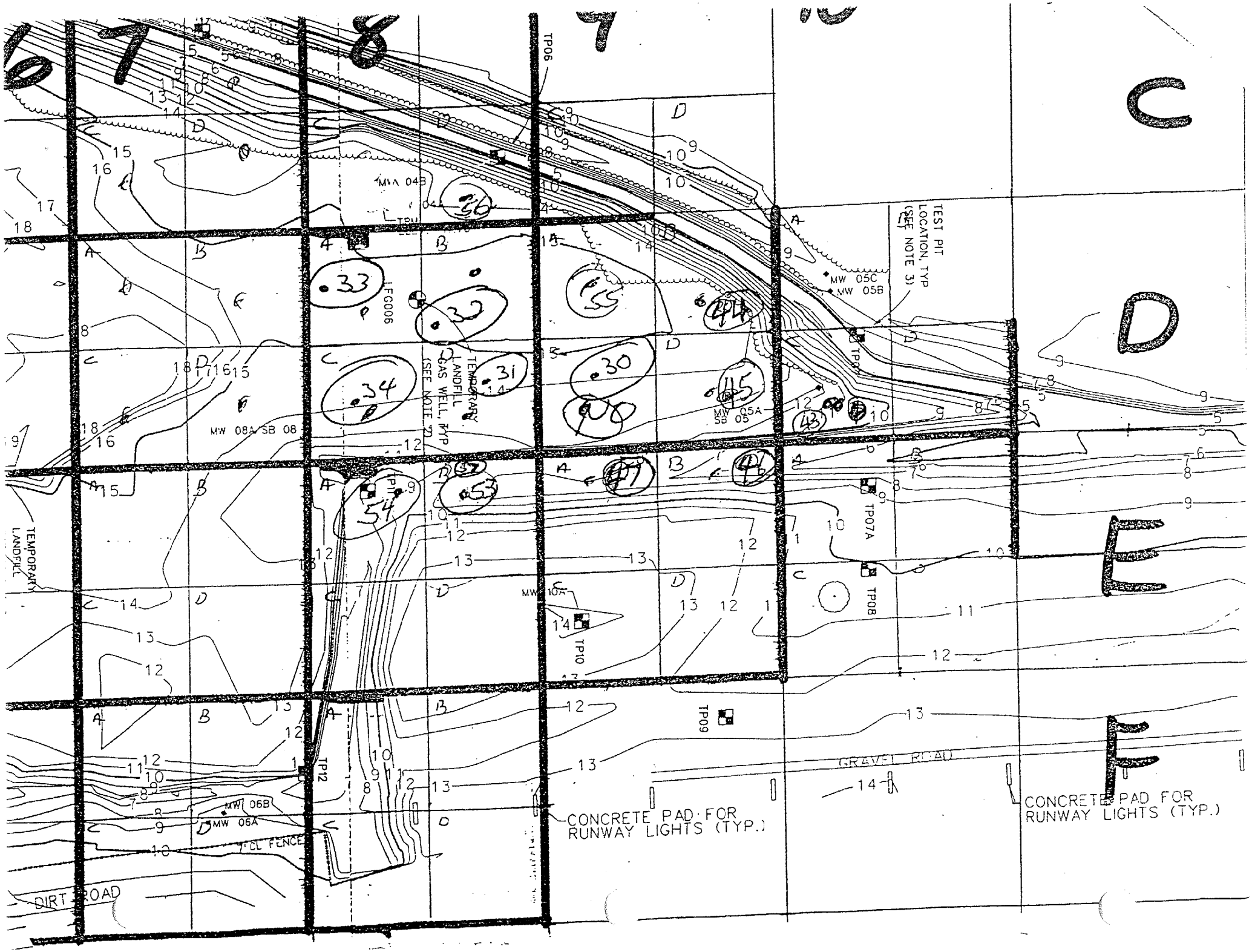
FIELD COMPACTION LOG **DATE:** 7/20/99

TECHNICIAN: J. Smith **QC MANAGER:** G.C.S.

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
E8-B	97.55	8.43	95	P
E8-A	99.1	9.12	↓	↓
D9-A	98.1	8.8		
C8-D	97.81	8.31		
SAND CONE	E8-B			

G.S.

PAGE_____ OF _____


TP06
MW 04B
TP11
LFG006
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 3)
MW 08A SB 08
TEST PIT LOCATION, TYP (SEE NOTE 3)
MW 05C
MW 05B
MW 05A SB 05
TP07A
TP08
TP09
TP10
TP12
MW 06B
MW 06A
TEMPORARY LANDFILL
DIRT ROAD
GRAVEL ROAD
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LAND FILL CAP JOB NO.: U 3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-20-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

53 ~~46~~ 54 ~~49~~ 55 ~~50~~ 56 ~~51~~

TEST NO.	1	2	3	4			
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	8.3	9.1	8.7	8.2			
WET DENSITY (pcf)	106.3	108.7	107.3	106.9			
DRY DENSITY (pcf)	98.0	99.6	98.6	98.3			
PERCENT COMPACTION	97.55	99.1	98.1	97.81			
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→	→	→			
OPT. WATER CONTENT	20.7	20.7	→	→			
LIFT, ELEVATION, OR SOIL MARK	1rst	1rst	→	→			
MOISTURE CONTENT %	8.43	9.12	8.8	8.31			
PROBE DEPTH (inch)	6"	6"	6"	6"			

LOCATION DIAGRAM: E8-B | E8-A | D9-A | C8-D

Grid Coordinates

REMARKS: See Attached Map.

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

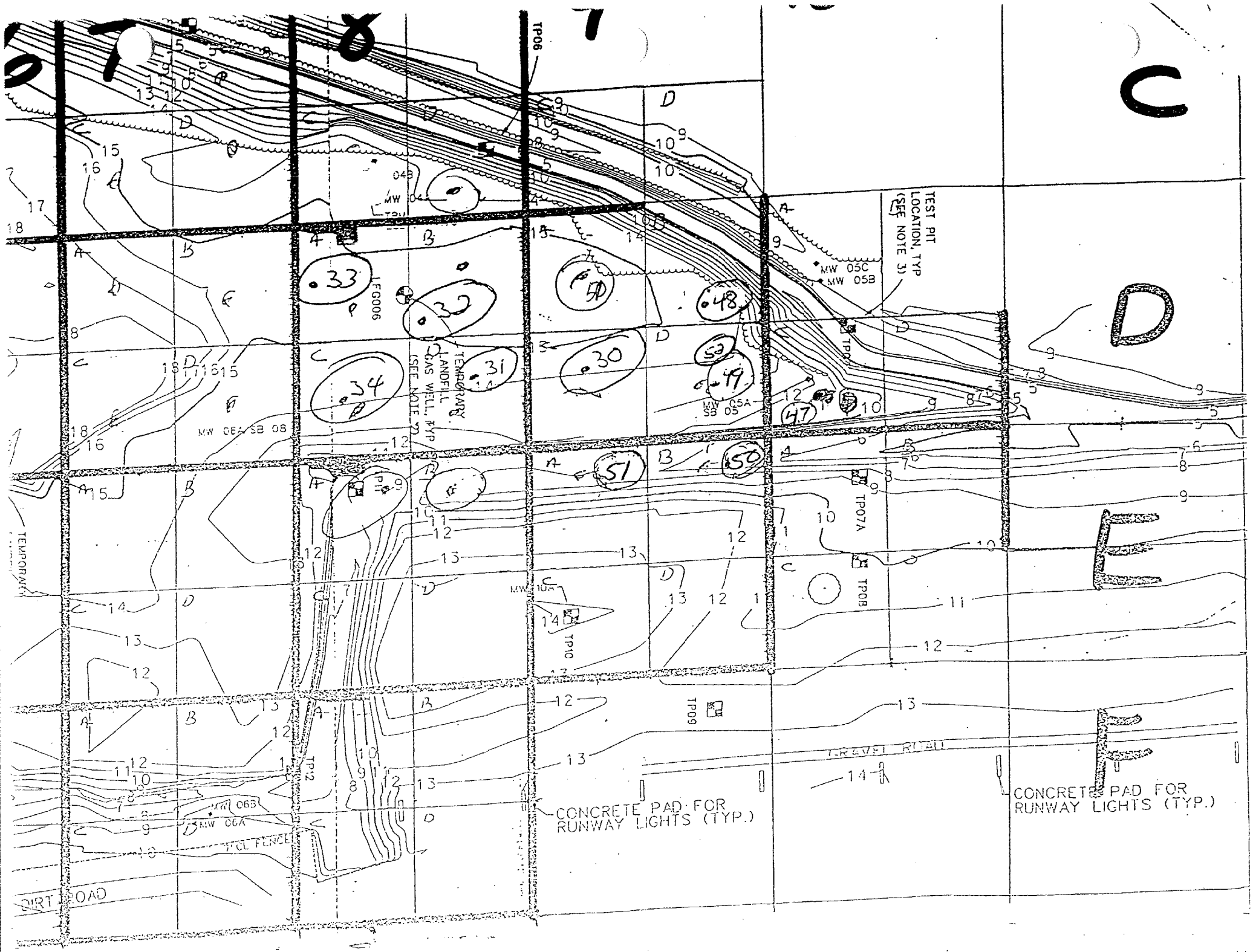
FIELD COMPACTION LOG **DATE:** 7/18/98

TECHNICIAN: J. Smith **QC MANAGER:** G. Ss.

	GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
17 (46)	D-10C	99.48	8.3	95%	P
48 (47)	D-9B	112.89	10.69	↓	↓
49 (45)	D-9D	97.08	9.63		
50 (46)	E-9B	96.59	10.15		
51 (47)	E-9A	96.23	10.38		
52 (48)	SAND CONE, D-9D				

.LS.

PAGE_____ OF _____


TEST PIT LOCATION, TYP (SEE NOTE 3)
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 3)
LFG006
MW 05C
MW 05B
MW 05A
SB 05
MW 06A/SB 06
MW 06B
MW 06A
TP06
TP07A
TP08
TP09
TP10
TP12
GRAVEL ROAD
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)
DIRT ROAD
STEEL FENCE

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD land fill cap JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-19-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	47	48	49	50	51		
TEST NO.	1	2	3	4	5		
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	8.3	12.6	9.4	9.8	10.0		
WET DENSITY (pcf)	108.3	125.6	107.0	106.9	106.7		
DRY DENSITY (pcf)	100.0	112.4	97.6	97.1	96.7		
PERCENT COMPACTION	99.48	112.89	97.08	96.59	96.23		
STANDARD PROCTOR MODIFIED PROCTOR	100.5						
OPT. WATER CONTENT	20.5						
LIFT, ELEVATION, OR SOIL MARK	1rst	1ust					
MOISTURE CONTENT %	8.30	10.69	9.63	10.15	10.38		
PROBE DEPTH (inch)	6"						

LOCATION DIAGRAM: D10-C D9-B D9-D E9-B E9-A

REMARKS:

See map attached

SAND Cone Test performed

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO	TRANSMITTAL NO.	DATE
N62470-98-C-8816	052D	7-27-99

FROM CONTRACTOR: GRACE INDUSTRIES, INC

Atlantic Div. Fac. Eng. Command

PROJECT TITLE AND LOCATION: LANDFILL CAP FOR CD LANDFILL NAVAL BASE NORFOLK, VA.

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
73	02315 3.10.2.3	DENSITY TESTS	7	A	
		#58 → #78		RA	~~ASI CH2MHILL~~ 1AUG99

CONTRACTOR'S COMMENTS

" I hereby certify that the (material) (equipment) (article) shown as marked in this submittal and proposed to be incorporated wit Contract Number N62470-98-C-8816, is in compliance with the ~~contract drawings and specification, can be installed in the~~ allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager _____, Date 7/27/99
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature)

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
28JUL99		

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	1AUG99	

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 7/22/99

TECHNICIAN: J. Smith **QC MANAGER:** G.C.S.

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
58	99.00	7.55	95	P
59	95.55	7.18		P
60	95.79	9.4		P
61	94.35	9.95		F
62	99.87	10.01		Retest - P
63	97.79	7.25		- P
64	96.92	7.59		P

QC check

These were Retests AT Request of MARK LINN-RAFCO

PAGE____ OF ____

Call Shawn

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: [redacted] CDLANDFILL JOB NO.: [redacted]B447

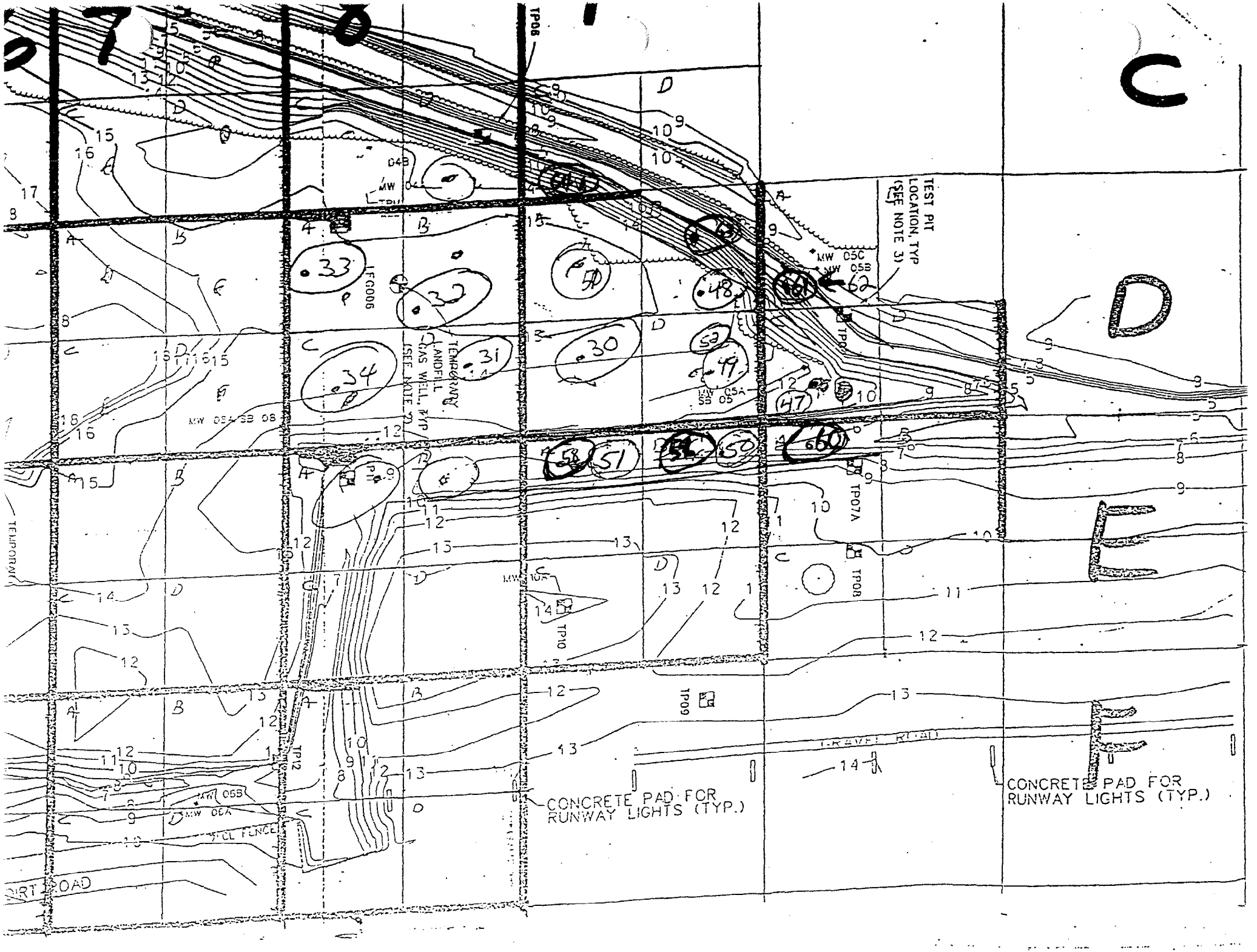
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-22-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: [redacted] Grace CLIENT: _____ TECH: J. Smith

	58	59	60	61	62	63	64
TEST NO.	1	2	3	4	5	6	7
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	7.5	6.9	9.1	9.4	10.0	7.1	7.4
WET DENSITY (pcf)	107.0	103.3	105.3	104.3	110.4	104.9	104.8
DRY DENSITY (pcf)	99.5	96.4	96.3	94.8	100.4	97.8	97.4
PERCENT COMPACTION	99.00	95.95	95.79	94.38	99.87	97.79	96.92
STANDARD PROCTOR MODIFIED PROCTOR	100.5	100.5	100.5	100.5	100.5	100.5	100.5
OPT. WATER CONTENT	20.7	20.7	20.7	20.7	20.7	20.7	20.7
LIFT, ELEVATION, OR SOIL MARK	1rst	1rst	1rst	1rst	1rst	1rst	1rst
MOISTURE CONTENT %	7.55	7.18	9.4	9.95	10.01	7.25	7.59
PROBE DEPTH (inch)	6"	6"	6"	6"	6"	6"	6"

LOCATION DIAGRAM: E9-A E9-B E10-A Reroll D10-A D10-A D9-B REMARKS: C9-C



TEST PIT LOCATION, TYP (SEE NOTE 3)
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)
GRAVEL ROAD
TP06
TP07A
TP08
TP09
TP10
TP12
MW 05C
MW 05B
MW 05A
MW 05A/SB 08
MW 05A
SB 05
MW 10A
MW 05B
MW 06A
LFG006

CPN CALIBRATION "BY CLINES TECHNICAL SERVICES"

SERIAL NO: M39028695 DATE: 7\16\99 OK GLS

DENSITY STANDARD COUNT: 17,460

DEPTH	COUNT AT 107.2 lb/ft^3	133.6	164.3	--- A ---	--- B ---	--- C ---
BS	11,198	8,323	6,171	2.58538	64.44569	0.15145
AC	22,614	16,711	12,099	4.90761	71.42914	0.20102
2	58,048	40,836	27,038	13.72639	76.39213	-0.04915
4	51,600	33,351	20,379	18.26684	57.64400	0.11080
6	36,231	21,748	12,195	17.25939	49.99217	0.05322
8	23,111	12,788	6,691	16.42091	41.78312	0.06137
10	13,617	7,069	3,550	13.62853	36.62936	0.04971
12	7,887	3,954	2,136	12.96139	30.58906	0.06208

WHERE: DENSITY IN lb/ft^3 = $B * Ln\left(\frac{A}{R - C}\right)$

$$R = RATIO = \frac{COUNT}{STD\ CNT}$$

MOISTURE STANDARD COUNT: 9,206

COUNT AT 0.0 lb/ft^3	23.1	--- A ---	--- B ---
751	4,221	61.28490	4.99945

WHERE: MOISTURE IN lb/ft^3 = (A * R) - B

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 7/27/55

TECHNICIAN: J. Smith **QC MANAGER:** GCS

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
65 C-8-D ~~8-C-D~~	98.63	9.19	95	P
66 C-8-C	101.3	13.06		
67 C-3-B	99.71	14.49		
68 C-4-A	99.61	14.87		
69 C-4-B	98.92	11.61		
70 C-3-D	98.73	11.22		
71 C-4-C	97.91	16.22		
72 C-4-D	97.16	18.88		
73 C-5-C	95.73	18.71		
74 D-3-B	100.0	15.23		
75 D-4-A	95.76	16.37		
76 D-4-B	99.52	14.75		
77 D-5-A	103.1	12.74		
78 D-5-B	99.51	13.7		

PAGE_____ **OF** _____

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-27-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grade CLIENT: _____ TECH: J. Smith

	72	73	74	75	76	77	78
TEST NO.	8	9	10	11	12	13	14
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	18.4	18.0	15.3	15.7	14.7	13.2	13.7
WET DENSITY (pcf)	116.1	114.2	115.8	112.8	114.8	116.8	113.7
DRY DENSITY (pcf)	97.6	96.2	100.5	98.2	100.0	103.6	100.0
PERCENT COMPACTION	97.16	95.73	100.0	95.76	99.52	103.1	99.57
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK	top	→					
MOISTURE CONTENT %	18.88	18.71	15.23	16.37	14.75	12.74	13.7
PROBE DEPTH (inch)	8"	→					
LOCATION DIAGRAM:	4C-D	5C-C	3D-B	4D-A	4D-B	5D-A	5D-B

REMARKS:

See attached map

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-27-97

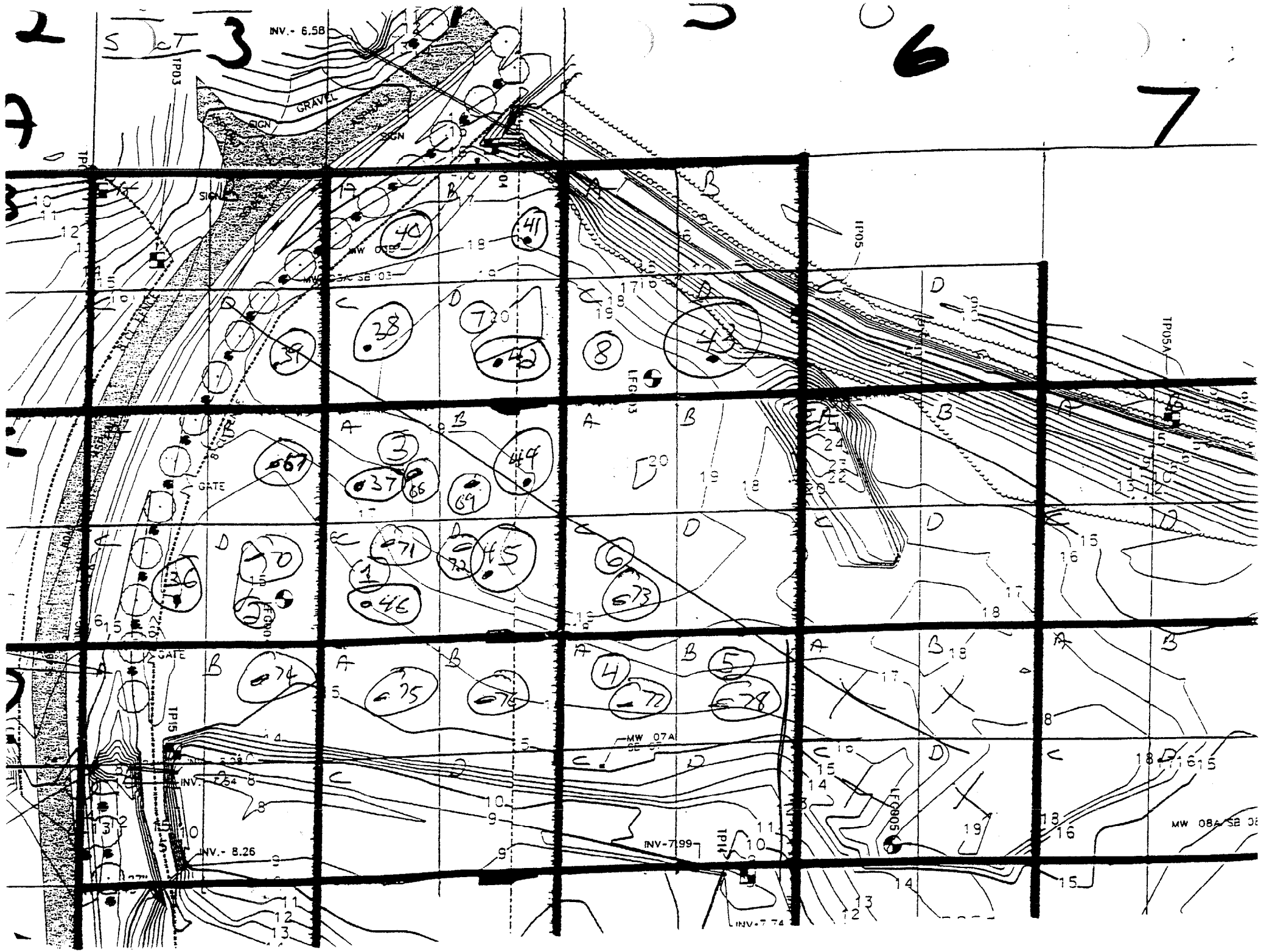
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

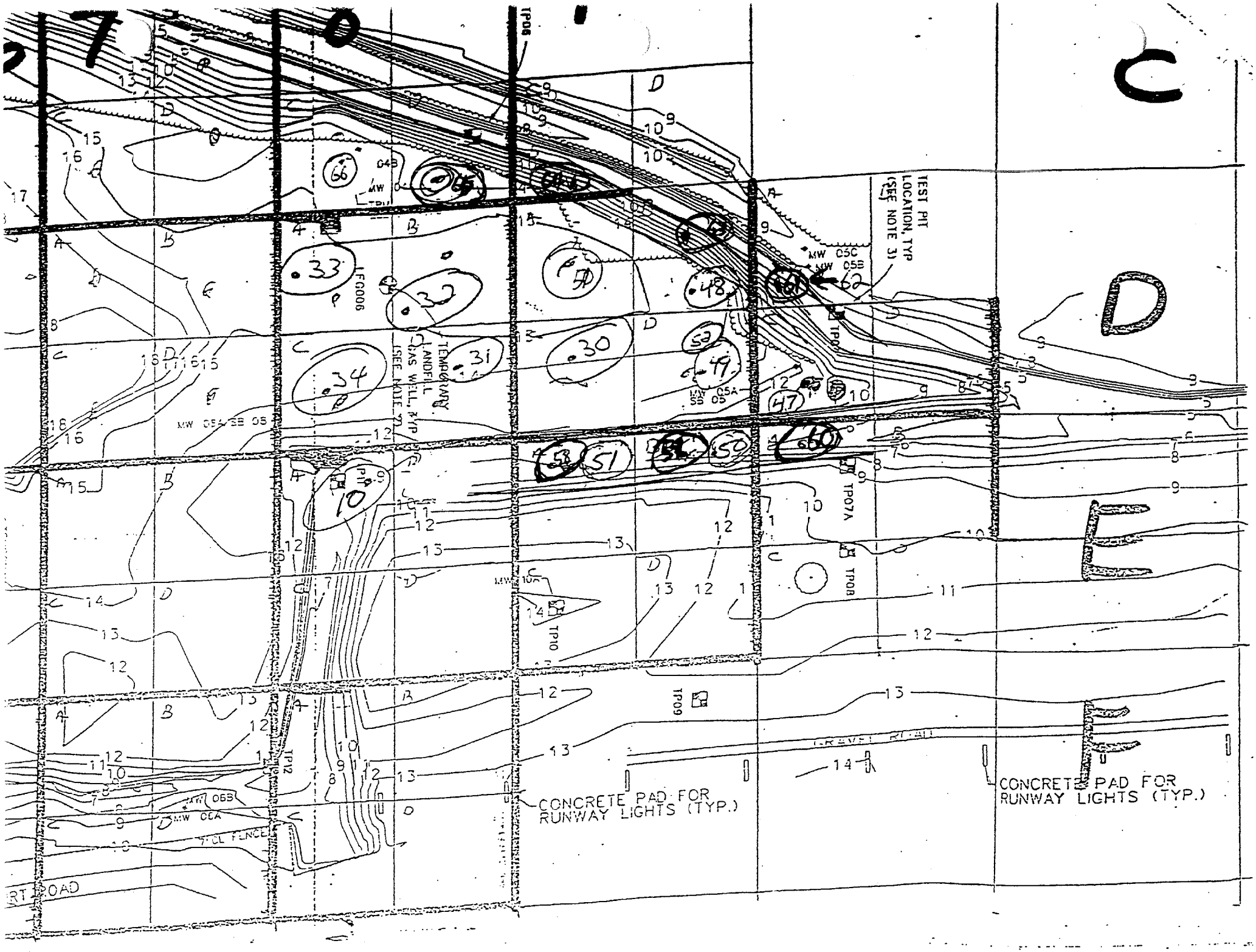
	65	66	67	68	69	70	71
TEST NO.	1	2	3	4	5	6	7
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	9.1	13.3	14.5	14.9	11.5	11.1	16.0
WET DENSITY (pcf)	108.2	115.2	114.7	115.0	111.0	110.3	114.3
DRY DENSITY (pcf)	99.1	101.9	100.2	100.1	99.4	99.2	98.4
PERCENT COMPACTION	98.63	101.3	99.71	99.61	98.92	98.73	97.91
STANDARD PROCTOR MODIFIED PROCTOR	100.5						
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	9.19	13.06	14.49	14.87	11.61	11.22	16.22
PROBE DEPTH (inch)	6"	6"	6"	6"	6"	6"	6"

LOCATION DIAGRAM: 8C-D 8C-C 3C-B 4C-A 4C-B 3C-D 4C-C REMARKS:

See attached MAP



INV.- 6.58
TP03
GRAVEL
SIGN
SIGN
SIGN
MW 03B
MW 03A SB 03
TP05
TP05A
LFG 03
GATE
GATE
TP15
MW 07A
INV.- 8.26
INV-7.99
TP14
LFG005
MW 08A SB 08



TEST PIT LOCATION, TYP (SEE NOTE 3)
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)
GRAVEL ROAD
7' CL FENCE
MW 05A/SB 05
MW 05C
MW 05B
MW 05A
SB 05
MW 06B
MW 06A
TP06
TP07A
TP08
TP09
TP10
TP12
LFG006

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO.	TRANSMITTAL NO.	DATE
N62470-98-C-8816	052E	7-28-99

FROM CONTRACTOR: GRACE INDUSTRIES, INC.
ATLANTIC DIV. FAC. ENG. COMMAND

PROJECT TITLE AND LOCATION: LANDFILL CAP for CO LANDFILL
NAVAL BASE
NORFOLK, VA.

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
73	02315 3.10.2.3	Density Tests	7	A	
		#52 & #57		RA	~~ASTC~~ HZMHILL 1AUG99

CONTRACTOR'S COMMENTS

" I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number N62470-98-C-8816, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager _____, Date 7-28-99
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature)

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
28JUL99		

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	1AUG99	

Engineering Consulting Services, Ltd.

ASTM D1556 Sand Cone Field Worksheet

Project: [redacted] CD LANDFILL CAP	Field Kit # 3 Sand Calib. 89.43 pcf	Date 7-19
Location: NORFOLK	Wt. of Sand in Cone & Plate 1470.6 lbs.	Job No. 13447 Technician: JS.

Area Tested: D9-D + E8-B

Test Number	1 (#52)	2 (#57)				
Location	D9-D	E8-B				
Lift / Elevation	1st	1st				
Volume						
Wt of Bottle & Cone, Before	7238.7	6401.6				
Wt of Bottle & Cone, After	3655.4	2498.5				
a) Wt. of Sand in hole, cone, & plate	3583.7	3903.1				
b) Wt. of Sand in cone & plate	1470.6	1470.6				
c) Wt. of Sand in hole (a - b)	4.6585	5.3626				
d) Volume of hole: c / Sand Calib = cu.ft.	.05209	.0599				
Density						
e) Wt. of Sample & Tare	2588.3	2971.1				
f) Wt. of Tare	12.9	12.9				
g) Wt. of Sample (e - f)	5.6777	6.5216				
h) Wet Density: g/d = pcf	108.9	108.8				
i) Dry Density: h/ (1 + q) =pcf	101.1	99.7				
j) Max. Dry Density (Proctor) =pcf	100.5	100.5				
k) % Compaction: (i/j) x 100	100.5	99.2				
Moisture						
Tare No.	AvaKin	MST3K				
l) Wt. of Sample & Tare, wet	833.3	811.8				
m) Wt. of Sample & Tare, Dry	789.5	762.7				
n) Wt. of Water lost: (l - m)	43.8	49.1				
o) Wt. of Tare	220.1	221.8				
p) Wt. of Dry soil: (m - o)	569.4	540.9				
q) % Moisture: (n / p) x 100	7.69	9.07				

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO	TRANSMITTAL NO.	DATE
N62470-98-C-8816	52 F	8/19/99

FROM CONTRACTOR: GRACE INDUSTRIES INC

ATLANTIC DIV, FAC. ENG. COMMAND

PROJECT TITLE AND LOCATION: LANDFILL CAP FOR CD LANDFILL NAVAL BASE NORFOLK, VA.

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
23	02315 3.10.2.3	DENSITY TESTS	7	A	
		#79 → #145		RA	AST CHRMHILL 7SEP99
		SAND CONES #145 & #154 NOT RECEIVED			

CONTRACTOR'S COMMENTS

I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number N62470-98-C-8816, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager _____, Date 8/19/99.
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature)

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
1SEP99		

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS: Tests 131 and 133 not included.

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	7SEP99	

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

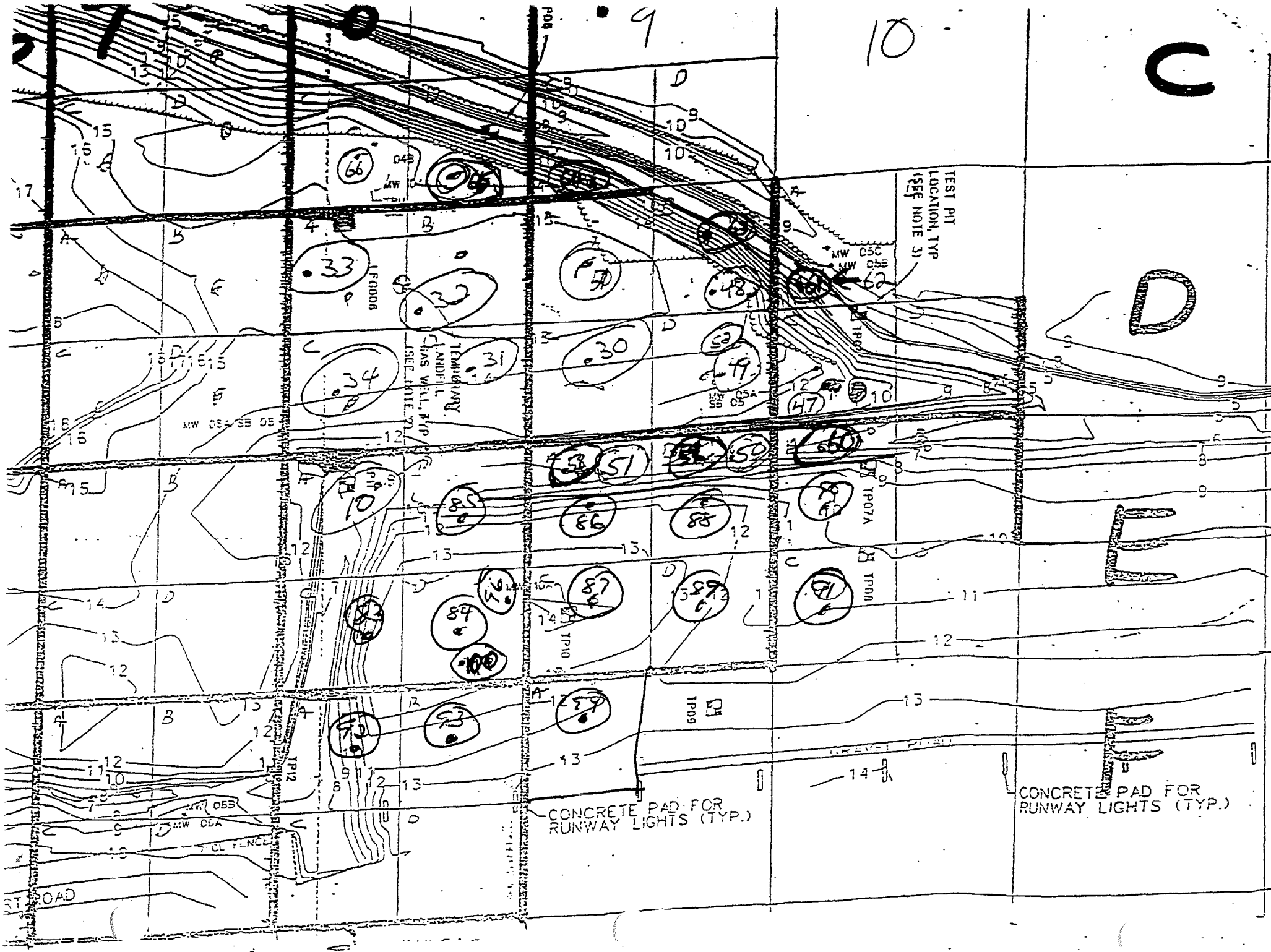
FIELD COMPACTION LOG **DATE:** 7/28/99

TECHNICIAN: J. Smith **QC MANAGER:** GCS

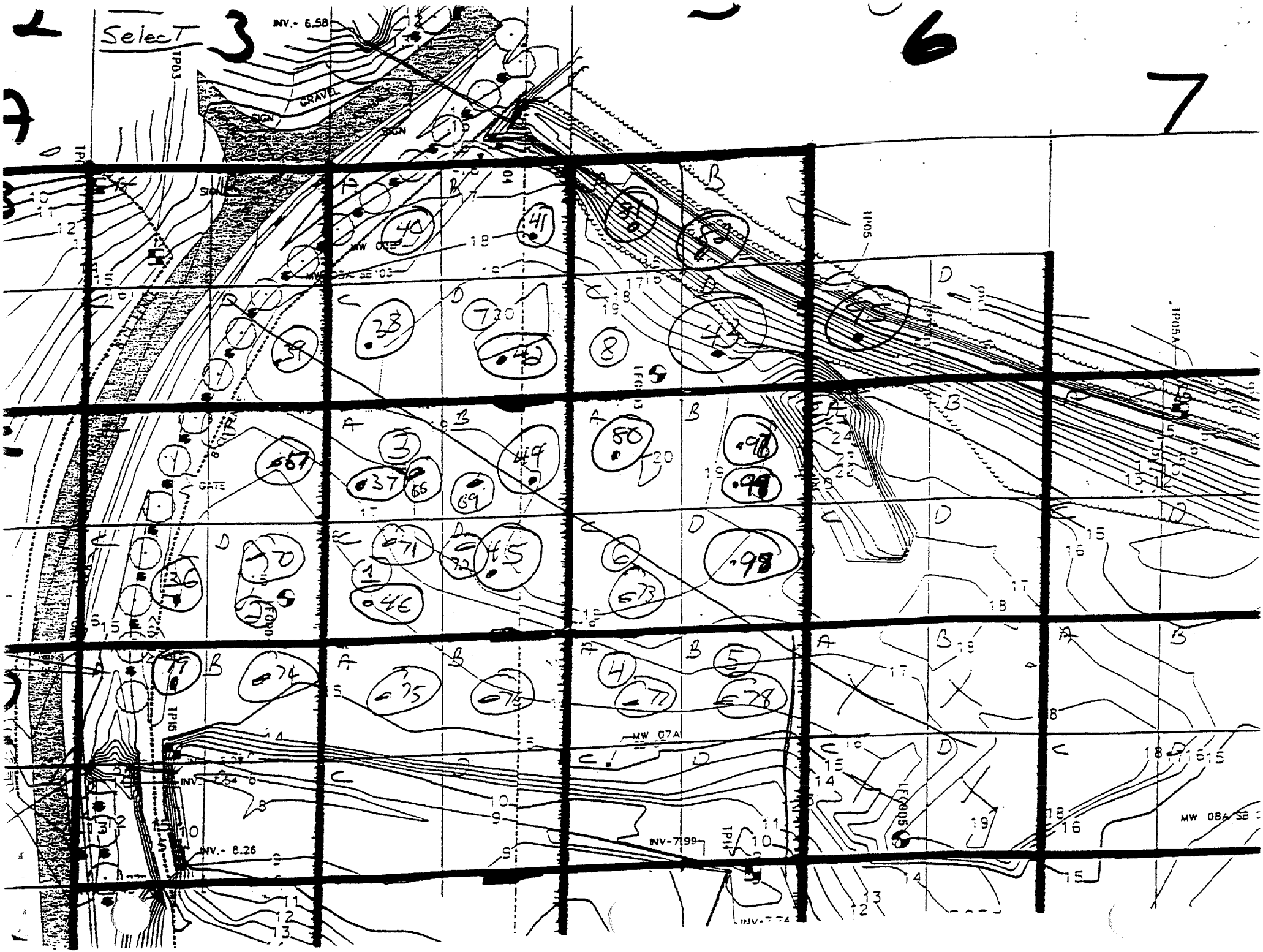
GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL	
79 D-3-A	98.38	12.81	95		
80 C-5-A	98.5	13.96			
81 B-5-A	100.8	18.99			
82 B-5-B	99.36	19.67			
83 E-8-C	99.97	11.38			
84 E-8-D	99.3	9.59			
85 E-8-B	100.4	7.25			Sideslope
86 E-9-A	100.2	7.35			
87 E-9-C	100.4	17.1			
88 E-9-B	100.6	8.52		P	Sideslope
89 E-9-D	103.7	5.17		P	
90 E-10-A	96.81	13.04		P	
91 E10-C	100.5	14.47		P	
92 F-8-A	99.5	12.27			
F-8-B	102.3	11.65			
F-9-A	~~100.7~~ 99.4	~~7.35~~ 9.93			
95 B-6-C	97.87	13.36			
96 E-8-D	95.18	9.18			CQC check
97 C-5-B	99.07	14.1			
	~~Sand cone~~				
	~~Sand cone~~				
98 C-5-D	98.77	18.98			
99 C-5-B	Sand Cone				
100 E-8-D	Sand Cone				

PAGE____ **OF**____

Robert, Longyear MC-3
M39028695



TEST PIT LOCATION, TYP (SEE NOTE 3)
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)
GRAVEL ROAD


Select
3
6
7
INV.- 6.58
TP03
GRAVEL
SIGN
TP05
TP05A
GATE
TP15
MW 07A
INV.- 8.26
INV-7.99
MW 08A

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-28-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	90	91	89	88	86	87	94
TEST NO.	1	2	3	4	5	6	7
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	12.7	14.6	5.4	8.6	7.4	12.2	9.9
WET DENSITY (pcf)	110.0	115.7	109.6	109.7	108.2	113.1	109.8
DRY DENSITY (pcf)	97.3	101.0	104.2	101.1	100.7	100.9	99.9
PERCENT COMPACTION	96.81	100.5	103.7	100.6	100.2	100.4	99.4
STANDARD PROCTOR MODIFIED PROCTOR	100.5	100.5	100.5	100.5	100.5	100.5	100.5
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK	1st Lift →						
MOISTURE CONTENT %	13.04	14.47	5.17	8.52	7.35	12.1	9.93
PROBE DEPTH (inch)	6"	6"	6"	6"	6"	6"	6"

LOCATION DIAGRAM: E-10 A E-10-C E-9-D E-9-B E-9-A E-9-C REMARKS:
F-9-A

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LAND FILL CAP JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-28-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	80	81	82	95	97	98	
TEST NO.	15	16	17	18	19	20	
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	13.8	19.2	196	13.1	14.0	18.8	
WET DENSITY (pcf)	112.8	120.5	119.5	111.5	113.6	118.1	
DRY DENSITY (pcf)	99.0	101.3	99.9	98.4	99.6	99.3	
PERCENT COMPACTION	98.5	100.8	99.36	97.87	99.07	98.77	
STANDARD PROCTOR MODIFIED PROCTOR	100.5	100.5	100.5	100.5	100.5	100.5	
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK	1st Lift						
MOISTURE CONTENT %	13.96	18.99	19.67	13.36	14.1	18.98	
PROBE DEPTH (inch)	6"	6"	6"	6"	6"	6"	

LOCATION DIAGRAM: C-5-A B-5-A B-5-B B-6-C C-5-B C-5-D

REMARKS: sand cone test performed #99

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-28-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	93	84	96	85	83	92	79
TEST NO.	8	9	10	11	12	13	14
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	12.0	9.6	8.8	7.5	11.4	12.3	12.7
WET DENSITY (pcf)	114.8	109.6	104.4	110.4	111.9	112.3	111.6
DRY DENSITY (pcf)	102.8	100.0	95.7	102.9	100.5	100.0	98.9
PERCENT COMPACTION	102.3	99.53	95.18	102.4	99.97	99.5	98.38
STANDARD PROCTOR MODIFIED PROCTOR	100.5	100.5	100.5	100.5	100.5	100.5	100.5
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK	1st						
MOISTURE CONTENT %	11.65	9.56	9.18	7.25	11.38	12.27	12.81
PROBE DEPTH (inch)	6"	6"	6"	6"	6"	6"	6"

LOCATION DIAGRAM: F-8-B | E-8-D Sand cone test performed #100 | E-8-D | E-8-B | E-8-C | F-8-A

REMARKS: D-3-A

See attached Map

Engineering Consu g Services, Ltd.

ASTM D1556 Sand Cone Field Worksheet

Project: CD landfill cap	Field Kit # 3 Sand Calib. 89.43 pcf	Date 7-28-99
Location: NORFOLK	Wt. of Sand in Cone & Plate 3.674 lbs.	Job No. N3447 Technician: J.S.

Area Tested: E-8-D and C-5-B

Test Number	E-8-D	C-5-B				
Location						
Lift / Elevation						
Volume Wt of Bottle & Cone, Before	7412.1	6505.8				
Wt of Bottle & Cone, After	3636.1	2460.8				
a) Wt. of Sand in hole, cone, & plate	3776.0	4045				
b) Wt. of Sand in cone & plate	1666.6	1666.6				
c) Wt. of Sand in hole (a - b)	4.6503	5.2434				
d) Volume of hole: c / Sand Calib = cu.ft.	.05199	.05863				
Density e) Wt. of Sample & Tare	2495.7	2833.7				
f) Wt. of Tare	12.9	12.9				
g) Wt. of Sample (e - f)	5.4735	6.2187				
h) Wet Density: g/d = pcf	105.28	106.06				
I) Dry Density: h/ (1 + q) =pcf	98.09	95.6				
j) Max. Dry Density (Proctor) =pcf	100.5	100.5				
k) % Compaction: (i/j) x 100	97.60	95.12				
Moisture Tare No.	A Redhed	Sands				
l) Wt. of Sample & Tare, wet	469.7	556.4				
m) Wt. of Sample & Tare, Dry	448.3	517.1				
n) Wt. of Water lost: (l - m)	21.4	39.3				
o) Wt. of Tare	156.6	157.9				
p) Wt. of Dry soil: (m - o)	291.7	359.2				
q) % Moisture: (n / p) x 100	7.33	10.94				

L:/FORMS/SNDCONE.doc.

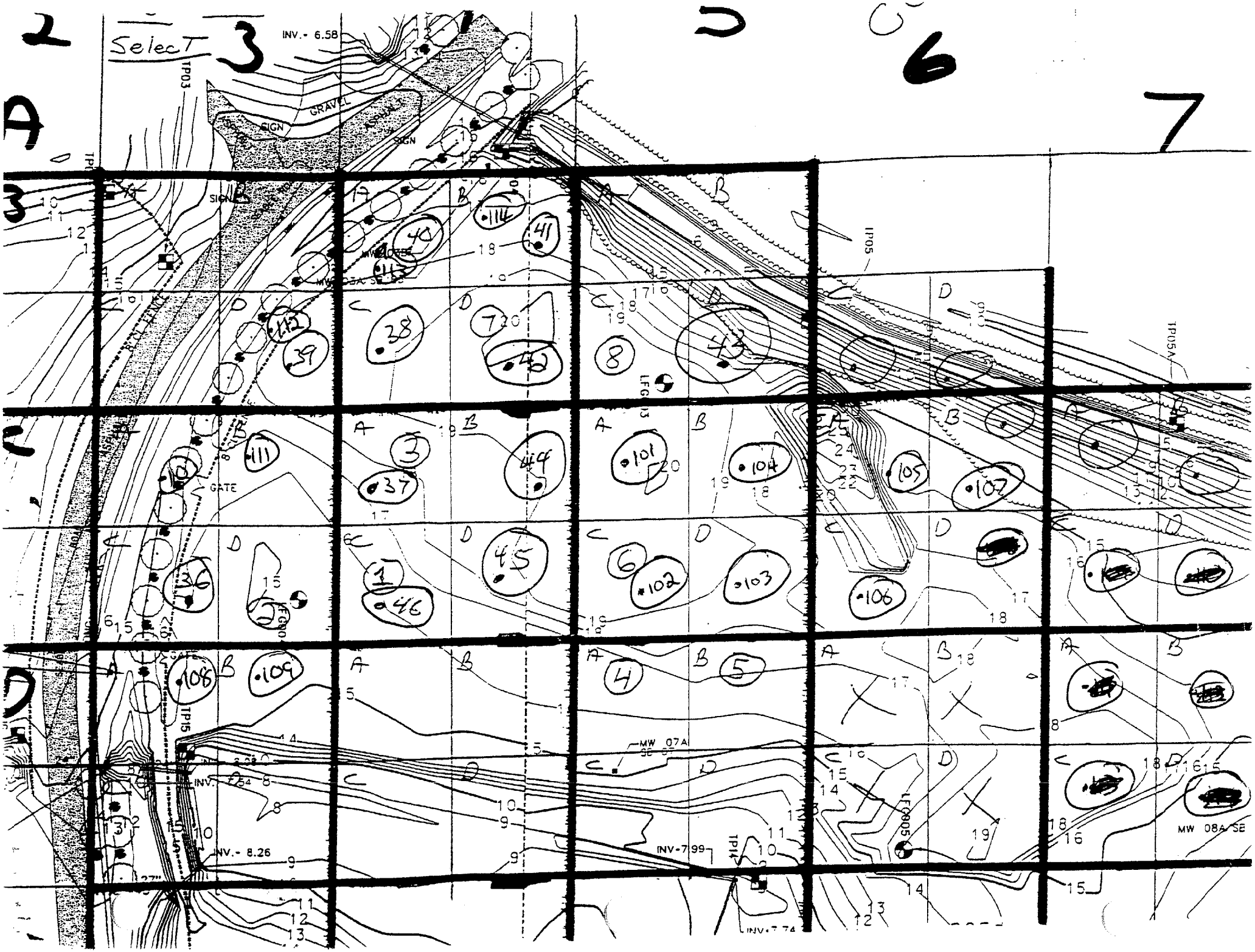
GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 7/28/88

TECHNICIAN: J. Smith **QC MANAGER:** GES

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
101 C-5-A	101.3	12.18	95%	P
102 C-5-C	97.04	16.42		
103 C-5-D	99.05	15.25		
104 C-5-B	99.41	13.58		
105 C-6-A	96.63	16.16		
106 C-6-C	98.22	16.71		
107 C-6-B	98.88	16.15		
108 D-3-A	95.5	17.41		
109 D-3-B	96.47	17.49		
110 C-3-A	97.14	18.91		
111 C-3-B	97.99	18.20		
112 B-3-D	95.1	16.34		
113 B-4-A	84.57	26.54		F - RETEST
114 B4-B	80.23	31.70		F - RETEST
115 SAND CONE	C-5-D			
116 SAND CONE	C-3-A			

PAGE_____ OF _____



Select
INV.- 6.58
TP03
GRAVEL
SIGN
TP05
TP05A
GATE
TP15
INV.- 8.26
INV-7.99
MW 07A
MW 08A SE
LFG005

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Landfill cap JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-29-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	101	102	103	104	105	106	107
TEST NO.	1	2	3	4	5	6	7
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	12.4	16.0	15.2	13.6	15.7	16.5	16.1
WET DENSITY (pcf)	114.2	113.5	114.7	113.5	112.8	115.2	115.5
DRY DENSITY (pcf)	101.8	97.5	99.5	99.9	97.1	98.7	99.5
PERCENT COMPACTION	101.3	97.04	99.05	99.41	96.63	98.22	98.98
STANDARD PROCTOR MODIFIED PROCTOR	100.5						
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK	1st Lift						
MOISTURE CONTENT %	12.18	16.42	15.25	13.58	16.16	16.71	16.15
PROBE DEPTH (inch)	6"						

LOCATION DIAGRAM: C-5-A C-5-C C-5-D C-5-B C-6-A C-6-C

Sand cone test performed

REMARKS: C-6-B

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 7-29-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	108	109	110	111	112	113	114
TEST NO.	8	9	10	11	12	13	14
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	16.7	17.0	18.5	17.9	15.6	22.6	25.6
WET DENSITY (pcf)	112.7	113.9	116.1	116.4	111.2	107.5	106.2
DRY DENSITY (pcf)	96.0	96.9	97.6	98.5	95.6	85.0	80.6
PERCENT COMPACTION	95.5	96.47	97.14	97.99	95.1	84.57	80.23
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK	1st Lift	→					
MOISTURE CONTENT %	17.41	17.49	18.91	18.2	16.34	26.54	31.7
PROBE DEPTH (inch)	6"	→					

LOCATION DIAGRAM: D-3-A D-3-B C-3-A [redacted] [redacted] C-3-B B-3-D B-4-A B-4-B

sand cone test performed

REMARKS:

Engineering Consu g Services, Ltd.

ASTM D1556 Sand Cone Field Worksheet

Project: CD LAND FILL CAP	Field Kit # 3 Sand Calib. 89.43 pcf	Date 7-29-99
Location: NORFOLK	Wt. of Sand in Cone & Plate [redacted] lbs. 3.6741	Job No. N3447 Technician: J.S.

Area Tested: C-5-D and C-3-A

Test Number	115	116				
Location	C-5-D	C-3-A				
Lift / Elevation	1st	1st				
Volume Wt of Bottle & Cone, Before	7251.6	6694.5				
Wt of Bottle & Cone, After	3290.2	2646.0				
a) Wt. of Sand in hole, cone, & plate	3961.4	4048.5				
b) Wt. of Sand in cone & plate	1666.6	1666.6				
c) Wt. of Sand in hole (a - b)	5.0591	5.2511				
d) Volume of hole: c / Sand Calib = cu.ft.	.0565	.05871				
Density e) Wt. of Sample & Tare	2843.8	2968.6				
f) Wt. of Tare	12.9	12.9				
g) Wt. of Sample (e - f)	6.2410	6.5161				
h) Wet Density: g/d = pcf	110.46	110.98				
I) Dry Density: h/ (1 + q) =pcf	100.86	100.7				
j) Max. Dry Density (Proctor) =pcf	100.5	100.5				
k) % Compaction: (i/j) x 100	100.35	100.19				
Moisture Tare No.	Stripper	MST3K				
l) Wt. of Sample & Tare, wet	592.0	612.8				
m) Wt. of Sample & Tare, Dry	559.7	576.6				
n) Wt. of Water lost: (l - m)	32.3	36.2				
o) Wt. of Tare	220.3	221.7				
p) Wt. of Dry soil: (m - o)	339.4	354.9				
q) % Moisture: (n / p) x 100	9.51	10.2				

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

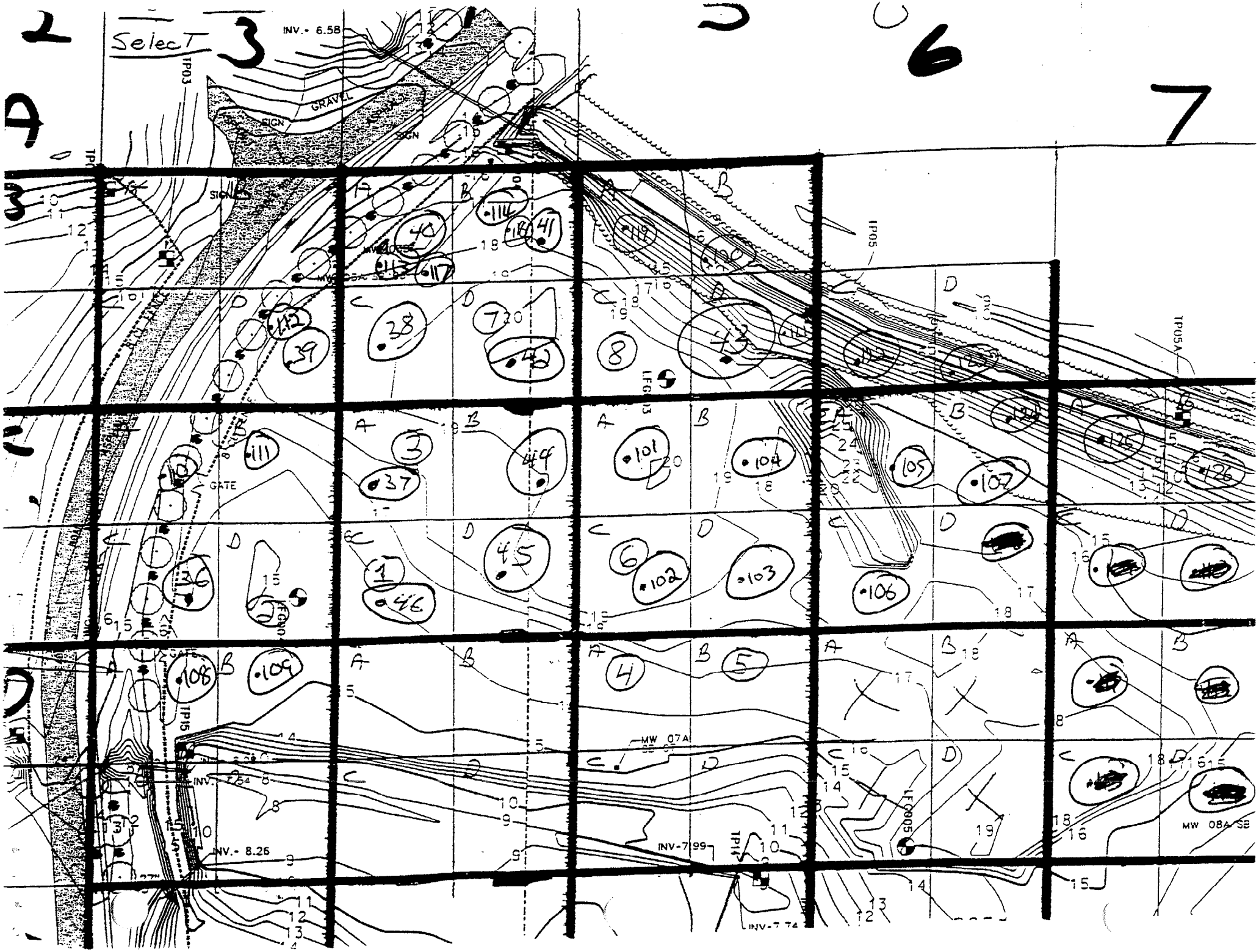
FIELD COMPACTION LOG **DATE:** 8/2/99

TECHNICIAN: J. Smith **QC MANAGER:** GCS

	GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL	
117	B-4-A	88.43	27.4	95	F - moisture	
118	B-4-B	88.97	27.79		F - moisture	
119	B-5-A	95.03	20.88		P	
120	B-5-B	95.9	20.49		P	
121	B-5-D	97.63	20.46		P	
122	B-5-C	97.12	20.69		P	
123	B-6-D	97.9	19.46		P	
124	C-6-B	96.0	18.15		P	
125	C-7-A	95.32	19.4		P	
126	C-7-B	93.8	21.98		P	*
127	D-4-A	97.02	17.11		P	
128	D-4-B	99.01	15.99		P	

* This is Above 90% As Discussed AT Q.C. Mgt. #5

PAGE____ OF ____


Select
INV.- 6.58
TP03
GRAVEL
SIGN
TP05
TP05A
GATE
TP15
INV.- 8.26
MW 07A
INV-7.99
TP14
INV-7.74
MW 08A SB

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD landfill cap. JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-2-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grade CLIENT: _____ TECH: J. Smith

	117	118	119	120	121	122	123
TEST NO.	1	2	3	4	5	6	7
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	24.3	24.8	19.9	19.7	20.1	20.2	19.1
WET DENSITY (pcf)	113.2	114.3	115.4	116.1	118.2	117.8	117.5
DRY DENSITY (pcf)	88.9	89.4	95.5	96.4	98.1	97.6	98.4
PERCENT COMPACTION	88.43	88.97	95.03	95.9	97.63	97.12	97.9
STANDARD PROCTOR MODIFIED PROCTOR	100.5	100.5	100.5	100.5	100.5	100.5	
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	27.4	27.79	20.88	20.49	20.46	20.69	19.46
PROBE DEPTH (inch)	6"	6"	6"	6"	6"	6"	6"

LOCATION DIAGRAM: B-4-A B-4-B B-5-A B-5-B B-5-D B-6-C B-6-D

REMARKS:

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Land fill cap JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-2-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	124	125	126	127	128		
TEST NO.	8	9	10	11	12		
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	17.5	18.6	20.7	16.7	15.9		
WET DENSITY (pcf)	114.0	114.4	115.0	114.2	115.4		
DRY DENSITY (pcf)	96.5	95.8	94.3	97.5	99.5		
PERCENT COMPACTION	96.0	95.32	93.8	97.02	99.01		
STANDARD PROCTOR MODIFIED PROCTOR	100.5	100.5	100.5	100.5	100.5		
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	18.15	19.4	21.98	17.11	15.99		
PROBE DEPTH (inch)	6"	6"	6"	6"	6"		

LOCATION DIAGRAM: C-6-B C-7-A C-7-B D-4-A D-4-B

REMARKS:

Sand cone test performed

CQC check

Engineering Consulting Services, Ltd.

ASTM D1556 Sand Cone Field Worksheet

Project: CD Land Fill Cap	Field Kit # 3 Sand Calib. 89.43 pcf	Date 8-2-99
Location:	Wt. of Sand in Cone & Plate 3,674 lbs.	Job No. N3440 Technician: J.S.

Area Tested: D-4-A

Test Number	129					
Location	D-4-A					
Lift / Elevation						
Volume						
Wt of Bottle & Cone, Before	2074.4					
Wt of Bottle & Cone, After	2985.3					
a) Wt. of Sand in hole, cone, & plate	4089.1					
b) Wt. of Sand in cone & plate	1666.6					
c) Wt. of Sand in hole (a - b)	5.3406					
d) Volume of hole: c / Sand Calib = cu.ft.	.05971					
Density						
e) Wt. of Sample & Tare	2928.4					
f) Wt. of Tare	12.9					
g) Wt. of Sample (e - f)	2915.5					
h) Wet Density: g/d = pcf	107.64					
I) Dry Density: h/ (1 + q) =pcf	99.06					
j) Max. Dry Density (Proctor) =pcf	100.5					
k) % Compaction: (i/j) x 100	98.56					
Moisture						
Tare No.	MST3K					
l) Wt. of Sample & Tare, wet	620.6					
m) Wt. of Sample & Tare, Dry	588.8					
n) Wt. of Water lost: (l - m)	31.8					
o) Wt. of Tare	221.7					
p) Wt. of Dry soil: (m - o)	367.1					
q) % Moisture: (n / p) x 100	8.66					

136.5

28th August

L:/ IS/SNDCONE.doc.

GRACE INDUSTRIES, INC. CONTRACT #N62470-98-C-8816

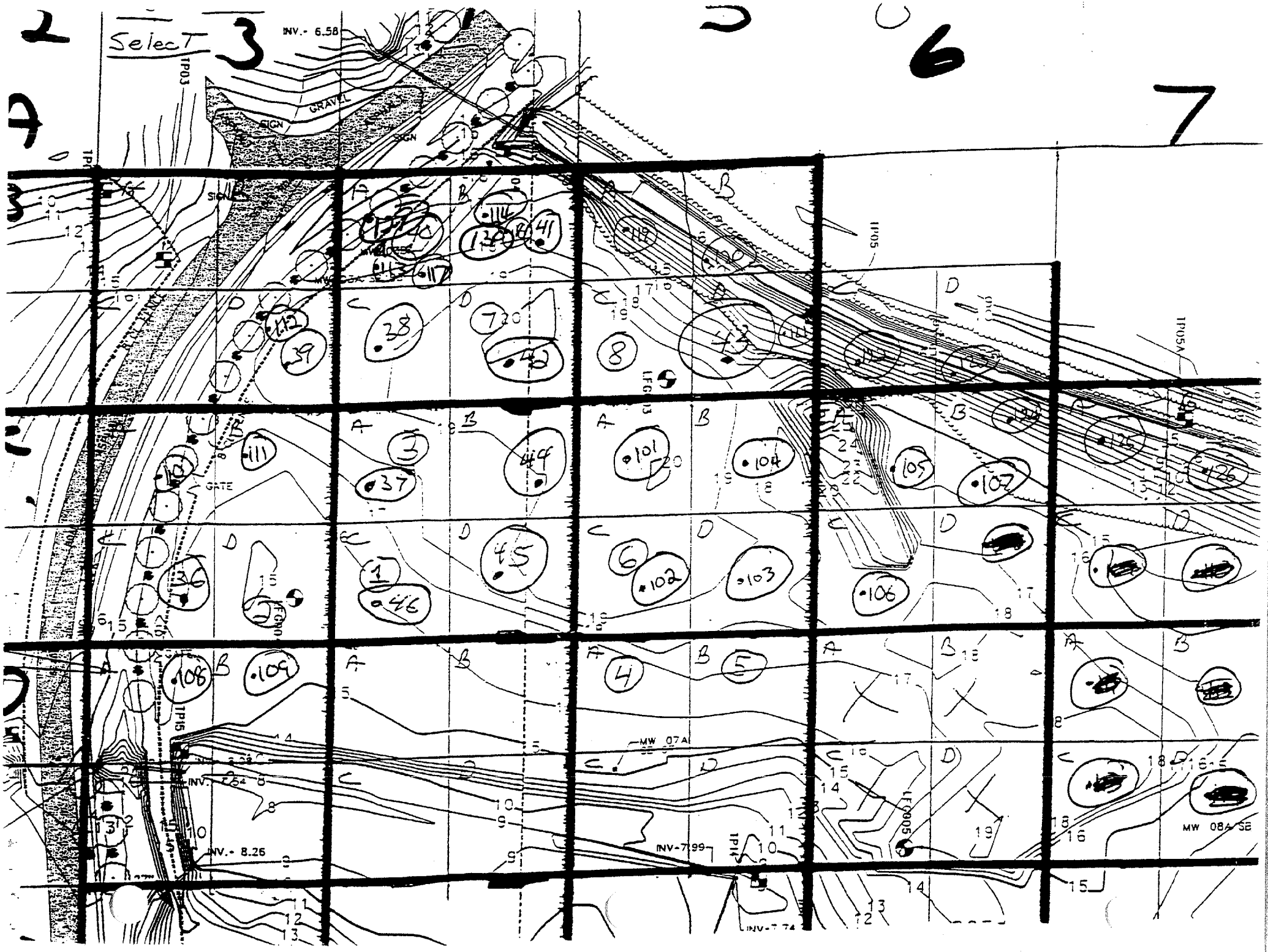
FIELD COMPACTION LOG DATE: 8/3/99

TECHNICIAN: J. Smith QC MANAGER: GCS

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
125 B4-A	98.3	12.95	95	P
130 B-4-B	97.31	13.46	95	P

These were Retests from Fails. Moisture went Down, Now Passed.

PAGE_____ OF _____


Select
INV.- 6.58
GRAVEL
SIGN
TP03
TP05
TP05A
GATE
TP15
INV.- 8.26
MW 07A
INV-7.99
INV-7.74
MW 08A SE

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Land fill CAP JOB NO.: N5447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-3-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

TEST NO.	1	2					
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	12.8	13.1					
WET DENSITY (pcf)	111.6	110.9					
DRY DENSITY (pcf)	98.8	97.8					
PERCENT COMPACTION	98.3	97.31					
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT							
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	12.95	13.46					
PROBE DEPTH (inch)	6"	→					

LOCATION DIAGRAM:

REMARKS:

Engineering Consulting Services, Ltd.

ASTM D1556 Sand Cone Field Worksheet

Project: CD Landfill Cap	Field Kit # 3 Sand Calib. 89.43 pcf	Date 8-3-99
Location:	Wt. of Sand in Cone & Plate 3,674 lbs.	Job No. N3447 Technician: J.S.

Area Tested: B-4-A

Test Number	132					
Location	B-4-A					
Lift / Elevation						
Volume Wt of Bottle & Cone, Before	6995.3					
Wt of Bottle & Cone, After	2901.6					
a) Wt. of Sand in hole, cone, & plate	4093.7					
b) Wt. of Sand in cone & plate	1666.6					
c) Wt. of Sand in hole (a - b)	5,3507					
d) Volume of hole: c = cu.ft. Sand Calib	.05983					
Density e) Wt. of Sample & Tare	2986.7					
f) Wt. of Tare	12.9					
g) Wt. of Sample (e - f)	2973.8					
h) Wet Density: g/d = pcf	109.57					
I) Dry Density: h/ (1 + q) =pcf	96.32					
j) Max. Dry Density (Proctor) =pcf	100.5					
k) % Compaction: (i/j) x 100	95.84					
Moisture Tare No.	M5T3K					
l) Wt. of Sample & Tare, wet	640.1					
m) Wt. of Sample & Tare, Dry	589.5					
n) Wt. of Water lost: (l - m)	50.6					
o) Wt. of Tare	221.7					
p) Wt. of Dry soil: (m - o)	367.8					
q) % Moisture: (n / p) x 100	13.75					

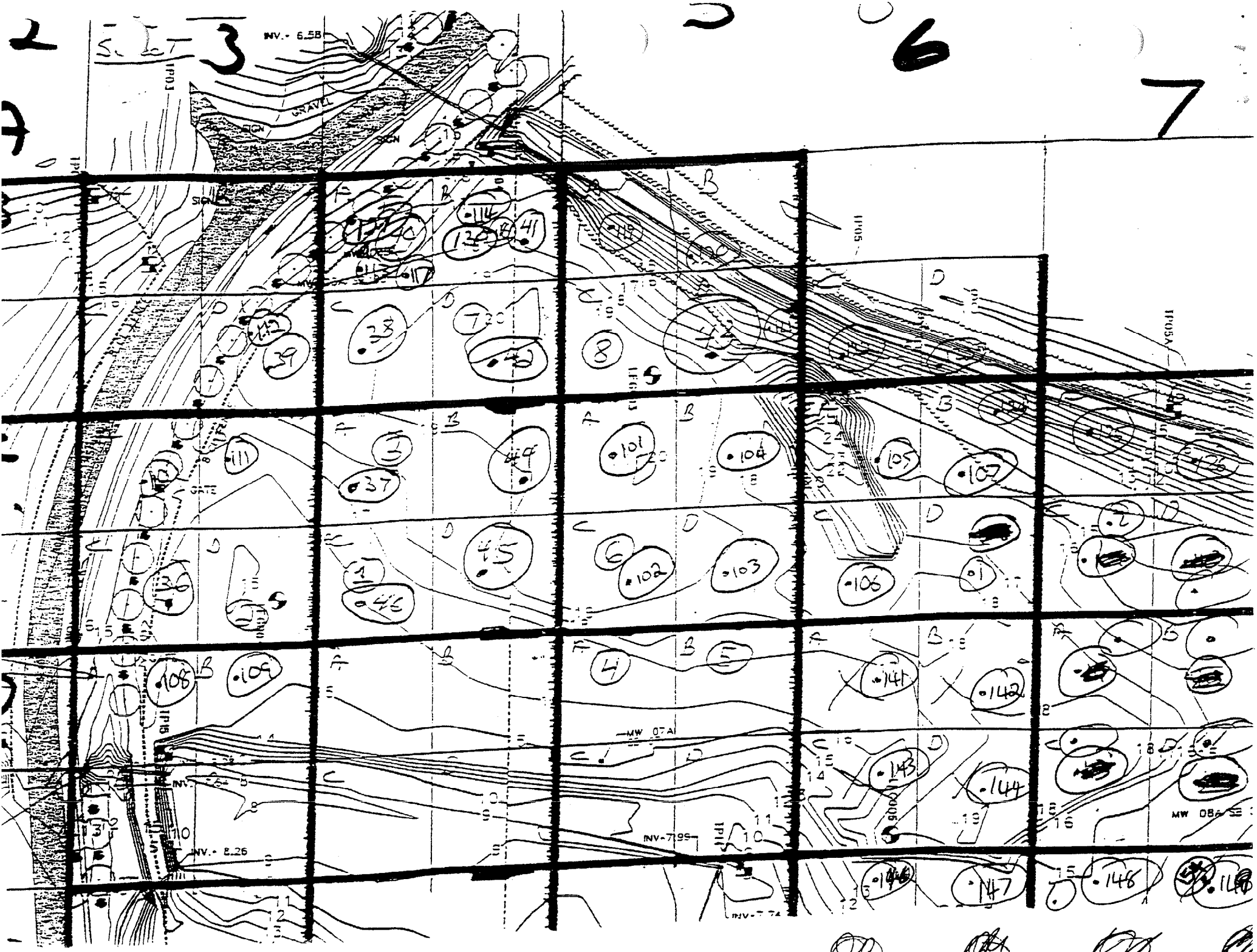
GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

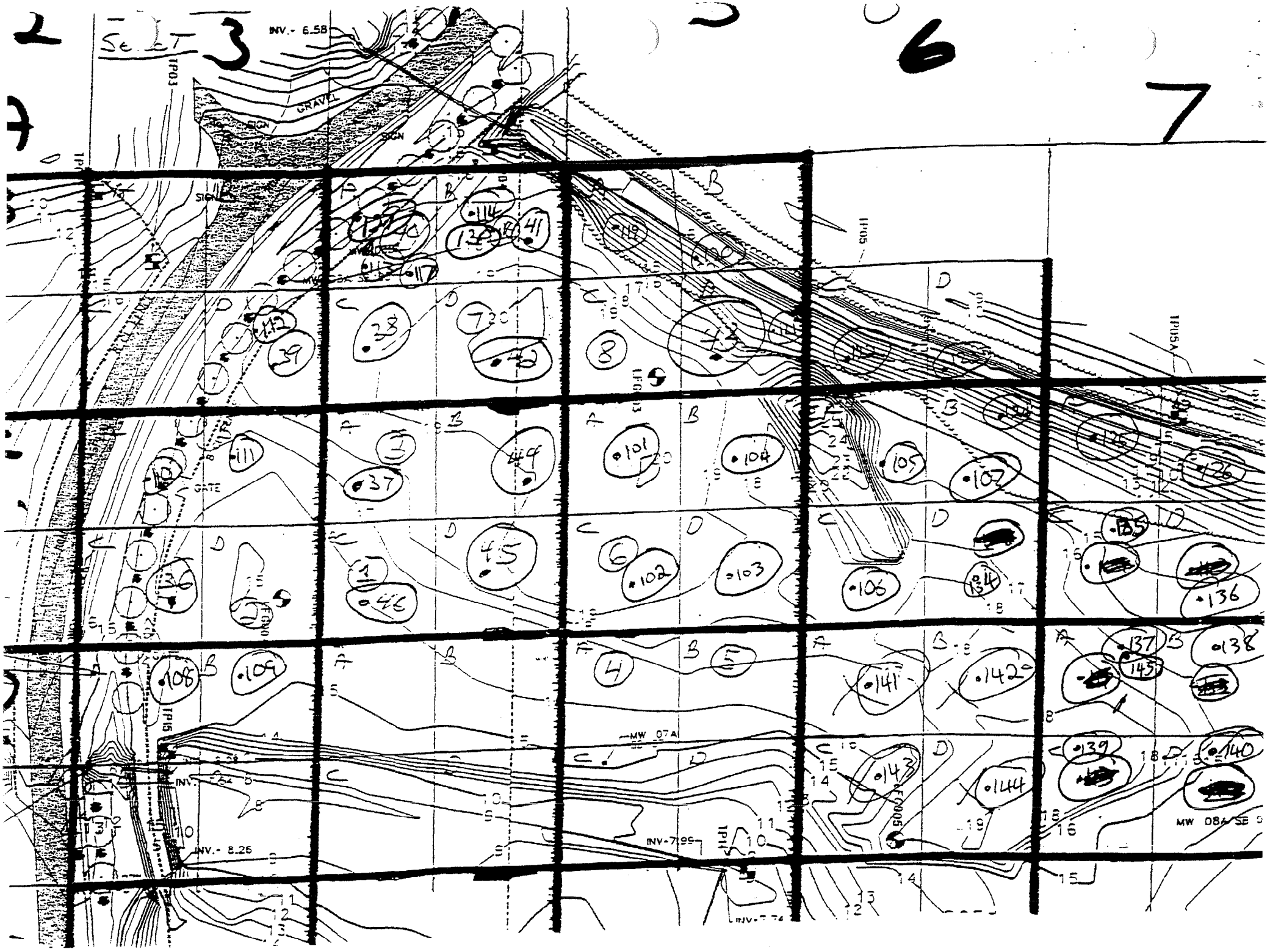
FIELD COMPACTION LOG **DATE:** 8/16/99

TECHNICIAN: John Smith **QC MANAGER:** G. C. S.

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
134 C-6-D	97.41	16.13	95	P
135 C-7-C	97.31	15.38	↓	↓
136 C-7-D	~~[illegible]~~ 97.31	16.51	↓	↓
137 D-7-A	~~[illegible]~~ 96.01	18.08	↓	↓
138 D-7-B	~~[illegible]~~ 96.91	17.82	↓	↓
139 D-7-C	97.91	17.17	↓	↓
140 D-7-D	96.71	17.63	↓	↓
141 D-6-A	97.41	15.04	↓	↓
142 D-6-B	99.5	14.12	↓	↓
143 D-6-C	97.21	13.2	↓	↓
144 D-6-D	97.31	14.28	↓	↓
145 D-7-A	SAND CONE			

PAGE_____ **OF** _____


SLOT 3
INV.- 6.58
GRAVEL
SIGN
GATE
INV.- 8.26
MW 07A
INV-7.99
MW 08A



Select
3
6
7
INV.- 6.58
GRAVEL
SIGN
GATE
TP03
TP05
TP05A
TP15
MW 07A
MW 08A
INV.- 8.26
INV-7.99
INV-7.74

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-18-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	141	142	143	144			
TEST NO.	8	9	10	11			
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	14.8	14.1	12.9	14.0			
WET DENSITY (pcf)	112.7	114.1	110.6	111.8			
DRY DENSITY (pcf)	97.9	100.0	97.9	97.8			
PERCENT COMPACTION	97.41	99.5	97.21	97.31			
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→	→	→			
OPT. WATER CONTENT	20.7	→	→	→			
LIFT. ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	15.04	14.12	13.2	14.28			
PROBE DEPTH (inch)	6"	→	→	→			
LOCATION DIAGRAM:	D-6-A	D-6-B	D-6-C	D-6-D			REMARKS:

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Landfill Cap JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-16
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	134	135	136	137	138	139	140
TEST NO.	1	2	3	4	5	6	7
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	15.8	15.1	16.2	17.6	17.4	16.9	17.2
WET DENSITY (pcf)	113.7	112.9	114.0	114.1	114.8	115.3	114.4
DRY DENSITY (pcf)	97.9	97.8	97.8	96.5	97.4	98.4	97.2
PERCENT COMPACTION	97.41	97.31	97.31	96.01	96.91	97.91	96.71
STANDARD PROCTOR MODIFIED PROCTOR	100.5						
OPT. WATER CONTENT	20.7						
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	16.13	15.38	16.51	18.08	17.82	17.17	17.63
PROBE DEPTH (inch)	6"						
LOCATION DIAGRAM:	C-6-D	C-7-C	C-7-D	D-7-A	D-7-B	D-7-C	D-7-D

REMARKS: SAND cone test performed 145

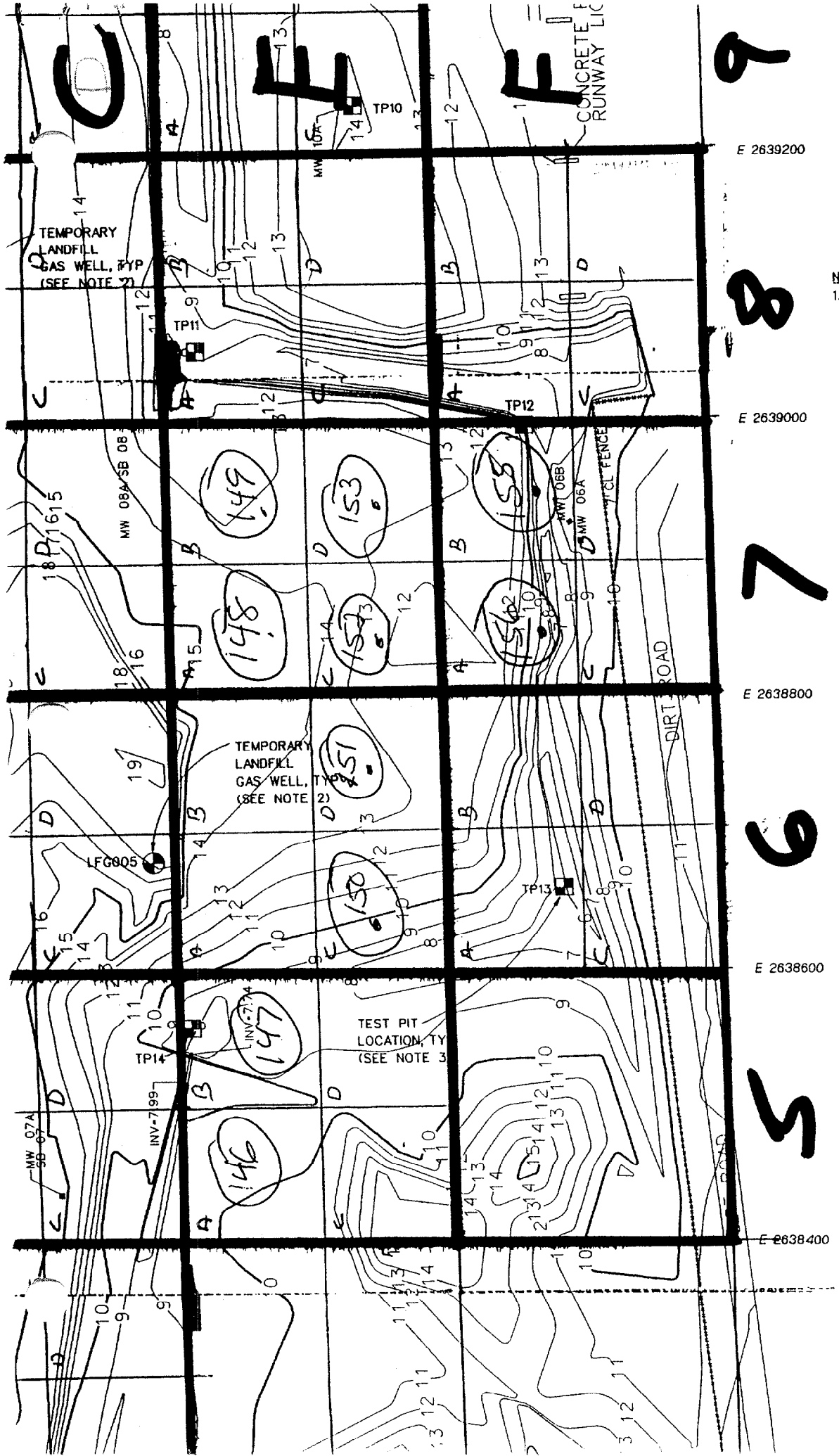
GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 8/17/99

TECHNICIAN: John Smith **QC MANAGER:** GCS

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
146 E-6-A	99.6	12.36	95	P
147 E-6-B	98.57	8.26	↓	↓
148 E-7-A	100.4	11.66		
149 E-7-B	97.29	13.4		
150 E-6-C	100.0	16.87		
151 E-6-D	97.43	18.06		
152 E-7-C	95.99	13.96		
153 E-7-D	98.48	11.79		
154 E-7-B	SAND CONE			
155 F-7-B	98.01	15.83	↓	P
156 F-7-A	97.81	15.61		P

PAGE_____ **OF** _____



NOTE:

1. TOPOGRAPHIC INFORMATION IS BASED ON A TOPOGRAPHIC SURVEY PERFORME BY PATTON, HARRIS, RUST & ASSOCIATE VIRGINIA BEACH, VIRGINIA JUNE 1998.

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Landfill cap JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-17
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	146	147	148	149	150	151	152	153
TEST NO.	1	2	3	4	5	6	7	8
DENSITY COUNT								
MOISTURE COUNT								
MOIST. CONTENT (pcf)	12.4	8.2	11.8	13.2	17.0	18.0	13.5	11.7
WET DENSITY (pcf)	112.5	107.2	112.6	110.9	117.5	118.0	109.9	110.6
DRY DENSITY (pcf)	100.1	99.1	100.9	97.8	100.5	99.9	96.5	99.0
PERCENT COMPACTION	99.6	98.57	100.4	97.29	100.0	99.43	95.99	98.4
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→						→
OPT. WATER CONTENT								
LIFT, ELEVATION, OR SOIL MARK								
MOISTURE CONTENT %	12.36	8.26	11.66	13.4	16.87	18.06	13.96	11.7
PROBE DEPTH (inch)	6"	6"	6"	→				→
LOCATION DIAGRAM:	E6-A	E6-B	E7-A	E7-B * Sand cone test performed 154	E-6-C	E-6-D	REMARKS: E7-C	E7

See Attached Map.

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Landfill CAP JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-17

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	155	156					
TEST NO.	9	10					
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	15.6	15.4					
WET DENSITY (pcf)	114.1	113.7					
DRY DENSITY (pcf)	98.5	98.3					
PERCENT COMPACTION	98.01	97.81					
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	15.83	15.61					
PROBE DEPTH (inch)	6"	→					

LOCATION DIAGRAM: F-7B | F-7-A

REMARKS:

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO.	TRANSMITTAL NO.	DATE
N62470-98-C-8816	57-G	8/25/99

FROM CONTRACTOR: GRACE Industries INC. Atlantic Div. Fac. Eng. Command

PROJECT TITLE AND LOCATION: Landfill CAP for CD Landfill Naval Base Norfolk VA.

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
73	02315 3.10.2.3	Density Tests	7	A	
		#145 thru #156		RA	ASTCH2MHILL 7SEP99

CONTRACTOR'S COMMENTS: I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number N62470-98-C-8816, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager [signature], Date 8/25/99
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature) [signature]

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
1SEP99		

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS: See changes to Item Identification above.

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	7SEP99	[signature]

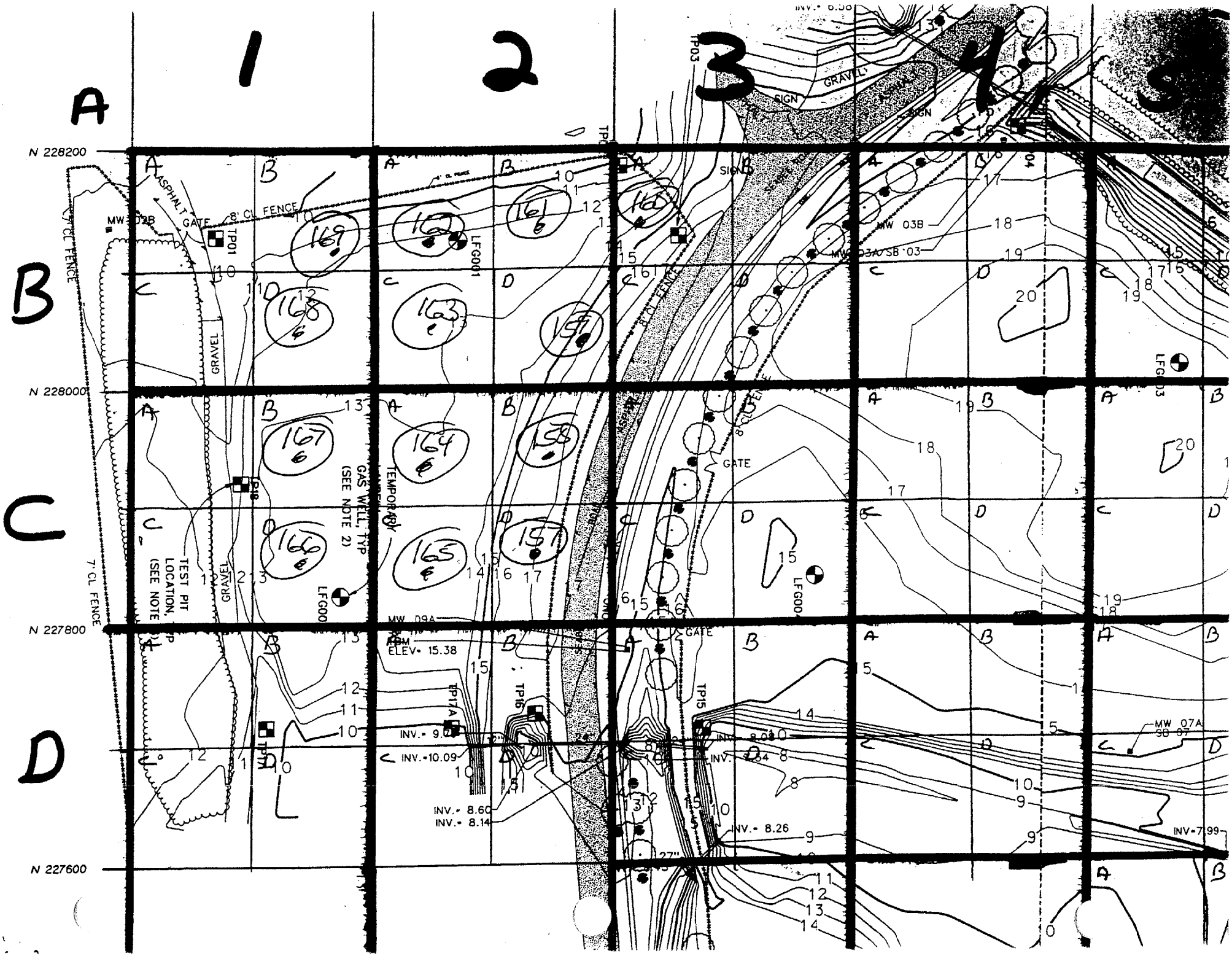
GRACE INDUSTRIES, INC. CONTRACT #N62470-98-C-8816

FIELD COMPACTION LOG DATE: 8/24/99

TECHNICIAN: J. Smith QC MANAGER: GCS

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
157 C-2-D	98.6	7.09	95%	P
158 C-2-B	98.31	7.64		
159 B-2-D	99.87	10.04		
160 B-3-A	98.4	10.05		
161 B-2-B	97.78	5.3		
162 B-2-A	100.3	6.76		
163 B-2-C	99.9	8.87		
164 C-2-A	100.6	10.21		
165 C-2-C	97.46	12.99		
166 C-1-D	98.76	11.01		
167 C-1-B	95.98	11.09		
168 B-1-D	98.87	10.17		
169 B-1-B	97.38	10.93		

PAGE_____ OF _____



A
B
C
D
1
2
3
4
N 228200
N 228000
N 227800
N 227600
ASPHALT
GATE
8' CL FENCE
7' CL FENCE
GRAVEL
TP01
TP03
TP15
TP16
TP17A
TP18
LFG001
LFG003
LFG004
MW 02B
MW 03B
MW 03A/SB 03
MW 09A
MW 07A
SB 07
GAS WELL, TYP
(SEE NOTE 2)
TEMPORARY
TEST PIT
LOCATION,
(SEE NOTE
ELEV= 15.38
INV.= 9.7
INV.=10.09
INV.= 8.60
INV.= 8.14
INV.= 8.26
INV=7.99
SIGN
169
162
161
160
168
163
157
167
164
158
166
165
157

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-24-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: [redacted] Grace CLIENT: _____ TECH: J. Smith

	157	158	159	160	161	162	163
TEST NO.	1	2	3	4	5	6	7
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	7.0	7.5	10.1	9.9	5.2	6.8	8.9
WET DENSITY (pcf)	106.1	106.4	110.4	108.8	103.5	107.6	109.3
DRY DENSITY (pcf)	99.1	98.9	100.46	98.9	98.3	100.8	100.4 [redacted]
PERCENT COMPACTION	98.6	98.31	99.87	98.4	97.78	100.3	99.9 [redacted]
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					→
OPT. WATER CONTENT	20.7	→					→
LIFT, ELEVATION, OR SOIL MARK			5.4757				
MOISTURE CONTENT %	7.09	7.64	10.04	10.05	5.3	6.76	8.87
PROBE DEPTH (inch)	6"	→					→

LOCATION DIAGRAM: C-2-D C-2-B B-2-D B-3-A B-2-B

REMARKS: B-2-A B-2-C

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: W3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-24-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	164	165	166	167	168	169	
TEST NO.	8	9	10	11	12	13	
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	10.4	12.7	10.9	10.7	10.1	10.7	
WET DENSITY (pcf)	111.9	110.7	109.6	107.2	109.5	108.6	
DRY DENSITY (pcf)	101.1	98.0	98.7	96.5	99.4	97.9	
PERCENT COMPACTION	100.6	97.48	98.26	95.98	98.87	97.38	
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→	→	→	→	→	
OPT. WATER CONTENT	20.7	→	→	→	→	→	
LIFT, ELEVATION, OR SOIL MARK	1st	→	→	→	→	→	
MOISTURE CONTENT %	10.71	12.99	11.04	11.09	10.17	10.93	
PROBE DEPTH (inch)	6"	→	→	→	→	→	

LOCATION DIAGRAM: C-2-A C-2-C C-1-D C-1-B B-1-D B-1-B REMARKS:

Engineering Consulting Services, Ltd.

ASTM D1556 Sand Cone Field Worksheet

Project: CD Landfill CAP	Field Kit # 3 Sand Calib. 89.43 pcf	Date 8-18-99 8-17-99
Location: NORFOLK	Wt. of Sand in Cone & Plate 1666.6 lbs.	Job No. N3447 Technician: J.S.

Area Tested: D-7-A

Test Number	145	154				
Location	D-7-A	E-7-B				
Lift / Elevation	1rst	1rst				
Volume Wt of Bottle & Cone, Before	6921.7	6921.7				
Wt of Bottle & Cone, After	3004.3	3121.4				
a) Wt. of Sand in hole, cone, & plate	3917.4	3800.3				
b) Wt. of Sand in cone & plate	166.6	1666.6				
c) Wt. of Sand in hole (a - b)	4.9621	4.7039				
d) Volume of hole: c = cu.ft. Sand Calib	.0554	.0525				
Density e) Wt. of Sample & Tare	2927.6	2507.8				
f) Wt. of Tare	12.9	12.9				
g) Wt. of Sample (e - f)	6.4257	5.5002				
h) Wet Density: g/d = pcf	115.9	104.7				
I) Dry Density: h/ (1 + q) =pcf	99.0	97.4				
j) Max. Dry Density (Proctor) =pcf	100.5	100.5				
k) % Compaction: (i/j) x 100	98.5	96.91				
Moisture Tare No.	Crocton	ECU				
l) Wt. of Sample & Tare, wet	855.9	778.2				
m) Wt. of Sample & Tare, Dry	763.1	734.8				
n) Wt. of Water lost: (l - m)	92.8	43.4				
o) Wt. of Tare	218.3	153.2				
p) Wt. of Dry soil: (m - o)	544.8	581.6				
q) % Moisture: (n / p) x 100	17.03	7.46				

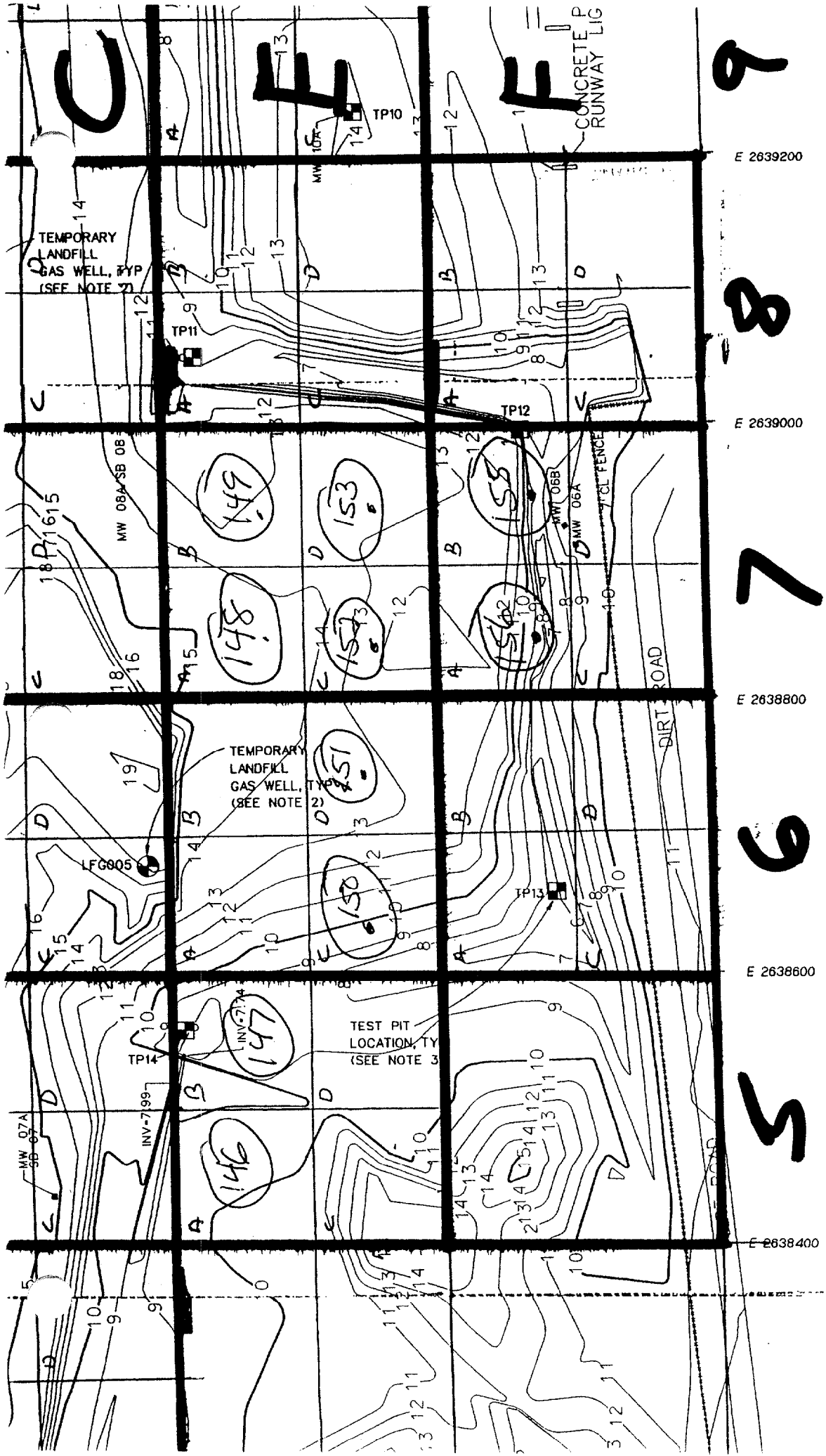
GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 8/17/99

TECHNICIAN: John Smith **QC MANAGER:** GCS

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
146 E-6-A	99.6	12.36	95	P
147 E-6-B	98.57	8.26	↓	↓
148 E-7-A	100.4	11.66		
149 E-7-B	97.29	13.4		
150 E-6-C	100.0	16.87		
151 E-6-D	97.43	18.06		
152 E-7-C	96.99	13.56		
153 E-7-D	98.48	11.79		
154 E-7-B	SAND CONE			
155 F-7-B	98.01	15.83	↓	P
156 F-7-A	97.81	15.61		P

PAGE_____ **OF** _____



NOTE:

1. TOPOGRAPHIC INFORMATION IS BASED ON A TOPOGRAPHIC SURVEY PERFORMED BY PATTON, HARRIS, RUST & ASSOCIATES VIRGINIA BEACH, VIRGINIA JUNE 1998.

D

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Landfill CAP JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-17
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	146	147	148	149	150	151	152	153
TEST NO.	1	2	3	4	5	6	7	8
DENSITY COUNT								
MOISTURE COUNT								
MOIST. CONTENT (pcf)	12.4	8.2	11.8	13.2	17.0	18.0	13.5	11.7
WET DENSITY (pcf)	112.5	107.2	112.6	110.9	117.5	118.0	109.9	110.6
DRY DENSITY (pcf)	100.1	99.1	100.9	97.8	100.5	99.9	96.5	99.0
PERCENT COMPACTION	99.6	98.57	100.4	97.29	100.0	99.43	95.99	98.48
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→						→
OPT. WATER CONTENT								
LIFT, ELEVATION, OR SOIL MARK								
MOISTURE CONTENT %	12.36	8.26	11.66	13.4	16.87	18.06	13.96	11.79
PROBE DEPTH (inch)	6"	6"	6"	→				→
LOCATION DIAGRAM:	E6-A	E6-B	E7-A	E7-B * Sand cone test performed 154	E-6-C	E-6-D	REMARKS: E7-C	E7-D

See Attached Map.

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CDLandfill CAP JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-17

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	155	156					
TEST NO.	9	10					
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	15.6	15.4					
WET DENSITY (pcf)	114.1	113.7					
DRY DENSITY (pcf)	98.5	98.3					
PERCENT COMPACTION	98.01	97.81					
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	15.83	15.61					
PROBE DEPTH (inch)	6"	→					

LOCATION DIAGRAM: F-7B | F-7-A

REMARKS:

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO.	TRANSMITTAL NO.	DATE
N62470-98-C-8816	52 H	9/13/99

FROM CONTRACTOR: GRACE Industries, Inc. Atlantic Div. Fac. Eng. Command

PROJECT TITLE AND LOCATION: Landfill Cap for CD Landfill Naval Base Norfolk VA.

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
73	02315 3.10.2.3	Density Tests	7	A	[signature]
		#157 thru #169			

CONTRACTOR'S COMMENTS

* I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number N62470-98-C-8816, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager [signature], Date 9/13/99
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature) [signature]

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

COPIES TO: ROICC (2) LANTDIV (1) A-E (1)	DATE	SIGNATURE

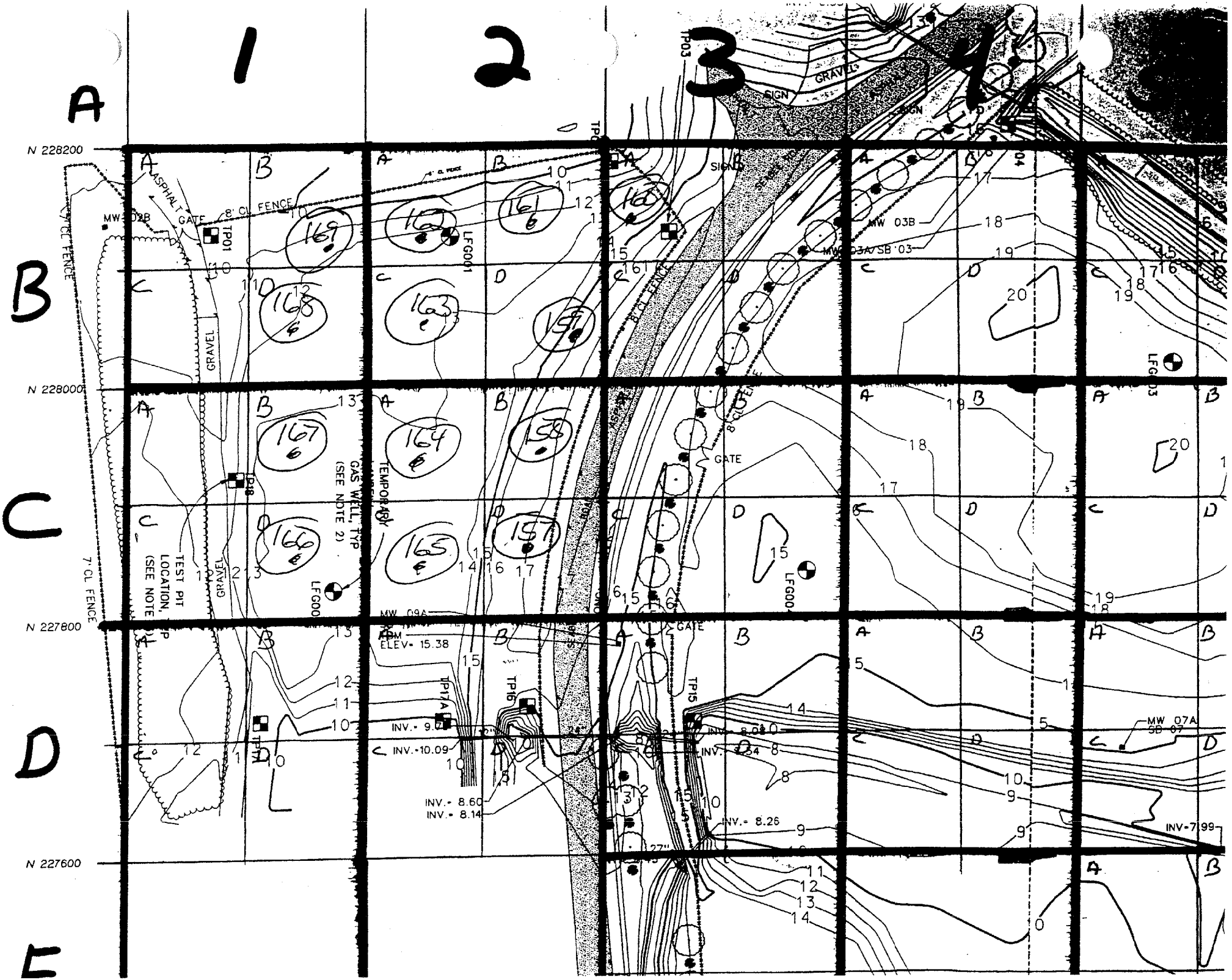
GRACE INDUSTRIES, INC. CONTRACT #N62470-98-C-8816

FIELD COMPACTION LOG DATE: 8/24/99

TECHNICIAN: J. Smith QC MANAGER: GCS

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
157 C-2-D	98.6	7.09	95%	P
158 C-2-B	98.31	7.64		
159 B-2-D	99.87	10.04		
160 B-3-A	98.4	10.05		
161 B-2-B	97.78	5.3		
162 B-2-A	100.3	6.76		
163 B-2-C	99.9	8.87		
164 C-2-A	100.6	10.21		
165 C-2-C	97.46	12.99		
166 C-1-D	98.76	11.01		
167 C-1-B	95.98	11.09		
168 B-1-D	98.87	10.17		
169 B-1-B	97.38	10.93		

PAGE_____ OF _____


1
2
3
4
A
B
C
D
E
N 228200
N 228000
N 227800
N 227600
ASPHALT
GATE
8' CL FENCE
7' CL FENCE
GRAVEL
SIGN
TP01
TP03
TP04
TP15
TP16
TP17A
LFG001
LFG003
MW 02B
MW 03B
MW 03A/SB 03
MW 09A
MW 07A
SB 07
GAS WELL, TYP
(SEE NOTE 2)
TEMPORARY
TEST PIT
LOCATION,
(SEE NOTE
ELEV- 15.38
INV.- 9.0
INV.-10.09
INV.- 8.60
INV.- 8.14
INV.- 8.26
INV-7.99

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-24-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: [redacted] Grace CLIENT: _____ TECH: J. Smith

	157	158	159	160	161	162	163
TEST NO.	1	2	3	4	5	6	7
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	7.0	7.5	10.1	9.9	5.2	6.8	8.9
WET DENSITY (pcf)	106.1	106.4	110.4	108.8	103.5	107.6	109.3
DRY DENSITY (pcf)	99.1	98.9	100.46	98.9	98.3	100.8	100.4 [redacted]
PERCENT COMPACTION	98.6	98.31	99.87	98.4	97.78	100.3	99.9 [redacted]
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					→
OPT. WATER CONTENT	20.7	→					→
LIFT. ELEVATION, OR SOIL MARK							
MOISTURE CONTENT %	7.09	7.64	10.04	10.05	5.3	6.76	8.87
PROBE DEPTH (inch)	6"	→					→

LOCATION DIAGRAM: C-2-D C-2-B B-2-D B-3-A B-2-B B-2-A B-2-C

REMARKS:

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD LANDFILL CAP JOB NO.: W3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 8-24-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

	164	165	166	167	168	169	
TEST NO.	8	9	10	11	12	13	
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	10.4	12.7	10.9	10.7	10.1	10.7	
WET DENSITY (pcf)	111.9	110.7	109.6	107.2	109.5	108.6	
DRY DENSITY (pcf)	101.1	98.0	98.7	96.5	99.4	97.9	
PERCENT COMPACTION	100.6	97.8	98.26	95.98	98.87	97.38	
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK	1st	→					
MOISTURE CONTENT %	10.71	12.99	11.04	11.09	10.17	10.93	
PROBE DEPTH (inch)	6"	→					
LOCATION DIAGRAM:	C-2-A	C-2-C	C-1-D	C-1-B	B-1-D	B-1-C	REMARKS:

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO.	TRANSMITTAL NO.	DATE
N62470-98-C-8816	52 I	10-13-99

FROM CONTRACTOR: GRACE INDUSTRIES, INC. ATLANTIC DIV. FAC. ENG. COMMAND

PROJECT TITLE AND LOCATION: LANDFILL CAP for CD LANDFILL NAVAL BASE NORFOLK VA.

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☑ Contractor Approved ☐ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
73	02315 9.2.3	Density Tests	7	A	
				RA	~~AST~~ CH2M HILL 18OCT99

CONTRACTOR'S COMMENTS

I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number N62470-98-C-8816, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager _____, Date 10/13/99
(Signature)

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature)

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO
13OCT99		

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

COPIES TO:	DATE	SIGNATURE
ROICC (2) LANTDIV (1) A-E (1)	18OCT99	

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 10/7/99

TECHNICIAN: J. Smith **QC MANAGER:** G. GS.

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
PS-36 D-6-D	101.2	9.97	95%	Pass
PS-37 E-6-B	99.72	8.83		Pass
PS-38 E-6-D	99.83	13.94		Pass
PS-39 E-6-B	99.44	14.29		Pass
PS-40 E-10-A	97.73	10.53	95%	PASS
PS-41 E-9-B	101.0	8.95		
PS 42 E-9-D	98.83	9.07		
PS-43 E-9-A	100.9	9.08		
PS-44 E-9 C	99.34	9.53		
PS-45 E-8-B	99.71	10.17		
PS-46 E-8-D	100.5	9.64		
PS-47 E-8-A	98.07	11.58		
PS-48 E-8-C	98.92	10.12		
PS-49 E-8-B	18.42	8.96		
D F-8-A	99.67	8.27		
PS-51 F-6-A	98.68	9.28		
PS-52 E-6-C	97.29	10.23		
PS-53 E 6-A	96.07	11.24		
PS-54 D-6-C	96.64	8.78	95%	PASS
PS-55 D-6-A	66.31	9.43		
PS-56 C-6-C	98.3	8.94		
PS-57 C-6-A	99.98	9.44		
PS-58 D-5-D	98.4	9.57		
PS-59 D-5-B	98.6	8.84		
PS-60 C-5-C	98.42	7.55		
PS-61 C-5-B	96.47	9.53		
PS-62 C-5-D	97.06	10.29		
PS-63 B-6-C	98.09	8.75		
PS-64 B-5-A	98.19	8.18		
PS-65 B-5-C	99.08	7.16		
PS-66 C-5-A	99.76	6.61		
PS-67 C-5-C	97.86	9.07		
PS-68 B-6-C	96.9	13.64		
PS-69 B-5-A	98.4	11.41		
PS 70 B-4-D	97.1	12.18		

PAGE 2 **OF** ____

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 10/12/99

TECHNICIAN: J. Smith **QC MANAGER:** G.C.S.

GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
PS-71 D-4-B	99.42	9.72	95%	Pass
PS-72 C-4-D	98.83	9.17	↓	↓
PS-73 C-4-B	95.64	13.74	↓	↓
PS-74 B-4-D	96.07	12.97	↓	↓

PAGE_____ **OF** _____

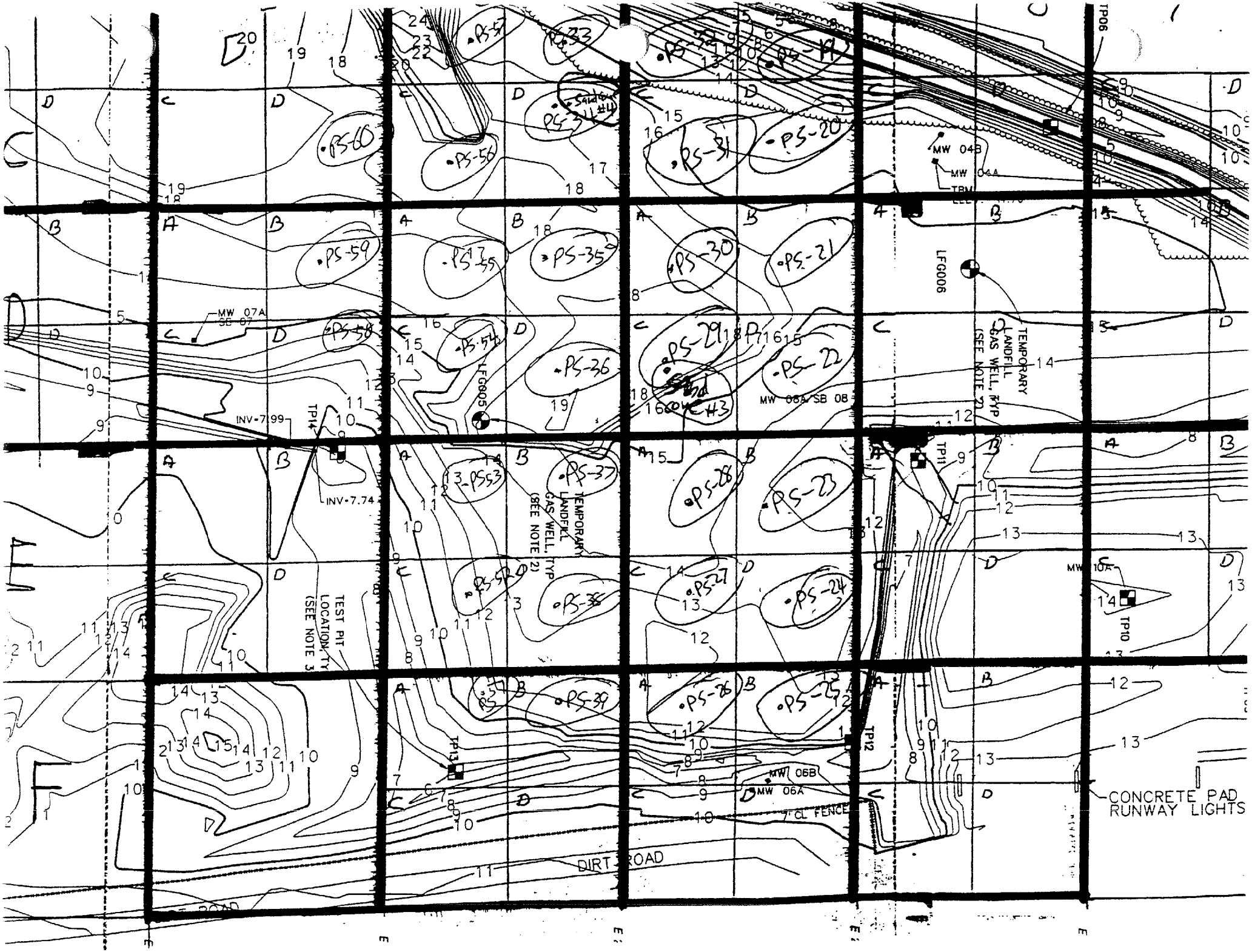
Engineering Consulting Services, Ltd.

ASTM D1556 Sand Cone Field Worksheet

Project: CD Landfill	Field Kit # 3 Sand Calib. 90.62 pcf	Date 10-8-99
Location: NORFOLK	Wt. of Sand in Cone & Plate 1666 lbs.	Job No. N3447 Technician: JS

Area Tested: Protective Soil Layer

Test Number	#5					
Location	E-9-C					
Lift / Elevation	Prot. Soil					
Volume Wt of Bottle & Cone, Before	6855.9					
Wt of Bottle & Cone, After	2996.4					
a) Wt. of Sand in hole, cone, & plate	3859.5					
b) Wt. of Sand in cone & plate	1666.6					
c) Wt. of Sand in hole (a - b)	4.8344					
d) Volume of hole: c / Sand Calib = cu.ft.	.05334					
Density e) Wt. of Sample & Tare	2501.2					
f) Wt. of Tare	12.9					
g) Wt. of Sample (e - f)	5.485 [redacted]					
h) Wet Density: g/d = pcf	102.8					
I) Dry Density: h/ (1 + q) =pcf	96.79					
j) Max. Dry Density (Proctor) =pcf	100.5 [redacted]					
k) % Compaction: (i/j) x 100	96.31					
Moisture Tare No.	Tuna					
l) Wt. of Sample & Tare, wet	1094.9					
m) Wt. of Sample & Tare, Dry	1040.8					
n) Wt. of Water lost: (l - m)	54.1					
o) Wt. of Tare	224.7					
p) Wt. of Dry soil: (m - o)	816.1					
q) % Moisture: (n / p) x 100	6.62 %					


TP06
MW 04B
MW 04A
LFG006
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
MW 07A
SB 07
INV-7.99
TP14
INV-7.74
LFG005
MW 08A SB 08
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
TP11
MW 10A
TP10
TEST PIT LOCATION, TYP (SEE NOTE 3)
TP13
TP12
MW 06B
MW 06A
CL FENCE
DIRT ROAD
CONCRETE PAD
RUNWAY LIGHTS

MW 03B
MW 03A/SB 03
TP05
TP05A
TP06
PS-74
PS-65
PS-73
PS-66
PS-61
PS-72
PS-67
PS-60
PS-71
PS-68
PS-59
PS-55
PS-70
PS-69
PS-50
PS-54
Sand Cone
LFG005
LFG006
MW 04B
MW 04A
MW 07A
SB 07
MW 08A/SB 08
INV-7.99
INV-7.74
TP14
TP11
TP10
MW 10A
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
TEST PIT LOCATION, TY (SEE NOTE 3

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD landfill Cap JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 10-11-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

TEST NO.	PS-61	PS-62	PS-63	PS-64	PS-65	PS-66	PS-67
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	9.2	10.0	8.7	8.1	7.6	6.6	8.9
WET DENSITY (pcf)	106.2	107.6	107.8	106.7	107.1	106.9	107.3
DRY DENSITY (pcf)	96.9	97.5	99.2	98.7	99.6	100.2	98.3
PERCENT COMPACTION	96.47	97.06	98.69	98.19	99.08	99.76	97.86
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK	Protective Soil Layer →						
MOISTURE CONTENT %	9.53	10.29	8.75	8.18	7.61	6.61	9.07
PROBE DEPTH (inch)	6" →						

LOCATION DIAGRAM: C-5-B B-5-D B-6-C B-5-A B-5-C

REMARKS: C-5A C-5-C

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Land fill JOB NO.: N3447

SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 10-11-99

STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____

CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

TEST NO.	PS-66	PS-69	PS-70	PS-71	PS-72	PS-73	PS-74
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	13.3	11.3	11.9	9.7	9.1	13.2	12.5
WET DENSITY (pcf)	110.7	110.2	109.5	109.6	108.4	109.3	108.1
DRY DENSITY (pcf)	97.4	98.9	97.6	99.9	99.3	96.1	96.5
PERCENT COMPACTION	96.9	98.4	97.1	99.42	98.83	95.64	96.07
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK	Protective Soil Layer →						
MOISTURE CONTENT %	13.64	11.41	12.18	9.72	9.17	13.74	12.97
PROBE DEPTH (inch)	6" →						

LOCATION DIAGRAM: B-6-C B-5A B-4-D D-4-B C-4-D C-4-B

REMARKS: B-4-D

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD land fill cap JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 10-11-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

TEST NO.	PS-54	PS-55	PS-56	PS-57	PS-58	PS-59	PS-60
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	8.5	9.1	8.8	9.5	9.5	8.8	7.5
WET DENSITY (pcf)	105.6	105.9	107.6	110.0	108.4	107.9	106.4
DRY DENSITY (pcf)	97.1	96.8	98.8	100.5	98.9	99.1	98.9
PERCENT COMPACTION	96.64	96.31	98.3	99.98	98.4	98.6	98.42
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK	Protective Soil Layer →						
MOISTURE CONTENT %	8.78	9.43	8.94	9.44	9.57	8.84	7.55
PROBE DEPTH (inch)	6" →						

LOCATION DIAGRAM: D-6-C D-6-A C-6-C C-6-A D-5-D D-5-B REMARKS:
C-5-C

814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Land fill cap JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 10-8-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

TEST NO.	PS-47	PS-48	PS-49	PS-50	PS-51	PS-52	PS-53
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	11.5	10.1	8.9	8.3	9.2	10.0	10.9
WET DENSITY (pcf)	110.0	109.5	107.8	108.7	108.4	107.8	107.4
DRY DENSITY (pcf)	98.6	99.4	98.9	100.4	99.2	97.8	96.5
PERCENT COMPACTION	98.07	98.92	98.42	99.87	98.68	97.29	96.07
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK	Protective Soil Layer →						
MOISTURE CONTENT %	11.58	10.12	8.96	8.27	9.28	10.23	11.24
PROBE DEPTH (inch)	6" →						

LOCATION DIAGRAM: E-8-A E-8-C F-8-B F-8-A F-6-A E-6-C

REMARKS: E-6-A

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

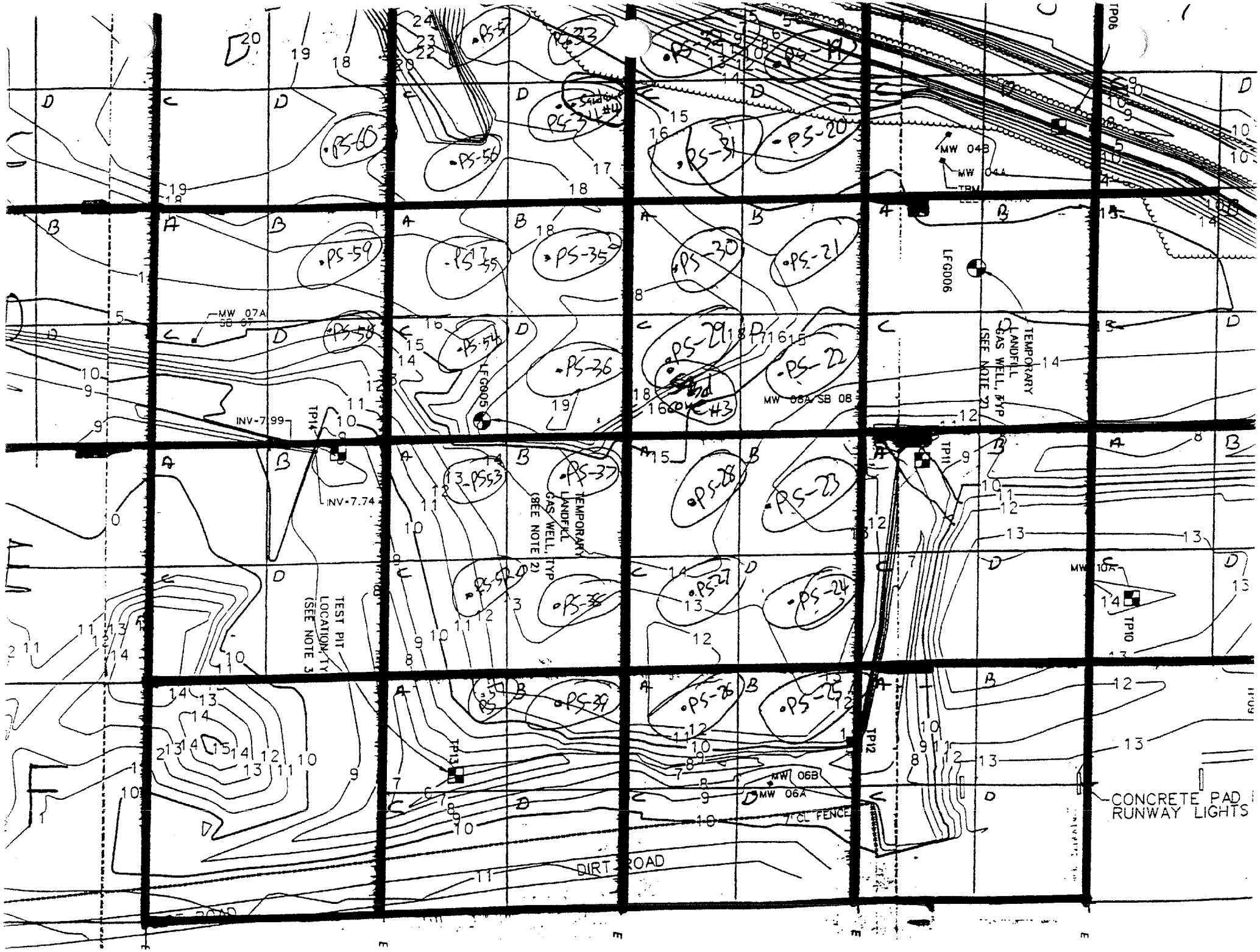
FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Landfill Cap JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 10-8-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

TEST NO.	PS-40	PS-41	PS-42	PS 43	PS-44	PS-45	PS-46
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	10.3	9.1	9.0	9.2	9.5	10.1	9.7
WET DENSITY (pcf)	108.6	110.6	108.3	110.7	108.4	109.3	110.8
DRY DENSITY (pcf)	98.2	101.5	99.3	101.5	99.9	99.4	101.1
PERCENT COMPACTION	97.73	100.9	98.83	100.9	99.34	99.71	100.5
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK	Protective			Soil	Lift	→	
MOISTURE CONTENT %	10.53	8.95	9.07	9.08	9.53	10.17	9.64
PROBE DEPTH (inch)	6"	→					

LOCATION DIAGRAM: E-10A E-9-B E-9-D E-9-A E-9-C

REMARKS: E-8-B E-8-D


TP06
MW 04B
MW 04A
TPM
LFG006
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
MW 08A/SB 08
TP11
MW 10A
TP10
MW 07A
SB 07
LFG005
INV-7.99
TP14
INV-7.74
TEST PIT LOCATION TYP (SEE NOTE 3)
TP13
TP12
MW 06B
MW 06A
7'CL FENCE
DIRT ROAD
CONCRETE PAD
RUNWAY LIGHTS

431-4960 266-5203

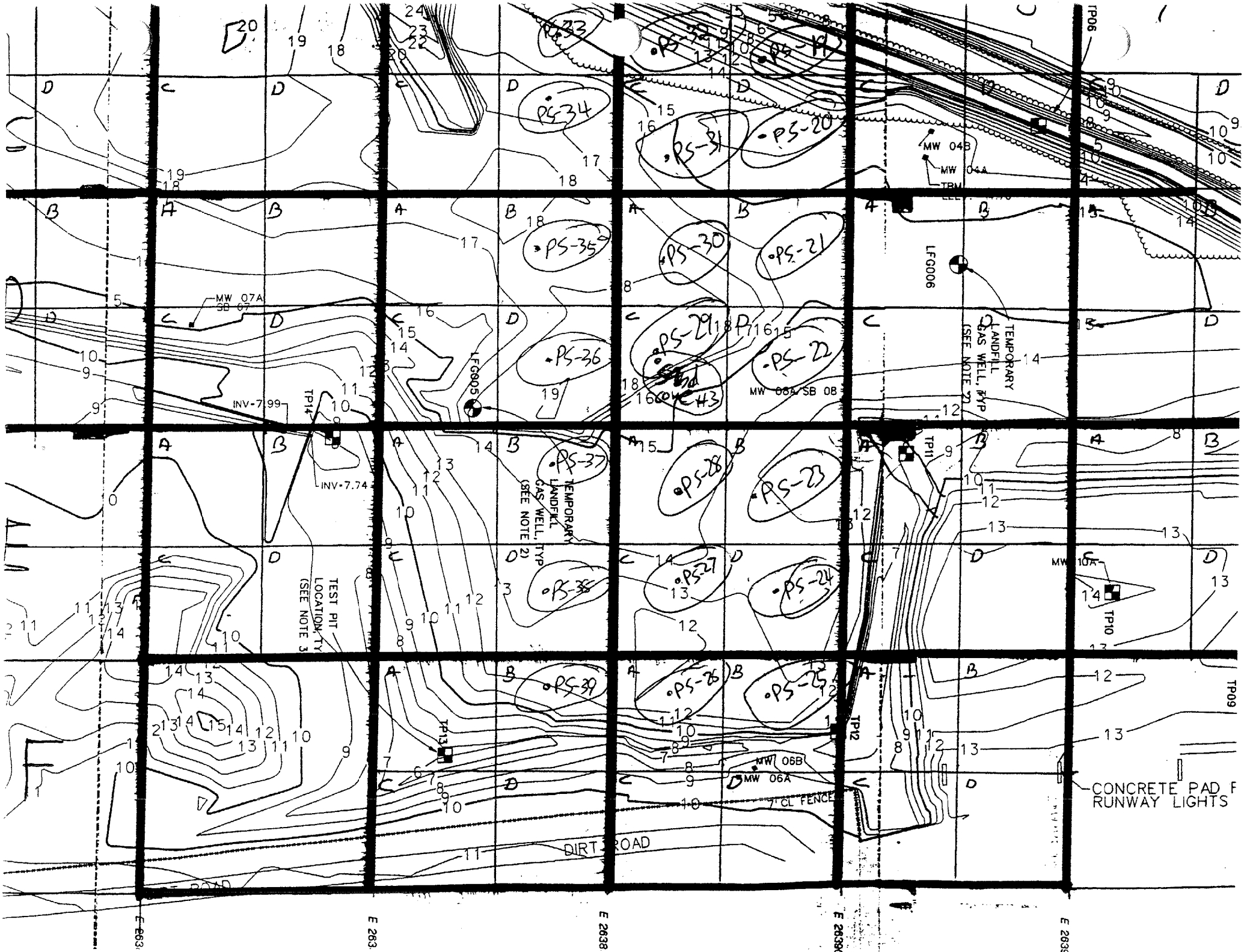
Lou 038

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 10/4/99

TECHNICIAN: J. Smith **QC MANAGER:** G. Cas

	GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL
PS-1	D-10-C	97.1	4.74	95%	Pass
PS-2	D-9-B	97.19	6.03		Pass
PS-3	D-9-D	95.2	17.92		Pass
PS-4	E-10-A	96.52	16.41		Pass
PS-5	E-9-B	96.41	17.04		Pass
PS-6	E-9-A	95.17	17.1		Pass
PS-7	D-9-C	96.26	17.4		Pass
PS-8	D-9-A	99.79	15.78	95%	Pass
PS-9	C-9-C	98.39	16.2		Pass
PS-10	C-8-D	97.16	16.72		Pass
PS-11	D-8-B	98.37	16.39		Pass
PS-12	D-8-D	95.06	20.76		Pass
PS-13	E-8-B	96.07	20.04		Pass
PS-14	E-8-A	97.62	18.55		Pass
5	D-8-C	97.71	12.88	95%	Pass
PS-16	D-8-A	97.81	14.07		Pass
PS-17	C-8-C	97.51	13.91		Pass
PS-18	E-8-A	98.9	12.57		Pass
PS-19	C-7-B	98.05	10.88	95%	Pass
PS-20	C-7-D	99.12	8.77		Pass
PS-21	D-7-B	101.5	10.15		Pass
PS-22	D-7-D	100.2	9.49		Pass
PS-23	E-7-B	99.98	9.26		Pass
PS-24	E-7-D	96.05	6.93		Pass
PS-25	F-7-B	97.4	5.95		Pass
PS-26	F-7-A	98.38	6.78		Pass
PS-27	E-7-C	99.98	6.17		Pass
PS-28	E-7-A	101.1	7.37		Pass
PS-29	D-7-C	98.31	7.58		Pass
PS-30	D-7-A	98.05	7.69		Pass
PS-31	C-7-C	98.1	8.09		Pass
PS-32	C-7-A	97.6	8.26		Pass
PS-33	C-6-B	103.0	10.17		Pass
PS-34	C-6-D	100.4	9.72		Pass
PS-35	D-6-B	100.2	10.75		Pass


MW 04B
MW 04A
TBM
LFG006
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 2)
MW 07A
SB 07
INV-7.99
TP14
INV-7.74
LFG005
MW 08A SB 08
TP11
TEST PIT LOCATION, TYP (SEE NOTE 3)
MW 10A
TP10
TP09
TP13
TP12
MW 06B
MW 06A
7' CL FENCE
DIRT ROAD
CONCRETE PAD F
RUNWAY LIGHTS
PS-34
PS-31
PS-20
PS-35
PS-30
PS-21
PS-36
PS-29
PS-22
PS-37
PS-28
PS-23
PS-27
PS-24
PS-39
PS-26
PS-25

EGS LTD
341 Cleveland Place
Virginia Beach, VA 23462
(804) 499-9100
FAX (804) 499-2404

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Land Fill cap JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 10-7-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grove CLIENT: _____ TECH: J. Smith

TEST NO.	PS-19	PS-20	PS-21	PS-22	PS-23	PS-24	PS-25
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	10.7	8.7	9.1	9.6	9.3	6.7	5.8
WET DENSITY (pcf)	109.3	108.3	111.1	110.3	109.8	103.2	103.7
DRY DENSITY (pcf)	98.5	99.6	102.0	100.7	100.5	96.5	97.9
PERCENT COMPACTION	98.05	99.12	101.5	100.2	99.98	96.05	97.4
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK	Protective Soil Layer						
MOISTURE CONTENT %	10.88	8.77	10.5	9.49	9.26	6.93	5.95
PROBE DEPTH (inch)	6"	→					

LOCATION DIAGRAM: C-7-B C-7-D D-7-B D-7-D E-7-B E-7-D REMARKS: F-7-B

See Attached Gridmap

EGS LTD
341 Cleveland Place
Virginia Beach, VA 23462
(804) 499-9100
FAX (804) 499-2404

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Landfill Cap JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 10-7-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

TEST NO.	PS-26	PS-27	PS-28	PS-29	PS-30	PS-31	PS-32
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	6.7	6.2	7.5	7.5	7.6	8.0	8.1
WET DENSITY (pcf)	105.6	106.7	109.1	106.3	106.1	106.6	106.2
DRY DENSITY (pcf)	98.9	100.5	101.6	98.8	98.5	98.6	98.1
PERCENT COMPACTION	98.38	99.98	101.1	98.31	98.05	98.1	97.6
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK	Protective Soil Layer				→		
MOISTURE CONTENT %	6.78	6.17	7.37	7.58	7.69	8.09	8.26
PROBE DEPTH (inch)	6"	→					

LOCATION DIAGRAM: F-7-A E-7-C E-7-A D-7-C D-7-A

Sand cone test #3 taken

REMARKS: C-7-C C-7-A

EGS LTD
341 Cleveland Place
Virginia Beach, VA 23462
(804) 499-9100
FAX (804) 499-2404

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Landfill cap JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 10-7-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

TEST NO.	PS-33	PS-34	PS-35	PS-36	PS-37	PS-38	PS-39
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	10.5	9.8	10.8	10.1	8.8	14.0	14.3
WET DENSITY (pcf)	114.0	110.9	111.5	111.8	109.1	114.3	114.2
DRY DENSITY (pcf)	103.5	101.1	100.7	101.7	100.2	100.3	99.9
PERCENT COMPACTION	103.0	100.4	100.2	101.2	99.72	99.83	99.44
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK	Protective Soil layer →						
MOISTURE CONTENT %	10.17	9.72	10.75	9.97	8.83	13.94	14.29
PROBE DEPTH (inch)	6" →						

LOCATION DIAGRAM: C-6-B C-6-D D-6-B D-6-D E-6-B E-6-D F-6-B

REMARKS:

Engineering Consu..ng Services, Ltd.

ASTM D1556 Sand Cone Field Worksheet

Project: CD Landfill cap	Field Kit # 3 Sand Calib. 90.62 pcf	Date: 10-8-99
Location: Norfak.	Wt. of Sand in Cone & Plate 3,674 lbs.	Job No. N3447 Technician: J.S.

Area Tested: _____

Test Number	#3	#4				
Location	D-7-C	C-6-D				
Lift / Elevation	PS	PS				
Volume Wt of Bottle & Cone, Before	6889.7	7030.1				
Wt of Bottle & Cone, After	2847.3	2910.6				
a) Wt. of Sand in hole, cone, & plate	~~4042.4~~	~~4119.5~~				
b) Wt. of Sand in cone & plate	1666.6	1666.6				
c) Wt. of Sand in hole (a - b)	5,2376	5,4076				
d) Volume of hole: c / Sand Calib = cu.ft.	.0577	.0596				
Density e) Wt. of Sample & Tare	2901.7	2995.4				
f) Wt. of Tare	12.9	12.9				
g) Wt. of Sample (e - f)	6.3886	6.5752				
h) Wet Density: g/d = pcf	110.38	110.32				
I) Dry Density: h/ (1 + q) =pcf	99.97	99.10				
j) Max. Dry Density (Proctor) =pcf	100.5	100.5				
k) % Compaction: (i/j) x 100	99.47	98.6				
Moisture Tare No.	AugKin	MST3K				
l) Wt. of Sample & Tare, wet	901.0	859.2				
m) Wt. of Sample & Tare, Dry	836.8 [redacted]	794.4				
n) Wt. of Water lost: (l - m)	64.2	64.8				
o) Wt. of Tare	220.5	222.1				
p) Wt. of Dry soil: (m - o)	616.3	572.3				
q) % Moisture: (n / p) x 100	10.41	11.32				

GRACE INDUSTRIES, INC. **CONTRACT #N62470-98-C-8816**

FIELD COMPACTION LOG **DATE:** 10/4/99

TECHNICIAN: J. Smith **QC MANAGER:** G. Cas

	GRID #	% COMPACTION	% MOISTURE	NEEDED	PASS/FAIL	
PS-1	D-10-C	97.1	4.74	95%	Pass	
PS-2	D-9-B	97.19	6.03		Pass	
PS-3	D-9-D	95.2	17.92		Pass	
PS-4	E-10-A	96.52	16.41		Pass	
PS-5	E-9-B	96.41	17.04		Pass	
PS-6	E-9-A	95.17	17.1		Pass	
PS-7	D-9-C	96.26	17.4		Pass	
PS-8	D-9-A	99.79	15.78	95%	Pass	
PS-9	C-9-C	98.39	16.2		Pass	
PS-10	C-8-D	97.16	16.72		Pass	
PS-11	D-8-B	98.37	16.39		Pass	
PS-12	D-8-D	95.08	20.76		Pass	
PS-13	E-8-B	96.07	20.04		Pass	
PS-14	E-8-A	97.62	18.55		Pass	
5	D-8-C	97.71	12.88	95%	Pass	10-6-99
PS-16	D-8-A	97.81	14.07		Pass	10-6-99
PS-17	C-8-C	97.51	13.91		Pass	10-6-99
PS-18	E-8-A	98.9	12.57		Pass	10-6-99
PS-19						
PS-20						
PS-21						
PS-22						
PS-23						
PS-24						
PS-25						
PS-26						
PS-27						
PS-28						
PS-29						
PS-30						
PS-31						
PS-32						
PS-33						
PS-34						
PS-35						

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD landfill cap JOB NO.: N 3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 10-8-99
STANDARD COUNT MOISTURE: / STANDARD COUNT DENSITY:
CONTRACTOR: Grace CLIENT: TECH: J Smith

TEST NO.	PS-15	PS-16	PS-17	PS-18			
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	12.6	13.8	13.6	12.5			
WET DENSITY (pcf)	110.8	112.1	111.6	111.9			
DRY DENSITY (pcf)	98.2	98.3	98.0	99.4			
PERCENT COMPACTION	97.71	97.81	97.51	98.9			
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→	→	→	→	→	→
OPT. WATER CONTENT	20.7	→	→	→	→	→	→
LIFT. ELEVATION, OR SOIL MARK	Protective Soil L						
MOISTURE CONTENT %	12.88	14.07	13.91	12.57			
PROBE DEPTH (inch)	6"	→	→	→	→	→	→

LOCATION DIAGRAM: D-8-C D-8-A C-8-C E-8-A REMARKS:

EGS LTD
341 Cleveland Place
Virginia Beach, VA 23462
(804) 499-9100
FAX (804) 499-2404

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Landfill cap JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 10-4-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

TEST NO.	PS-1	PS-2	PS-3	PS-4	PS-5	PS-6	PS-7
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	4.6	5.9	17.1	15.9	16.5	17.1	16.8
WET DENSITY (pcf)	102.2	103.6	112.8	113.0	113.4	112.8	113.6
DRY DENSITY (pcf)	97.6	97.7	95.7	97.0	96.9	95.6	96.7
PERCENT COMPACTION	97.1	97.19	95.2	96.52	96.41	95.17	96.26
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK	Protective	Soil	Lift	→			
MOISTURE CONTENT %	4.74	6.03	17.92	16.41	17.04	17.1	17.4
PROBE DEPTH (inch)	6"	→					

LOCATION DIAGRAM: D-10-C [redacted] [redacted] E-10-A E-9-B E-9-A
D-9-B D-9-D

REMARKS: D-9-C

ECS LTD
814 Greenbrier Circle
Suite A
Chesapeake, VA 23320-2643
(757) 366-5100
FAX (757) 366-5203

FIELD DENSITY TEST
NUCLEAR METHOD
ASTM D-2922

PROJECT: CD Landfill Cap JOB NO.: N3447
SUBJECT: NUCLEAR FIELD DENSITY TEST DATE: 10-4-99
STANDARD COUNT MOISTURE: _____ STANDARD COUNT DENSITY: _____
CONTRACTOR: Grace CLIENT: _____ TECH: J. Smith

TEST NO.	PS-8	PS-9	PS-10	PS-11	PS-12	PS-13	PS-14
DENSITY COUNT							
MOISTURE COUNT							
MOIST. CONTENT (pcf)	15.8	16.0	16.3	16.2	19.8	19.3	18.2
WET DENSITY (pcf)	116.1	114.9	114.0	115.1	115.4	115.8	116.3
DRY DENSITY (pcf)	100.3	98.9	97.6	98.9	95.6	96.5	98.1
PERCENT COMPACTION	99.79	98.39	97.16	98.37	95.08	96.07	97.62
STANDARD PROCTOR MODIFIED PROCTOR	100.5	→					
OPT. WATER CONTENT	20.7	→					
LIFT, ELEVATION, OR SOIL MARK	Protective Soil Lift	→					
MOISTURE CONTENT %	15.78	16.2	16.72	16.39	20.76	20.04	18.55
PROBE DEPTH (inch)	6"	→					

LOCATION DIAGRAM: D-9-A C-9-C C-8-D D-8-B P-8-D E-8-B

REMARKS: E-8-A

8
9
10
11
N 2280
N 227800
N 227600
N 227400
TP06
TP07A
TP08
TP09
TP10
TP12
MW 04B
MW 04A
TBN
MW 05C
MW 05B
MW 05A
SB 05
MW 08A/SB 08
MW 10A
MW 06B
MW 06A
CL FENCE
LF0006
TEMPORARY LANDFILL GAS WELL, TYP (SEE NOTE 3)
TEST PIT LOCATION, TYP (SEE NOTE 3)
PS-1
PS-2
PS-3
PS-4
PS-5
PS-6
PS-7
PS-8
PS-9
PS-10
PS-11
PS-12
PS-13
PS-14
PS-15
PS-16
PS-17
Sand Cove
GRAVEL ROAD
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)
CONCRETE PAD FOR RUNWAY LIGHTS (TYP.)

Engineering Consu. .ig Services, Ltd.

ASTM D1556 Sand Cone Field Worksheet

Project: CD Landfill cap	Field Kit # 3 Sand Calib. 90.62 pcf	Date 10-4-99
Location: NOR FOLK	Wt. of Sand in Cone & Plate [redacted] lbs.	Job No. U3447 Technician: J.S.

Area Tested: D-9-A + C-8-C

Test Number	#1	#2				
Location	D-9-A	C-8-C				
Lift / Elevation						
Volume Wt of Bottle & Cone, Before	7012.9	6981.5				
Wt of Bottle & Cone, After	3390.2	2941.5				
a) Wt. of Sand in hole, cone, & plate	3622.7	4240.0				
b) Wt. of Sand in cone & plate	1666.6	1666.6				
c) Wt. of Sand in hole (a - b)	4.3124	5.6733				
d) Volume of hole: c / Sand Calib = cu.ft.	.0475	.0626				
Density e) Wt. of Sample & Tare	2519.4 [redacted]	3102.4				
f) Wt. of Tare	12.9	12.9				
g) Wt. of Sample (e - f)	5.5258 [redacted]	6.8111				
h) Wet Density: g/d = pcf	116.33	108.8				
I) Dry Density: h/ (1 + q) =pcf	99.28	98.66				
j) Max. Dry Density (Proctor) =pcf	100.5	100.5				
k) % Compaction: (i/j) x 100	98.78	98.16				
Moisture Tare No.	Tuna	MST3K				
l) Wt. of Sample & Tare, wet	899.5	945.7				
m) Wt. of Sample & Tare, Dry	800.7	878.3				
n) Wt. of Water lost: (l - m)	98.8	67.4				
o) Wt. of Tare	225.3	222.5				
p) Wt. of Dry soil: (m - o)	575.4	655.8				
q) % Moisture: (n / p) x 100	17.17	10.27				

L:/FORMS/SNDCONE.doc

Appendix B

LLDPE Flexible Membrane Cover QC Documentation

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 1 of ____

Project: Norfolk CD

Project No.: 1584

Date: 7/22/99

Product (check one):

FML 40 mil LL-T GT ____ GCL ____

GC ____ GN ____ other ____

Sector: D-10, D-9 C-9.

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
1	243	64	1440
2	243	84'	1890
3	243	102.5	2306.25
4	243	121	2722.5
5	243	135	3037.5
6	243	132'	2970

-292.5 OFF TOTAL

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 14,658.75

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: ____

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 2 of ____

Project: Norfolk CD

Project No.: 1584

Date: 7-23-99

Product (check one):

FML 40 mil LL-TX GT _____ GCL _____

Sector: _____ GC _____ GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
7	248	28'	630
8	248	175'	3937.5
9	248	192'	4320
10	248	204'	4590
11	248	73.5'	1653.75
12	182	144.5'	3251.25
13	182	230'	5175
14	182	240'	5400
15	182	59'	1327.5
16	244	191.5'	4308.75
17	244	260'	5850
18	244	196'	4410

BEGINNING BALANCE: _____ TOTAL INSTALLED TODAY: 49,373.75

RECEIVED TODAY: _____

TOTAL MATERIAL ON HAND: _____ TOTAL INSTALLED TO DATE: 64,032.5

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 3 of ____

Project: Norfolk CD

Project No.: 1854

Date: 7/26/99

Product (check one):

FML 40mil LL-Tex GT _____ GCL _____

Sector: _____ GC _____ GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
19	238	77'	1733
20	238	280'	6300
21	238	291'	6548
22	238	46'	1035
23	312	256'	5760

BEGINNING BALANCE: _____ TOTAL INSTALLED TODAY: 21,376

RECEIVED TODAY: _____

TOTAL MATERIAL ON HAND: _____ TOTAL INSTALLED TO DATE: 85,409

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 4 of ____

Project: Norfolk CD

Project No.: 1584

Date: 7-27-99

Product (check one):

FML 40 mil LL-text GT ____ GCL ____

Sector: ____ GC ____ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
24	312	316'	7110
25	312	132'.5	2981
26	245	194.5	4,376
27	245	325	7313
28	245	169.5	3814
29	297	153'.5	3454
30	297	322	7245

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 36,293

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 121,702

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 5 of ____

Project: NORFOLK CD

Project No.: 1584

Date: 7/28/99

Product (check one):

FML 40 mil LL+~~TX~~ GT ____ GCL ____

Sector: ____ GC ____ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
31	297	23 X 22.5 ÷ 2 =	258.75
32	297	35	787.5
33	297	59.5	1338.75
34	297	85	1912.5
35	240	110	2475
36	240	114	2565
37	240	15.5	348.75
38	240	142.5	3228.75
39	240	157	3532.5
40	240	133	2992.5
41	338	33	742.5
42	338	179	4027.5
43	338	185.5	4173.75
44	338	188	4230
45	338	93.5	2104
46	292	93.5	2104
47	292	190	4275

- 21260 [illegible] total

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: See next page →

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 173,600

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 6 of ____

Project: Norfolk CD

Project No.: 1584

Date: 7/28/99

Product (check one):

FML 40 mil LLDPE ☒ GT ____ GCL ____

Sector: ____ GC ____ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
48	292	191.5	4309
49	292	193	4343

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 51,898

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 173,600

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 7 of ____

Project: NORFOLK CO

Project No.: 1584

Date: 8/2

Product (check one):

FML 40 mil LLDX

GT ____ GCL ____

Sector: ____

GC ____ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
50	239	203'	4567.5
51	239	204'	4590
52	239	26'	585
53	239	29'	652.5
54	239	33'	742.5
55	239	38'	855
56	300	42'	945
57	239	47'	1057.5
58	239	49'	1102.5
59	300	53'	1192.5
60	239	56'	1260

BEGINNING BALANCE: ____

TOTAL INSTALLED TODAY: 17,550

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____

TOTAL INSTALLED TO DATE: 191,150

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 8 of ____

Project: NorFolk CD

Project No.: 1584

Date: 8/9/99

Product (check one):

FML 40 mil LLTX GT ____ GCL ____

Sector: ____ GC ____ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
61	300	141'	3173
62	300	74' x 22.5 ÷ 2 =	833
63	300	228'	5130
64	300	47' x 22.5 ÷ 2 =	529
65	300	100'	2,250
66	303	213'	4,793
67	303	366'	8,235
68	304	294'	6615
69	303	119'	2678
70	304	409'	9203
71	293	38'	855
72	293	476'	10,710
73	293	241'	5,423
74	298	261.5	5884
75	298	23 x 22.5 ÷ 2 =	259

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 66,579

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 257,729

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 9 of ____

Project: Norfolk CD

Project No.: 1584

Date: 8/10/99

Product (check one):

FML 40 mil LL-TX GT ____ GCL ____

Sector: ____ GC ____ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
76	298	401'	9,022.5
77	301	122.5	2756.25
78	301	545	12,262.5
79	294	567.5	12,769
80	294	110.5	2,975
81	295	467.5	10,519
82	295	214	4,815
83	296	357.5	8,044
84	296	331.5	7459
85	302	231	5197.5
86	302	469	10,552.5
87	340	92.5	2081.25
88	340	559	12,577.5

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 100,541.25

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 358,270.25

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 10 of ____

Project: NORFOLKCD

Project No.: 1584

Date: 8/13/99

Product (check one):

FML 40mil LLTX

GT ____ GCL ____

GC ____ GN ____ other ____

Sector: ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
89	339	549'	12,352.5
90	339	131.5	2959
91	341	406.5	9146.25
92	341	289	6502.5
93	343	237	5332.5
94	343	462.5	10,406.25
95	342	52.5	1,181.25
96	342	505	11,362.5
97	342	137.5	3,094
98	349	357.5	8044

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 70,380

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 428,650.25

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 11 of _____

Project: Norfolk CD

Project No.: _____

Date: 8/16/99

Product (check one):

FML 40 mil LL-tx

GT _____ GCL _____

Sector: _____

GC _____ GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
99	349	329.5	7414
100	346	153	3442.5
101	346	431	9697.5
102	346	39	877.5
103	325	460	10,350
104	325	231	5197.5
105	327	232.5	5231.25
106	327	52.5	1181.25
107	327	421.5	9484
108	329	471	10,597.5
109	329	166	3735
110	344	295	6637.5
111	344	405	9112.5
112	345	49	1102.5
113	345	451	10,147.5
114	345	192.5	4331.25
115	348	255	5737.5

BEGINNING BALANCE: _____ TOTAL INSTALLED TODAY: See next page →

RECEIVED TODAY: _____

TOTAL MATERIAL ON HAND: _____ TOTAL INSTALLED TO DATE: _____

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 12 of ____

Project: Norfolk CD

Project No.: 1584

Date: 8/16/99

Product (check one):

FML 40mil tx-LL GT ____ GCL ____

Sector: ____ GC ____ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
116	348	446.5	10,046.25
117	347	445	10,012.5
118	347	249.5	5614
119	330	192.5	4331.25
120	330	436	9810
121	330	67	1507.5
122	333	364	8190
123	333	346.5	7796.25
124	326	81.5	1834
125	326	425	9562.5
126	326	177	3982.5
127	336	244	5490
128	336	~~441~~ 462'	9922.5
129	328	459	10,327.5
130	328	252	5445
131	332	211	4797.5
132	332	449	10,102.5

ADD 472.5 to total

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: See next page →

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: ____

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 13 of ____

Project: NorFolk CD

Project No.: 1584

Date: 8/16/99

Product (check one):

FML 40mil LLtx GT ____ GCL ____

Sector: ____ GC ____ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
133	335	124'	2,790
Tri 133A	335	124'x22.5÷2=	1395
134	335	32	720
Tri 134A	335	80x22.5÷2=	900

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 228,803

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 657,453.25

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 14 of ____

Project: Norfolk

Project No.: 1584

Anchor Trench Not included

Date: 8-24-99

Product (check one):

FML ✓ GT ____ GCL ____

Sector: ____ GC ____ GN ____ other ____

2 2

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
135	335	66.5	1,496.25
136	335	63	1417.5
137	↓	61.5	1383.75
138	↓	60	1350
139	↓	58.5	1316.25
140	↓	56.5	1271.25
141	231	55.5	1,248.75
142	↓	54.5	1226.25
143	↓	53.5	1203.75
144	↓	18 x 38 (19 38)	684
145	↓	21 x 6.5	136.5
146	↓	19.5 x 7	136.5
147	↓	25	562.5
148	↓	~~61~~ 31 x 4.5	~~274~~ 139.5
149	↓	149	~~75~~ 3352.5
150	↓	153	3442.5
151	↓	75.5	1698.75

22,066.5

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 22,066.5

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 679,519.75

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 15 of _____

Project: Norfolk

Project No.: 1584

Anchor Trench Not Included

Date: 8-24-99

Product (check one):

FML ✓ GT _____ GCL _____

Sector: _____ GC _____ GN _____ other _____

2 L 2

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
152	337	81.5	1833.75
153	↓	167	3757.5
154	↓	217	4882.5
155	↓	185.5	4173.75
156	241	39.5	888.75
157	337	230.5	5186.25
158	241	236.5	5321.25
159	~~8~~ 286	82.5	1856.25
160	241	159	3577.5
161	~~245~~ 286	245.5	5523.75
162	286	245	5512.5
163	284	243.5	5478.75
164	286	107.5	2418.75
165	284	241	5422.5
166	284	226.5	5,096.25
167	278	136.5	3,071.25
168	284	52.5	1,181.25

64,382.5

65182.5

BEGINNING BALANCE: _____ TOTAL INSTALLED TODAY: 65,182.5

RECEIVED TODAY: _____

TOTAL MATERIAL ON HAND: _____ TOTAL INSTALLED TO DATE: 744,702.25

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 16 of ____

Project: Norfolk

Project No.: 1584

Date: 8-24

Product (check one):

FML ✓ GT ____ GCL ____

GC ____ GN ____ other ____

Anchor Trench Not Included

2 L 2

Sector: ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
169	278	133	2992.5
170	278	74.5	1676.25
171	278	17 x 44 ÷ 2	374
		22,066.5	
		65,182.5	
		5,042.75	
	Total	92,292	

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 5,042.75

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 749,745

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 14-16 of _____

Project: Norfolk

Project No.: _____

Date: 8-24-99

Product (check one):

FML ✓ GT _____ GCL _____

Sector: Anchor Trench GC _____ GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		851 x 4	3,404

BEGINNING BALANCE: _____ TOTAL INSTALLED TODAY: 3404 8/24/99

RECEIVED TODAY: _____

TOTAL MATERIAL ON HAND: _____ TOTAL INSTALLED TO DATE: 753,149

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 17 of _____

Project: NORFOLK CD

Project No.: 1584

Date: 8/28/99

Product (check one):

FML 40mil

GT _____

GCL _____

Sector: _____

GC _____

GN _____

other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
172	278	261.5	5884
173	277	191	4297.5
174	277	474	10,665
175	281	478'	10,755
176	281	212'	4770
177	284	263'	5,917.5
178	284	472	10,620
179	282	467	10,507.5
180	282	225'	5,062.5
181	280	237	5,332.5
182	280	457'	10,282.5
183	287	451	10,147.5
184	287	188'	4230
185	279	255'	5,737.5
186	279	429'	9,652.5
187	285	336'	7560
188	285	82X22.5÷2 =	922.5

BEGINNING BALANCE: _____

TOTAL INSTALLED TODAY: See next page →

RECEIVED TODAY: _____

TOTAL MATERIAL ON HAND: _____

TOTAL INSTALLED TO DATE: See next page →

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 18 of ____

Project: NORFOLK CD

Project No.: 1584

Date: 8/28/99

Product (check one):

FML 40mil

GT ____

GCL ____

Sector: ____

GC ____

GN ____

other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
189	285	253'	5,692.5
190	285	66x22.5÷2 =	742.5
191	308	39x22.5÷2 =	439
192	308	70'	1575
193	308	110	2,475
194	308	122x22.5÷2 =	1,372.5
195	308	180'	4050
196	308	54x22.5÷2 =	607.5
197	308	92'	2,070
198	308	35x22.5÷2 =	394
199	308	75x22.5÷2 =	844

BEGINNING BALANCE: ____

TOTAL INSTALLED TODAY: 142,606

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____

TOTAL INSTALLED TO DATE: 895,755

893,809

QA Signature: ____

Date: ____

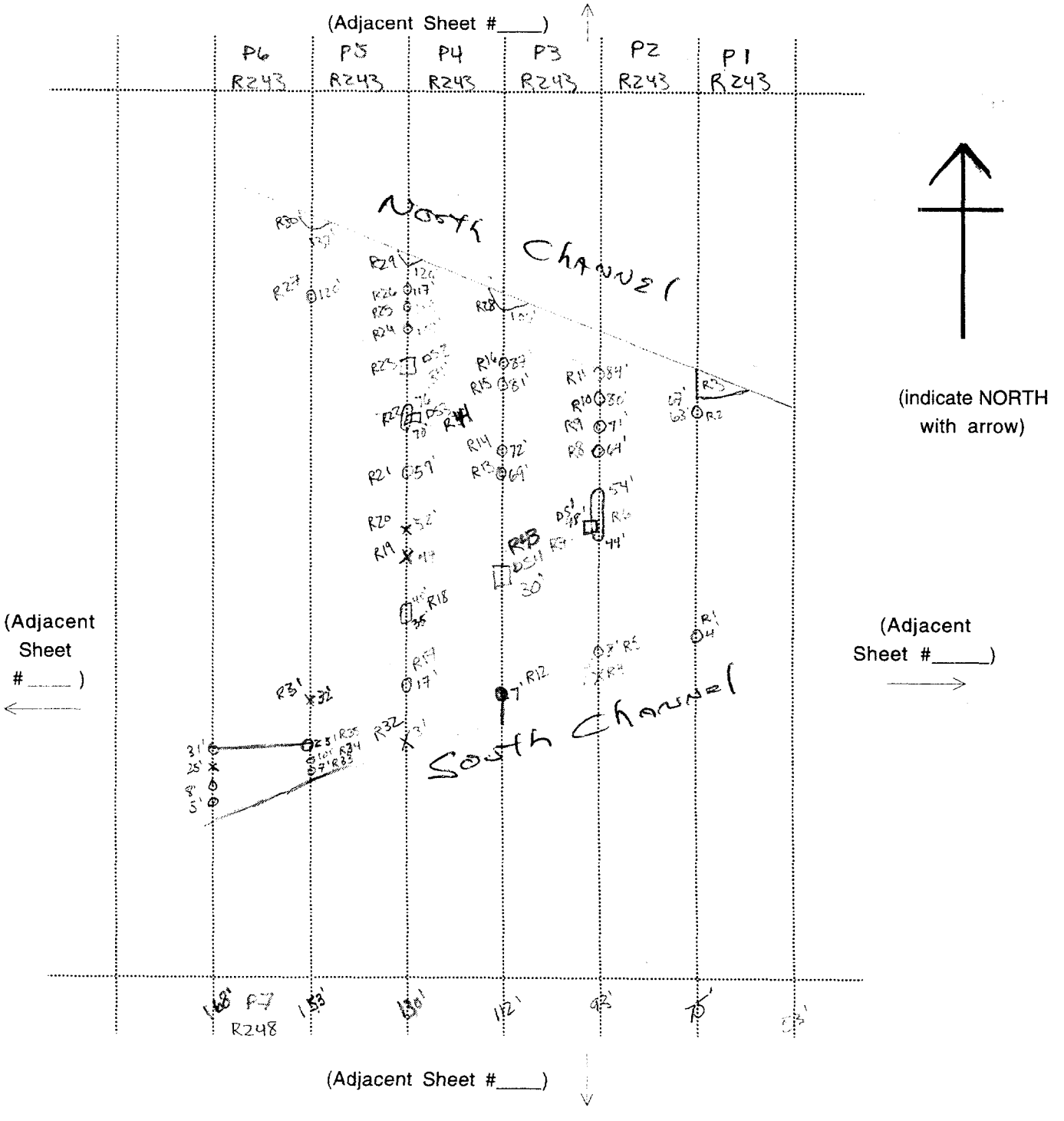
6/22/98

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 7/22/99

Project Name: NORFOLK CD Project No.: 1584 Sheet No.: 1



X - REPAIRS - DESTRUCT R - ROLL NO.

0 - PATCH - BOOT P - PANEL NO.

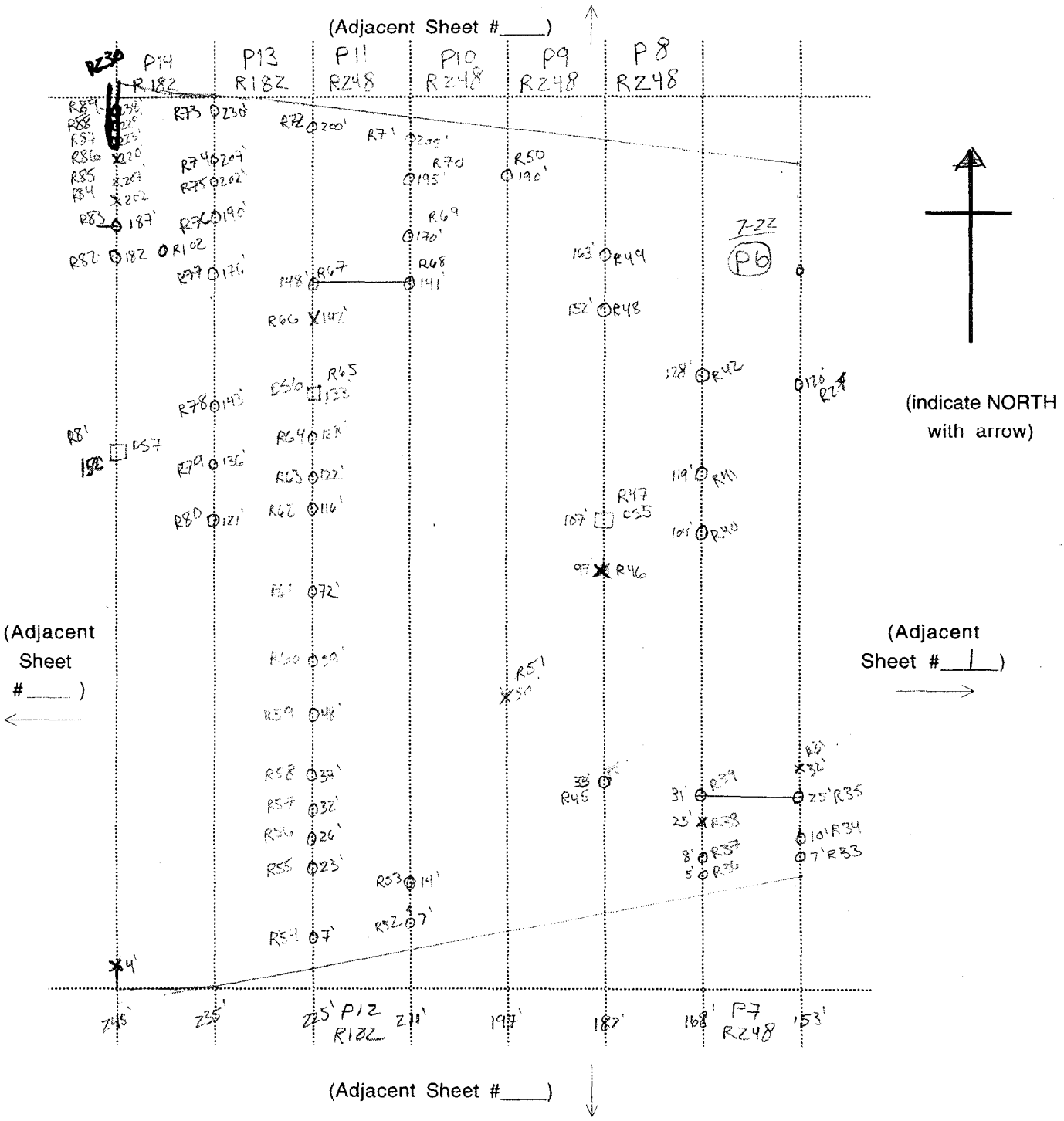
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 7-23-99

Project Name: Norfolk CD Project No.: 1584 Sheet No.: 2



X - REPAIRS ⬚ - DESTRUCT R - ROLL NO.

0 - PATCH ⊙ - BOOT P - PANEL NO.

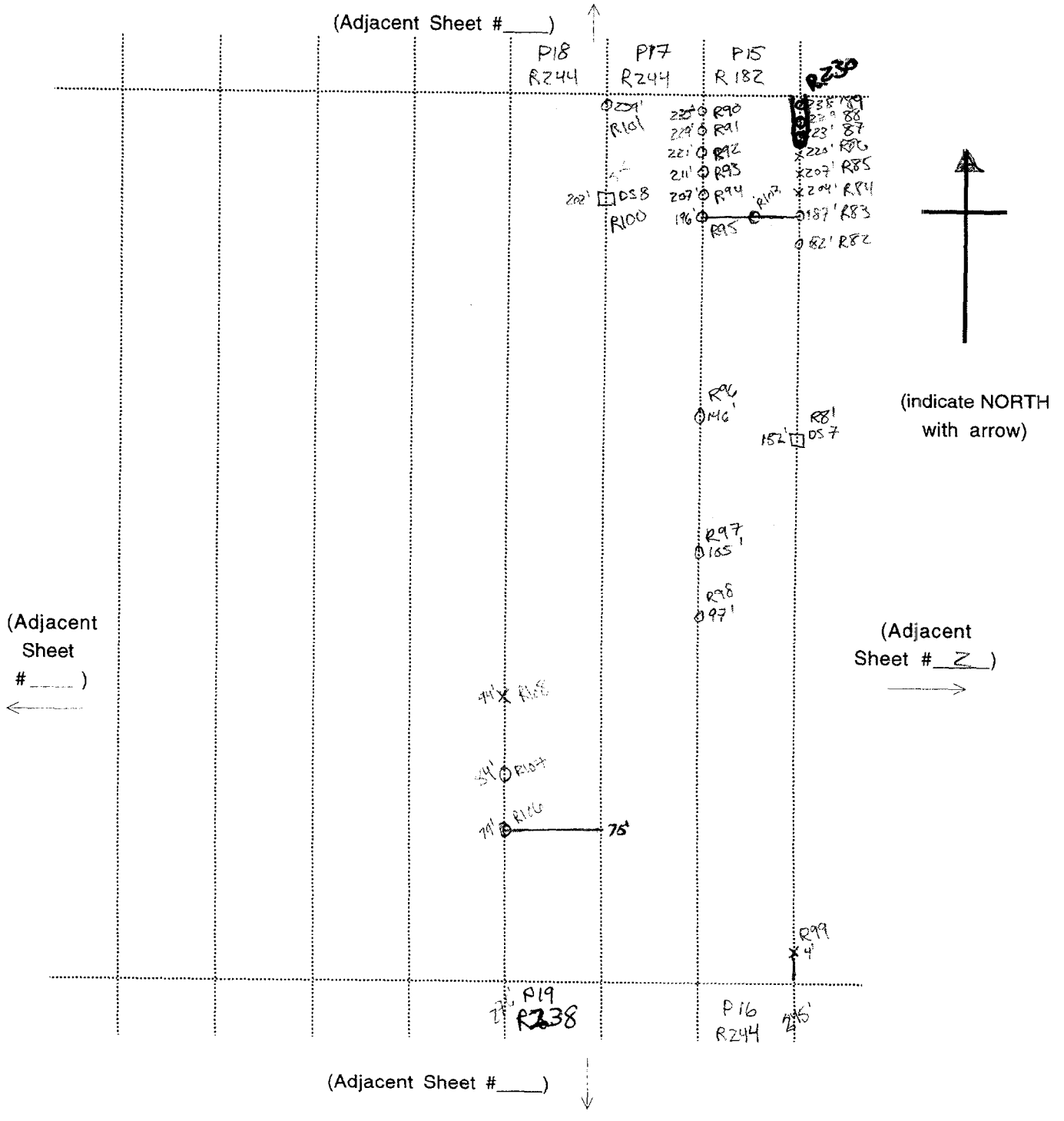
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 7-23-99

Project Name: Norfolk CD Project No.: 1584 Sheet No.: 3



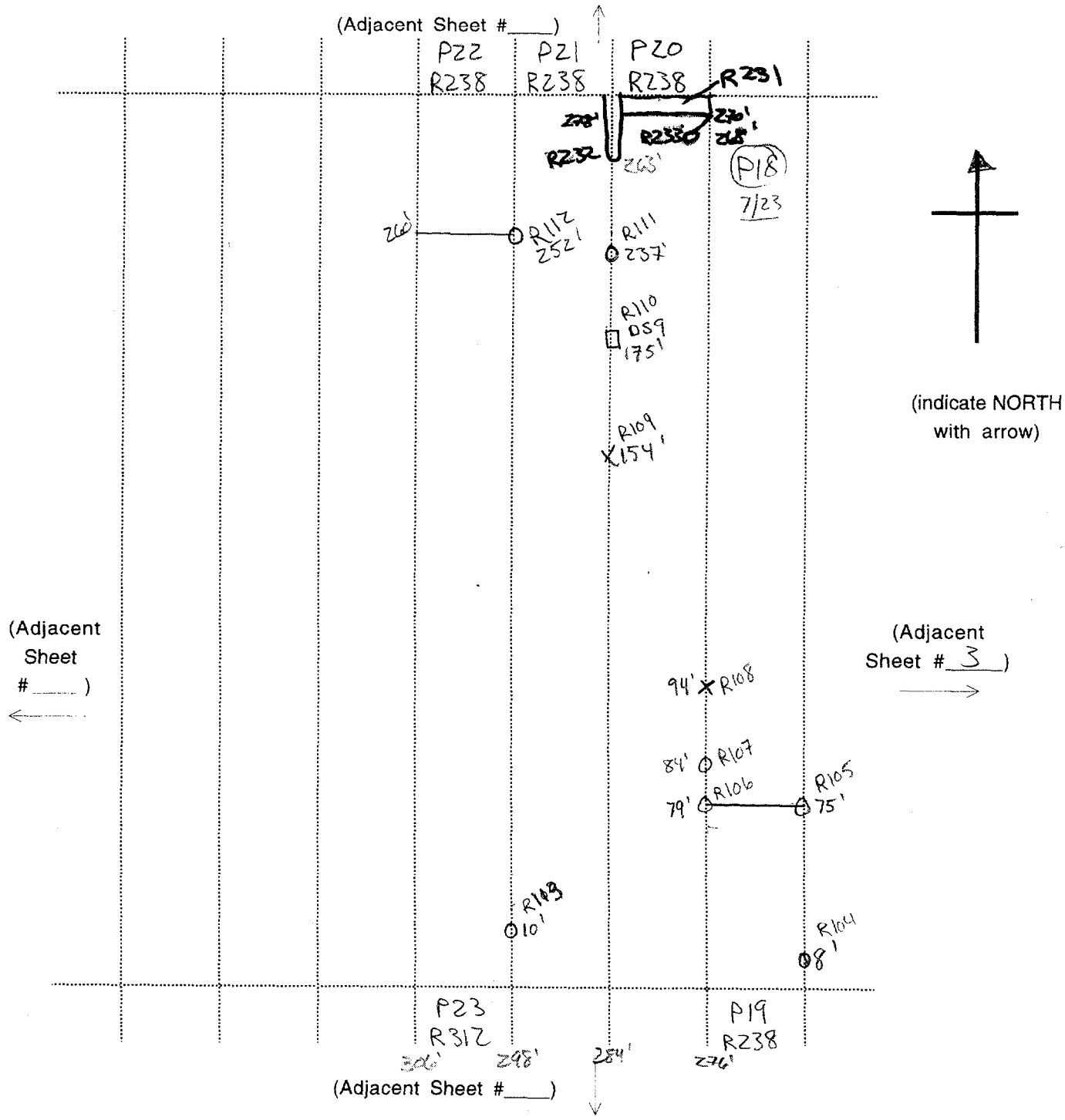
X - REPAIRS
0 - PATCH
- DESTRUCT
- BOOT
R - ROLL N0.
P - PANEL NO.

6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Project Name: Norfolk, D Project No.: 1584 Date Installed: 7/26/99 Sheet No.: 4



X - REPAIRS ⊡ - DESTRUCT R - ROLL NO.
0 - PATCH ⊙ - BOOT P - PANEL NO.

6/13/96

GeoPacific Lining Inc.

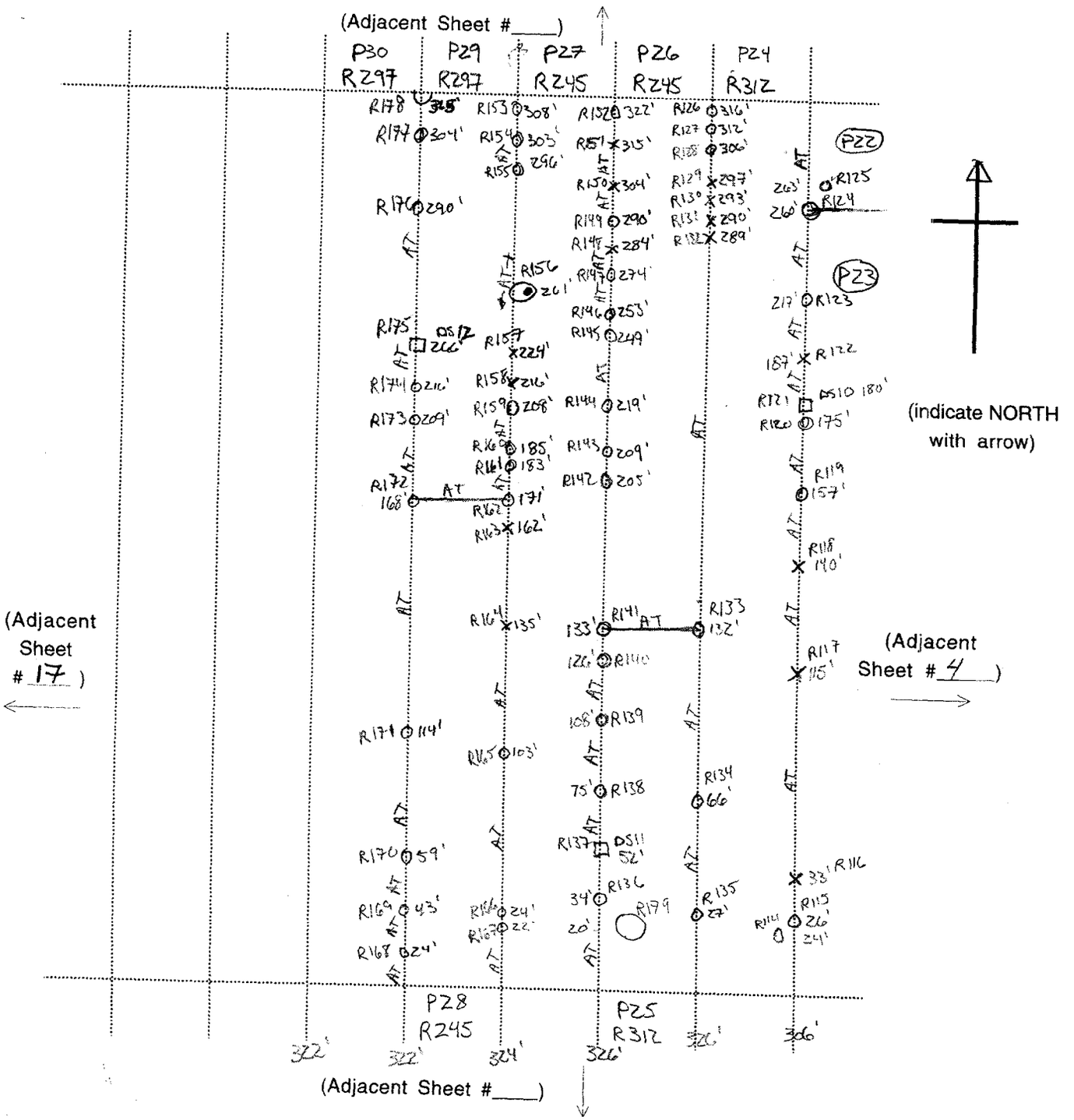
DAILY PANEL LAYOUT

Project Name: Norfolk CD

Project No.: 1584

Date Installed: 7/27/99

Sheet No.: 5



X - REPAIRS

0 - PATCH

□ - DESTRUCT

⊙ - BOOT

R - ROLL NO.

P - PANEL NO.

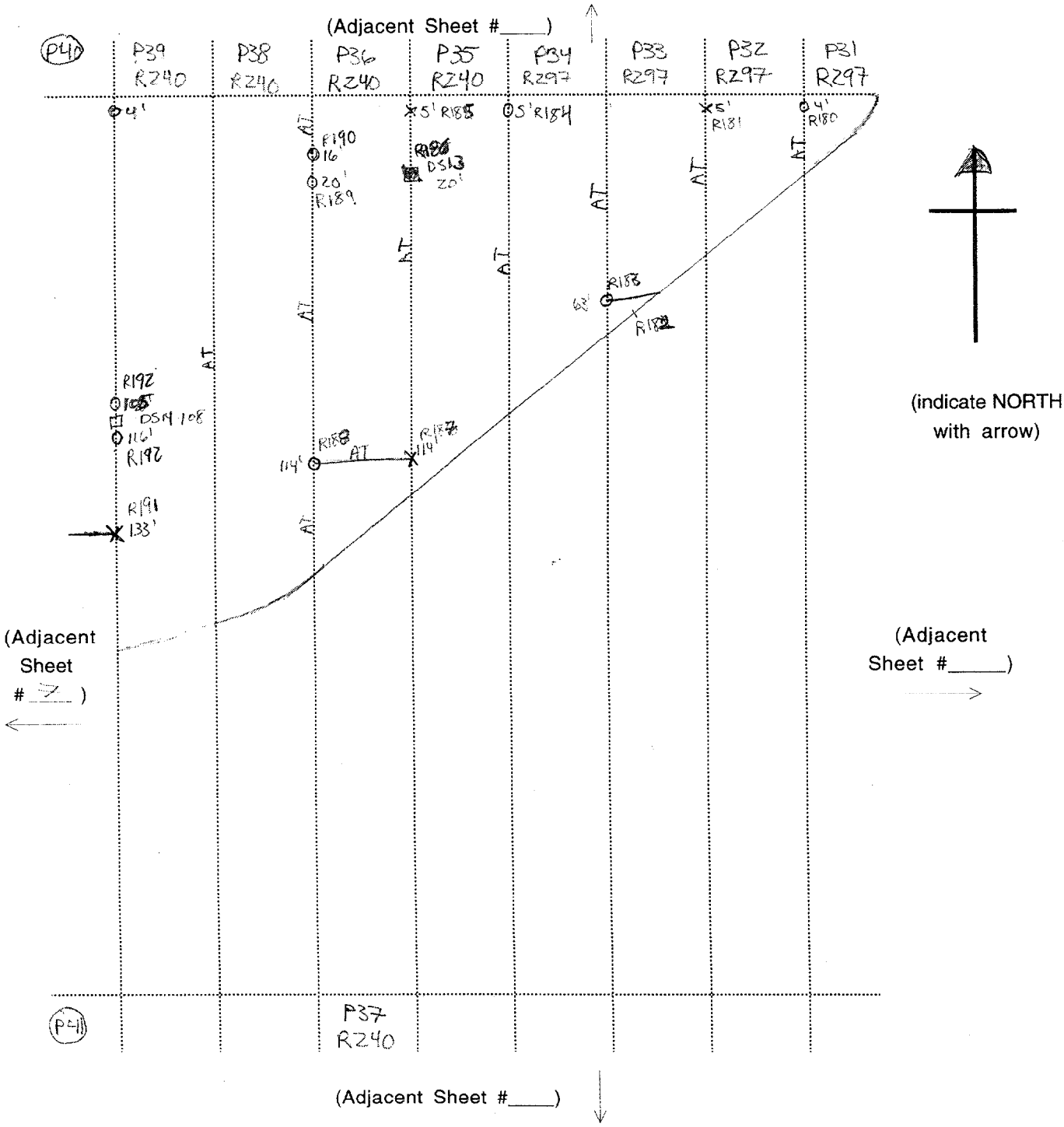
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 7/28/99

Project Name: Norfolk CD Project No.: 1584 Sheet No.: 6



X - REPAIRS □ - DESTRUCT R - ROLL NO.

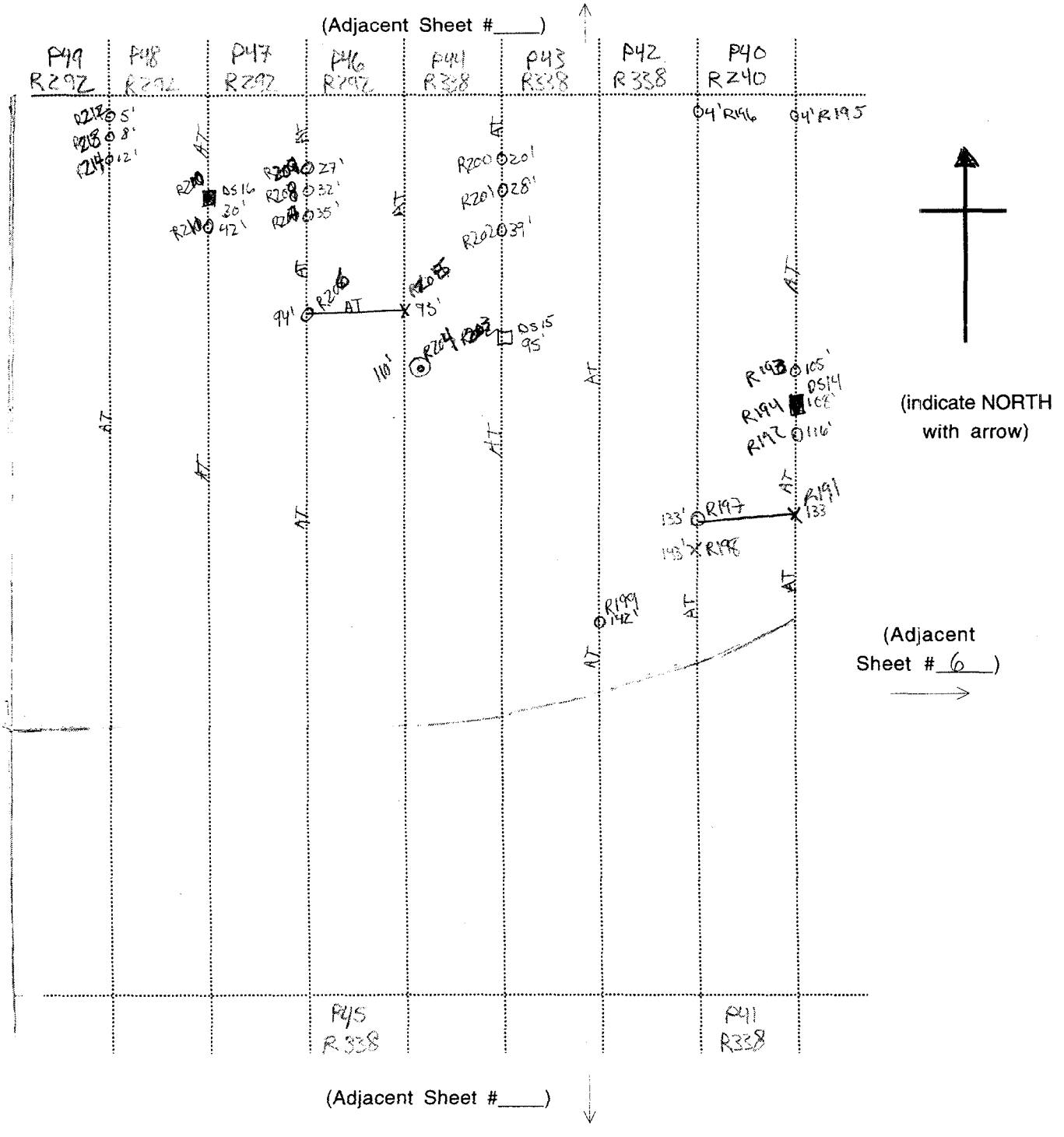
0 - PATCH ⊙ - BOOT P - PANEL NO.

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 7/28/99

Project Name: Norfolk CD Project No.: 1584 Sheet No.: 7



X - REPAIRS □ - DESTRUCT R - ROLL NO.

0 - PATCH ⊙ - BOOT P - PANEL NO.

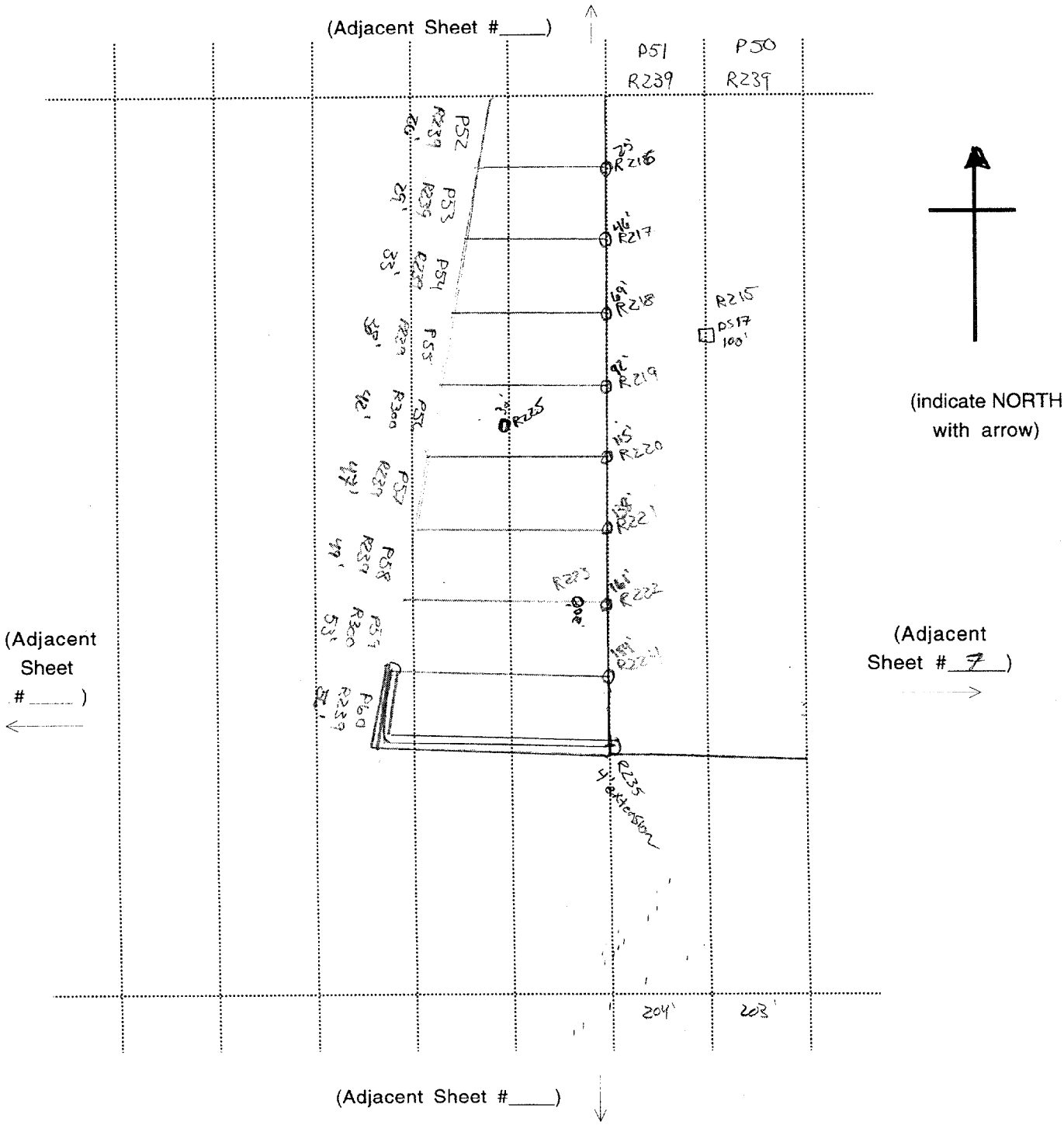
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/2

Project Name: Norfolk CD Project No.: 1584 Sheet No.: 8



X - REPAIRS ☐ - DESTRUCT R - ROLL N0.

0 - PATCH ⊙ - BOOT P - PANEL NO.

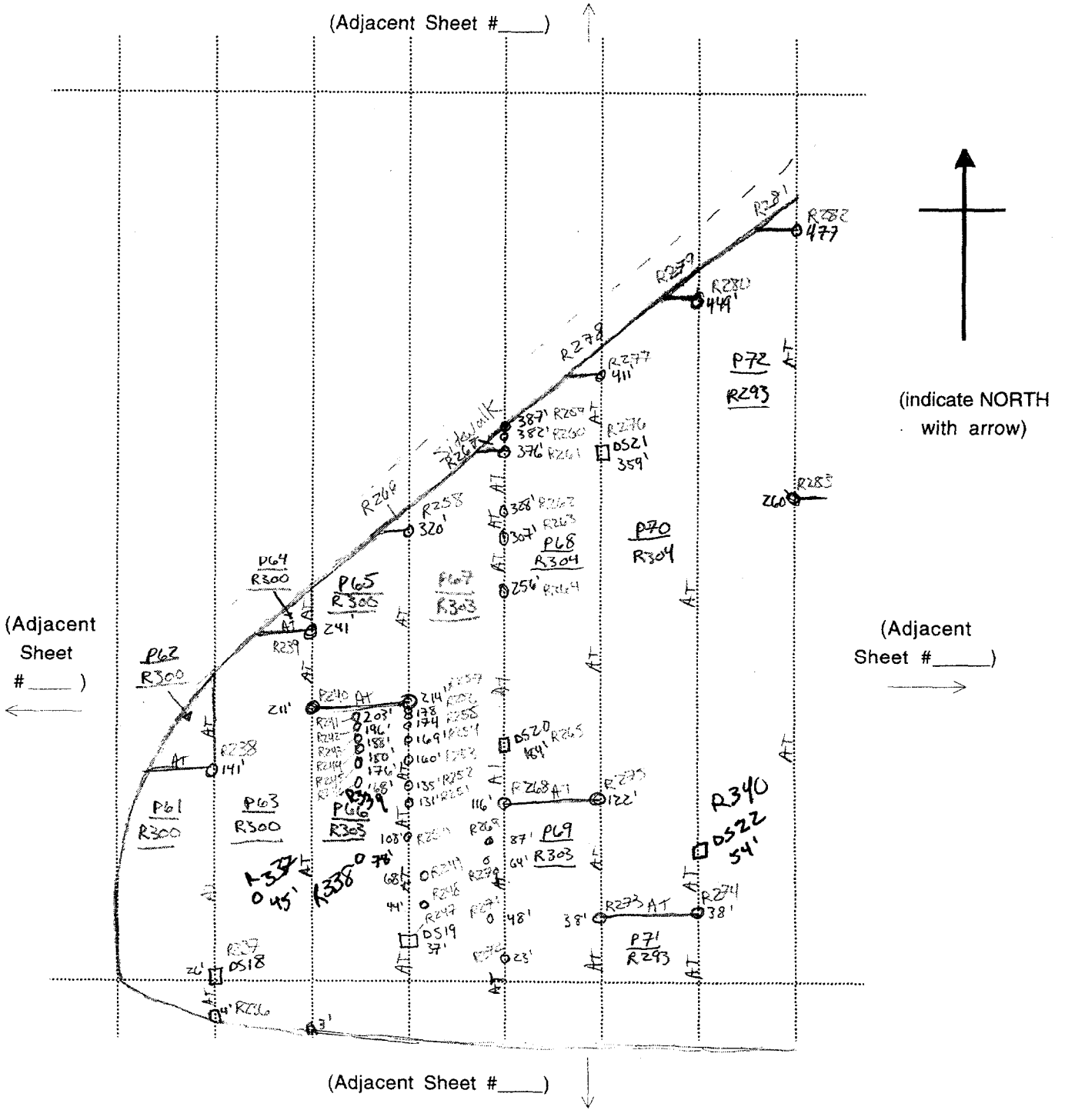
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/9/99

Project Name: Norfolk CD Project No.: 1584 Sheet No.: 9



X - REPAIRS ☐ - DESTRUCT R - ROLL NO.

0 - PATCH ⊙ - BOOT P - PANEL NO.

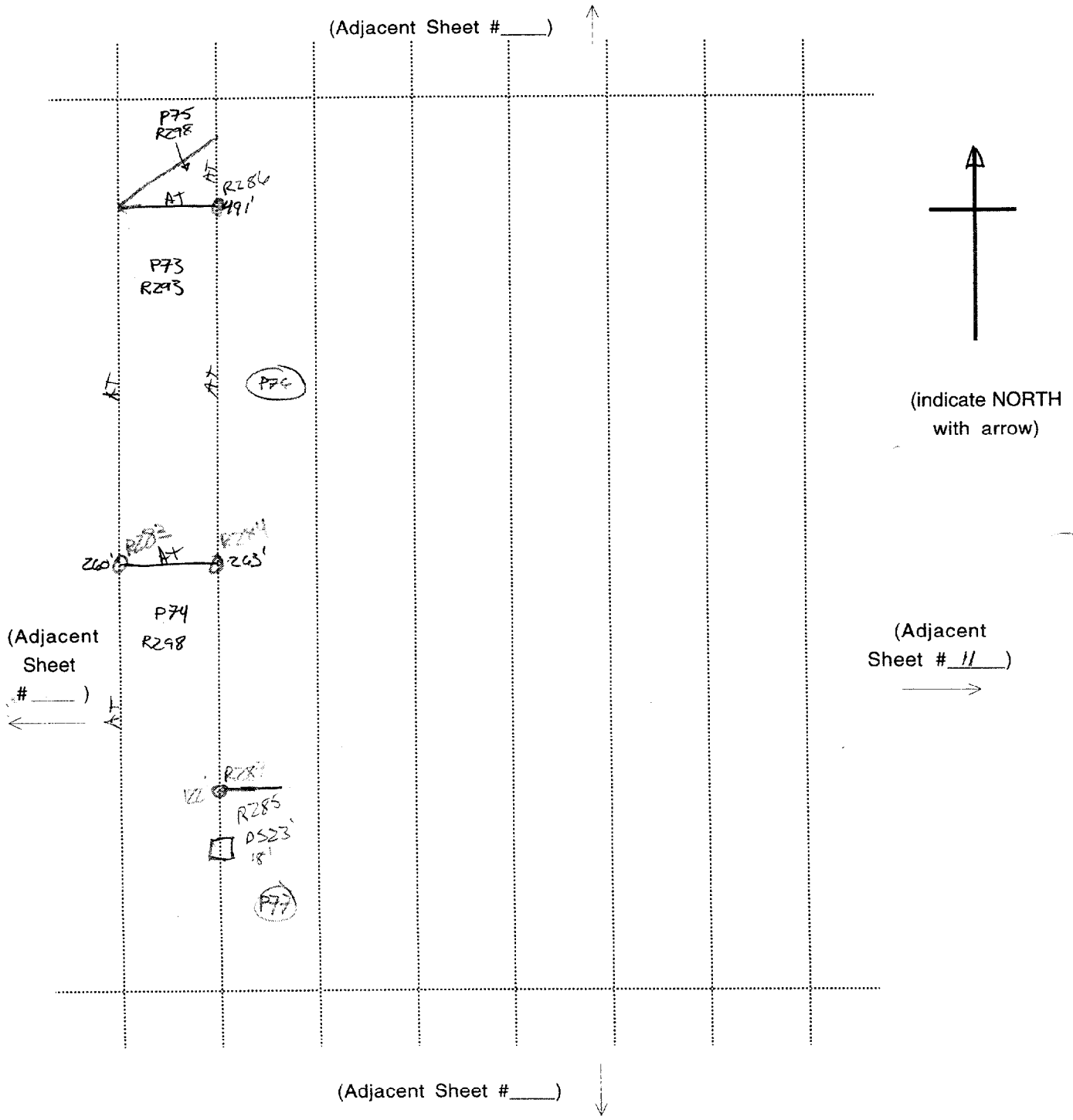
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/9/99

Project Name: Norfolk CD Project No.: 1584 Sheet No.: 40



X - REPAIRS ☐ - DESTRUCT R - ROLL N0.

0 - PATCH ⊙ - BOOT P - PANEL NO.

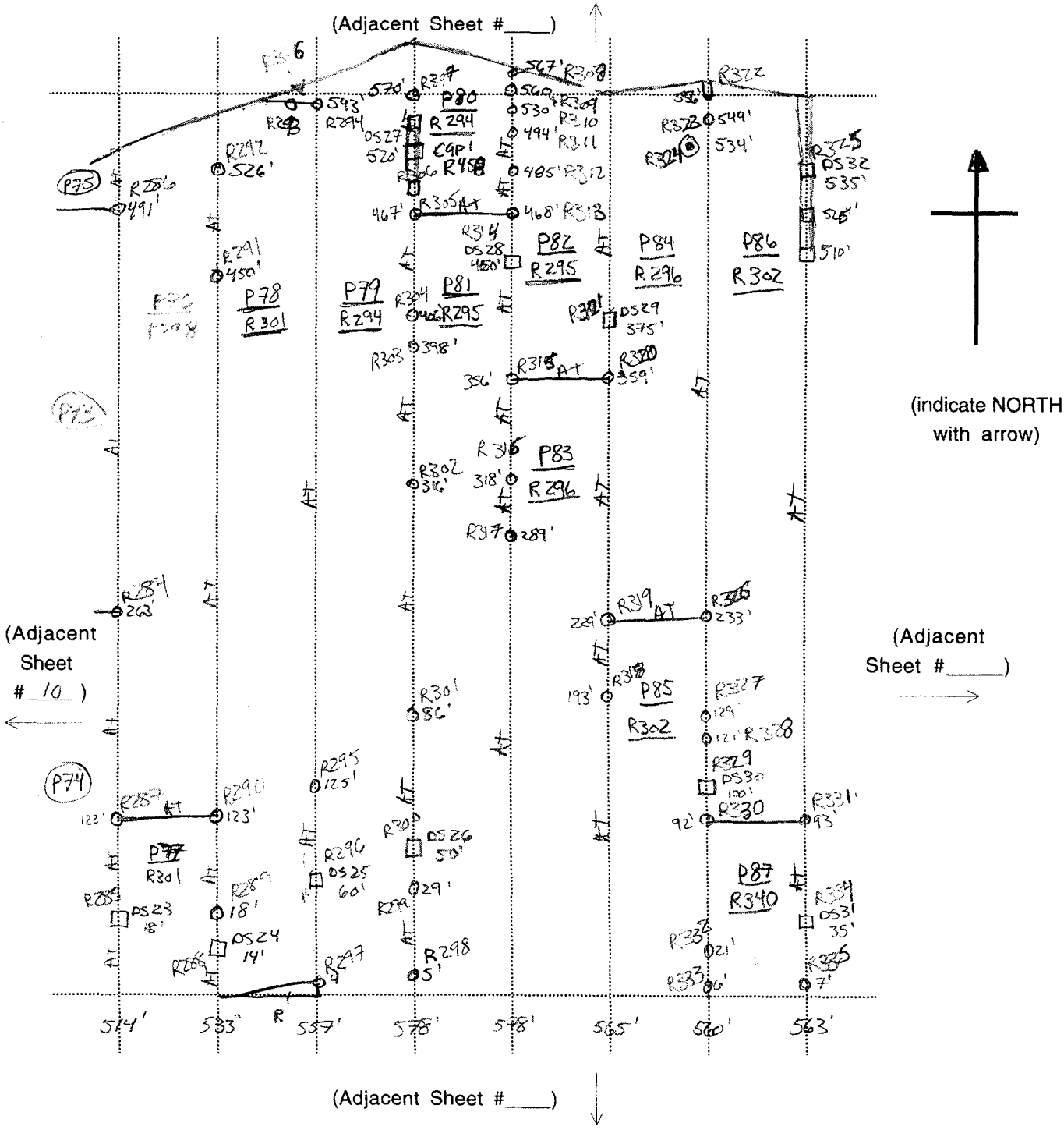
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/10/99

Project Name: NORFOLK CD Project No.: 1584 Sheet No.: 11



X - REPAIRS - DESTRUCT R - ROLL NO.

0 - PATCH - BOOT P - PANEL NO.

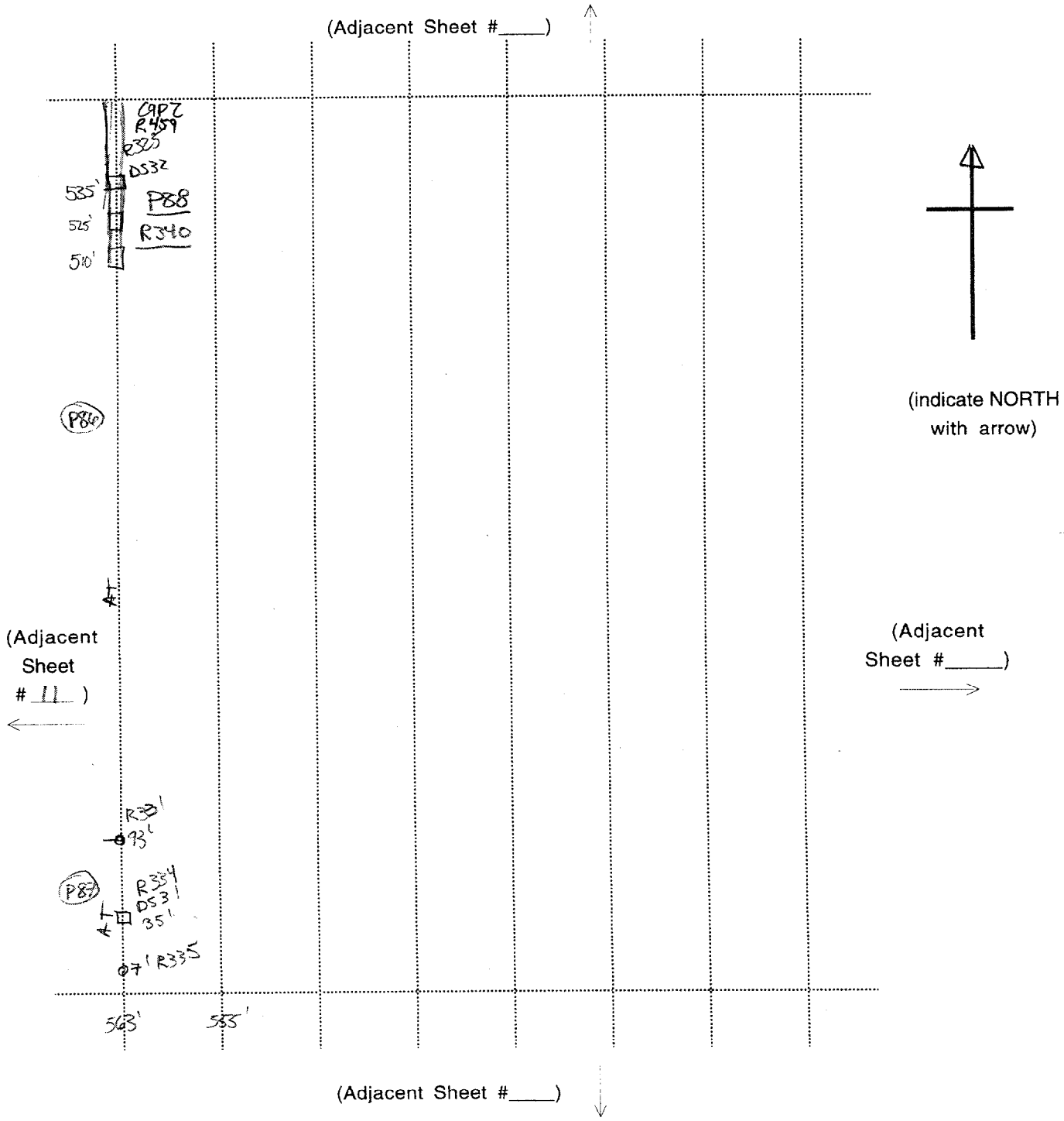
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/10/99

Project Name: Norfolk CD Project No.: 1584 Sheet No.: 12



X - REPAIRS □ - DESTRUCT R - ROLL N0.

0 - PATCH ⊙ - BOOT P - PANEL NO.

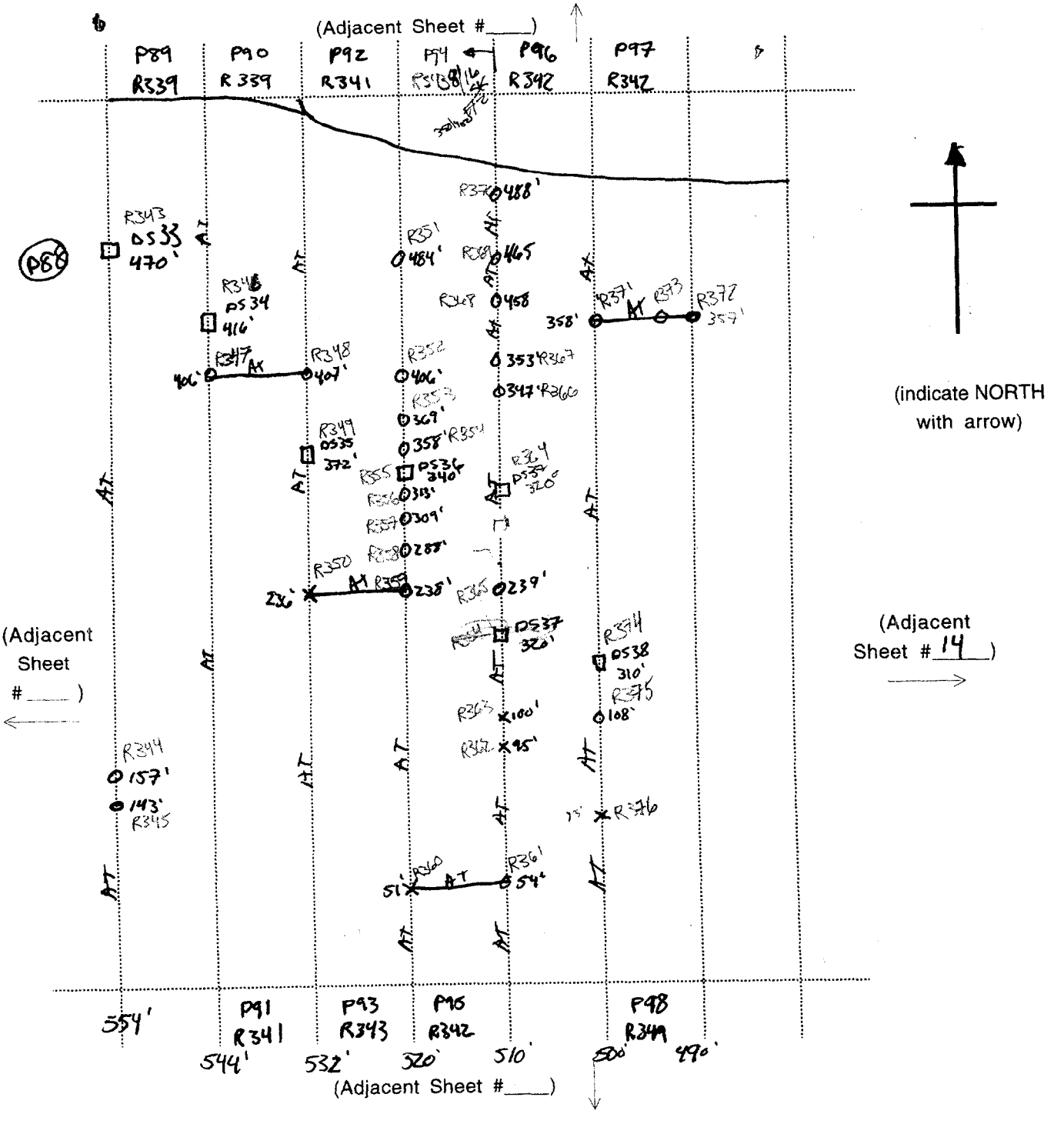
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/13/99

Project Name: Norfolk CD Project No.: 1584 Sheet No.: 13



X - REPAIRS □ - DESTRUCT R - ROLL NO.

0 - PATCH ⊙ - BOOT P - PANEL NO.

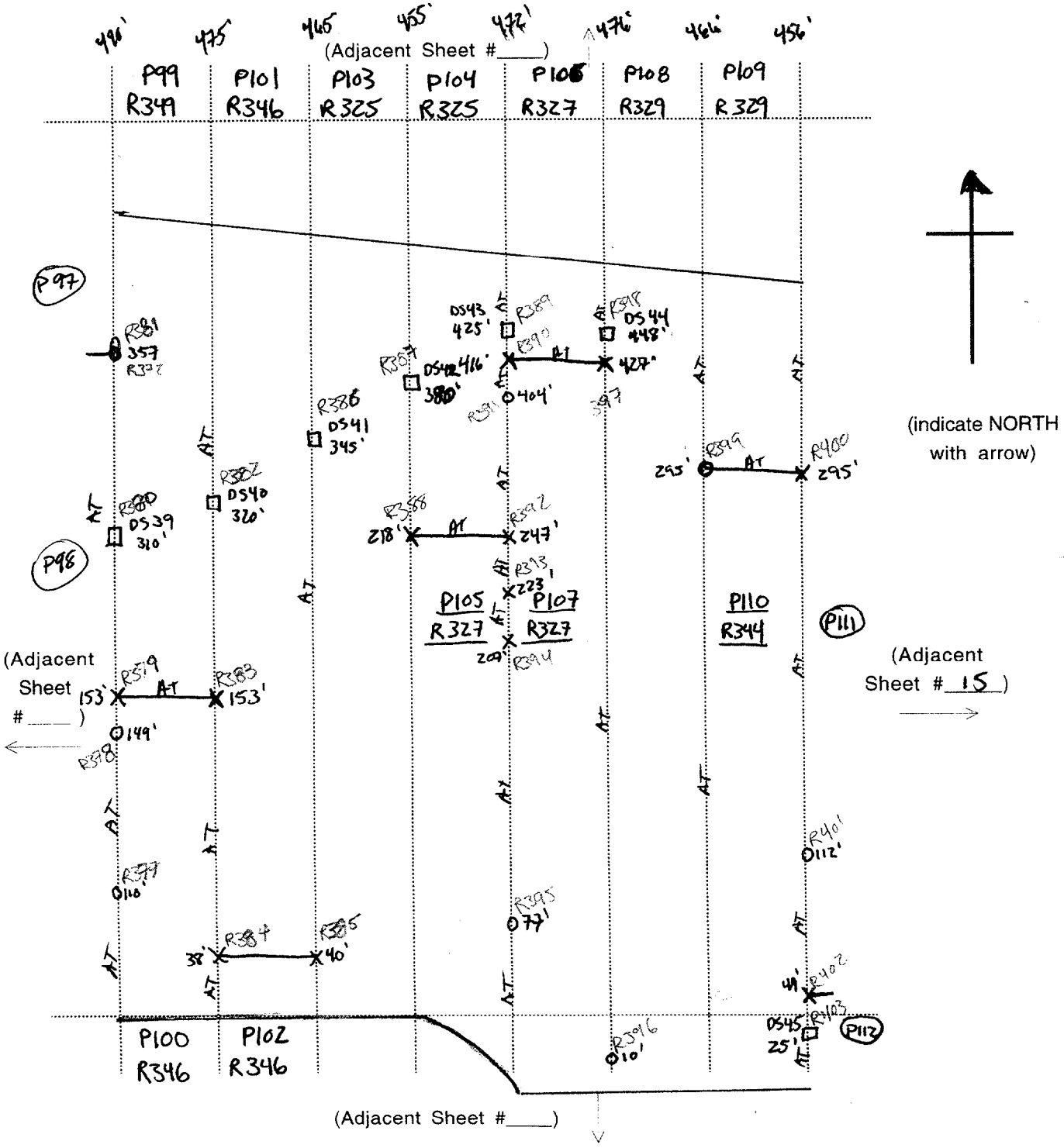
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/16/99

Project Name: NORFOLK CD Project No.: 1584 Sheet No.: 14



X - REPAIRS ☐ - DESTRUCT R - ROLL NO.

0 - PATCH ⊙ - BOOT P - PANEL NO.

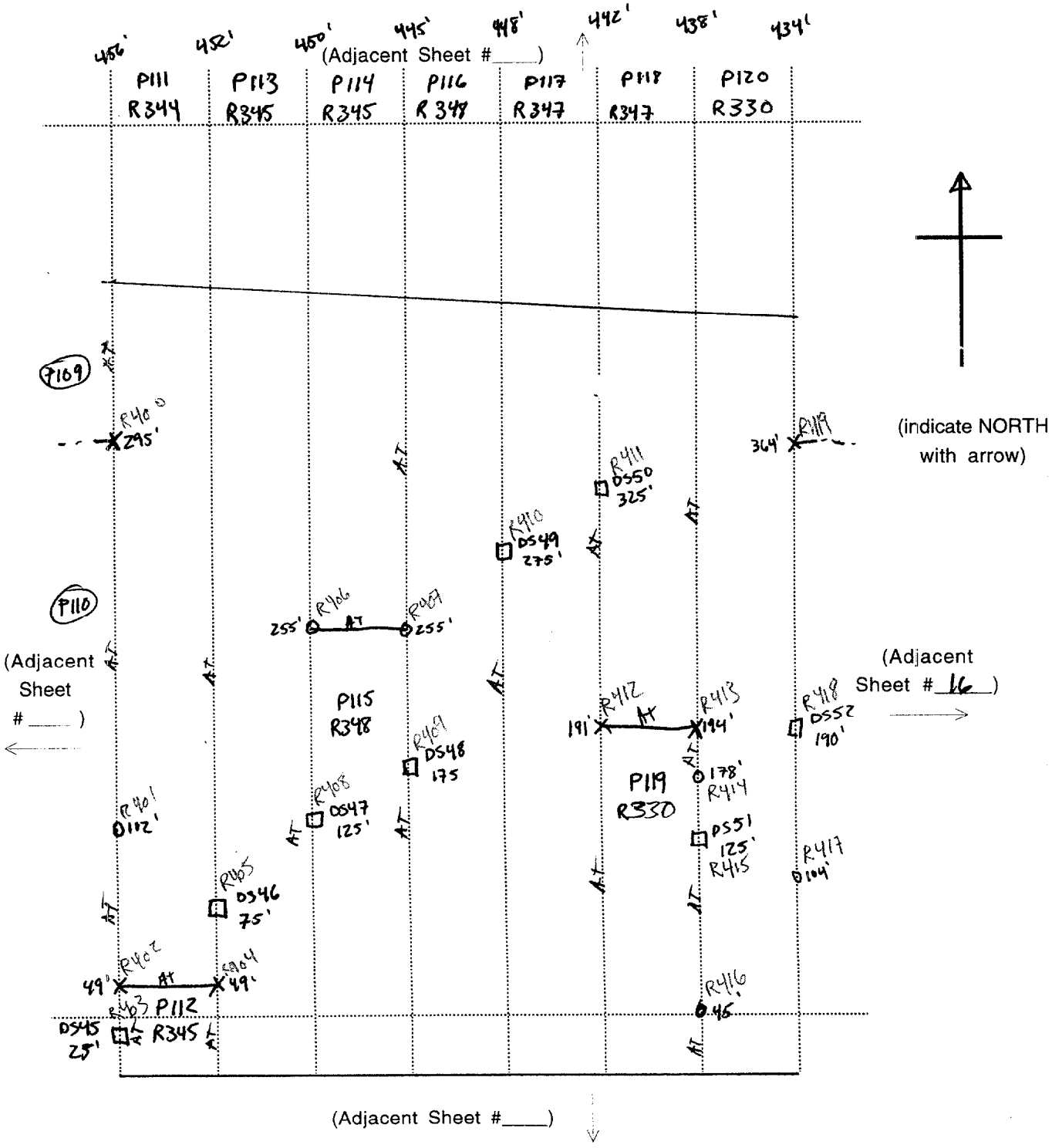
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/16/99

Project Name: NORFOLK CD Project No.: 1584 Sheet No.: 15



X - REPAIRS - DESTRUCT R - ROLL NO.

0 - PATCH - BOOT P - PANEL NO.

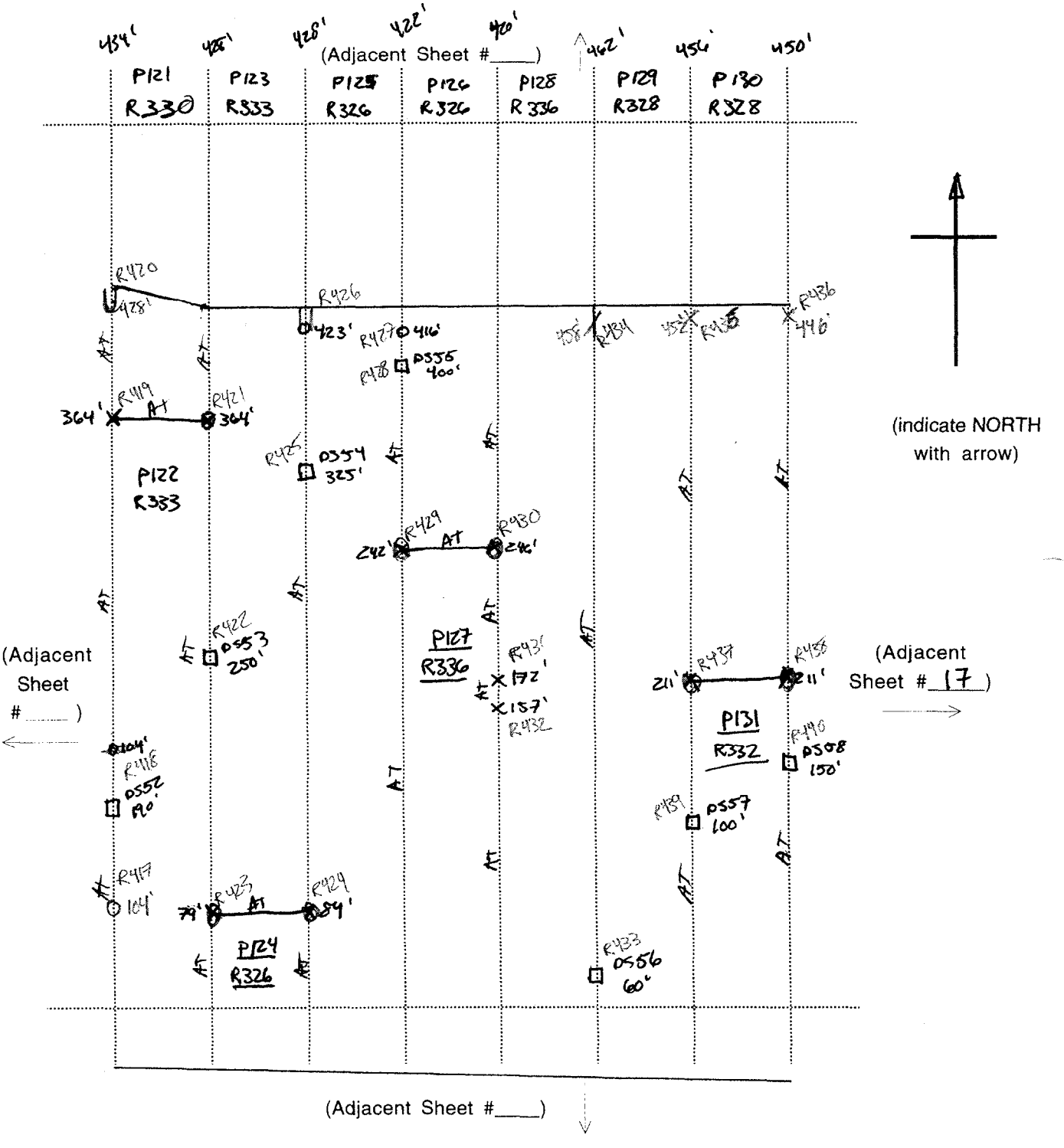
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/16/99

Project Name: NorFolkcD Project No.: 1584 Sheet No.: 16



X - REPAIRS — - DESTRUCT R - ROLL NO.

0 - PATCH ⊙ - BOOT P - PANEL NO.

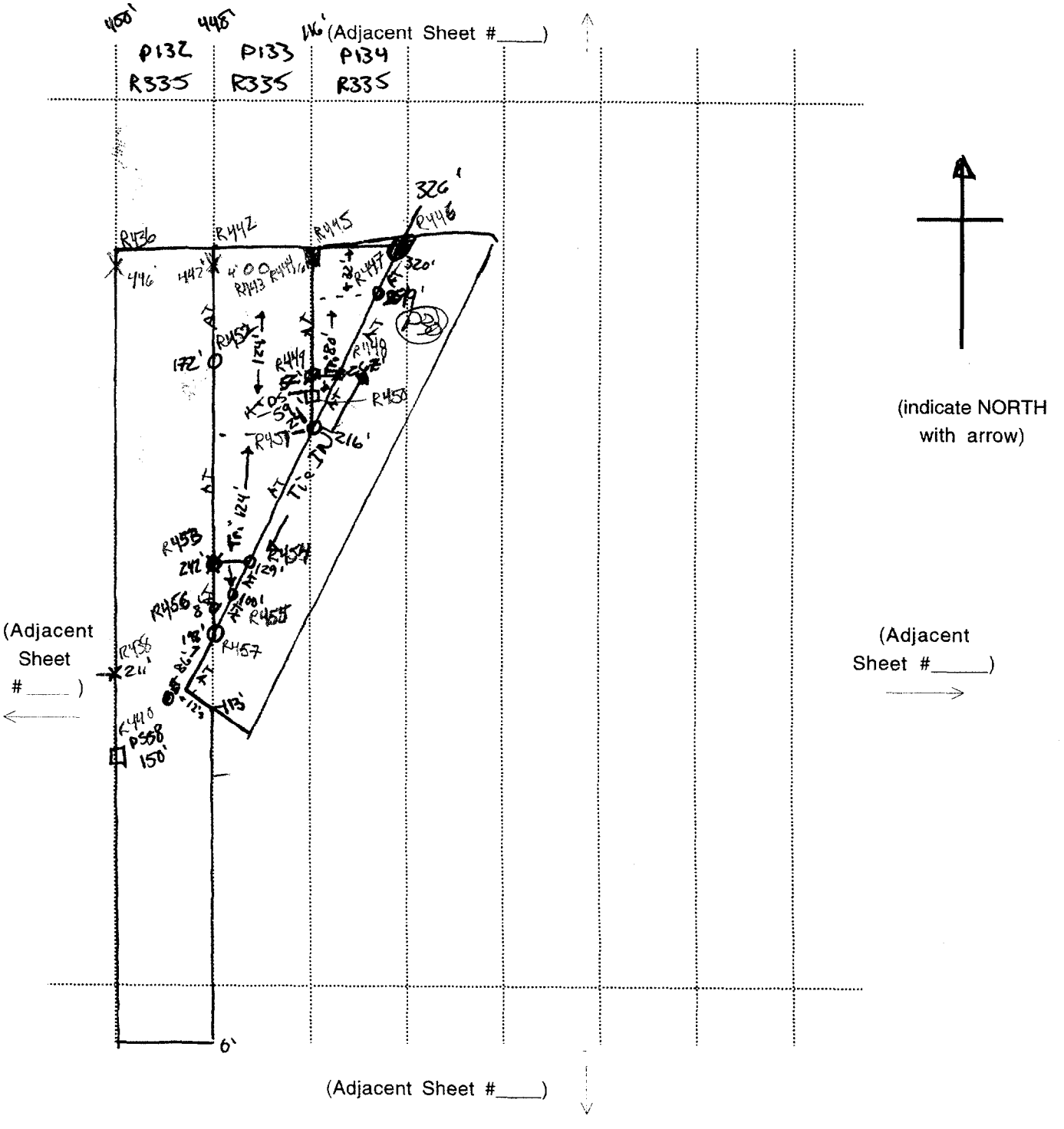
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/16/99

Project Name: NORFOLK CD Project No.: 1584 Sheet No.: 17



X - REPAIRS ☐ - DESTRUCT R - ROLL NO.

0 - PATCH ⊙ - BOOT P - PANEL NO.

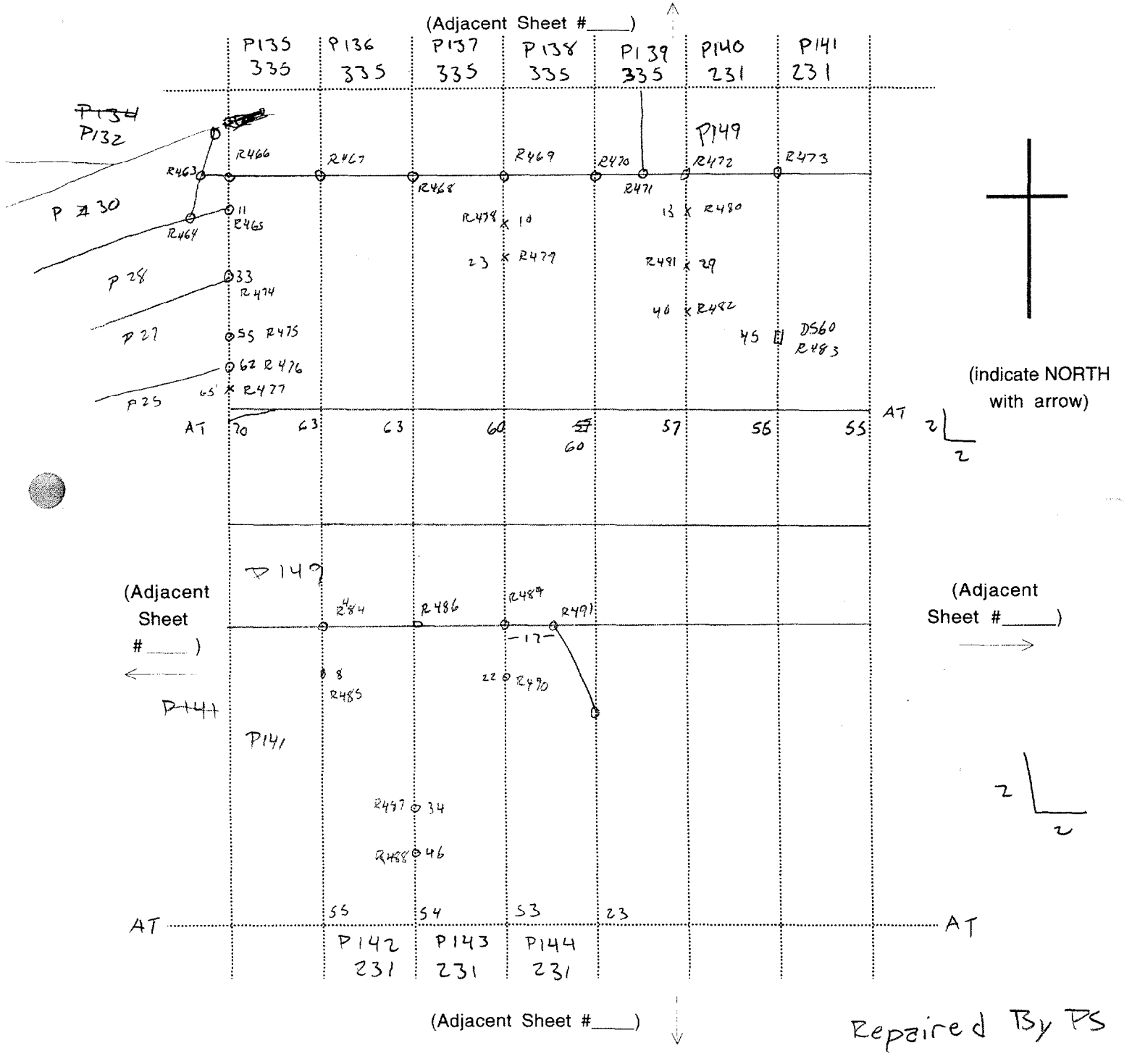
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8-24

Project Name: Norfolk Project No.: 1584 Sheet No.: 18



Repaired By PS

X - REPAIRS ☐ - DESTRUCT R - ROLL NO.

0 - PATCH ⊙ - BOOT P - PANEL NO.

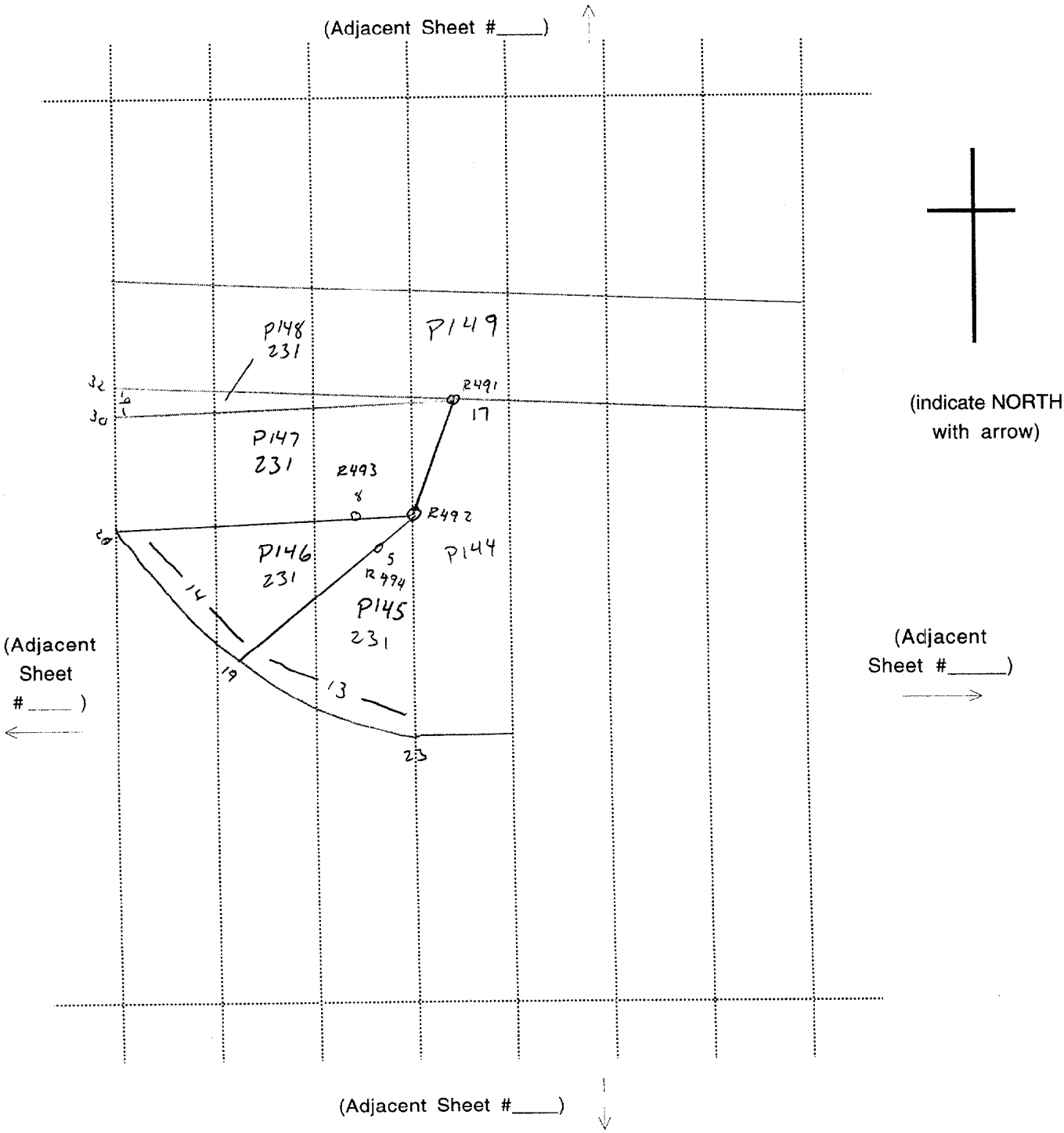
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8-24

Project Name: Norfolk Project No.: 1584 Sheet No.: 19



X - REPAIRS — DESTRUCT — R - ROLL N0.

0 - PATCH — BOOT — P - PANEL NO.

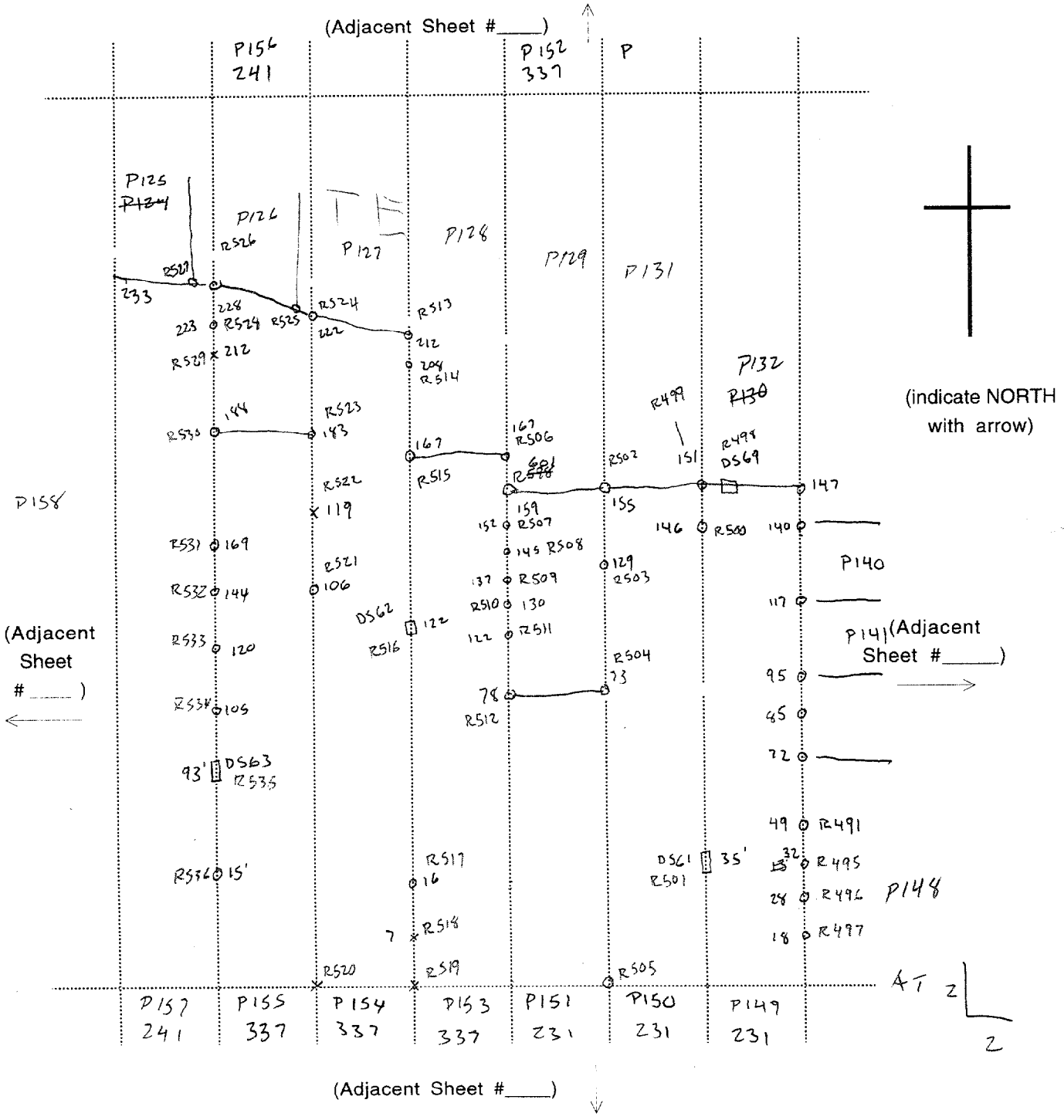
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8-24

Project Name: Norfolk Project No.: 1584 Sheet No.: 20



X - REPAIRS ▭ - DESTRUCT R - ROLL NO.

0 - PATCH ⊙ - BOOT P - PANEL NO.

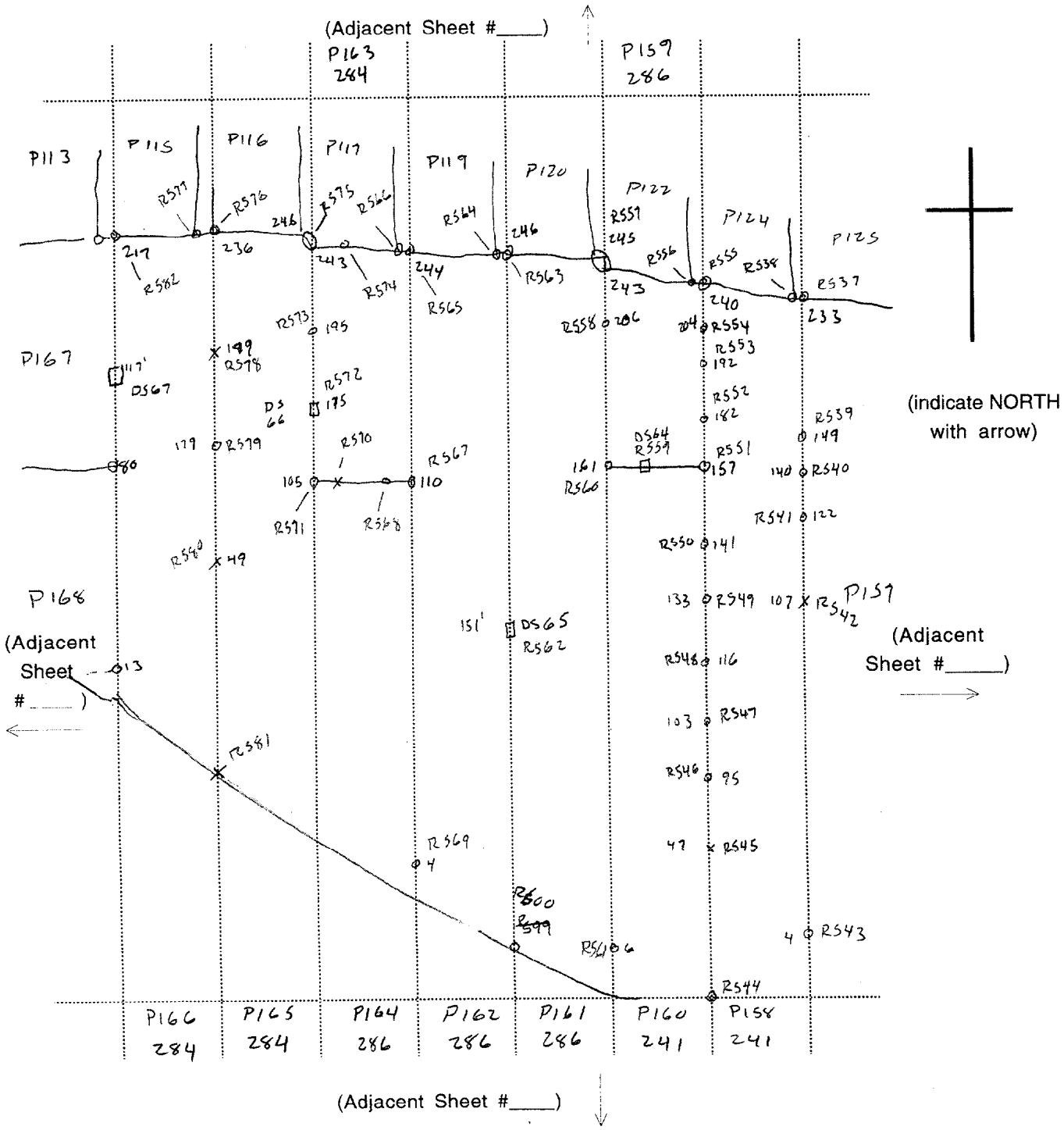
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8-24

Project Name: Norfolk Project No.: 1584 Sheet No.: 7



X - REPAIRS - DESTRUCT R - ROLL NO.

0 - PATCH - BOOT P - PANEL NO.

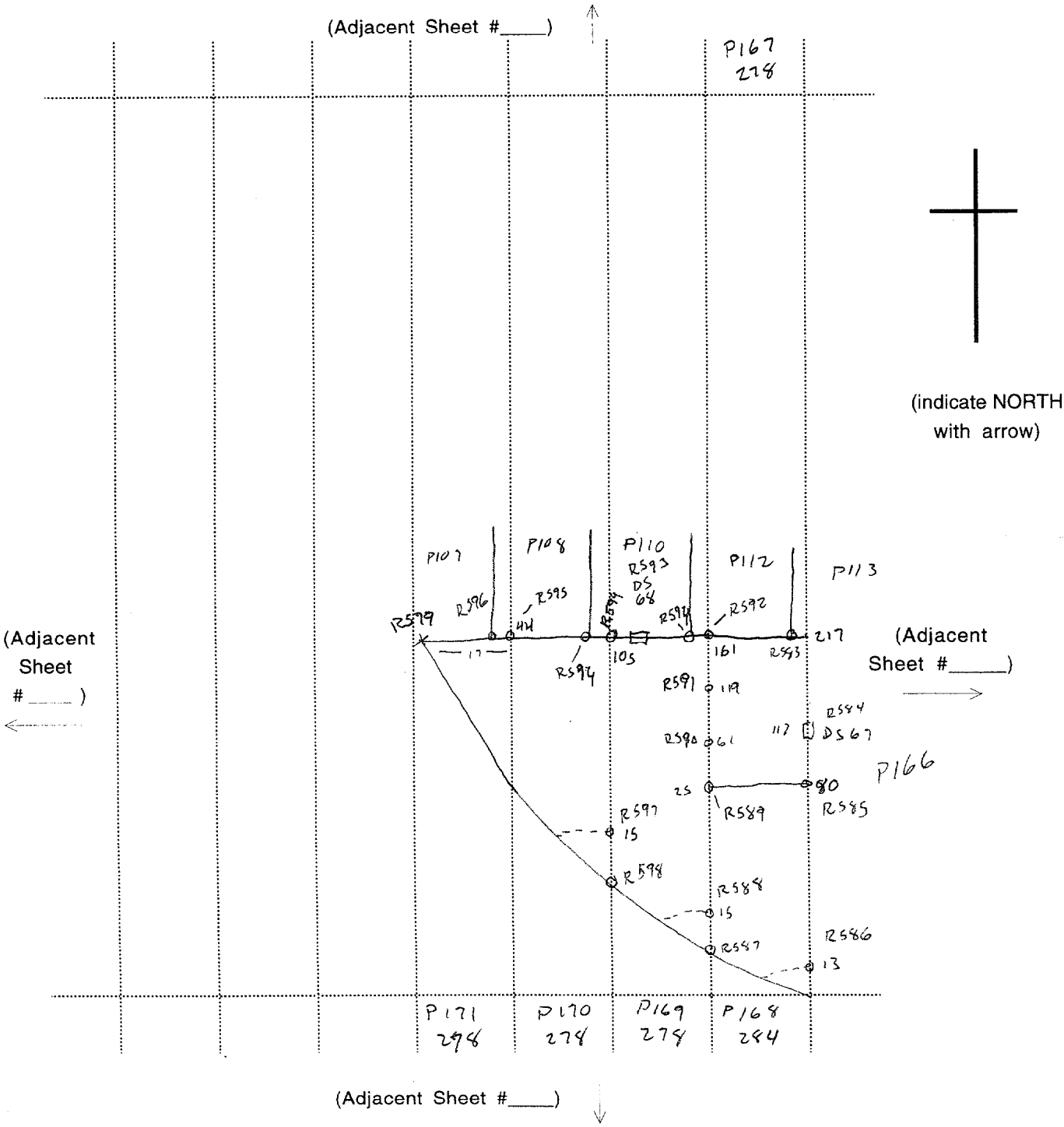
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8-24

Project Name: Norfolk Project No.: 1584 Sheet No.: 22



X - REPAIRS ☐ - DESTRUCT R - ROLL N0.

0 - PATCH ⊙ - BOOT P - PANEL NO.

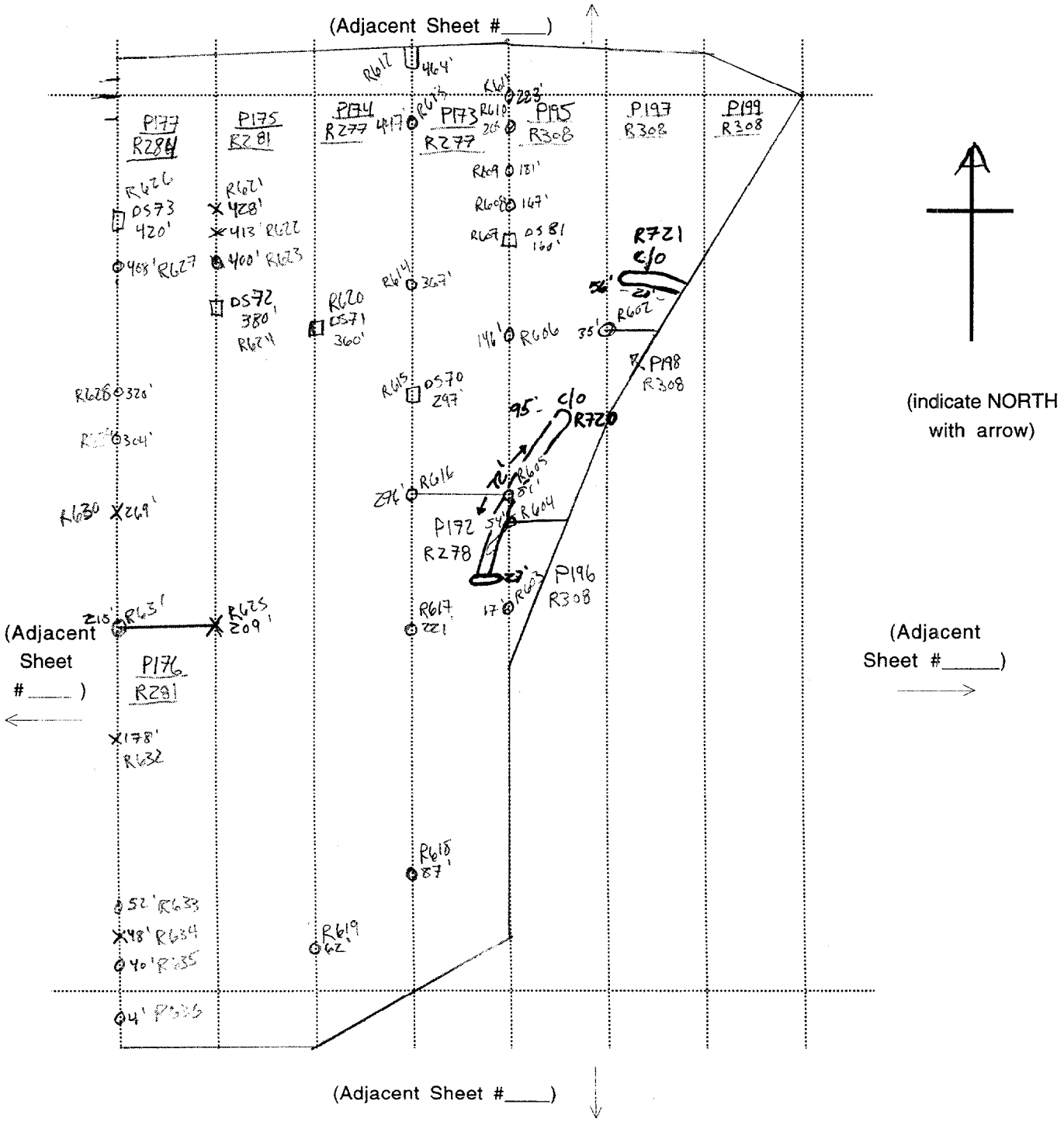
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/28/99

Project Name: NORFolk cD Project No.: 1584 Sheet No.: 23



X - REPAIRS ▭ - DESTRUCT R - ROLL N0.

0 - PATCH ⊙ - BOOT P - PANEL NO.

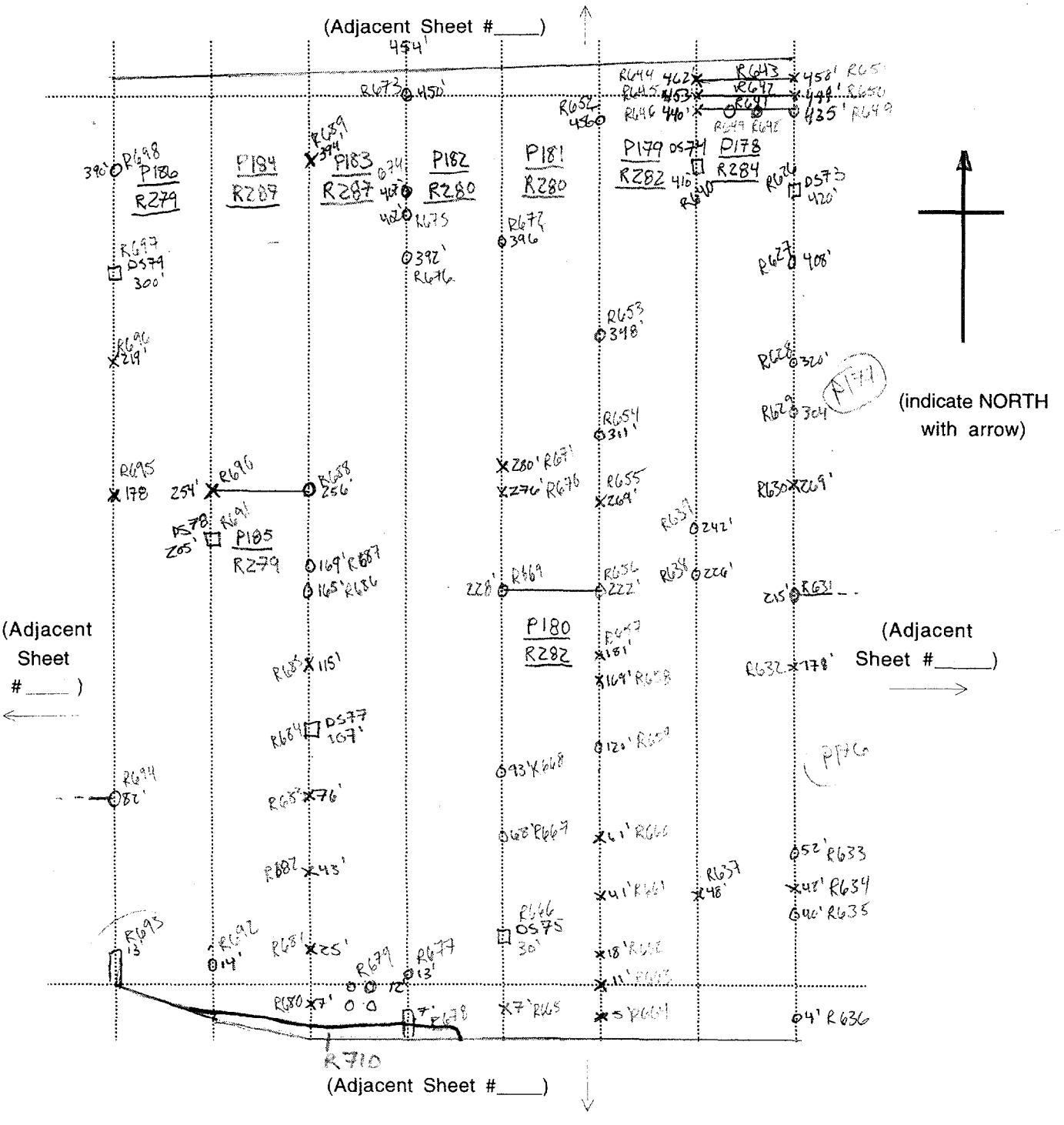
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/28/99

Project Name: NORFOLKCD Project No.: 1584 Sheet No.: 24



X - REPAIRS □ - DESTRUCT R - ROLL NO.

0 - PATCH ⊙ - BOOT P - PANEL NO.

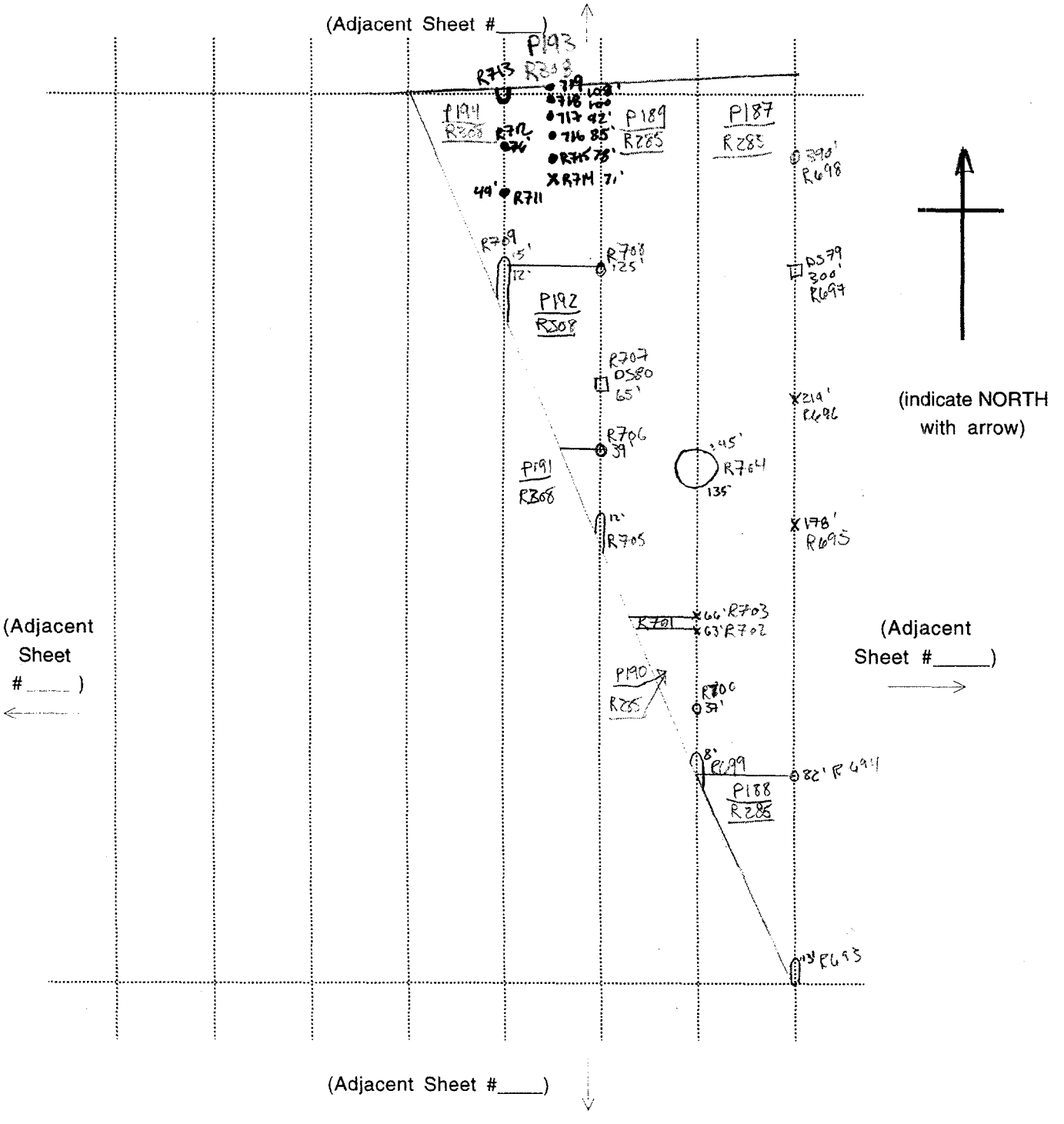
6/13/96

GeoPacific Lining Inc.

DAILY PANEL LAYOUT

Date Installed: 8/28/99

Project Name: NORFOLK CD Project No.: 1584 Sheet No.: 25



X - REPAIRS - DESTRUCT R - ROLL N0.

0 - PATCH - BOOT P - PANEL NO.

6/13/96

GeoPacific Lining Inc.

DAILY TRIAL WELD LOG / END OF SEAM D.S.

PROJECT: Norfolk PROJECT NO.: 1584 Pg. 4 of

DATE / TRIAL NO.	OPERATOR / MACHINE	AMB	TEMP SPD	Seam No.	PEEL	PEEL	SHEAR	FTB Y/N	P/F
7/27	Am SK HS #1	70°	750°/6.0		66 65	62 76	76		P
7/27	Am PS ext #1	70°	450°/300°		[illegible]	62 64	66		P
7/27	pm PS ext #1	85°	420°/300°		64 66		68		P
7/28 Am	SK HS #2	80°	750°/6.0		65 63	65 67	79		P
7/28 pm	SK HS #2	87°	750°/6.0		68 64	64 68	76		P
7/28 pm	ext PS #1	87°	420°/300		64 60		69		P
8/2 Am	HS SK #2	75°	750°/6.0		63 70	65 65	71		P
8/2 pm	ext PS #1	89°	400°/350°		68 70		79		P
8/3 pm	PS # ext 1	85°	400°/350°		64 69		73		P
8/9 am	SK #2 HS	74°	600/5.0		67 69	67 63	77		P
8/9 pm	SK #2 HS	78°	750/6.0		63 64	64 65	76		P
8/10 Am	SK HS #2	75°	750°/6.0		66 64	66 65	73		P
8/10 Am	SP ext #2	75°	450°/350°		59 64		70		P
8/10 pm	SK HS #2	85°	750°/6.0		62 66	64 61	72		P
8/10 pm	ext SP # 1	85°	400°/300°		59 59		69		P
8/11 Am	JJ ext #1	75°	410°/310°		58 64		69		P
8/11 pm	JJ ext #1	85°	410°/310°		59 59		70		P

Comments:

GeoPacific Lining Inc

DAILY TRIAL WELD LOG / END OF SEAM D.S.

PROJECT: Norfolk CD PROJECT NO.: 1584 Pg. 2 of

DATE / TRIAL NO.	OPERATOR / MACHINE	AMB	TEMP SPD	Seam No.	PEEL	PEEL	SHEAR	FTB Y/N	P/F
8/12 AM	JJ ext#1	75°	450°/300		64 63		72		P
8/12 PM	JJ ext#1	85°	450/300		62 63		70		P
8/13 AM	SK HS#2	75°	750°/6.0		63 68	67 66	71		P
8/13 AM	RS HS#1	75°	750°/6.0		57 63	62 62	65		P
8/13 PM	SK HS#1	85°	750°/6.0		61 67	66 63	77		P
8/16 AM	SK HS#2	70°	750°/6.0		69 67	69 68	73		P
8/16 AM	Ricky HS#10	70°	750/6.5		64 68	64 66	77		P
8/16 AM	RC HS #8	70°	750/6.5		66 66	70 75	78		P
8/16 PM	Ricky HS#10	85°	750°/6.5		65 67	70 69	76		P
8/16 PM	SK HS#2	85°	750°/6.0		66 67	63 66	73		P
8/16 PM	RC HS#8	85°	750°/6.0		63 66	65 67	70		P
8/16 PM	SK ext 2	85°	400°/300°		61 63	57 60	70		P
8/17	SK EXT2	68	450/350		61 68	59 53	76		P
8/18 AM	SK EXT2	95°	450/350		64 64	55 59	70		P
8/18 AM	P.S EXT2	95°	450/350		66 64	63 64	71		P
8/18 PM	SK ext#2	85°	450°/350°		61 63	66 64	70		P
8/18 PM	PA ext#2	85°	450°/350°		60 63	66 64	74		P

Comments:

GeoPacific Lining Inc.

DAILY TRIAL WELD LOG / END OF SEAM D.S.

PROJECT: Norfolk PROJECT NO.: 1584 Pg. 3 of

DATE / TRIAL NO.	OPERATOR / MACHINE	AMB	TEMP SPD	Seam No.	PEEL	PEEL	SHEAR	FTB Y/N	P/F
8-19 AM	SK EX #2		450°-350° ~~350°-4~~		64 58	64	70		P
8-24 Am	SK ~~KS~~ # 2		750°-6		68 59	62 61	72/76		
"	KS # 7		750°-6		70 64	64 78	72/76		
"	TC # 10		750°-5.5		60 64	~~54~~ 59 68	80/78		
8-24 PM	SK #2		750°-6		64 55	68 71	72/54		
"	KS #~~10~~ 7		750°-7		66 62	72 63	77/62		
~~PS~~ "	PS x #2		450°-330		62	52	73/69		
8/26 Am	PS ext #2		450°350°		60 62		70		P
8/26 Am	JH ext #1		450°/350°		63 61		73		P
8-26 Pm	JH x # 1		455/350°		58 62	62	68/72		
"	PS x # 2		400/350°		61 59	63	70/71		
8/27	JH ext #1		4[illegible]/3[illegible]°		[illegible] 61		70		P
8/28	RS HS#7		750°/6.0		63 60	60 66	72		P
8/28	SK HS#2		700°/6.0		[illegible] 58	61 65	76		P
8/28	RC HS#~~7~~		8[illegible]°/6.0		58 62	65 62	72		P
8/28	RS HS#1		750°/6.0		60 61	58 60	71		P
8/28	PA ext #2		350°/~~485~~°		61 60		70		P

Comments:

8/28	RP ext #1	~~455~~/350°	63/61		71	P
8/30	~~PS~~ ext #2	450°/~~350~~°	63/60		73	P

GeoPacific Lining Inc.

DAILY TRIAL WELD LOG / END OF SEAM D.S.

PROJECT: NORFOLK CD PROJECT NO.: 1584 Pg. 4 of

DATE / TRIAL NO.	OPERATOR / MACHINE	AMB	TEMP SPD	Seam No.	PEEL	PEEL	SHEAR	FTB Y/N	P/F
9/14	JH Ext #2		470°/370°		76 74		80		P
9/22	JH Ext #2		470°/370°		80 78		82		P
9/23 AM	JH Ext #2		470°/370°		76 78		82		P
9/23 PM	JH Ext #2		470°/370°		72 77		80		P
9/24 AM	JH ext #2		470°/370°		79 76		81		P

Comments:

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CD Project No.: 1584

Pg. 1 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
7/22	1/2	SK	1	750°/6.0	7/22	SRM	30	30	P
7/22	2/3	SK	1	750°/6.0	7/22	SRM	30	30	P
7/22	3/4	BS	2	750°/6.0	7/22	SRM	31	30	P
7/22	3/4	BS	2	750°/6.0	7/22	SRM	31	30	P
7/22	4/5	BS	2	750°/6.0	7/22	SRM	30	29	P
7/22	4/5	BS	2	750°/6.0	7/22	SRM	31	30	P
7/22	4/5	BS	2	750°/6.0	7/22	SRM	31	30	P
7/22	4/5	BS	2	750°/6.0	7/22	SRM	31	30	P
7/22	5/6	BS	2	750°/6.0	7/22	SRM	31	30	P
7/22	5/6	BS	2	750°/6.0	7/22	SRM	30	28	P
7/23	6/7	SK	1	750°/6.0	7/23	SRM	30	29	P
	7/8						30	28	P
	6/8						30	29	P
	6/8						31	30	P
	6/8						31	30	P
	8/9						31	29	P
	8/9						31	30	P
	8/9						31	30	P
7/23	89	SK	1	750°/6.0	7/23	SRM	30	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CA Project No.: 1584

Pg. 2 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
7/23	9/10	SK	1	750°/6.0	7/23	SRM	32	30	P
	10/12						31	29	
	10/11						31	30	
	10/11						30	30	
	11/12						30	30	
	12/13						30	30	
	12/13						31	31	
	12/13						31	29	
	11/13						31	30	
	13/14						32	30	
	13/14						31	30	
	14/16						30	28	
	14/16						30	28	
	14/15						28	28	
	15/16						30	30	
	16/17						30	30	
	16/17						28	28	
	16/17						28	28	
7/23	17/18	SK	1	750°/6.0	7/23	SRM	29	29	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CO Project No.: 1584

Pg. 3 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
7/26	17/19	SK	1	750°/6.0	7/26	SRM	30	28	P
	18/19						30	29	
	19/20						30	30	
	18/20						31	29	
	20/21						31	30	
	21						~~28~~	28	
	21/22						31	29	
	21/23						~~28~~	28	
7/26	22/23	SK	1	750°/6.0	7/26	SRM	30	30	P
7/27	22/24	SK	1	750°/6.0	7/27	SRM	30	30	P
	23/24						30	29	
	23/24						31	29	
	23/24						31	30	
	23/24						31	31	
	23/24						31	31	
	23/24						30	30	
	23/24						31	29	
	22/24						30	30	
7/27	24/25	SK	1	750°/6.0		SRM	30	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CD Project No.: 1584

Pg. 4 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
7/27	24/25	SK	1	750°/6.0	7/27	SRM	31	29	P
	24/26						31	30	
	25/26						31	30	
	25/27						30	29	
	25/27						31	30	
	25/27						31	31	
	25/27						30	30	
	26/27						30	30	
							31	29	
							31	30	
							31	30	
							30	30	
	26/27						31	31	
	27/28						31	30	
	27/28						31	30	
	27/28						31	30	
	27/28						30	30	
	28/29						30	30	
7/27	27/29	SK	1	750°/6.0	7/27	SRM	30	29	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CD Project No.: 1584

Pg. 5 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
7/27	27/29	SK	1	750°/6.0	7/27	SRM	30	30	P
	27/29						30	30	
	27/29						30	30	
	28/30						30	28	
							31	29	
							31	30	
							30	30	
	28/30						31	30	
	29/30						31	30	
							31	29	
							30	29	
7/27	29/30	SK	1	750°/6.0	7/27	SRM	30	30	P
7/28	31/32	SK	1	750°/6.0	7/28	SRM	30	30	P
7/28	32/33	SK	1	750°/6.0	7/28	SRM	30	30	P
	33/34						31	30	
	34/35						30	29	
	35/36						30	30	
	36/37						30	30	
7/28	37/38	SK	1	750°/6.0	7/28	SRM	30	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CO Project No.: 1584

Pg. 6 of ____

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
7/28	36/38	SK	1	750°/6.0	7/28	SRM	30	29	P
	36/38						31	31	
	38/39						31	30	
	39/40						30	30	
	39/40						31	30	
	40/41						30	30	
	39/41						30	29	
	41/42						30	29	
	40/42						31	29	
	42/43						31	30	
	42/43						30	30	
	43/44						30	30	
	43/44						30	29	
	44/45						31	30	
	44/46						30	29	
	45/46						30	29	
	46/47						30	30	
	46/47						31	30	
7/28	45/47	SK	1	750°/6.0	7/28	SRM	31	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CD Project No.: 1584

Pg. 7 of ____

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
7/28	47/48	SK	1	750°/6.0	7/28	SRM	30	30	P
7/28	47/48	SK	1	750°/6.0	7/28	SRM	31	30	P
7/28	48/49	SK	1	750°/6.0	7/28	SRM	31	30	P
8/2	50/51	SK	2	750°/6.0	8/2	SRM	31	29	P
	52/53						30	28	
	53/54						28	28	
	54/55						30	30	
	55/56						31	30	
	56/57						30	28	
	57/58						28	28	
	58/59						30	30	
	59/60						28	28	
	T1/51	52					30	30	
		53					28	28	
		54					30	28	
		55					30	30	
		56					30	30	
		57					30	30	
8/2	T1/51	58	SK	2	750°/6.0	8/2	SRM	31	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk cb Project No.: 1584

Pg. 8 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/2	T151/59	SK	2	750° /6	8/2	SRM	30	30	P
8/2	T151/60	SK	2	750°/6	8/2	SRM	30	30	P
8/9	61/63	SK	2	750°/6.0	8/10	SRM	30	30	P
	61/63						31	30	
	61/62						30	30	
	62/63						31	30	
	64/65						30	30	
	63/64						30	30	
	63/65						30	30	
	63/66						31	30	
	65/66						30	30	
	65/67						31	30	
	66/67						31	30	
	↕						30	30	
							31	30	
	66/67						30	30	
	67/68						30	29	
	67/68						30	30	
8/9	67/68	SK	2	750°/6.0	8/10	SRM	31	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CO Project No.: 1584

Pg. 9 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/9	67/68	SK	1	750°/6.0	8/10	SRM	31	29	P
	67/68						30	30	P
	67/69						31	30	
	67/69						30	30	
	68/69						30	30	
	68/70						30	30	
	68/70						31	30	
	69/70						31	30	
	69/71						30	30	
	70/71						30	30	
	71/72						30	29	
	70/72						30	30	
							31	30	
							31	30	
							30	30	
							30	30	
	70/72						30	30	
	72/73						31	29	
	72/74						31	29	
8/9	73/74	SK	2	750°/6.0	8/10	SRM	30	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CD Project No.: 1584

Pg. 10 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/9	73/75	SK	2	750°/6.0	8/10	SRM	30	30	P
8/10	75/76						30	30	
	73/76						31	29	
	74/76						31	30	
	74/77						31	31	
	76/77						30	30	
	76/78						31	29	
	76/78						31	29	
	77/78						30	30	
	77/78						30	30	
	78/79						31	30	
	78/79						31	30	
	78/79						30	30	
	79/81						30	30	
							31	29	
							31	30	
							31	30	
	79/81						31	30	
8/10	80/81	SK	2	750°/6.0	8/10	SRM	30	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CD Project No.: 1584

Pg. 11 of ____

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/10	79/80	SK	2	750°/6.0	8/10	SRM	31	29	P
	80/82						30	30	
	80/82						30	30	
	81/82						31	29	
	82/83						30	30	
	81/83						31	30	
	81/83						30	30	
	81/83						31	29	
	83/85						31	29	
	83/85						31	30	
	83/84						31	29	
	84/85						30	30	
	82/84						31	29	
	84/86						30	29	
	85/86						31	30	
	85/86						30	30	
	85/87						31	30	
	85/87						30	30	
8/10	86/87	SK	2	750°/6.0	8/10	SRM	30	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CD Project No.: 1584

Pg. 12 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/10	87/88	SK	2	750°/6.0	8/10	SRM	30	30	P
8/10	86/88	SK	2	750°/6.0	8/10	SRM	31	29	P
8/13	88/89	SK	2	750°/6.0	8/13	SRM	31	30	P
	88/89						30	30	
	88/89						31	30	
	89/91						31	29	
	89/90						31	29	
	90/91						30	30	
	90/92						31	30	
	90/92						31	31	
	91/93						31	29	
	91/93	SK	2				31	29	
	92/93	SK	1				30	30	
	93/94						31	29	
	93/95						30	30	
	94/95						30	30	
	92/94						31	30	
	92/94						31	30	
8/13	92/94	SK	1	750°/6.0	8/13	SRM	31	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CD Project No.: 1584

Pg. 13 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/13	92/94	SK	1	750°/6.0	8/13	SRM	30	30	P
							31	29	
							31	29	
	92/94						30	30	
	95/96						31	30	
	94/96						31	30	
	94/96						31	30	
	94/96						31	30	
	94/96						31	30	
	94/96	SK	1				31	30	
	94/96	BS	2				31	30	
	96/98						30	30	
	96/98						30	29	
	96/98						31	30	
	97/98						30	30	
8/13	96/97	BS	2	750°/6.0	8/13	SRM	31	30	P
8/16	98/99	SK	2	750°/6.0	8/16	SRM	31	31	P
8/16	98/99	SK	2	750°/6.0	8/16	SRM	31	31	P
8/16	98/100	SK	2	750°/6.0	8/16	SRM	30	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: NORFOLK CD Project No.: 1584

Pg. 14 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/16	98/100	SK	2	750°/6.0	8/16	SRM	31	30	P
8/16	99/100	RS	10	750°/6.5	8/16	SRM	30	30	P
8/16	99/101	RS	10	750°/6.5	8/16	SRM	31	29	P
8/16	100/101	RS	10	750°/6.5	8/16	SRM	31	30	P
8/16	100/102	RS	10	750°/6.5	8/16	SRM	30	30	P
8/16	101/103	RC	8	750°/6.5	8/16	SRM	31	29	P
	102/103	RC	8	750°/6.5			30	30	
	103/104	RS	10	750°/6.5			31	30	
	103/105	RS	10	750°/6.5			31	30	
	104/105	SK	2	750°/6.0			30	30	
	104/106	RC	8	750°/6.5			30	30	
	104/107						30	30	
	104/107						31	29	
	105/107						30	30	
	105/107						30	30	
	105/107						31	30	
8/16	105/107	RC	8	750°/6.5	8/16	SRM	31	29	P
8/16	106/107	SK	2	750°/6.5	8/16	SRM	30	30	P
8/16	106/108	RS	10	750°/6.5	8/16	SRM	30	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: NORFOLK CD Project No.: 1584

Pg. 15 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/16	107/108	RS	10	750°/6.5	8/16	SRM	31	30	P
8/16	108/109	SK	2	750°/6.0	8/16	SRM	30	30	P
8/16	108/110	SK	2	750°/6.0	8/16	SRM	31	30	P
8/16	109/110	SK	2	750°/6.0	8/16	SRM	30	30	P
	109/111	RC	8	750°/6.5			31	30	
	110/111						31	30	
	110/111						31	30	
	110/112						30	30	
	111/112	RC	8	750°/6.5			30	30	
	111/113	RS	10	750°/6.5			31	30	
	112/113	RS	10	750°/6.5			30	30	
	113/114	SK	2	750°/6.0			31	30	
	113/115	SK	2	750°/6.0			31	30	
	114/115	RC	8	750°/6.5			30	30	
	114/116	RS	10	750°/6.5			31	30	
	115/116	RS	10	750°/6.5			31	31	
	116/117	SK	2	750°/6.5			31	30	
	117/118	RS	10	750°/6.5			31	30	
8/16	117/119	RS	10	750°/6.5	8/16	SRM	31	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: NORFOLK CD Project No.: 1584

Pg. 16 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/16	118/119	RC	8	700°/6.5	8/16	SRM	30	30	P
8/16	118/120	RC	8	750°/6.5	8/16	SRM	31	30	P
	119/120	RC	8	750°/6.5			30	30	
	119/120	RC	8	750°/6.5			31	31	
	119/120	RC	8	750°/6.5			30	30	
	120/121	RS	10	750°/6.5			30	30	
	120/122	RS	10	750°/6.5			31	30	
	120/122	RS	10	750°/6.5			31	30	
	121/122	SK	2	750°/6.0			30	30	
	121/123	SK	2	750°/6.0			30	30	
	122/123	SK	2	750°/6.0			31	30	
	122/124	SK	2	750°/6.0			30	30	
	122/124	SK	2	750°/6.0			30	30	
	123/124	RS	10	750°/6.5			30	30	
	123/125	RC	8	750°/6.5			31	30	
	124/125	RC	8	750°/6.5			30	30	
	125/126	RS	10	750°/6.5			31	31	
	125/127	RS	10	750°/6.5			31	30	
8/16	126/127	RC	8	750°/6.5	8/16	SRM	30	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk CD Project No.: 1584

Pg. 17 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/16	126/128	RC	8	750°/6.5	8/16	SRM	31	30	P
8/16	126/128	RC	8	750°/6.5	8/16	SRM	31	30	P
	127/128	RC	8	750°/6.5			31	30	
	127/128	RC	8	750/6.5			31	31	
	127/128	RC	8	750°/6.5			31	30	
	128/129	RS	10	750°/6.5			31	30	
	129/130	RC	8	750°/6.5			31	30	
	129/131	RC	8	750°/6.5			31	30	
	130/131	RS	10	750°/6.5			30	30	
	130/132	RS	10	750°/6.5			30	29	
8/16	131/132	RS	10	750°/6.5	8/16	SRM	31	30	P
8/16	Ti 132/30	RC	8	750°/6.5	8/17	SRM	31	29	P
	Ti 132/133	RC	8	750°/6.5			30	30	P
	Ti 132/133	RC	8	750°/6.5			30	30	
	Ti 132/133	RC	8	750°/6.5			31	30	
	Ti 133/134	RS	10	750°/6.5			31	30	
	Ti 133/134	RS	10	750°/6.5			31	30	
	Ti 133/30	RC	8	750°/6.5			31	30	
8/16	Ti 133/30	RC	8	750°/6.5	8/17	SRM	30	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk Project No.: 1584

Pg. 18 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8-24	135-?	SK	2	750°-6	8-24	RP	30	29	P
	148-149						31	30	
	"						34	34	
	149-144						30	29	
	149-143						34	34	
	149-142						32	32	
	"						30	30	
	141-149						30	29	
	149-140						30	30	
	149-137						32	31	
	134-139						30	30	
	134-138						30	29	
	134-137						36	34	
	134-136						32	31	
	134-135						30	30	
	135-(P)						36	36	
	130-(P)						30	29	
	Tie End 135-?						30	30	
	Tie end 135-?						32	32	

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: ~~B~~ Norfolk Project No.: 1584

Pg. 19 of ____

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8-24	149-150	KS	7	750°-6	8-24	RP	30	30	P
	136-137	"	7	750°-6			31	30	
	137-138	SK	2	"			30	30	
	"	"	"				32	32	
	138-139	~~SK~~ KS	7				30	28	
	140-139	SK	2				30	28	
	"	↓	↓				31	28	
	"	↓	↓				32	32	
	141-140	KS	7				30	30	
	141-142	SK	2				32	32	
	142-143	SK	2				30	28	
	143-144	KS	7				32	32	
	"	"	"				31	31	
	145-144	SK	2				32	30	
	145-146	SK	"				32	32	
	146-147	"	"				30	30	
	147-148	SK	"				30	30	
	144-147	KS ~~SK~~	7				30	30	
	149-150	KS	7				30	30	

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk Project No.: 1584

Pg. 20 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8-24	150-151	KS	4	750°-6	8-24	RP	35	35	P
	152-151	KS					30	29	
	150-152	KS					30	30	
	150-152	KS					32	31	
	152-153	KS					31	31	
	151-153	KS					30	30	
	151-153	KS					35	35	
	153-154	KS					36	35	
	153-154	KS					34	33	
	154-155	KS					32	32	
	154-155	KS					35	35	
8-24	154-156	KS			8-25	RP	32	31	
	155-156	KS					36	36	
	156-157	SK					30	30	
	155-157	"					36	36	
	155-157	"					30	30	
	"	"					35	35	
	"	"					30	29	
	"	"					30	30	

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk Project No.: 1584

Pg. 21 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8-24	155-157	SK	2	750° - 6	8-25	RP	30	29 ~~30~~	P
	158-157	KS	7				34	33	
	"	"	"				30	30	
	"	"	"				31	31	
	158-159	SK	2				30	30	
	"	"	"				30	30	
	156-160	KS	7				30	30	
	158-160	SK	2				32	32	
	"	"					35	34	
	"	"					34	34	
	"	"					30	30	
	161-160	KS	7				30	30	
	161-159	KS	"				34	34	
	"	"	"				30	30	
	161-162	SK	2				32	32	
	"	SK	"				31	30	
	164-162	KS	7				35	34	
	164-163	KS					32	31	
	162-163	"					32	32	

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk Project No.: 1584

Pg. 22 of ____

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8-24 ~~8-24~~	165-163	SK	7	750°-6	~~8~~ 8-25	RP	30	30	P
	"	"					31	30	
	"	"					29	29	
	164-165	"					34	34	
	166-165	SK					32	32	
	"	"					36	36	
	"	"					32	32	
	"	"					30	29	
	166-168	"					30	30	
	167-168	SK					36	36	
	168-169						33	32	
	167-168						30	30	
	167-169				8-25		32	32	
	"						32	32	
	169-170						32 ~~34~~ ~~31~~	32 ~~34~~ ~~30~~	
	"						34 ~~32~~ ~~34~~	34	
	170-171						31	30	
	171-107						32	32	
	170-108						33	33	

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: NORFOLK CD Project No.: 1584

Pg. 18 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/16	Ti 133/30	RC	8	750°/6.5	8/17	SAM	31	30	P
8/16	Ti 134/30	RS	10	750°/6.5	8/17	SAM	31	30	|
8/16	Ti 134/30	RS	10	750°/6.5	8/17	SAM	30	30	|
8/16	Ti 134/30	RS	10	750°/6.5	8/17	SAM	31	31	P
8-24	167-169	SK	2	750°-6	8-25	RP	31	30	P
	169-110	KS	7		8-26		32	31	
	167-112						36	25	
	166-113						32	32	
	165-115						32	32	
	163 116						36	36	
	162-117						42	42	
	161-119						36	36	
	159-120						30	30	
	158-122						40	40	
	157-124						36	35	
	156-125						34	33	
	154-127	SK	2				30	30	
	154-128	SK	11				34	34	
	153-128	SK	11				32	31	

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Nor Folk Project No.: 1584

Pg. 24 of

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8-24	132-129	SK	2	750°-6	8-26	RP	30	30	P
	130-131						32	31	
	131-149						32	32	
8/24	164-165						34	34	
8/28	P197-199	RS	1	750°/6	8/28	SRM	31	30	P
	195-197						31	30	P
	197-198						30	30	P
	195-198						31	30	
	173/195						31	30	
							30	30	
							31	30	
							32	31	
							30	30	
	173/195						31	30	
	172/196						30	30	
	172/196						30	30	
	172/195						31	30	
	195/196	RS	1	750°/6			30	30	
8/28	173/172	SK	2	700°/6	8/28	SRM	30	30	P

old New
PG 18+23
For Further Reference

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: Norfolk Co Project No.: 1584

Pg. 25 of ____

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/28	174/172	SK	2	700°/6.0	8/28	SRM	31	30	P
8/28	174/172	SK	2	700°/6.0	8/28	SRM	31	31	P
8/28	174/172	SK	2	700°/6.0	8/28	SRM	31	30	P
8/28	174/173	RS	1	750°/6.0	8/28	SRM	31	30	P
8/28	174/173	RS	1	750°/6.0	8/28	SRM	31	30	P
8/28	174/173	RS	1	750°/6.0	8/28	SRM	31	30	P
8/28	175/174	RC	7	750°/6.0	8/28	SRM	31	30	P
8/28	175/174	RC	7	750°/6.0	8/28	SRM	31	30	P
	175/176	SK	2	700°/6.0			31	30	
	175/177						31	30	
							30	30	
							30	30	
	175/177	SK	2	700°/6.0			30	30	
	176/178	RS	1	750°/6.0			30	30	
							31	30	
	176/178						30	30	
	177/178						31	30	
							30	30	
8/28	177/178	RS	1	750°/6.0	8/28	SRM	31	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: [illegible]/KCD Project No.: 1584

Pg. 26 of ____

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/28	177/178	RS	1	700°/6.0	8/28	SRM	30	30	P
	177/178	RS	1	700°/6.0			30	30	
	177/176	RC	7	700°/6.0			30	30	
	178/179	SK	2	700°/6.0			30	30	
							31	30	
							30	30	
							31	30	
	178/179	SK	2	700°/6.0			30	30	
	179/180						30	30	
							31	31	
							31	29	
							31	30	
	179/180	SK	2	700°/6.0			30	30	
	179/181			700°/6.0			31	30	
							31	30	
							31	30	
	179/181			700°/6.0			31	30	
	180/182	SK	2	700°/6.0			31	30	
8/28	180/182	SK	2	700°/6.0	8/28	SRM	31	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: NORECO Project No.: 1584

Pg. 27 of ____

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/28	180/182	SK	2	700°/6.0	8/28	SRM	31	30	P
	180/181	RC	7	750°/6.0			30	30	
	181/182	SK	2	700°/6.0			31	30	
							31	30	
	181/182	SK	2	700°/6.0			30	30	
	182/183	RS	1	750°/6.0			31	29	
	182/183	RS	1	750°/6.0			31	30	
	183/185	RS	1	750°/6.0			30	30	
							31	30	
							32	31	
							31	29	
							30	30	
	183/185	RS	1	750°/6.0			31	30	
	183/184	RS	1	750°/6.0			31	30	
	183/184	RS	1	750°/6.0			30	29	
	185/186	SK	2	700°/6.0			31	30	
	184/186	SK	2	700°/6.0			31	29	
	186/188	RS	1	750°/6.0			31	30	
8/28	186/187	RS	1	750°/6.0	8/28	SRM	31	30	P

GeoPacific Lining Inc.

DAILY PRESSURE TEST / WELDER

PROJECT: NORFOLK CO Project No.: 1584

Pg. 28 of ____

WELDING					PRESSURE TEST				
Date	Seam NO.	Welder	Mach. NO.	Temp. PHT Speed	Date	QC	Start	FIN.	P / F
8/28	186/187	RS	1	750°/6.0	8/28	SRM	30	30	P
							31	30	
8/28	187	RS	1	750°/6.0	8/28	SRM	31	30	P
8/28	187/188	RC	7	750°/6.0	8/28	SRM	30	30	P
8/28	187/190	RS	1	750°/6.0	8/28	SRM	31	30	P
8/28	187/190	RS	1	750°/6.0	8/28	SRM	31	30	P
8/28	184/185	SK	2	700°/6.0	8/28	SRM	30	30	P
	187/189	RS	1	750°/6.0	8/28	SRM	31	30	P
	187/189	RS	1	750°/6.0	8/28	SRM	31	30	P
	189/190						30	30	
	189/190						30	30	
	189/191						31	30	
	189/192						31	30	
	189/193						30	30	
	192/193						31	31	
8/28	193/194	RS	1	750°/6.0	8/28	SRM	30	30	P

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk CD

Project No.: 1584

Pg. 1 of

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
7/22	1	P.S.	1	SN 1/2 (4' (P))	7/26	SRM	P
	2			SN 1/2 (63' (P))			
	3			SN 1/2 (67'-75' (P))			
	4			SN 2/3 (1'-4' Bead)			
	5	P.S.	1	SN 2/3 (8' (P))			
	6			SN-2/3 (44'-54' (P))			
	7			SN-2/3/RG (44'-48' ext DS1)			
	8			SN-2/3 (64' (P))			
	9			SN-2/3 (71' (P))			
	10	PS	1	SN-2/3 (78' (P))			
	11	JJ	2	SN-2/3 (84' (P))			
	12			SN-3/4 (7' (P))			
	13			SN-3/4 (69' (P))			
	14			SN-3/4 (72' (P))			
	15			SN-3/4 (81' (P))			
	16	JJ	2	SN-3/4 (87' (P))			
	17	PS	1	SN-4/5 (17' — (P))			
	18	PS	1	SN 4/5 (35'-40' (P))			
	19	JJ	2	SN 4/5 (47' (P))			
	20	JJ	2	SN 4/5 (52' Bead)			
7/22	21	JJ	2	SN 4/5 (59' (P))	7/26	SRM	P

(P): patch

T = Bead

X = Bead

QA Signature:

Date:

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFOLK

Project No.: 1584

Pg. 2 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
7/22	22	JJ	2	SN 4/5 (70'-76' (P))	7/26	SRM	P
	23			SN 4/5 (84' DSZ)			
	24			SN 4/5 (102' (P))			
	25			SN 4/5 (109' (P))			
	26			SN 4/5 (117' (P))			
7/22	27	JJ	2	SN - 5/6 (120' (P))			
7/23	28	BS	2	SN 3/4 (106'-112' At (P))			
7/23	29	BS	2	SN - 4/5 (126'-130' At (P))			
7/25	30	BS	2	SN 5/6 (132'-140' At (P))			
7/23	31	BS	2	SN 5/6 (7' Bead)			
7/23	32	BS	2	SN 4/5 (0'-3' Bead)			
7/23	33	JJ	1	SN-5/7 (7' (P))			
	34			SN-5/7 (10' (P))			
	35			SN-5/7/6 (25' (P))			
	36			SN-7/8 (5' (P))			
	37			SN-7/8 (8' (P))			
	38			SN-7/8 (25' X Bead)			
	39			SN-6/7/8 (31' (P))			
	40			SN-6/8 (104' (P))			
	41			SN-6/8 (119' (P))			
7/23	42	JJ	1	SN-6/8 (128' (P))	7/26	SRM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFOLK CO

Project No.: 1584

Pg. 3 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
7/26	43	PS.	1	SN-3/4 (30' DS 4)	7/26	SRM	P
	44			SN-4/5/R22 (DS 3 70'-73')			
	45			SN-8/9 (33' P)			
	46			SN-8/9 (97' X Bead)			
	47			SN-8/9 (107 DS5)			
	48			SN-8/9 (152' P)			
	49			SN8/9 (163' P)			
	50			SN 9/10 (190' P)			
	51			SN 9/10 (50' X Bead)			
	52			SN-10/12 (7' P)			
	53			SN 10/12 (14' P)			
	54			SN 12/13 (7' P)			
	55			SN 12/13 (23' P)			
	56			SN-12/13 (26' P)			
	57			SN-12/13 (32' P)			
	58			SN-12/13 (37 P)			
	59			SN-12/13 (48' P)			
	60			SN 12/13 (59' P)			
	61			SN-12/13 (72' P)			
	62			SN-12/13 (116' P)			
7/26	63	PS	1	SN-12/13 (122' P)	7/26	SRM	P

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk c.o

Project No.: 1584

Pg. 4 of

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
7/26	64	PS	1	SN 12/13 (128' P)	7/26	SRM	P
	65	SK	2	SN 12/13 (133' DS6)			
	66	SK	2	SN-12/13 (142' X Board)			
	67	SK	2	BS 12/13/11 (148' P)			
	68	SK	2	BS-10/11/12 (14:' P)			
	69	PS	1	SN-10/11 (170' P)			
	70			SN-10/11 (195' P)			
	71			SN-10/11 (205' P)			
	72			SN-11/13 (200' P)			
	73			SN-13/14 (230' P)			
	74			SN-13/14 (207' P)			
	75			SN-13/14 (202' P)			
	76			SN-13/14 (196' P)			
	77	PS	1	SN-13/14 (176' P)			
	78	SK	2	SN-13/14 (143' P)			
	79			SN-13/14 (136' P)			
	80			SN-13/14 (121' P)			
	81			SN 14/16 (156' DS7)			
	82			SN-14/16 (182' P)			
	83	SK	2	BS-14/16/15 (187' P)			
7/26	84	SK	2	SN-14/15 (202' X Board)	7/26	SRM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk CD

Project No.: 1584

Pg. 5 of

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
7/26	85	SK	2	SN-14/15 (207' X Bead)	7/26	SRM	P
	86			SN-14/15 (220' X)			
	87			SN-14/15 (223' (R))			
	88			SN-14/15 (229' (R))			
	89			SN-14/15 (238' (R))			
	90			SN-15/17 (235' (R))			
	91			SN 15/17 (229' (R))			
	92			SN 15/17 (221' (R))			
	93			SN-15/17 (211' (R))			
	94			SN-15/17 (207' (R))			
	95			BS 15/16/17 (196' (R))			
	96			SN 16/17 (146' (R))			
	97			SN 16/17 (103' (R))			
	98			SN 16/17 (97' (R))			
	99			SN 14/16 (0-4' X Bead)			
	100			SN-17/18 (DS8 202')			
7/26	101	SK	2	SN-17/18 (259' (R))			
7/26	102	SK	2	SN-14 (mid panel 282' (R))			
7/26	103	SK	2	BS-15/16 (mid panel (R))			
7/26	104	PS	1	SN-17/19 (8' (R))			
7/26	105	PS	1	SN-17/18/19 (75' (R))	7/26	SRM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk CD

Project No.: 1584

Pg. 6 of

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
7/26	106	PS	1	BS- 19/18/20 (79' P)	7/26	SRM	P
	107			SN- 18/20 (84' P)			
	108			SN- 18/20 (94' X)			
	109			SN- 20/21 (154' X)			
	110			SN- 20/21 (175' OS9)			
	111			SN- 20/21 (237' P)			
	112			SN- 21/22/23 (252' P)			
7/26	113	PS	1	SN- 21/23 (10' P)	7/26	SRM	P
7/27	114	PS	1	SN- 24 (24' P)	7/28	SRM	P
	115			SN- 23/24 (26' P)			
	116			SN- 23/24 (33' X)			
	117			(115' X)			
	118			(140' X)			
	119			(157' P)			
	120			(175' P)			
	121			(180' OS10)			
	122			(187' X)			
	123			SN- 23/24 (217' P)			
	124			SN- 23/22/24 (26' P)			
	125			SN- 22 (263' P)			
7/27	126	PS	1	SN- 24/26 (316' P)	7/28	SRM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk CD

Project No.: 1584

Pg. 7 of

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
7/27	127	PS	1	SN-24/26 (312' P)	7/28	SRM	P
	128			(306' P)			
	129			(297' X)			
	130			(293' X)			
	131			(290' X)			
	132			SN-24/26 (289' X)			
	133			SN-~~25~~/24/26 (132' BS P)			
	134			SN-24/25 (66' P)			
	135			SN-24/25 (27' P)			
	136			SN-25/27 (34' P)			
	137			(52' DS 11)			
	138			(75' P)			
	139			(108' P)			
	140			SN-25/27 (126' P)			
	141			SN-25/27/26 (133' P)			
	142			SN-26/27 (205' P)			
	143			(209' P)			
	144			(219' P)			
	145			(249' P)			
	146			(253' P)			
7/27	147	PS	1	SN 26/27 (274' P)	7/28	SRM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk CD

Project No.: 1584

Pg. 8 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
7/27	148	PS	1	SN-26/27 (284' X)	7/28	SRM	P
	149			(290' P)			
	150			(304' X)			
	151			(315' X)			
	152			SN-26/27 (372' P)			
	153			SN 27/29 (308' P)			
	154			(303' P)			
	155			(296' P)			
	156			(261' Boot)			
	157			(224' X)			
	158			(216' X)			
	159			(208' P)			
	160			(185' P)			
	161			SN-27/29 (183' P)			
	162			SN-27/28/29 (171' P)			
	163			SN 27/28 (162' X)			
	164			(135' X)			
	165			(103' P)			
	66			(24' P)			
	167			SN 27/28 (22' P)			
7/27	168	PS	1	SN 28/30 (24' P)	7/28	SRM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk CO

Project No.: 1584

Pg. 4 of

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
7/27	169	PS	1	SN 28/30 (43' P)	7/28	SRM	P
	170			SN 28/30 (59' P)			
	171			SN - 28/30 (114' P)			
	172			BS - 28/29/30 (168' P)			
	173			SN - 29/30 (209' P)			
	174			(216' P)			
	175			(266' DS12)			
	176			(290' P)			
	177			(304' P)			
7/27	178	PS	1	SN - 29/30 (315' P) in HT			
7/27	179	PS	1	SN - 25 (Big patch (Subgrade) mid panel 20')	7/28	SRM	P
7/28	180	PS	1	SN - 31/32 (4' P)	8/3	SRM	P
7/28	181	PS	1	32/33 (5' X)			
	182	SK HS#	1	33/34 (9'x15' Hot wedged-triangle)			
	183	PS	1	33/34/RIB2 (63' P)			
	184			34/35 (5' P)			
	185			35/36 (5' Bead X)			
	186			35/36 (20' DS13)			
	187			35/36/37 (114' X)			
	188			36/37/38 (114' P)			
7/28	189	PS	1	SN 36/38 (20' P)	8/3	SRM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NwFdK CP

Project No.: 1584

Pg. 10 of

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
7/28	190	PS	1	SN - 36/38 (16' (P))	8/3	SRM	P
	191			SN - 39/40/41 (133' X)			
	192			SN - 39/40 (116' (P))			
	193			SN - 39/40 (105' (P))			
	194			SN - 39/40 (108' DS14)			
	195			SN - 39/40 (4' (P))			
	196			SN - 40/42 (4' (P))			
	197			SN - 40/42/41 (133' (P))			
	198			SN - 41/42 (143' X)			
	199			SN 42/43 (142' (P))			
	200			SN - 43/44 (20' (P))			
	201			SN - 43/44 (28' (P))			
	202			SN - 43/44 (39' (P))			
	203			SN - 43/44 (95' DS15)			
	204			SN - 44/46 (on 44 4' ROS 10' Boot) (P)			
	205			SN - 44/46/45 (93' X)			
	206			SN - 46/47/45 (94' (P))			
	207			SN - 46/47 (35' (P))			
	208			SN - 46/47 (32' (P))			
	209			SN - 46/47 (27' (P))			
7/28	210	PS	1	SN - 47/48 (30' DS16)	8/3	SRM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk CD

Project No.: 1584

Pg. 11 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
7/28	211	PS	1	SN-47/48 (42' (P))	8/3	SRM	P
	212			SN-48/49 (5' (P))			
	213			SN-48/49 (8' (P))			
7/28	214	PS	1	SN-48/49 (12' (P))			
8/2	215	PS	1	SN-50/51 (100' DS17)			
	216			Ti-51/52/53 (23' (P))			
	217			51/53/54 (46' (P))			
	218			51/54/55 (69' (P))			
	219			51/55/56 (92' (P))			
	220			51/56/57 (115' (P))			
	221			51/57/58 (138' (P))			
	222			51/58/59 (161' (P))			
	223			Ti 51/59/60 (184' (P))			
8/2	224	PS	1	SN 59/60 (20' (P))			
8/2	225	PS	1	SN 56 (midpanel 30' (P))	8/3	SRM	P
8/2	226	PS	1	SN 56 (midpanel 39' (P))	8/3	SRM	P
8/2	227	PS	1	SN 55/56 (25'-X 4' LOS)	8/3	SRM	P
8/2	228	PS	1	SN-57 (midpanel 21' (P))	8/3	SRM	P
8/2	229	PS	1	SN-60 (midpanel 14' (P))	8/3	SRM	P
8/3	230	PS	1	SN 14/15 (223'-[illegible] (P) Cap Patch)	8/3	SRM	P
8/3	231	PS	1	SN 20 (+ADD on- 220-[illegible] 2nd Peice)	8/3	SRM	P

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk CD

Project No.: 1584

Pg. 12 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
8/3	232	PS	1	SN-20/21 (cup patch 263'-265 (P))	8/3	SRM	P
8/3	233	PS	1	SN-18/20 (Bond to patch on 20-268'-278)	8/3	SRM	P
8/10	234	PS	1	SN-20/21 (8' (P))	8/10	SRM	P
8/10	235	PS	1	-ADD ON- SN 60/59/51 (West + South side of Panel 60 Anchor trench Peice)	8/10	SRM	P
8/12	236	JJ	1	SN-61/63 (0'-4' AT (P))	8/12	SRM	P
	237			SN-61/63 (26' DS18)			
	238			SN-61/63/62 (141' (P))			
	239			SN 63/64/65 (241' (P))			
	240			SN 63/65/66 (211' (P))			
	241			SN 66 midpanel (203' (P))			
	242			(196' (P))			
	243			(188' (P))			
	244			(180' (P))			
	245			(176' (P))			
	246			SN 66 midpanel (168' (P))			
	247			SN 66/67 (37' DS19)			
	248			SN 67 (44'-4' East-S (P))			
	249			SN 67 (68'-4' East of Seam (P))			
	250			SN 66/67 (108' (P))			
	251			SN-66/67 (131' (P))			
8/12	252	JJ	1	SN 66/67 (135' (P))	8/12	SRM	P

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFOLK CD

Project No.: 1584

Pg. 13 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
8/12	253	JJ	1	SN-66/67 (160' P)	8/12	SRM	P
	254			SN-66/67 (169' P)			
	255			SN-66/67 (174' P)			
	256			SN-66/67 (178' P)			
	257			SN-66/67/65 (214' P)			
8/12	258	JJ	1	SN-65/67/R266 (320' P)	8/12	SRM	P
8/11	259	~~JJ~~	1	SN-68/R267 387' P	8/11	SRM	P
8/11	260	JJ	1	SN-R267/68 (382' P)	8/11	SRM	P
8/11	261	JJ	1	SN-R267/68 (376' P)	8/11	SRM	P
8/12	262	JJ	1	SN-67/68 (328' P)	8/12	SRM	P
	263			SN 67/68 (307' P)			
	264			SN 67/68 (346' P)			
	265			SN 67/68 (184' [illegible])			
	266			SN 68/67 (320'-EOS Tri P)			
	267			SN 67/68 (376'-[illegible] Tri P)			
	268			SN 67/68/69 (116' P)			
	269			SN 67 (4' WOS - 87' P) West of Seam			
	270			SN 67 (4' WOS - 64' P)			
	271			SN 67 (4' WOS - 48' P)			
	272			SN 67/69 (23' P)			
8/12	273	JJ	1	SN-69/70/71 ([illegible]' P)	8/12	SRM	P

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk CO

Project No.: 1584

Pg. 14 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
8/12	274	JJ	1	SN 71/70/72 (38' (P))	8/12	SRM	P
8/12	275			SN 69/70/68 (122' (P))	8/12	SRM	P
8/11	276			SN 68/70 (359' OS 21)	8/11	SRM	P
8/11	277			SN 68/70/R278 (41' (P))			
8/11	278			SN 68/70 (411'-EOS TN (P))			
8/11	279			SN 70/72 (449'-EOS TN (P))			
8/11	280			SN 70/72/R279 (449' (P))			
8/11	281			SN 72/73 (477-EOS TN (P))			
8/11	282			SN 72/72 (477' (P))	8/11	SRM	P
8/12	283			SN 72/73/74/200' (P)	8/12	SRM	P
8/12	284			SN-74/72/76 (262' (P))			
8/12	285			SN 74/77 (0523 15')			
8/11	286			SN 73/76/75 (491' (P))			
8/12	287			SN-74/76/77 (122 (P))			
8/12	288			SN 77/78 (0524 14')			
8/12	289			SN 77/78 (18' (P))			
8/12	290			SN 77/76/78 (123' (P))	8/12	SRM	P
8/11	291			SN 76/77 (450' (P))	8/11	SRM	P
8/11	292			SN 76/78 (526' (P))			
8/11	293			SN 78/R336 (midpoint (P))			
8/11	294	JJ	1	SN 78/79/R336 (518' (P))	8/11	SRM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk D

Project No.: 1584

Pg. 15 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
8/12	295	JJ	1	SN - 78/79 (125' (P))	8/12	SPM	P
	296			SN 78/79 (0525 60')			
	297			SN 78/79 (Accon (P) P28 2-4')			
	298			SN - 79/81 (5' (P))			
	299			SN - 79/81 (24' (P))			
	300			SN - 79/81 (0526 50')			
8/12	301	JJ	1	SN - 79/81 (86' (P))	8/12	SPM	P
8/11	302	JJ	1	SN - 79/81 ([illegible] (P))	8/11	SPM	P
	303			SN - 79/81 ([illegible] (P))			
	304			SN - 79/81 ([illegible] (P))			
	305			SN - 79/80 ([illegible] (P))			
	306			[illegible]			
	307			SN 79/80 (540' (P))			
	308			SN 80/82 (567' (P))			
	309			SN 80/82 (560' (P))			
	310			SN 80/82 (530' (P))			
	311			SN 80/82 (494' (P))			
	312			SN 80/82 (485' (P))			
	313			SN 80/82/82 (468' (P))			
	314			SN 80/82 ([illegible])			
8/11	315	JJ	1	SN - 80/82 ([illegible] (P))	8/11	SPM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: [illegible]

Project No.: 1584

Pg. 16 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
8/12	316	JS	1	SN 81/83 (318' P)	8/12	SRM	P
8/12	317	JJ	1	SN 81/83 (289' P)	8/12	SRM	P
8/11	318	JS	1	SN 83/85 (193' P)	8/11	SRM	P
	319			SN 83/85/84 (229' P)			
	320			SN 82/83/84 (359' P)			
	321			SN 82/84 (DS29 375')			
	322			SN-84/86 (556'-605 P)			
	323			SN 84/86 (549' P)			
	324			SN 84/86 (534' P)			
	325			SN 86/88 (DS32-535')			
	326			SN 84/85/86 (233' P)			
	327			SN 85/86 (129' P)			
	328			SN 85/86 (121' P)			
	329			SN 85/86 (DS30 100')			
	330			SN 85/86/87 (92' P)			
	331			SN 86/87/88 (93' P)			
	332			SN 85/87 (21' P)			
	333			SN 85/87 (6' P)			
	334			SN 87/88 (DS31-35')			
	335			SN 87/88 (7' P)			
8/11	336	JS	1	SN 78/79 (Triangle 543'-605 P)	8/11	SRM	P

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk CD

Project No.: 1584

Pg. 17 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
8/12	337	JJ	1	SN-63 (45' midpanel (P))	8/12	SRM	P
8/12	338	|	|	SN-66 (78' midpanel (P))	|	|	|
8/12	339			SN-66 (15 Bead Scattered 168'-203')			
8/12	340	JJ	1	SN-70/72 (54' DS22)	8/12	SRM	P
8/12	341	JJ	1	SN-6 (midpanel 180' (P))	8/12	SRM	P
8/10	342	PA	1	SN-57 (End of Seam-ADDON 0'-4' Ext-Atpeico)	8/10	SRM	P
8/16	343	SK	2	SN-88/89 (470' DS33)	8/18	SRM	P
	344			SN 88/89 (157' (P))			
	345			SN 88/89 (143' (P))			
	346			SN 89/90 (416' DS34)			
	347			SN 89/90/91 (406' (P))			
	348			SN 90/92 (407' (P))			
	349			SN 90-92 (372' DS35)			
	350			SN 90/92/94 (372' T-Bead)			
	351			SN 92/94 (484' (P))			
	352			SN 92/94 (406' (P))			
	353			SN 92/94 (369' (P))			
	354			SN-92/94 (358' (P))			
	355			SN-92/94 (390' DS36)			
	356			SN 92/94 (318' (P))			
8/16	357	SK	2	SN 92/94 (309' (P))	8/18	SRM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFOLK CD

Project No.: 1584

Pg. 18 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
8/16	358	SK	2	SN 92/94 (288' P)	8/18	SRM	P
	359			SN 92/93/94 (233' P)			
	360			SN 93/94/95 (51' T-Bead X)			
	361			SN 94/95/96 (54' P)			
	362			SN-94/96 (95' BD-X)			
	363			SN-94/96 (100' BD-X)			
	364			SN 94/96 (320' DS 37)			
	365			SN-94/96 (239' P)			
	366			SN 94/96 (347' P)			
	367			SN 94/96 (353' P)			
	368			SN 94/96 (458' P)			
	369			SN 94/96 (465' P)			
	370			SN 94/96 (488' P)			
	371			SN 96/97/98 (358' P)			
	372			SN 97/98/99 (357 P) W TOC			
8/16	373	SK	2	SN 97/98 (16' Right P)			
8/18	374	SK	2	SN 96/98 (310' DS38)			
	375			SN 96/98 (188' P)			
	376			SN 96/98 (75' BD-X)			
	377			SN 98/100 (110' P)			
8/18	378	SK	2	SN 98/100 (149' P)	8/18	SRM	P

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFOLK CO

Project No.: 1584

Pg. 19 of

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
8/18	379	SK	Z	SN 98/99/100 (153' BD-X)	8/18	SRM	P
8/17	380			SN 98/99 (DS39 310')			
8/17	381			SN 97/98/99 (357' P)			
8/17	382			SN 99/101 (320' DS40)			
8/18	383			SN 99/100/101 (153' BD-X)			
8/18	384			SN - 100/101/102 (38' BP-X)			
8/18	385			SN-101/102/103 (40' BD-X)			
8/17	386			SN-101/103 (DS41-345')			
8/17	387			SN-103/104 (380' DS42)			
8/17	388			SN-103/104/105 (218' BD-X)			
8/17	389			SN-104/106 (425' DS43)			
8/17	390			SN-104/105/106 (416' BD-X)			
8/17	391			SN-104/107 (404' P)			
8/17	392			SN-104/105/107 (247' BD-X)			
8/17	393			SN 105/107 (225' BD-X)			
8/17	394			SN 105/107 (207' BD)			
8/18	395			SN 105/107 (77' P)			
8/18	396			SN 107/108 (10' P)			
8/17	397			SN 107/108/106 (427' BD-X)			
8/17	398			SN 106/108 (DS44-448')			
8/17	399	SK	Z	SN 108/109/110 (295' P)	8/18	SRM	P

QA Signature: _____

Date: _____

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFolk CP

Project No.: 1584

Pg. 20 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
8/17	400	SK	2	SN 109/110/111 (295' - BD = X)	8/18	SRM	P
8/18	401			SN 110/111 (112' P)			
	402			SN 110/111/112 (49' X)			
	403			SN 110/112 (25' DS 45)			
	404			SN 112/111/113 (49' X)			
8/18	405			SN 111/113 (75' DS 46)			
8/17	406			SN 113/114/115 (255' P)			
8/17	407			SN 114/115/116 (255' P)			
8/18	408			SN 113/115 (125' DS 47)			
8/18	409			SN 115/116 (175' DS 48)			
8/17	410			SN 116/117 (DS 49 · 275')			
8/17	411			SN 117/118 (325' DS 50)			
8/18	412			SN 117/118/119 (191' X)			
8/18	413			SN 118/119/120 (194' X)			
8/18	414			SN 119/120 (178' P)			
8/18	415			SN 119/120 (DS 51 - 125')			
8/18	416			SN 119/120 (45' P)			
8/18	417			SN 120/122 (104' P)			
8/18	418			SN 120/122 (190' DS 52)			
8/17	419			SN 120/121/122 (364' X)			
8/17	420	SK	2	SN 120/121 (428' - 80 S P)	8/18	SRM	P

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFOLKCO

Project No.: 1584

Pg. 21 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
8/17	421	SK	2	SN-121/122/123 (364' P)	8/18	SRM	P
8/18	422			SN-122/123 (250' DS53)			
8/18	423			SN-122/123/124 (79' P)			
8/18	424			SN-123/124/125 (84' P)			
8/17	425			SN 123/125 (325' DS54)			
8/17	426			SN 123/125 (423'-EOS P)			
8/17	427			SN 125/126 (416' P)			
8/17	428			SN 125/126 (400' DS 55)			
8/17	429			SN 125/126/127 (242' P)			
8/17	430			SN 126/127/128 (246' P)			
8/18	431			SN-127/128 (172'-X)			
8/18	432			SN-127/128 (157'-X)			
8/18	433			SN 128/129 (DS56-60')			
8/17	434			SN-128/129 (458'-EOS X)			
8/17	435			SN 129/130 (452'-EOS X)			
8/17	436			SN 130/132 (446'-EOS X)			
8/17	437			SN 129/130/131 (211'-P)			
8/17	438			SN 130/131/132 (211' P)			
8/18	439			SN 129/131 (100'-DS 57)			
8/18	440			SN 131/132 (DS58-150')			
8/17	441	SK	2	SN 132/133 (442'-EOS BD X)	8/18	SRM	P

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFOLK CD

Project No.: 1584

Pg. ZZ of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location (Note Type of Repair)	Date	QC	P / F
8/17	442	SK	2	SN 132/133 (442'-EOS-X)	8/18	SRM	P
8/17	443			SN 133 (442'-4' east (P))			
8/17	444			SN 133 (442'-midpoint (P))			
8/17	445			SN 133/134 (110'-EOS (P))			
8/17	446			Ti SN 134/30 (320'-EOS (P))			
8/17	447			Ti - 134/30 (299' (P))			
8/17	448			Ti - 134/Ti/30/26' (P)			
8/17	449			SN-133/134/Ti (52' (P))			
8/18	450			SN 133/134 (24' EOS59)			
8/18	451			Ti - 133/134/30 (216' (P))			
8/18	452			SN-132/133 (172' (P))			
8/18	453			Bottom of P32 to North SN-132/133 (242' (P))			
8/18	454			Ti SN-133/30/Ti (129' (P))			
8/18	455			Ti - 133/30 (100' (P))			
8/18	456			SN-132/133 (8' (P))			
8/18	457			SN 132/133/30 (P8' North 86' NE (P))			
8/18	458			SN-79/80 (510'-530' CAP1)			
8/18	459	SK	2	SN 86/88 (510'-563' EOS, CAP2)	8/18	SRM	2
8/19	460	SK	2	DS 54 B P123/125 (415')	8/19	RP	P
8/19	461	SK	2	DS-57A P129/131 910'	↓	↓	↓
8/19	462	SK	2	DS-59A P133/134 - 57 25'-57' out seam	↓	↓	↓

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk

Project No.: 1584

Pg. 23 of

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
8-24	463	PS	2	S ~~135~~ 130-132 (P)	8-26	SM	P
	464			S 30-28 (P)			
	466 ~~465~~			~~0~~ 0' P135-132 TE (P)			
	465 ~~466~~			11' from R466 on P28-35 (P)			
	467			0' EOS on P136-132 TE (P)			
	468			0' EOS on P137-132-136 TE (P)			
	469			0' EOS on P132-137-138 TE (P)			
	470			0' EOS on P132-138-139 TE (P)			
	471			0' on P132-149-139 TE (P)			
	472			0' EOS P149-139-146 (P) TE			
	473			0' EOS P149-140-141 (P) TE			
	474			33' from TE on P135-28-27 TE (P)			
	475			55' from R466 on S135-27 TE (P)			
	476			62' from R466 on S135-27-25 TE (P)			
	477			65' from R466 on S135-25 Bead TE			
	478			10' from R469 on S137-138 (B)			
	479			23' from R469 on S137-138 (B)			
	480			13' from R472 on S139-140 (B)			
	481			29' from R472 on S139-140 (B)			
	482			40' from R472 on S139-140 (B)			
	483			45' from R473 on S140-141 DS60			

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk

Project No.: 1584

Pg. 24 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
~~8-24~~	484	PS	2	0' S141-149-142 TE (P)	8-26	SM	P
	485			8' From R484 on S141-142 (P)			
	486			0' S149-142-143 TE (P)			
	487			34' S142-143 from R486 (P)			
	488			46' from R486 on S142-143 (P)			
8-25	491 ~~489~~	PS	2	TE (P) ~~0~~ 30' from AT on S149-148-147-144			
	489			0' ~~from~~ S149-143-144 (P) TE			
	490			(P) 22' from R489 on S143-144			
	492			19' from AT on S144-145-146-147			
	493			8' from R492 on S147-146 (P)			
	494			5' from R492 on S146-145 (P)			
	495			32' from AT on S149-148 (P)			
	496			28' from AT on S149-148 (P)			
	497			18' from AT on S149-148 (P)			
	499 ~~498~~			TE (P) EOS 154' from AT on S131-132-150-149			
	498 ~~499~~			TE 151' from AT OS131-149 DS69			
	500			146' from AT on S150-149 (P)			
	501			DS 61 35' from AT on S150-149			
	502			TE (P) 155' from AT on S152-150			
	503			129' from AT on S152-150 (P)			
	504			TE 73' from AT on S152-150-151 (P)			

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk

Project No.: 1584

Pg. 25 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
8-26	505	PS	2	0' AT S151-150 (P)	8-26	SM ~~RP~~	P
	506			167' from AT on S128-129-152 S153 (P) EOS TE			
	507			159' from AT on S129-152-153 TE (P)			
	508			152' from AT on 153-152 (P)			
	509			145' from AT on P153-152 (P)			
	510			137' from AT on S153-152 (P)			
	511			122' " " " " " "			
	512			78' from AT on S152-151-153			
	513			212' from AT on S127-128-154 TE (P)			
	514			208' from AT on S128-154 TE (P)			
	515			167' from AT on S128-154-153 TE (P)			
	516			122' from AT on S154-153 DS62			
	517			16' from AT on S154-153 (P)			
	518			7' from AT on S154-153 (P)			
	519			0' from AT ON S154-153 (P)			
8-26	520	JH	1	0' From AT on S154-155 (B)		RP	
	521			106' from AT on S154-155 (P)			
	522			119' from AT on S154-155 (B)			
	523			153' from AT on S154-155-156 (P)			
	524	PS	2	222' from AT on S127-156-154 (P)			
	525	PS	2	222' from AT On S126-127-156 (P)			

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk

Project No.: 1584

Pg. 26 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
8-26	526	PS	2	TE (P) 228' From At On S126-157-155	8-26	RP	P
	527	"	"	(P) 228' From AT on S125-126-157			
	528	JH	1	223' From AT on S157-156 (P)			
	529			212' From At On S157-156 (P)			
	530			188' From AT On S156-157-155 (P)			
	531			169' From At On S157-155 (P)			
	532			144' From AT on S157-155 (P)			
	533			120' From At on S157-155 (P)			
	534			105' From At on S157-155 (P)			
	535			93' From At On S157-155 DS63			
	536			15' From At On S157-155 (P)			
	537	PS	2	233' (P) ~~23~~ From At On S125-157-158			
	538	"	"	233' From At On S124-125-158 (P)			
	539	JH	1	149' From At on S157-158 (P)			
	540			140' " " " " "			
	541			122' " " " " "			
	542			107' " " " " (R)			
	543			4' " " " " (P)			
	544 ~~546~~			0' From At on S160-158 (P)			
	545			47' " " " " " (R)			
	546			95' " " " " " (P)			

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk

Project No.: 1584

Pg. 27 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
8-26	547	JH	1	103' from At on S160-158 (P)	8-26	RP	P
	548			116' from At on S160-158 (P)			
	549			133' " " " " " "			
	550			141' " " " " " "			
	551			157' from At on S160-158-159 (P)			
	552			182' from At on S159-158 (P)			
	553			192' from At on S159-158 (P)			
	554			204' " " " " " (P)			
	555	PS	2	240' " " " S159-158-124 TE (P)			
	556	"	"	240' from At On S122-124-159 TE (P)			
	557	"	"	243' from At on S120-122-159-161 TE (P)			
	558	JH	1	206' from At on S160-159 (P)			
	560 ~~559~~			161' from At on S159-161-160 (P)			
	559 ~~560~~			161' from At on S159-160 DS64			
	561			6' from At on S161-160 (P)			
	562			151' from At on S162-161 DS65			
	563	PS	2	246' from At on S120,162,161 (P)			
	564			246' from At on S119-120-162 (P)			
	565			244' from At on S164,162,119 (P)			
	566			244' from At on S117,119,163 (P)			
	567	JH	1	110' from At on S163,162,164 (P)			

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk

Project No.: 15824

Pg. 28 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
8-26	568	JH	1	16' from At on S 163, 164 ~~10'~~ 2' from RS67 (P)	8-26	RP	P
	569			4' from At on S164, 162 (P)			
	570			105' from At on S 163, 164 2' from R571 (B)			
	571			105' from At on S164-163, 165 (P)			
	572			175' from At on S 165-163 DS66			
	573			195' from At on S 165-163 (P)			
	574	PS	2	2' from RS75 (P) 243' from At on S117-165, 163			
	575	"	"	TE (P) 246' from At on S116, 117, 165, 163			
	576	"	"	236' from At on S116, 166, 165 (P)			
	577	"	"	236' from At on S115, 116, 166 (P)			
	578	JH	1	189' from At on S166, 165 (B)			
	579			179' " " " " " (P)			
	580			49' " " " " " "			
	581			0' " " " " " (B)			
	582	PS	2	217' from At on S167, 166, 115 (P)			
	583	"	"	217' from At on S112, 113, 167 (P)			
	584	JH	1	117' from At on S 167, 166 DS67			
	585			80' from At on S167, 166, 168 (P)			
	586			13' from At on S168, 166 (P)			
	587			0' from At on S169, 168 (P)			
	588			15' from At on S169, 168 (P)			

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk

Project No.: 1384

Pg. 29 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
8-26	589	JH	1	25' from At on S167, 168, 169 TE (P)	8-26	RP	P
	590			61' from At on S169, ~~18~~ 168 (P)			
	591			119' " " " " " "			
	592	PS	2	161' from At on S169-167, 112 TE (P)			
	594 ~~593~~			161' from At on S110, 112, 169 (P)			
	593 ~~594~~			~~4~~ 4' from RS94 105' from At on S110, 169 DS68			
	595			44' from At on S171, 170, 108 TE (P)			
	596			44' from At on S107, 108, 171 TE (P)			
	597			15' from At on S170, 169 (P)			
	598			0' from At on S170, 169 (P)			
	599			0 from At S171, 107 (R)			
	600	JH	1	0' from At S162, 161			
	601	JH	1	159' from At S129, 152, 153 (P)			
7/30	602	PS	2	SN195/198/197 (35' (P))	8/30	SRM	P
	603			SN 172/196 (17' (P))			
	604			SN 172/196/195 (54' (P))			
	605			SN 172/173/195 (81' (P))			
	606			SN 173/195 (146' (P))			
	607			SN 173/175 (RS31-160')			
	608			SN 173/175 (167' (P))			
8/30	609	PS	2	SN 173/175 (181' (P))	8/30	SRM	P

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: Norfolk CD

Project No.: 1584

Pg. 30 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
8/30	610	PS	2	SN 173/195 (205' (P))	8/30	SRM	P
8/30	611	PS	2	SN 173/195 (223' (P))	8/30	SRM	P
8/28	612	PS	2	SN 174/173 (464-805 (P))	8/30	SRM	P
	613			SN 174/173 (447' (P))			
	614			174/173 (367' (P))			
	615			174/173 (DS70 297')			
	616			SN 173/174/172 (276' (P))			
	617			172/174 (221' (P))			
	618			172/174 (87' (P))			
	619			SN 174/175 (62' (P))			
	620			SN 174/175 (DS71-360')			
	621			SN 175/177 (428' X)			
	622			SN 175/177 (413' X)			
	623			SN 175/177 (400' (P))			
	624			SN 175/177 (DS72 380')			
8/28	625	PS	Z	SN 175/176/177 (209' (P))	8/30	SRM	P
9/23	626	JH	Z	SN 177/178 (0573-420')	9/23	SRM	P
8/28	627	PS	Z	SN 177/178 (468' (P))	8/30	SRM	P
	628			SN 177/178 (320' (P))			
	629			SN 177/178 (304' (P))			
8/28	630	PS	Z	SN 177/178 (269' (P))	8/30	SRM	P

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFOLK CO

Project No.: 1584

Pg. 31 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
8/28	631	PS	2	SN 177/176/178 (215' (P))	8/30	SRM	P
	632			SN 176/178 (178' X)			
	633			(52' (P))			
	634			(48' X)			
	635			(40' (P))			
8/28	636	PS	2	SN 176/178 (4' (P))			
8/28	637	RP	1	SN 178/179 (48' X)			
8/28	638	PS	2	SN 178/179 (226' (P))			
	639			(242' (P))			
	640			(DS 74-410')			
	641			SN 179/178/177 (ADD ON Xtra 435-453)			
	642			SN 179/178/177 (ADD ON Xtra 453-462)			
	643			SN 179/178/177 (ADD ON Xtra 462-EOS)			
	644			SN 179/R642/643 (462' X)			
	645			SN 179/R642/R641 (453' X)			
8/28	646	PS	2	SN 179/178/R641 (440' X)	8/30	SRM	P
9/23	647	JH	2	SN 178/R641 (440'-6' EOS (P))	9/23	SRM	P
9/23	648	JH	2	SN 178/R641 (437'-6' EOS (P))	9/23	SRM	P
8/28	649	PS	2	SN 177/178/R641 (435' (P))	8/30	SRM	
	650			SN 177/R641/R642 (449' X)			
8/28	651	PS	2	SN 177/R642/R643 (458' X)	8/30	SRM	P

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFOLK CP

Project No.: 1584

Pg. 32 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
8/28	652	PS	2	SN 179/181 (456' P)	8/30	SRM	P
	653			(348' P)			
	654			(311' P)			
	655	PS	2	SN 179/181 (269' X)			
	656	RP	1	SN 179/180/181 (222' P)			
	657			SN 180/179 (171' X)			
	658			(169' X)			
	659			(120' P)			
	660			(61' X)			
	661			(41' X)			
	662			(15' X)			
	663			(11' X)			
	664			SN 180/179 (5' X)			
	665			SN 180/182 (7' X)			
	666			(DS75-30')			
	667			(68' P)			
	668			SN 180/182 (93' P)			
	669			SN 180/181/182 (228' P)			
	670			SN 181/182 (276' X)			
	671			(280' X)			
8/28	672			SN 181/182 (396' P)	8/30	SRM	P

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFOLKCO

Project No.: 1584

Pg. 53 of _____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
8/28	673	RP	1	SN 182/183 (450' P)	8/30	SRM	P
	674			(407' P)			
	675			(402' P)			
	676			(392' P)			
	677			(13' P)			
	678			SN 182/183 (0-7' extrwld P)			
	679			SN 183 (7'-12' 4 patches mid panel)			
	680			SN 183/185 (7' X)			
	681			(25' X)			
	682			(43' X)			
	683			(76' X)			
	684			(DS77-107')			
	685			(115' X)			
	686			(165' P)			
	687			(169' P)			
	688			SN 183/184/185 (256' P)			
	689			SN 183/184 (394' X)			
	690			SN 184/185/186 (254' X)			
	691			SN 185/186 (DS78-205')			
	692			SN 185/186 (14' P)			
8/28	693	RP	1	SN 186/188 (0-13' extrwld P)	8/30	SRM	P

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFOLK CD

Project No.: 1584

Pg. 34 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
8/28	694	RP	1	SN 186/187/188 (82' P)	8/30	SRM	P
	695			SN 186/187 (178'-X)			
	696			(219'-X)			
	697			(DS79-300')			
8/28	698	RP	1	SN 186/187 (390'- P)	8/30	SRM	P
9/23	699	JH	2	SN 188/187/190 (0'-8' P) ext weld	9/23		P
8/28	700	RP	1	SN 187/190 (37' P)	8/30	SRM	P
	701	RP		SN 190/189/187 (63'-66' P) ADDIN			
	702	RP		SN 190/187/R701 (63'-X)			
8/28	703	RP	1	SN 189/187/R701 (66'-X)	8/30	SRM	P
9/14	704	JH	2	SN 187/189 (135'-145' P) 10X10	9/22	SRM	P
9/23	705	JH	2	SN 191/189 (0'-12' P) ext weld	9/23		P
	706			SN 191/192/189 (39'-P)			
	707			SN 192/189 (DS80-65')			
9/23	708	JH	2	SN 189/192/193 (125' P)	9/23		P
9/24	709	JH	2	SN 192/193/194 (0-12' P) ext weld	9/24		P
9/22	710	JH	2	SN 182 1/2 / 183 F / 185 F (4' ADDON AT)	9/22		P
9/23	711	JH	2	SN 193/194 (49' P)	9/23		P
	712			SN 193/194 (76' P)			
	713			SN 193/194 (End of Seam 205-3')			
9/23	714	JH	2	Panel 193 (mid panel 71' X)	9/23	SRM	P

6/13/96

GeoPacific Lining Inc.

REPAIR LOG

PROJECT: NORFolk CO

Project No.: 1584

Pg. 35 of ____

WELDING					VACUUM TEST		
Date	Repair NO.	Tech.	Mach. NO.	Location	Date	QC	P / F
9/23	715	JH	2	Panel 193 (midpanel 78' (P))	9/23	SRM	P
|	716	|	|	P193 (midpanel 85' (P))	|	|	|
|	717	|	|	P193 (midpanel 92' (P))	|	|	|
|	718	|	|	P193 (midpanel 100' (P))	|	|	|
9/23	719	JH	2	P193 (mid panel 108' (P))	9/23	SRM	P
9/23	720	JH	2	SN 172 C/O /173/195 (72' in swell capstrip)	9/24	SRM	P
9/24	721	JH	2	SN 197 (56' C/O 20' capstrip)	9/24	SRM	P

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 7-23-99 FILE NO: 1584

PROJECT: NORFOLK CD

SUBGRADE AREA ACCEPTED: 14,059# PANEL 1-6

LOCATION: NORTH EAST

, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS: N/A

Accepted surface conditions to be maintained by: GRACE
Company (initials of company's rep)

Supervisor: Signature DEMOND ADAMS Print Name

6/13/96

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 7-22-99 FILE NO: 1584

PROJECT: NORFOLK

SUBGRADE AREA ACCEPTED: 49,374# (64,033) PANEL 7-18

LOCATION: NORTH EAST

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS: N/A

Accepted surface conditions to be maintained by: GRACE
Company (initials of company's rep)

Supervisor: [signature]
Signature

DEMOND ADAMS
Print Name

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 7-26-98 FILE NO: 1584

PROJECT: NORFOLK CD

SUBGRADE AREA ACCEPTED: 21,376# PANEL 19 - 23
(85,409)

LOCATION: NORTH EAST

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS: N/A

Accepted surface conditions to be maintained by: GRACE
Company (initials of company's rep)

Supervisor: [signature] DEMOND ADAMS
Signature Print Name

6/13/96

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 7-27-99 FILE NO: 1584

PROJECT: NORFOLK CO

SUBGRADE AREA ACCEPTED: FML panels 24-30 Approx 36,293 Sq FT

LOCATION: NorthEast

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS: MOUND IN SUBGRADE PANEL 25
METAL & STICKS IN TRENCH

Accepted surface conditions to be maintained by: GRACE
Company (initials of company's rep)

Supervisor: [signature] DEMOND ADAMS
Signature Print Name

6/13/96

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 7-28-99 FILE NO: 1584

PROJECT: NORFOLK CD

SUBGRADE AREA ACCEPTED: up to Gas well Approx- 52,000 SqFT
Panels 31 - 49

LOCATION: South Swell Airport side

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS: NORTH A.T. DEBRIS AND METAL

Accepted surface conditions to be maintained by: GRACE
Company (initials of company's rep)

Supervisor: Signature DEMOND ADAMS Print Name

6/13/96

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 8/2/99 FILE NO: 1585

PROJECT: NORFOLK CD

SUBGRADE AREA ACCEPTED: Panels 50-60 Approx 17,550 SqFT

LOCATION: South Swell Airport Side, E-8 A & B Grids.

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS: N/A

Accepted surface conditions to be maintained by: GRACE
Company

(initials of company's rep)

Supervisor: DEMOND ADAMS
Signature Print Name

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 8/9/99 FILE NO: 1584

PROJECT: NorFolkCD

SUBGRADE AREA ACCEPTED: FML panels 61-75 Approx - 66,579 Sq Ft

LOCATION (West Side)

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS:

Accepted surface conditions to be maintained by: GRACE
Company (Initials of company's rep)

Supervisor: [signature] Demond Adams
Signature Print Name

6/13/96

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 8/10/99 FILE NO: 1584

PROJECT: Norfolk CD

SUBGRADE AREA ACCEPTED: FML Panels 76-88 Approx - 100,541 SqFT

LOCATION: westside

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS:

Accepted surface conditions to be maintained by RACE
Company (initials of company's rep)

Supervisor: Signature Demond Adams Print Name

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 8/13/99 FILE NO: 1584

PROJECT: NORFolk CD

SUBGRADE AREA ACCEPTED: FML panel #'s 89-98 Approx- 70,380 Sq Ft

LOCATION: West to East Side

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS:

Accepted surface conditions to be maintained by: GRACE
Company (initials of company's rep)

Supervisor: Signature Demond Adams
Print Name

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 8/16/99 FILE NO: 1584

PROJECT: NORFOLK CD

SUBGRADE AREA ACCEPTED: FML panels 99-134 Approx- 228,803 sq FT

LOCATION: North, West to East mid-Section tie IN. @ P-30

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS:

Accepted surface conditions to be maintained by: GRACE
Company (initials of company's rep)

Supervisor: Signature DEMOND ADAMS Print Name

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 8-24-99 FILE NO: 1584

PROJECT: NORFOLK CD LANDFILL

SUBGRADE AREA ACCEPTED: Panels 135 to 171

LOCATION: South of East Mid Section working to West Anchor Trench.

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS: N/A

Accepted surface conditions to be maintained by: _____
Company (initials of company's rep)

Supervisor: Marc Aikin
Signature

Marc Aikin
Print Name

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE
OF SUBGRADE SURFACE CONDITIONS

DATE: 8-28-99 FILE NO: 1584

PROJECT: NORFOLK CD LANDFILL

SUBGRADE AREA ACCEPTED: FML PANELS 172-194

LOCATION: Western Most Area

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS: N/A

Accepted surface conditions to be maintained by: _____
Company (initials of company's rep)

Supervisor: [signature] [signature]
Signature Print Name

6/13/96

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE OF SUBGRADE SURFACE CONDITIONS

DATE: 8-28-99 FILE NO: 1584

PROJECT: NORFOLK CO LANDFILL

SUBGRADE AREA ACCEPTED: FMC PAWFGS 195 TO 199

LOCATION: WEST OF SEEBEE RD.

I, the undersigned, duly authorized representative of GeoPacific Lining, Inc., do hereby accept the subgrade SURFACE conditions as acceptable for the placement of geomembrane material. I do not accept any responsibility for the conditions or composition of the subsurface, any defects to the subgrade, or surface damage caused by weather conditions after the acceptance that might effect the integrity of the lining system or any effects the soil may have on the geomembrane. GeoPacific will deploy liner as per surface acceptance unless otherwise instructed in writing as below and will back charge all associated costs should the liner need to be removed or repaired for testing or subgrade improvements.

EXCEPTIONS AND SPECIAL INSTRUCTIONS: N/A

Accepted surface conditions to be maintained by: Grace Industries
Company (initials of company's rep)

Supervisor: [signature] Marc Aikin
Signature Print Name

6/13/96

GeoPacific Lining Inc.

CERTIFICATE OF ACCEPTANCE

DATE: 8-7-99 FILE NO: 158A - 01

INSTALLATION PERIOD COVERED: 7-19/8-7-99

PROJECT: Norfolk CD

CLIENT: Grace I.

DETAILS OF WORK COMPLETED AND MEASURED: 191,150# 40 Mill texture liner
92,925.5# Geocomposite
2 boots

I, the undersigned, duly authorized representative of GRACE I. do hereby take over and accept the work described above from the date indicated, subject to the exceptions detailed below, and confirm that the work has been completed in accordance with the specifications and the terms and conditions of the contract. There is no apparent damage to the liner.

I have evaluated and measured the work together with the GeoPacific representative, and agree that the measurements shown above are true and correct, and that the installation has met our approval.

EXCEPTIONS:

AUTHORIZED REPRESENTATIVE: Gary Saville C.Q.C.
print signature title

GEOPACIFIC REPRESENTATIVE: Demond Adams Super.
print signature title

GeoPacific Lining Inc.

CERTIFICATE OF FINAL ACCEPTANCE

DATE: 9-28-99 FILE NO: 1584

INSTALLATION PERIOD COVERED: 7-22-99 Thru 9-27-99

PROJECT: NORFOLK CD

CLIENT: Grace Ind.

DETAILS OF WORK COMPLETED: 895,755 SqFT of liner installation
925,785 SqFT of Geo composite installation

I, the undersigned, duly authorized representative of _____ (Engineer) &
I, the undersigned, duly authorized representative of Grace Ind. (Contractor)
do hereby accept the work described above as of the date indicated, subject to the exceptions detaile below, and confirm that the work has been completed in accordance with the plans and specifications, and the terms and conditions of the contract. I have evaluated the work, which includes / does not include measured area together with the GeoPacific Lining, Inc. representative, and agree that the installation meets our approval. There is no apparent damage to the liner.

EXCEPTIONS: N/A

I, the undersigned, duly authorized representative of Grace Ind. (Contractor)
agree that as of this date, the terms and conditions of the required warranty as itemized in the specifications go into effect, and the Contractor takes responsibility for protecting the work described and accepted above from future damages.

CONTRACTOR'S REPRESENTATIVE: Herb Merkert (print) Herbert B. Merkert (signature) Supervisor (title)

GEOPACIFIC LINING REPRESENTATIVE: Scott MacDonald (print) Scott MacDonald (signature) Supervisor (title)

ENGINEER'S REPRESENTATIVE: _____ print signature title

Note: Be advised that refusal, by the Contractor's representative, to sign this form without adequate information about what remains to be completed could result in standby charges for GPL crew awaiting direction.

Precision Geosynthetic Laboratories

July 23, 1999

RECEIVED
JUL 30 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller: RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of two (2) 40 mil LLDPE seam samples received July 23, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

R. Belanger
Ronald E. Belanger
Technical Director

Enclosure: (Job No. 990942)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

July 23, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seams
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. 990942)

MATERIAL DESCRIPTION: 40 mil LLDPE seams **No. of MATERIALS:** (2)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: July 23, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 1 P2/ 3	C #46128
DS- 2 P4/ 5	C #46129

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 and 2. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **990942**
PGL CONTROL NO. : **46128** 23-Jul-99
CLIENT SAMPLE ID : **DS- 1 P2/ 3**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	67	FTB^{BRK}	69	FTB^{SE3}	N/A	N/A
	66	FTB^{BRK}	69	FTB^{SE2}		
	68	FTB^{BRK}	67	FTB^{SE3}		
	65	FTB^{BRK}	67	FTB^{SE3}		
	69	FTB^{BRK}	71	FTB^{SE3}		
Avg.	67		69		N/A	N/A
S.D.	2		2			
Specs	***40*** *min.*		***36*** *min.*			

N/A: NOT APPLICABLE, EXTRUSION WELD SEAM.

BREAK DESCRIPTION, FILLET- EXTRUSION WELD SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE2	BREAK AT SEAM EDGE IN THE TOP SHEET.
SE3	BREAK AT SEAM EDGE IN THE BOTTOM SHEET.
AD-BRK	BREAK IN THE BOTTOM SHEETING AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **990942**
PGL CONTROL NO. : **46129** 23-Jul-99
CLIENT SAMPLE ID : **DS- 2 P4/ 5**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	75	FTB^{BRK}	70	FTB^{SE1}	70	FTB^{SE1}
	74	FTB^{BRK}	70	FTB^{SE1}	68	FTB^{SE1}
	76	FTB^{BRK}	72	FTB^{SE1}	70	FTB^{SE1}
	75	FTB^{BRK}	71	FTB^{SE1}	67	FTB^{SE1}
	77	FTB^{BRK}	70	FTB^{SE1}	70	FTB^{SE1}
Avg.	75		71		69	
S.D.	1		1		1	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

July 27, 1999

RECEIVED
AUG 0 6 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller: RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of seven (7) 40 mil LLDPE seam samples received July 24, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

R. Belanger
Ronald E. Belanger
Technical Director

Enclosure: (Job No. 990967)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

July 27, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seams
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. 990967)

MATERIAL DESCRIPTION: 40 mil LLDPE seams **No. of MATERIALS:** (7)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: July 24, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 2A P5/ 4	C #46251
DS- 3 P5/ 4	C #46252
DS- 4 P3/ 4	C #46253
DS- 5 P8/ 9	C #46254
DS- 6 P12/ 13	C #46255
DS- 7 P14/ 16	C #46256
DS- 8 P17/ 18	C #46257

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 through 7. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **990967**
PGL CONTROL NO. : **46251** 27-Jul-99
CLIENT SAMPLE ID : **DS- 2A P5/ 4**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	71	FTB^{BRK}	70	FTB^{SE1}	70	FTB^{SE1}
	73	FTB^{BRK}	69	FTB^{SE1}	67	FTB^{SE1}
	74	FTB^{BRK}	72	FTB^{SE1}	69	FTB^{SE1}
	73	FTB^{BRK}	68	FTB^{SE1}	68	FTB^{SE1}
	75	FTB^{BRK}	70	FTB^{SE1}	70	FTB^{SE1}
Avg.	73		70		69	
S.D.	2		1		1	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **990967**
PGL CONTROL NO. : **46252** 27-Jul-99
CLIENT SAMPLE ID : **DS- 3 P5/ 4**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	68	FTB^{BRK}	66	FTB^{SE3}	N/A	N/A
	69	FTB^{BRK}	69	FTB^{SE3}		
	67	FTB^{BRK}	68	FTB^{SE3}		
	70	FTB^{BRK}	65	FTB^{SE3}		
	55	FTB^{BRK}	67	FTB^{SE3}		
Avg.	66		67		N/A	N/A
S.D.	6		2			
Specs	***40*** *min.*		***36*** *min.*			

N/A: NOT APPLICABLE, EXTRUSION WELD SEAM.

BREAK DESCRIPTION, FILLET- EXTRUSION WELD SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE2	BREAK AT SEAM EDGE IN THE TOP SHEET.
SE3	BREAK AT SEAM EDGE IN THE BOTTOM SHEET.
AD-BRK	BREAK IN THE BOTTOM SHEETING AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 3.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **990967**
PGL CONTROL NO. : **46253** 27-Jul-99
CLIENT SAMPLE ID : **DS- 4 P3/ 4**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	72	FTB^{BRK}	70	FTB^{SE1}	72	FTB^{SE1}
	73	FTB^{BRK}	68	FTB^{SE1}	68	FTB^{SE1}
	74	FTB^{BRK}	72	FTB^{SE1}	73	FTB^{SE1}
	72	FTB^{BRK}	70	FTB^{SE1}	73	FTB^{SE1}
	75	FTB^{BRK}	69	FTB^{SE1}	72	FTB^{SE1}
Avg.	73		70		72	
S.D.	1		1		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 4.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **990967**
PGL CONTROL NO. : **46254** 27-Jul-99
CLIENT SAMPLE ID : **DS- 5 P8/ 9**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	74	FTB^{BRK}	72	FTB^{SE1}	71	FTB^{SE1}
	72	FTB^{BRK}	68	FTB^{SE1}	71	FTB^{SE1}
	75	FTB^{BRK}	70	FTB^{SE1}	72	FTB^{SE1}
	73	FTB^{BRK}	70	FTB^{SE1}	68	FTB^{SE1}
	74	FTB^{BRK}	68	FTB^{SE1}	71	FTB^{SE1}
Avg.	74		70		71	
S.D.	1		2		2	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 5.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 990967
PGL CONTROL NO. : 46255 27-Jul-99
CLIENT SAMPLE ID : **DS- 6 P12/ 13**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	68	FTB^{BRK}	69	FTB^{SE1}	66	FTB^{SE1}
	68	FTB^{BRK}	68	FTB^{SE1}	64	FTB^{SE1}
	67	FTB^{BRK}	70	FTB^{SE1}	66	FTB^{SE1}
	68	FTB^{BRK}	66	FTB^{SE1}	66	FTB^{SE1}
	69	FTB^{BRK}	66	FTB^{SE1}	66	FTB^{SE1}
Avg.	68		68		66	
S.D.	0		2		1	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 6.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 990967
PGL CONTROL NO. : 46256 27-Jul-99
CLIENT SAMPLE ID : **DS- 7 P14/ 16**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	67	FTB^{BRK}	70	FTB^{SE1}	68	FTB^{SE1}
	68	FTB^{BRK}	68	FTB^{SE1}	66	FTB^{SE1}
	70	FTB^{BRK}	70	FTB^{SE1}	68	FTB^{SE1}
	68	FTB^{BRK}	69	FTB^{SE1}	65	FTB^{SE1}
	69	FTB^{BRK}	70	FTB^{SE1}	65	FTB^{SE1}
Avg.	68		69		66	
S.D.	1		1		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 7.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 990967
PGL CONTROL NO. : 46257 27-Jul-99
CLIENT SAMPLE ID : **DS- 8 P17/ 18**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	75	FTB^{BRK}	70	FTB^{SE1}	68	FTB^{SE1}
	72	FTB^{BRK}	70	FTB^{SE1}	70	FTB^{SE1}
	75	FTB^{BRK}	72	FTB^{SE1}	72	FTB^{SE1}
	72	FTB^{BRK}	71	FTB^{SE1}	70	FTB^{SE1}
	73	FTB^{BRK}	70	FTB^{SE1}	72	FTB^{SE1}
Avg.	73		71		70	
S.D.	2		1		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

July 28, 1999

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

RECEIVED
AUG 0 6 1999
GEOPACIFIC LINING

Dear Ms. Miller: RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of four (4) 40 mil LLDPE seam samples received July 28, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

R. Belanger
Ronald E. Belanger
Technical Director

Enclosure: (Job No. J990037)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

July 28, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seams
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. J990037)

MATERIAL DESCRIPTION: 40 mil LLDPE seams **No. of MATERIALS:** (4)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: July 28, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 11 P27/ 25	C #40281
DS- 10 P24/ 23	C #40282
DS- 12 P30/ 29	C #40283
DS- 9 P21/ 20	C #40284

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 through 4. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : J990037
PGL CONTROL NO. : 40281 28-Jul-99
CLIENT SAMPLE ID : **DS- 11 P27/ 25**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	78	FTB[BRK]	76	FTB[SE1]	77	FTB[SE1]
	77	FTB[BRK]	77	FTB[SE1]	77	FTB[SE1]
	77	FTB[BRK]	75	FTB[SE1]	76	FTB[SE1]
	79	FTB[BRK]	80	FTB[SE1]	81	FTB[SE1]
	79	FTB[BRK]	72	FTB[SE1]	76	FTB[SE1]
Avg.	78		76		77	
S.D.	1		3		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : J990037
PGL CONTROL NO. : 40282 28-Jul-99
CLIENT SAMPLE ID **: DS- 10 P24/ 23**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	77	FTB^{BRK}	78	FTB^{SE1}	74	FTB^{SE1}
	80	FTB^{BRK}	78	FTB^{SE1}	77	FTB^{SE1}
	81	FTB^{BRK}	76	FTB^{SE1}	76	FTB^{SE1}
	81	FTB^{BRK}	80	FTB^{SE1}	80	FTB^{SE1}
	80	FTB^{BRK}	78	FTB^{SE1}	77	FTB^{SE1}
Avg.	80		78		77	
S.D.	2		1		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 3.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : J990037
PGL CONTROL NO. : 40283 28-Jul-99
CLIENT SAMPLE ID : **DS- 12 P30/ 29**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	76	FTB^{BRK}	76	FTB^{SE1}	70	FTB^{SE1}
	75	FTB^{BRK}	74	FTB^{SE1}	74	FTB^{SE1}
	74	FTB^{BRK}	72	FTB^{SE1}	76	FTB^{SE1}
	77	FTB^{BRK}	77	FTB^{SE1}	82	FTB^{SE1}
	78	FTB^{BRK}	74	FTB^{SE1}	80	FTB^{SE1}
Avg.	76		75		76	
S.D.	2		2		5	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 4.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : J990037
PGL CONTROL NO. : 40284 28-Jul-99
CLIENT SAMPLE ID : **DS- 9 P21/ 20**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	80	FTB^{BRK}	76	FTB^{SE1}	77	FTB^{SE1}
	80	FTB^{BRK}	74	FTB^{SE1}	77	FTB^{SE1}
	77	FTB^{BRK}	75	FTB^{SE1}	75	FTB^{SE1}
	82	FTB^{BRK}	77	FTB^{SE1}	79	FTB^{SE1}
	78	FTB^{BRK}	76	FTB^{SE1}	74	FTB^{SE1}
Avg.	79		76		76	
S.D.	2		1		2	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

July 29, 1999

RECEIVED
AUG 0 6 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller:

RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of four (4) 40 mil LLDPE seam samples received July 29, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

Enclosure: (Job No. J990039)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

July 29, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seams
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. J990039)

MATERIAL DESCRIPTION: 40 mil LLDPE seams **No. of MATERIALS:** (4)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: July 29, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 13	C #40290
DS- 14	C #40291
DS- 15	C #40292
DS- 16	C #40293

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 through 4. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990039**
PGL CONTROL NO. : **40290** 29-Jul-99
CLIENT SAMPLE ID : **DS- 13**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	74	FTB^{BRK}	79	FTB^{SE1}	72	FTB^{SE1}
	76	FTB^{BRK}	74	FTB^{SE1}	70	FTB^{SE1}
	73	FTB^{BRK}	72	FTB^{SE1}	73	FTB^{SE1}
	74	FTB^{BRK}	73	FTB^{SE1}	74	FTB^{SE1}
	75	FTB^{BRK}	70	FTB^{SE1}	72	FTB^{SE1}
Avg.	74		74		72	
S.D.	1		3		1	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990039**
PGL CONTROL NO. : **40291** 29-Jul-99
CLIENT SAMPLE ID : **DS- 14**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	77	FTB[BRK]	80	FTB[SE1]	70	FTB[SE1]
	77	FTB[BRK]	77	FTB[SE1]	72	FTB[SE1]
	80	FTB[BRK]	76	FTB[SE1]	74	FTB[SE1]
	81	FTB[BRK]	77	FTB[SE1]	79	FTB[SE1]
	78	FTB[BRK]	78	FTB[SE1]	72	FTB[SE1]
Avg.	79		78		73	
S.D.	2		2		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 3.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990039**
PGL CONTROL NO. : **40292** 29-Jul-99
CLIENT SAMPLE ID : **DS- 15**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	84	FTB^{BRK}	76	FTB^{SE1}	77	FTB^{SE1}
	82	FTB^{BRK}	77	FTB^{SE1}	77	FTB^{SE1}
	83	FTB^{BRK}	82	FTB^{SE1}	80	FTB^{SE1}
	83	FTB^{BRK}	80	FTB^{SE1}	79	FTB^{SE1}
	82	FTB^{BRK}	77	FTB^{SE1}	76	FTB^{SE1}
Avg.	83		78		78	
S.D.	1		3		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 4.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990039**
PGL CONTROL NO. : **40293** 29-Jul-99
CLIENT SAMPLE ID : **DS- 16**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	80	FTB[BRK]	73	FTB[SE1]	76	FTB[SE1]
	80	FTB[BRK]	69	FTB[SE1]	75	FTB[SE1]
	82	FTB[BRK]	69	FTB[SE1]	75	FTB[SE1]
	81	FTB[BRK]	67	FTB[SE1]	79	FTB[SE1]
	84	FTB[BRK]	75	FTB[SE1]	77	FTB[SE1]
Avg.	81		71		76	
S.D.	2		3		2	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

August 4, 1999

RECEIVED
AUG 1 6 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller: RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of one (1) 40 mil LLDPE seam sample received August 4, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

R. Belanger
Ronald E. Belanger
Technical Director

Enclosure: (Job No. J990060)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

August 4, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seam
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. J990060)

MATERIAL DESCRIPTION: 40 mil LLDPE seam **No. of MATERIALS:** (1)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: August 4, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 17 P51/ 50	C #40458

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

TEST CONDITIONS: The sample was 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 are summarized in Table 1. The units in which the data are reported are included on the table. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : J990060
PGL CONTROL NO. : 40458 4-Aug-99
CLIENT SAMPLE ID : **DS- 17 P51/ 50**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	82	FTB^{BRK}	76	FTB^{SE1}	77	FTB^{SE1}
	81	FTB^{BRK}	79	FTB^{SE1}	77	FTB^{SE1}
	86	FTB^{BRK}	76	FTB^{SE1}	75	FTB^{SE1}
	83	FTB^{BRK}	79	FTB^{SE1}	78	FTB^{SE1}
	82	FTB^{BRK}	80	FTB^{SE1}	81	FTB^{SE1}
Avg.	83		78		78	
S.D.	2		2		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

August 10, 1999

RECEIVED
AUG 1 9 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller: RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of five (5) 40 mil LLDPE seam samples received August 10, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Quejan
Quality Assurance

R. Belanger
Ronald E. Belanger
Technical Director

Enclosure: (Job No. J990071)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

August 10, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seams
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. J990071)

MATERIAL DESCRIPTION: 40 mil LLDPE seams **No. of MATERIALS:** (5)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: August 10, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 18	C #40559
DS- 19	C #40560
DS- 20	C #40561
DS- 21	C #40562
DS- 22	C #40563

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 through 5. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990071**
PGL CONTROL NO. : **40559** 10-Aug-99
CLIENT SAMPLE ID : **DS- 18**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB^{BRK}	69	FTB^{SE1}	74	FTB^{SE1}
	77	FTB^{BRK}	67	FTB^{SE1}	75	FTB^{SE1}
	73	FTB^{BRK}	71	FTB^{SE1}	73	FTB^{SE1}
	79	FTB^{BRK}	75	FTB^{SE1}	74	FTB^{SE1}
	84	FTB^{BRK}	74	FTB^{SE1}	78	FTB^{SE1}
Avg.	78		71		75	
S.D.	4		3		2	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990071**
PGL CONTROL NO. : **40560** 10-Aug-99
CLIENT SAMPLE ID : **DS- 19**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	76	FTB^{BRK}	73	FTB^{SE1}	72	FTB^{SE1}
	79	FTB^{BRK}	77	FTB^{SE1}	71	FTB^{SE1}
	74	FTB^{BRK}	70	FTB^{SE1}	69	FTB^{SE1}
	77	FTB^{BRK}	78	FTB^{SE1}	71	FTB^{SE1}
	76	FTB^{BRK}	80	FTB^{SE1}	73	FTB^{SE1}
Avg.	76		76		71	
S.D.	2		4		1	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 3.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990071**
PGL CONTROL NO. : **40561** 10-Aug-99
CLIENT SAMPLE ID : **DS- 20**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB^{BRK}	70	FTB^{SE1}	74	FTB^{SE1}
	82	FTB^{BRK}	76	FTB^{SE1}	76	FTB^{SE1}
	76	FTB^{BRK}	73	FTB^{SE1}	75	FTB^{SE1}
	77	FTB^{BRK}	74	FTB^{SE1}	73	FTB^{SE1}
	78	FTB^{BRK}	72	FTB^{SE1}	69	FTB^{SE1}
Avg.	78		73		73	
S.D.	2		2		3	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 4.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990071**
PGL CONTROL NO. : **40562** 10-Aug-99
CLIENT SAMPLE ID : **DS- 21**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	77	FTB^{BRK}	70	FTB^{SE1}	69	FTB^{SE1}
	75	FTB^{BRK}	74	FTB^{SE1}	77	FTB^{SE1}
	69	FTB^{BRK}	73	FTB^{SE1}	76	FTB^{SE1}
	79	FTB^{BRK}	79	FTB^{SE1}	76	FTB^{SE1}
	77	FTB^{BRK}	74	FTB^{SE1}	76	FTB^{SE1}
Avg.	75		74		75	
S.D.	4		3		3	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 5.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990071**
PGL CONTROL NO. : **40563** 10-Aug-99
CLIENT SAMPLE ID : **DS- 22**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	76	FTB^{BRK}	70	FTB^{SE1}	72	FTB^{SE1}
	74	FTB^{BRK}	69	FTB^{SE1}	71	FTB^{SE1}
	72	FTB^{BRK}	70	FTB^{SE1}	69	FTB^{SE1}
	75	FTB^{BRK}	75	FTB^{SE1}	74	FTB^{SE1}
	76	FTB^{BRK}	70	FTB^{SE1}	69	FTB^{SE1}
Avg.	75		71		71	
S.D.	2		2		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

August 12, 1999

RECEIVED
AUG 1 9 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller:

RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of ten (10) 40 mil LLDPE seam samples received August 12, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

Enclosure: (Job No. J990073)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

August 12, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seams
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. J990073)

MATERIAL DESCRIPTION: 40 mil LLDPE seams **No. of MATERIALS:** (10)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: August 12, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 23	C #40571
DS- 24	C #40572
DS- 25	C #40573
DS- 26	C #40574
DS- 27	C #40575
DS- 28	C #40576
DS- 29	C #40577
DS- 30	C #40578
DS- 31	C #40579
DS- 32	C #40580

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 through 10. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990073**
PGL CONTROL NO. : **40571** 12-Aug-99
CLIENT SAMPLE ID : **DS- 23**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	81	FTB^{BRK}	74	FTB^{SE1}	76	FTB^{SE1}
	82	FTB^{BRK}	79	FTB^{SE1}	77	FTB^{SE1}
	80	FTB^{BRK}	82	FTB^{SE1}	79	FTB^{SE1}
	85	FTB^{BRK}	75	FTB^{SE1}	73	FTB^{SE1}
	80	FTB^{BRK}	73	FTB^{SE1}	77	FTB^{SE1}
Avg.	82		77		76	
S.D.	2		4		2	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990073**
PGL CONTROL NO. : **40572** 12-Aug-99
CLIENT SAMPLE ID : **DS- 24**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	85	FTB[BRK]	83	FTB[SE1]	81	FTB[SE1]
	84	FTB[BRK]	79	FTB[SE1]	76	FTB[SE1]
	83	FTB[BRK]	76	FTB[SE1]	77	FTB[SE1]
	88	FTB[BRK]	77	FTB[SE1]	70	FTB[SE1]
	83	FTB[BRK]	74	FTB[SE1]	73	FTB[SE1]
Avg.	85		78		75	
S.D.	2		3		4	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 3.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990073**
PGL CONTROL NO. : **40573** 12-Aug-99
CLIENT SAMPLE ID : **DS- 25**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	82	FTB^{BRK}	76	FTB^{SE1}	84	FTB^{SE1}
	83	FTB^{BRK}	81	FTB^{SE1}	82	FTB^{SE1}
	81	FTB^{BRK}	78	FTB^{SE1}	79	FTB^{SE1}
	79	FTB^{BRK}	73	FTB^{SE1}	79	FTB^{SE1}
	79	FTB^{BRK}	74	FTB^{SE1}	77	FTB^{SE1}
Avg.	81		76		80	
S.D.	2		3		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 4.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990073**
PGL CONTROL NO. : **40574** 12-Aug-99
CLIENT SAMPLE ID : **DS- 26**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	87	FTB[BRK]	77	FTB[SE1]	79	FTB[SE1]
	85	FTB[BRK]	77	FTB[SE1]	76	FTB[SE1]
	86	FTB[BRK]	79	FTB[SE1]	83	FTB[SE1]
	84	FTB[BRK]	78	FTB[SE1]	81	FTB[SE1]
	82	FTB[BRK]	71	FTB[SE1]	76	FTB[SE1]
Avg.	85		76		79	
S.D.	2		3		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 5.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990073**
PGL CONTROL NO. : **40575** 12-Aug-99
CLIENT SAMPLE ID : **DS- 27**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB^{BRK}	71	FTB^{SE1}	79	FTB^{SE1}
	86	FTB^{BRK}	***71***	***FTB*** $^{AD\text{-}BRK}$	76	FTB^{SE1}
	82	FTB^{BRK}	71	FTB^{SE1}	74	FTB^{SE1}
	83	FTB^{BRK}	76	FTB^{SE1}	82	FTB^{SE1}
	83	FTB^{BRK}	79	FTB^{SE1}	78	FTB^{SE1}
Avg.	83		74		78	
S.D.	3		4		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 6.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990073**
PGL CONTROL NO. : **40576** 12-Aug-99
CLIENT SAMPLE ID : **DS- 28**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB^{BRK}	73	FTB^{SE1}	76	FTB^{SE1}
	83	FTB^{BRK}	76	FTB^{SE1}	74	FTB^{SE1}
	82	FTB^{BRK}	66	FTB^{SE1}	73	FTB^{SE1}
	82	FTB^{BRK}	79	FTB^{SE1}	83	FTB^{SE1}
	87	FTB^{BRK}	80	FTB^{SE1}	75	FTB^{SE1}
Avg.	83		75		76	
S.D.	3		6		4	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 7.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990073**
PGL CONTROL NO. : **40577** 12-Aug-99
CLIENT SAMPLE ID : **DS- 29**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB[BRK]	83	FTB[SE1]	78	FTB[SE1]
	78	FTB[BRK]	81	FTB[SE1]	77	FTB[SE1]
	76	FTB[BRK]	82	FTB[SE1]	78	FTB[SE1]
	81	FTB[BRK]	83	FTB[SE1]	71	FTB[SE1]
	81	FTB[BRK]	82	FTB[SE1]	76	FTB[SE1]
Avg.	79		82		76	
S.D.	2		1		3	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 8.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990073**
PGL CONTROL NO. : **40578** 12-Aug-99
CLIENT SAMPLE ID : **DS- 30**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	76	FTB^{BRK}	75	FTB^{SE1}	76	FTB^{SE1}
	81	FTB^{BRK}	80	FTB^{SE1}	77	FTB^{SE1}
	77	FTB^{BRK}	73	FTB^{SE1}	73	FTB^{SE1}
	79	FTB^{BRK}	75	FTB^{SE1}	76	FTB^{SE1}
	82	FTB^{BRK}	80	FTB^{SE1}	79	FTB^{SE1}
Avg.	79		77		76	
S.D.	3		3		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 9.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990073**
PGL CONTROL NO. : **40579** 12-Aug-99
CLIENT SAMPLE ID : **DS- 31**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	83	FTB^{BRK}	79	FTB^{SE1}	78	FTB^{SE1}
	84	FTB^{BRK}	79	FTB^{SE1}	74	FTB^{SE1}
	83	FTB^{BRK}	79	FTB^{SE1}	75	FTB^{SE1}
	84	FTB^{BRK}	77	FTB^{SE1}	79	FTB^{SE1}
	88	FTB^{BRK}	85	FTB^{SE1}	84	FTB^{SE1}
Avg.	84		80		78	
S.D.	2		3		4	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 10.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990073**
PGL CONTROL NO. : **40580** 12-Aug-99
CLIENT SAMPLE ID : **DS- 32**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	91	FTB^{BRK}	***28***	***AD***	***21***	***AD***
	77	FTB^{BRK}	***49***	***AD***	77	FTB^{SE1}
	79	FTB^{BRK}	***52***	***AD***	***25***	***AD***
	83	FTB^{BRK}	***52***	***AD***	***22***	***AD***
	82	FTB^{BRK}	76	FTB^{SE1}	***45***	***AD***
Avg.	82		51		38	
S.D.	5		17		24	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

August 16, 1999

RECEIVED
SEP 0 1 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller: RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of nine (9) 40 mil LLDPE seam samples received August 16, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

Enclosure: (Job No. J990081)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

August 16, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seams
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. J990081)

MATERIAL DESCRIPTION: 40 mil LLDPE seams **No. of MATERIALS:** (9)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: August 16, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 27A	C #40632
DS- 27B	C #40633
DS- 32B	C #40634
DS- 33	C #40635
DS- 34	C #40636
DS- 35	C #40637
DS- 36	C #40638
DS- 37	C #40639
DS- 38	C #40640

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 through 9. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Quejada
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990081**
PGL CONTROL NO. : **40632** 16-Aug-99
CLIENT SAMPLE ID : **DS- 27A**

BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
85	FTB[BRK]	76	FTB[SE1]	74	FTB[SE1]
82	FTB[BRK]	75	FTB[SE1]	73	FTB[SE1]
82	FTB[BRK]	72	FTB[SE1]	74	FTB[SE1]
85	FTB[BRK]	79	FTB[SE1]	76	FTB[SE1]
84	FTB[BRK]	76	FTB[SE1]	80	FTB[SE1]
Avg. 84		76		75	
S.D. 2		3		3	
Specs ***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990081**
PGL CONTROL NO. : **40633** 16-Aug-99
CLIENT SAMPLE ID : **DS- 27B**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	81	FTB^{BRK}	76	FTB^{SE1}	71	FTB^{SE1}
	82	FTB^{BRK}	75	FTB^{SE1}	70	FTB^{SE1}
	82	FTB^{BRK}	76	FTB^{SE1}	72	FTB^{SE1}
	84	FTB^{BRK}	79	FTB^{SE1}	75	FTB^{SE1}
	87	FTB^{BRK}	77	FTB^{SE1}	80	FTB^{SE1}
Avg.	83		77		74	
S.D.	2		2		4	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 3.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990081**
PGL CONTROL NO. : **40634** 16-Aug-99
CLIENT SAMPLE ID : **DS- 32B**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB^{BRK}	***30***	***AD***	67	FTB^{SE1}
	81	FTB^{BRK}	***34***	***AD***	75	FTB^{SE1}
	80	FTB^{BRK}	***75***	***AD***	***45***	***AD***
	82	FTB^{BRK}	***34***	***AD***	60	FTB^{SE1}
	82	FTB^{BRK}	***51***	***AD***	***45***	***AD***
Avg.	81		45		58	
S.D.	1		19		13	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 4.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990081**
PGL CONTROL NO. : **40635** 16-Aug-99
CLIENT SAMPLE ID : **DS- 33**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	86	FTB^{BRK}	77	FTB^{SE1}	78	FTB^{SE1}
	93	FTB^{BRK}	75	FTB^{SE1}	76	FTB^{SE1}
	91	FTB^{BRK}	76	FTB^{SE1}	76	FTB^{SE1}
	89	FTB^{BRK}	79	FTB^{SE1}	79	FTB^{SE1}
	89	FTB^{BRK}	76	FTB^{SE1}	78	FTB^{SE1}
Avg.	90		77		77	
S.D.	3		2		1	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 5.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990081**
PGL CONTROL NO. : **40636** 16-Aug-99
CLIENT SAMPLE ID : **DS- 34**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	83	FTB^{BRK}	73	FTB^{SE1}	76	FTB^{SE1}
	85	FTB^{BRK}	77	FTB^{SE1}	75	FTB^{SE1}
	90	FTB^{BRK}	76	FTB^{SE1}	***73***	***AD***
	88	FTB^{BRK}	86	FTB^{SE1}	81	FTB^{SE1}
	87	FTB^{BRK}	79	FTB^{SE1}	79	FTB^{SE1}
Avg.	87		78		77	
S.D.	3		5		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 6.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990081**
PGL CONTROL NO. : **40637** 16-Aug-99
CLIENT SAMPLE ID : **DS- 35**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	83	FTB^{BRK}	80	FTB^{SE1}	78	FTB^{SE1}
	85	FTB^{BRK}	77	FTB^{SE1}	79	FTB^{SE1}
	86	FTB^{BRK}	77	FTB^{SE1}	79	FTB^{SE1}
	92	FTB^{BRK}	86	FTB^{SE1}	85	FTB^{SE1}
	86	FTB^{BRK}	76	FTB^{SE1}	76	FTB^{SE1}
Avg.	86		79		79	
S.D.	3		4		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 7.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990081**
PGL CONTROL NO. : **40638** 16-Aug-99
CLIENT SAMPLE ID : **DS- 36**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	89	FTB^{BRK}	79	FTB^{SE1}	73	FTB^{SE1}
	84	FTB^{BRK}	83	FTB^{SE1}	81	FTB^{SE1}
	85	FTB^{BRK}	75	FTB^{SE1}	78	FTB^{SE1}
	88	FTB^{BRK}	75	FTB^{SE1}	79	FTB^{SE1}
	84	FTB^{BRK}	74	FTB^{SE1}	80	FTB^{SE1}
Avg.	86		77		78	
S.D.	2		4		3	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 8.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990081**
PGL CONTROL NO. : **40639** 16-Aug-99
CLIENT SAMPLE ID : **DS- 37**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	85	FTB[BRK]	78	FTB[SE1]	76	FTB[SE1]
	84	FTB[BRK]	77	FTB[SE1]	73	FTB[SE1]
	88	FTB[BRK]	78	FTB[SE1]	78	FTB[SE1]
	90	FTB[BRK]	82	FTB[SE1]	87	FTB[SE1]
	90	FTB[BRK]	79	FTB[SE1]	79	FTB[SE1]
Avg.	87		79		79	
S.D.	3		2		5	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 9.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990081**
PGL CONTROL NO. : **40640** 16-Aug-99
CLIENT SAMPLE ID : **DS- 38**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	89	FTB^{BRK}	76	FTB^{SE1}	76	FTB^{SE1}
	89	FTB^{BRK}	77	FTB^{SE1}	79	FTB^{SE1}
	86	FTB^{BRK}	74	FTB^{SE1}	78	FTB^{SE1}
	88	FTB^{BRK}	80	FTB^{SE1}	79	FTB^{SE1}
	87	FTB^{BRK}	82	FTB^{SE1}	79	FTB^{SE1}
Avg.	88		78		78	
S.D.	1		3		1	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

August 17, 1999

RECEIVED
SEP 0 1 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller: RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of eleven (11) 40 mil LLDPE seam samples received August 17, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

Enclosure: (Job No. J990082)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

August 17, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seams
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. J990082)

MATERIAL DESCRIPTION: 40 mil LLDPE seams **No. of MATERIALS:** (11)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: August 17, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 39	C #40641
DS- 40	C #40642
DS- 41	C #40643
DS- 42	C #40644
DS- 43	C #40645
DS- 44	C #40646
DS- 45	C #40647
DS- 46	C #40648
DS- 47	C #40649
DS- 48	C #40650
DS- 49	C #40651

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 through 11. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990082**
PGL CONTROL NO. : **40641** 17-Aug-99
CLIENT SAMPLE ID : **DS- 39**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	90	FTB^{BRK}	82	FTB^{SE1}	79	FTB^{SE1}
	88	FTB^{BRK}	78	FTB^{SE1}	77	FTB^{SE1}
	89	FTB^{BRK}	82	FTB^{SE1}	76	FTB^{SE1}
	90	FTB^{BRK}	79	FTB^{SE1}	77	FTB^{SE1}
	90	FTB^{BRK}	82	FTB^{SE1}	78	FTB^{SE1}
Avg.	89		81		77	
S.D.	1		2		1	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990082**
PGL CONTROL NO. : **40642** 17-Aug-99
CLIENT SAMPLE ID : **DS- 40**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	85	FTB^{BRK}	79	FTB^{SE1}	79	FTB^{SE1}
	90	FTB^{BRK}	83	FTB^{SE1}	83	FTB^{SE1}
	89	FTB^{BRK}	77	FTB^{SE1}	81	FTB^{SE1}
	88	FTB^{BRK}	79	FTB^{SE1}	83	FTB^{SE1}
	84	FTB^{BRK}	76	FTB^{SE1}	82	FTB^{SE1}
Avg.	87		79		82	
S.D.	3		3		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 3.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990082**
PGL CONTROL NO. : **40643** 17-Aug-99
CLIENT SAMPLE ID : **DS- 41**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	81	FTB^{BRK}	80	FTB^{SE1}	75	FTB^{SE1}
	83	FTB^{BRK}	84	FTB^{SE1}	84	FTB^{SE1}
	82	FTB^{BRK}	80	FTB^{SE1}	82	FTB^{SE1}
	84	FTB^{BRK}	77	FTB^{SE1}	79	FTB^{SE1}
	80	FTB^{BRK}	80	FTB^{SE1}	79	FTB^{SE1}
Avg.	82		80		80	
S.D.	2		2		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 4.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990082**
PGL CONTROL NO. : **40644** 17-Aug-99
CLIENT SAMPLE ID : **DS- 42**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	O'JTER TRACK LOAD (lbs/in)	BREAK TYPE
	89	FTB^{BRK}	83	FTB^{SE1}	83	FTB^{SE1}
	90	FTB^{BRK}	84	FTB^{SE1}	86	FTB^{SE1}
	88	FTB^{BRK}	83	FTB^{SE1}	80	FTB^{SE1}
	85	FTB^{BRK}	83	FTB^{SE1}	82	FTB^{SE1}
	85	FTB^{BRK}	85	FTB^{SE1}	85	FTB^{SE1}
Avg.	87		84		83	
S.D.	2		1		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 5.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990082**
PGL CONTROL NO. : **40645** 17-Aug-99
CLIENT SAMPLE ID : **DS- 43**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	89	FTB^{BRK}	76	FTB^{SE1}	76	FTB^{SE1}
	89	FTB^{BRK}	80	FTB^{SE1}	74	FTB^{SE1}
	85	FTB^{BRK}	78	FTB^{SE1}	79	FTB^{SE1}
	92	FTB^{BRK}	74	FTB^{SE1}	75	FTB^{SE1}
	84	FTB^{BRK}	79	FTB^{SE1}	77	FTB^{SE1}
Avg.	88		77		76	
S.D.	3		2		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 6.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990082**
PGL CONTROL NO. : **40646** 17-Aug-99
CLIENT SAMPLE ID : **DS- 44**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	85	FTB^{BRK}	80	FTB^{SE1}	83	FTB^{SE1}
	86	FTB^{BRK}	76	FTB^{SE1}	77	FTB^{SE1}
	87	FTB^{BRK}	79	FTB^{SE1}	84	FTB^{SE1}
	86	FTB^{BRK}	76	FTB^{SE1}	79	FTB^{SE1}
	86	FTB^{BRK}	75	FTB^{SE1}	82	FTB^{SE1}
Avg.	86		77		81	
S.D.	1		2		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 7.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990082**
PGL CONTROL NO. : **40647** 17-Aug-99
CLIENT SAMPLE ID : **DS- 45**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	85	FTB^{BRK}	76	FTB^{SE1}	74	FTB^{SE1}
	86	FTB^{BRK}	76	FTB^{SE1}	76	FTB^{SE1}
	84	FTB^{BRK}	81	FTB^{SE1}	78	FTB^{SE1}
	90	FTB^{BRK}	75	FTB^{SE1}	73	FTB^{SE1}
	87	FTB^{BRK}	80	FTB^{SE1}	73	FTB^{SE1}
Avg.	86		78		75	
S.D.	2		3		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 8.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990082**
PGL CONTROL NO. : **40648** 17-Aug-99
CLIENT SAMPLE ID : **DS- 46**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	87	FTB^{BRK}	76	FTB^{SE1}	81	FTB^{SE1}
	88	FTB^{BRK}	71	FTB^{SE1}	81	FTB^{SE1}
	85	FTB^{BRK}	81	FTB^{SE1}	76	FTB^{SE1}
	87	FTB^{BRK}	81	FTB^{SE1}	75	FTB^{SE1}
	82	FTB^{BRK}	74	FTB^{SE1}	76	FTB^{SE1}
Avg.	86		77		78	
S.D.	2		4		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 9.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990082**
PGL CONTROL NO. : **40649** 17-Aug-99
CLIENT SAMPLE ID : **DS- 47**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OJTER TRACK LOAD (lbs/in)	BREAK TYPE
	87	FTB^{BRK}	87	FTB^{SE1}	88	FTB^{SE1}
	86	FTB^{BRK}	78	FTB^{SE1}	85	FTB^{SE1}
	93	FTB^{BRK}	83	FTB^{SE1}	84	FTB^{SE1}
	87	FTB^{BRK}	78	FTB^{SE1}	81	FTB^{SE1}
	87	FTB^{BRK}	73	FTB^{SE1}	83	FTB^{SE1}
Avg.	88		80		84	
S.D.	3		5		3	
Specs	***40*** *min.*		***36*** *min.*		***3(*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 10.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990082**
PGL CONTROL NO. : **40650** 17-Aug-99
CLIENT SAMPLE ID : **DS- 48**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	84	FTB^{BRK}	82	FTB^{SE1}	81	FTB^{SE1}
	86	FTB^{BRK}	82	FTB^{SE1}	81	FTB^{SE1}
	88	FTB^{BRK}	83	FTB^{SE1}	83	FTB^{SE1}
	92	FTB^{BRK}	87	FTB^{SE1}	85	FTB^{SE1}
	87	FTB^{BRK}	82	FTB^{SE1}	82	FTB^{SE1}
Avg.	87		83		82	
S.D.	3		2		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 11.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990082**
PGL CONTROL NO. : **40651** 17-Aug-99
CLIENT SAMPLE ID : **DS- 49**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	83	FTB^{BRK}	83	FTB^{SE1}	83	FTB^{SE1}
	86	FTB^{BRK}	87	FTB^{SE1}	80	FTB^{SE1}
	87	FTB^{BRK}	85	FTB^{SE1}	76	FTB^{SE1}
	90	FTB^{BRK}	84	FTB^{SE1}	77	FTB^{SE1}
	84	FTB^{BRK}	84	FTB^{SE1}	73	FTB^{SE1}
Avg.	86		85		78	
S.D.	3		2		4	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

August 18, 1999

RECEIVED
SEP 0 1 1999
GEOPACIFIC LINI

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller:

RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of eleven (11) 40 mil LLDPE seam samples received August 18, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

Enclosure: (Job No. J990087)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

August 18, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seams
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. J990087)

MATERIAL DESCRIPTION: 40 mil LLDPE seams **No. of MATERIALS:** (11)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: August 18, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 50	C #40677
DS- 51	C #40678
DS- 52	C #40679
DS- 53	C #40680
DS- 54	C #40681
DS- 55	C #40682
DS- 56	C #40683
DS- 57	C #40684
DS- 58	C #40685
DS- 59	C #40686
DS- 32C	C #40687

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 through 11. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990087**
PGL CONTROL NO. : **40677** 18-Aug-99
CLIENT SAMPLE ID : **DS- 50**

BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
84	FTB[BRK]	83	FTB[SE1]	78	FTB[SE1]
85	FTB[BRK]	78	FTB[SE1]	83	FTB[SE1]
79	FTB[BRK]	78	FTB[SE1]	84	FTB[SE1]
86	FTB[BRK]	70	FTB[SE1]	80	FTB[SE1]
84	FTB[BRK]	81	FTB[SE1]	82	FTB[SE1]
Avg. 84		78		81	
S.D. 3		5		2	
Specs ***40*** *min.*		***36*** *min.*		***36*** *min.*	

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990087**
PGL CONTROL NO. : **40678** 18-Aug-99
CLIENT SAMPLE ID : **DS- 51**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	90	FTB^{BRK}	76	FTB^{SE1}	79	FTB^{SE1}
	88	FTB^{BRK}	78	FTB^{SE1}	79	FTB^{SE1}
	86	FTB^{BRK}	77	FTB^{SE1}	79	FTB^{SE1}
	89	FTB^{BRK}	83	FTB^{SE1}	83	FTB^{SE1}
	87	FTB^{BRK}	84	FTB^{SE1}	82	FTB^{SE1}
Avg.	88		80		80	
S.D.	2		4		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

Precision Geosynthetic Laboratories

TABLE 3.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990087**
PGL CONTROL NO. : **40679** 18-Aug-99
CLIENT SAMPLE ID : **DS- 52**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	90	FTB^{BRK}	83	FTB^{SE1}	82	FTB^{SE1}
	87	FTB^{BRK}	83	FTB^{SE1}	81	FTB^{SE1}
	87	FTB^{BRK}	81	FTB^{SE1}	79	FTB^{SE1}
	91	FTB^{BRK}	84	FTB^{SE1}	81	FTB^{SE1}
	85	FTB^{BRK}	84	FTB^{SE1}	84	FTB^{SE1}
Avg.	88		83		81	
S.D.	2		1		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

Precision Geosynthetic Laboratories

TABLE 4.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990087**
PGL CONTROL NO. : **40680** 18-Aug-99
CLIENT SAMPLE ID : **DS- 53**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	91	FTB[BRK]	83	FTB[SE1]	79	FTB[SE1]
	85	FTB[BRK]	84	FTB[SE1]	84	FTB[SE1]
	86	FTB[BRK]	82	FTB[SE1]	80	FTB[SE1]
	85	FTB[BRK]	81	FTB[SE1]	82	FTB[SE1]
	87	FTB[BRK]	75	FTB[SE1]	80	FTB[SE1]
Avg.	87		81		81	
S.D.	2		4		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

Precision Geosynthetic Laboratories

TABLE 5.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990087**
PGL CONTROL NO. : **40681** 18-Aug-99
CLIENT SAMPLE ID : **DS- 54**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	82	FTB^{BRK}	79	FTB^{SE1}	***79***	***AD***
	83	FTB^{BRK}	79	FTB^{SE1}	81	FTB^{SE1}
	80	FTB^{BRK}	79	FTB^{SE1}	***77***	***AD***
	83	FTB^{BRK}	83	FTB^{SE1}	88	FTB^{SE1}
	81	FTB^{BRK}	78	FTB^{SE1}	***63***	***AD***
Avg.	82		80		78	
S.D.	1		2		9	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

Precision Geosynthetic Laboratories

TABLE 6.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990087**
PGL CONTROL NO. : **40682** 18-Aug-99
CLIENT SAMPLE ID : **DS- 55**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	83	FTB^{BRK}	81	FTB^{SE1}	81	FTB^{SE1}
	80	FTB^{BRK}	77	FTB^{SE1}	81	FTB^{SE1}
	77	FTB^{BRK}	75	FTB^{SE1}	80	FTB^{SE1}
	79	FTB^{BRK}	82	FTB^{SE1}	84	FTB^{SE1}
	76	FTB^{BRK}	77	FTB^{SE1}	76	FTB^{SE1}
Avg.	79		78		80	
S.D.	3		3		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

Precision Geosynthetic Laboratories

TABLE 7.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990087**
PGL CONTROL NO. : **40683** 18-Aug-99
CLIENT SAMPLE ID : **DS- 56**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	86	FTB^{BRK}	80	FTB^{SE1}	83	FTB^{SE1}
	82	FTB^{BRK}	81	FTB^{SE1}	83	FTB^{SE1}
	83	FTB^{BRK}	79	FTB^{SE1}	86	FTB^{SE1}
	82	FTB^{BRK}	83	FTB^{SE1}	79	FTB^{SE1}
	84	FTB^{BRK}	80	FTB^{SE1}	85	FTB^{SE1}
Avg.	83		81		83	
S.D.	2		2		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

Precision Geosynthetic Laboratories

TABLE 8.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990087**
PGL CONTROL NO. : **40684** 18-Aug-99
CLIENT SAMPLE ID : **DS- 57**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	86	FTB^{BRK}	***55***	***AD***	***63***	***AD***
	88	FTB^{BRK}	***56***	***AD***	***59***	***AD***
	84	FTB^{BRK}	***75***	***AD***	***47***	***AD***
	85	FTB^{BRK}	***79***	***AD***	***38***	***AD***
	85	FTB^{BRK}	***57***	***AD***	***62***	***AD***
Avg.	86		64		54	
S.D.	2		12		11	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

Precision Geosynthetic Laboratories

TABLE 9.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990087**
PGL CONTROL NO. : **40685** 18-Aug-99
CLIENT SAMPLE ID : **DS- 58**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	87	FTB^{BRK}	86	FTB^{SE1}	83	FTB^{SE1}
	90	FTB^{BRK}	84	FTB^{SE1}	77	FTB^{SE1}
	83	FTB^{BRK}	82	FTB^{SE1}	78	FTB^{SE1}
	86	FTB^{BRK}	88	FTB^{SE1}	87	FTB^{SE1}
	90	FTB^{BRK}	79	FTB^{SE1}	80	FTB^{SE1}
Avg.	87		84		81	
S.D.	3		3		4	
Specs	***40** min.*		***36** min.*		***36** min.*	

Precision Geosynthetic Laboratories

TABLE 10.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990087**
PGL CONTROL NO. : **40686** 18-Aug-99
CLIENT SAMPLE ID : **DS- 59**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	O JTER TRACK LOAD (lbs/in)	BREAK TYPE
	90	FTB^{BRK}	77	FTB^{SE1}	***31***	***AD***
	83	FTB^{BRK}	79	FTB^{SE1}	***51***	***AD***
	88	FTB^{BRK}	77	FTB^{SE1}	***52***	***AD***
	86	FTB^{BRK}	79	FTB^{SE1}	***38***	***AD***
	82	FTB^{BRK}	80	FTB^{SE1}	***42***	***AD***
Avg.	86		78		43	
S.D.	3		1		9	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

Precision Geosynthetic Laboratories

TABLE 11.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990087**
PGL CONTROL NO. : **40687** 18-Aug-99
CLIENT SAMPLE ID : **DS- 32C**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	87	FTB^{BRK}	85	FTB^{SE1}	84	FTB^{SE1}
	87	FTB^{BRK}	85	FTB^{SE1}	89	FTB^{SE1}
	89	FTB^{BRK}	85	FTB^{SE1}	86	FTB^{SE1}
	89	FTB^{BRK}	83	FTB^{SE1}	82	FTB^{SE1}
	91	FTB^{BRK}	77	FTB^{SE1}	82	FTB^{SE1}
Avg.	89		83		85	
S.D.	2		3		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

August 19, 1999

RECEIVED
SEP 0 1 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller:

RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of one (1) 40 mil LLDPE seam sample received August 19, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Quera
Quality Assurance

Ronald E. Belanger
Technical Director

Enclosure: (Job No. J990090)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

August 19, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seam
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. J990090)

MATERIAL DESCRIPTION: 40 mil LLDPE seam **No. of MATERIALS:** (1)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: August 19, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 34A	C #40717

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

TEST CONDITIONS: The sample was 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 are summarized in Table 1. The units in which the data are reported are included on the table. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990090**
PGL CONTROL NO. : **40717** 19-Aug-99
CLIENT SAMPLE ID : **DS- 34A**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	75	FTB^{BRK}	79	FTB^{SE1}	75	FTB^{SE1}
	84	FTB^{BRK}	81	FTB^{SE1}	79	FTB^{SE1}
	85	FTB^{BRK}	83	FTB^{SE1}	86	FTB^{SE1}
	88	FTB^{BRK}	82	FTB^{SE1}	78	FTB^{SE1}
	84	FTB^{BRK}	73	FTB^{SE1}	78	FTB^{SE1}
Avg.	83		80		79	
S.D.	5		4		4	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

August 20, 1999

RECEIVED
SEP 0 1 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller: RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of three (3) 40 mil LLDPE seam samples received August 20, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

Enclosure: (Job No. J990097)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

August 20, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seam
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. J990097)

MATERIAL DESCRIPTION: 40 mil LLDPE seam **No. of MATERIALS:** (3)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: August 20, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 54B	C #40771
DS- 57A	C #40772
DS- 59A	C #40773

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 through 3. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990097**
PGL CONTROL NO. : **40771** 20-Aug-99
CLIENT SAMPLE ID : **DS- 54B**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	83	FTB^{BRK}	82	FTB^{SE1}	79	FTB^{SE1}
	87	FTB^{BRK}	77	FTB^{SE1}	81	FTB^{SE1}
	79	FTB^{BRK}	78	FTB^{SE1}	76	FTB^{SE1}
	85	FTB^{BRK}	83	FTB^{SE1}	84	FTB^{SE1}
	86	FTB^{BRK}	73	FTB^{SE1}	77	FTB^{SE1}
Avg.	84		79		79	
S.D.	3		4		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990097**
PGL CONTROL NO. : **40772** 20-Aug-99
CLIENT SAMPLE ID : **DS- 57A**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	84	FTB^{BRK}	74	FTB^{SE1}	88	FTB^{SE1}
	87	FTB^{BRK}	77	FTB^{SE1}	88	FTB^{SE1}
	85	FTB^{BRK}	72	FTB^{SE1}	77	FTB^{SE1}
	83	FTB^{BRK}	79	FTB^{SE1}	84	FTB^{SE1}
	86	FTB^{BRK}	74	FTB^{SE1}	73	FTB^{SE1}
Avg.	85		75		82	
S.D.	2		3		7	
Specs	***40** min.*		***36** min.*		***36** min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 3.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990097**
PGL CONTROL NO. : **40773** 20-Aug-99
CLIENT SAMPLE ID : **DS- 59A**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	86	FTB^{BRK}	83	FTB^{SE1}	87	FTB^{SE1}
	93	FTB^{BRK}	83	FTB^{SE1}	81	FTB^{SE1}
	84	FTB^{BRK}	74	FTB^{SE1}	79	FTB^{SE1}
	88	FTB^{BRK}	83	FTB^{SE1}	81	FTB^{SE1}
	87	FTB^{BRK}	83	FTB^{SE1}	76	FTB^{SE1}
Avg.	88		81		81	
S.D.	3		4		4	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

August 25, 1999

RECEIVED
SEP 07 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller: RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of ten (10) 40 mil LLDPE seam samples received August 25, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

Enclosure: (Job No. J990112)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

August 25, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seams
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. J990112)

MATERIAL DESCRIPTION: 40 mil LLDPE seams **No. of MATERIALS:** (10)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: August 25, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 60	C #40904
DS- 61	C #40905
DS- 62	C #40906
DS- 63	C #40907
DS- 64	C #40908
DS- 65	C #40909
DS- 66	C #40910
DS- 67	C #40911
DS- 68	C #40912
DS- 69	C #40913

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 through 10. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990112**
PGL CONTROL NO. : **40904** 25-Aug-99
CLIENT SAMPLE ID : **DS- 60**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	86	FTB^{BRK}	76	FTB^{SE1}	79	FTB^{SE1}
	91	FTB^{BRK}	80	FTB^{SE1}	84	FTB^{SE1}
	93	FTB^{BRK}	78	FTB^{SE1}	77	FTB^{SE1}
	88	FTB^{BRK}	75	FTB^{SE1}	77	FTB^{SE1}
	94	FTB^{BRK}	76	FTB^{SE1}	77	FTB^{SE1}
Avg.	90		77		79	
S.D.	3		2		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990112**
PGL CONTROL NO. : **40905** 25-Aug-99
CLIENT SAMPLE ID : **DS- 61**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	90	FTB^{BRK}	82	FTB^{SE1}	84	FTB^{SE1}
	89	FTB^{BRK}	83	FTB^{SE1}	84	FTB^{SE1}
	94	FTB^{BRK}	79	FTB^{SE1}	83	FTB^{SE1}
	88	FTB^{BRK}	77	FTB^{SE1}	83	FTB^{SE1}
	93	FTB^{BRK}	78	FTB^{SE1}	80	FTB^{SE1}
Avg.	91		80		83	
S.D.	3		3		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 3.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990112**
PGL CONTROL NO. : **40906** 25-Aug-99
CLIENT SAMPLE ID : **DS- 62**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	92	FTB^{BRK}	83	FTB^{SE1}	81	FTB^{SE1}
	91	FTB^{BRK}	77	FTB^{SE1}	84	FTB^{SE1}
	99	FTB^{BRK}	79	FTB^{SE1}	76	FTB^{SE1}
	97	FTB^{BRK}	84	FTB^{SE1}	83	FTB^{SE1}
	88	FTB^{BRK}	82	FTB^{SE1}	76	FTB^{SE1}
Avg.	93		81		80	
S.D.	5		3		4	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 4.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990112**
PGL CONTROL NO. : **40907** 25-Aug-99
CLIENT SAMPLE ID : **DS- 63**

BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
82	FTB^{BRK}	80	FTB^{SE1}	78	FTB^{SE1}
82	FTB^{BRK}	76	FTB^{SE1}	77	FTB^{SE1}
82	FTB^{BRK}	75	FTB^{SE1}	76	FTB^{SE1}
88	FTB^{BRK}	78	FTB^{SE1}	79	FTB^{SE1}
81	FTB^{BRK}	81	FTB^{SE1}	81	FTB^{SE1}
Avg. 83		78		78	
S.D. 3		3		2	
Specs ***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 5.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990112**
PGL CONTROL NO. : **40908** 25-Aug-99
CLIENT SAMPLE ID : **DS- 64**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB^{BRK}	73	FTB^{SE1}	73	FTB^{SE1}
	84	FTB^{BRK}	74	FTB^{SE1}	78	FTB^{SE1}
	83	FTB^{BRK}	75	FTB^{SE1}	82	FTB^{SE1}
	77	FTB^{BRK}	72	FTB^{SE1}	78	FTB^{SE1}
	76	FTB^{BRK}	71	FTB^{SE1}	76	FTB^{SE1}
Avg.	80		73		77	
S.D.	4		2		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 6.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990112**
PGL CONTROL NO. : **40909** 25-Aug-99
CLIENT SAMPLE ID : **DS- 65**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	76	FTB^{BRK}	77	FTB^{SE1}	75	FTB^{SE1}
	77	FTB^{BRK}	72	FTB^{SE1}	77	FTB^{SE1}
	75	FTB^{BRK}	78	FTB^{SE1}	80	FTB^{SE1}
	77	FTB^{BRK}	76	FTB^{SE1}	76	FTB^{SE1}
	78	FTB^{BRK}	73	FTB^{SE1}	70	FTB^{SE1}
Avg.	77		75		76	
S.D.	1		3		4	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 7.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990112**
PGL CONTROL NO. : **40910** 25-Aug-99
CLIENT SAMPLE ID : **DS- 66**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	77	FTB^{BRK}	79	FTB^{SE1}	79	FTB^{SE1}
	83	FTB^{BRK}	77	FTB^{SE1}	77	FTB^{SE1}
	78	FTB^{BRK}	79	FTB^{SE1}	79	FTB^{SE1}
	79	FTB^{BRK}	83	FTB^{SE1}	78	FTB^{SE1}
	74	FTB^{BRK}	74	FTB^{SE1}	77	FTB^{SE1}
Avg.	78		78		78	
S.D.	3		3		1	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 8.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990112**
PGL CONTROL NO. : **40911** 25-Aug-99
CLIENT SAMPLE ID : **DS- 67**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	83	FTB^{BRK}	78	FTB^{SE1}	75	FTB^{SE1}
	77	FTB^{BRK}	77	FTB^{SE1}	77	FTB^{SE1}
	76	FTB^{BRK}	76	FTB^{SE1}	77	FTB^{SE1}
	77	FTB^{BRK}	76	FTB^{SE1}	74	FTB^{SE1}
	76	FTB^{BRK}	79	FTB^{SE1}	78	FTB^{SE1}
Avg.	78		77		76	
S.D.	3		1		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 9.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990112**
PGL CONTROL NO. : **40912** 25-Aug-99
CLIENT SAMPLE ID : **DS- 68**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB[BRK]	79	FTB[SE1]	79	FTB[SE1]
	81	FTB[BRK]	89	FTB[SE1]	80	FTB[SE1]
	80	FTB[BRK]	75	FTB[SE1]	82	FTB[SE1]
	82	FTB[BRK]	83	FTB[SE1]	88	FTB[SE1]
	77	FTB[BRK]	81	FTB[SE1]	78	FTB[SE1]
Avg.	80		81		81	
S.D.	2		5		4	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 10.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : **J990112**
PGL CONTROL NO. : **40913** 25-Aug-99
CLIENT SAMPLE ID : **DS- 69**

BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
77	FTB^{BRK}	82	FTB^{SE1}	84	FTB^{SE1}
79	FTB^{BRK}	74	FTB^{SE1}	77	FTB^{SE1}
76	FTB^{BRK}	77	FTB^{SE1}	76	FTB^{SE1}
84	FTB^{BRK}	77	FTB^{SE1}	78	FTB^{SE1}
77	FTB^{BRK}	75	FTB^{SE1}	77	FTB^{SE1}
Avg. 79		77		78	
S.D. 3		3		3	
Specs ***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

August 31, 1999

RECEIVED
SEP 17 1999
GEOPACIFIC LINING

Ms. Nicole Miller
GEOPACIFIC LINING, INC.
1300 Dexter Avenue North, Suite 205
Seattle, Washington 98109

Dear Ms. Miller: RE: Norfolk, Job #1584 / P.O. No. 1584-1881

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the laboratory report for the testing of twelve (12) 40 mil LLDPE seam samples received August 31, 1999.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence and disclosed to other parties only with the authorization of Client or Precision Geosynthetic Laboratories.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

R. Belanger
Ronald E. Belanger
Technical Director

Enclosure: (Job No. 991274)

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

Precision Geosynthetic Laboratories

August 31, 1999

VERIFICATION OF MATERIAL PROPERTIES
40 Mil LLDPE Seams
NORFOLK, JOB #1584 / P.O. NO. 1584-1881

FOR: GEOPACIFIC LINING, INC.
(Reference: PGL Job No. 991274)

MATERIAL DESCRIPTION: 40 mil LLDPE seams **No. of MATERIALS:** (12)

ORIGIN OF MATERIAL: GEOPACIFIC LINING, INC. / Seattle, WA

DATE RECEIVED: August 31, 1999 **SHIPPER:** Federal Express.

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
DS- 70 P173/ 174	C #47564
DS- 71 P174/ 175	C #47565
DS- 72 P175/ 176	C #47566
DS- 73 P176/ 178	C #47567
DS- 74 P178/ 179	C #47568
DS- 75 P181/ 182	C #47569
DS- 76 P182/ 183	C #47570
DS- 77 P183/ 184	C #47571
DS- 78 P184/ 186	C #47572
DS- 79 P186/ 187	C #47573
DS- 80 P189/ 192	C #47574
DS- 81 P173/ 195	C #47575

TESTS REQUIRED:

DESCRIPTION	TEST METHOD
Seam Peel Adhesion	ASTM D4437
Bonded Seam Strength	ASTM D4437

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 are summarized in Tables 1 through 12. The units in which the data are reported are included on the tables. Break types are defined as Film- tear bond (FTB) and separation (AD).

PRECISION GEOSYNTHETIC LABORATORIES

Cora B. Queja
Quality Assurance

Ronald E. Belanger
Technical Director

1742 West Katella Ave., Suite #4, Orange, CA 92867 TEL : (714) 744-4599 FAX : (714) 744-0357

TABLE 1.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47564 31-Aug-99
CLIENT SAMPLE ID : **DS- 70 P173/ 174**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	75	FTB^{BRK}	73	FTB^{SE1}	68	FTB^{SE1}
	78	FTB^{BRK}	74	FTB^{SE1}	70	FTB^{SE1}
	76	FTB^{BRK}	74	FTB^{SE1}	70	FTB^{SE1}
	78	FTB^{BRK}	74	FTB^{SE1}	76	FTB^{SE1}
	74	FTB^{BRK}	74	FTB^{SE1}	75	FTB^{SE1}
Avg.	76		74		72	
S.D.	2		0		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 2.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47565 31-Aug-99
CLIENT SAMPLE ID **: DS- 71 P174/ 175**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	78	FTB^{BRK}	69	FTB^{SE1}	74	FTB^{SE1}
	74	FTB^{BRK}	72	FTB^{SE1}	76	FTB^{SE1}
	76	FTB^{BRK}	68	FTB^{SE1}	68	FTB^{SE1}
	76	FTB^{BRK}	72	FTB^{SE1}	72	FTB^{SE1}
	74	FTB^{BRK}	69	FTB^{SE1}	72	FTB^{SE1}
Avg.	76		70		72	
S.D.	1		2		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 3.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47566 31-Aug-99
CLIENT SAMPLE ID : **DS- 72 P175/ 176**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	76	FTB^{BRK}	72	FTB^{SE1}	70	FTB^{SE1}
	76	FTB^{BRK}	74	FTB^{SE1}	70	FTB^{SE1}
	74	FTB^{BRK}	74	FTB^{SE1}	66	FTB^{SE1}
	76	FTB^{BRK}	76	FTB^{SE1}	68	FTB^{SE1}
	75	FTB^{BRK}	75	FTB^{SE1}	70	FTB^{SE1}
Avg.	76		74		69	
S.D.	1		1		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 4.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47567 31-Aug-99
CLIENT SAMPLE ID : **DS- 73 P176/ 178**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB^{BRK}	70	FTB^{SE1}	72	FTB^{SE1}
	79	FTB^{BRK}	72	FTB^{SE1}	74	FTB^{SE1}
	77	FTB^{BRK}	78	FTB^{SE1}	71	FTB^{SE1}
	78	FTB^{BRK}	74	FTB^{SE1}	72	FTB^{SE1}
	78	FTB^{BRK}	72	FTB^{SE1}	70	FTB^{SE1}
Avg.	78		73		72	
S.D.	1		3		1	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 5.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47568 31-Aug-99
CLIENT SAMPLE ID : **DS- 74 P178/ 179**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB^{BRK}	73	FTB^{SE1}	73	FTB^{SE1}
	79	FTB^{BRK}	74	FTB^{SE1}	74	FTB^{SE1}
	76	FTB^{BRK}	74	FTB^{SE1}	72	FTB^{SE1}
	78	FTB^{BRK}	77	FTB^{SE1}	78	FTB^{SE1}
	78	FTB^{BRK}	76	FTB^{SE1}	77	FTB^{SE1}
Avg.	78		75		75	
S.D.	1		2		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 6.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47569 31-Aug-99
CLIENT SAMPLE ID : **DS- 75 P181/ 182**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	77	FTB^{BRK}	73	FTB^{SE1}	75	FTB^{SE1}
	77	FTB^{BRK}	76	FTB^{SE1}	78	FTB^{SE1}
	75	FTB^{BRK}	73	FTB^{SE1}	75	FTB^{SE1}
	76	FTB^{BRK}	76	FTB^{SE1}	73	FTB^{SE1}
	76	FTB^{BRK}	76	FTB^{SE1}	76	FTB^{SE1}
Avg.	76		75		75	
S.D.	1		2		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 7.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47570 31-Aug-99
CLIENT SAMPLE ID : **DS- 76 P182/ 183**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB^{BRK}	73	FTB^{SE1}	70	FTB^{SE1}
	79	FTB^{BRK}	74	FTB^{SE1}	75	FTB^{SE1}
	77	FTB^{BRK}	73	FTB^{SE1}	68	FTB^{SE1}
	79	FTB^{BRK}	74	FTB^{SE1}	80	FTB^{SE1}
	78	FTB^{BRK}	75	FTB^{SE1}	74	FTB^{SE1}
Avg.	78		74		73	
S.D.	1		1		5	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 8.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47571 31-Aug-99
CLIENT SAMPLE ID : **DS- 77 P183/ 184**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	81	FTB^{BRK}	70	FTB^{SE1}	76	FTB^{SE1}
	80	FTB^{BRK}	73	FTB^{SE1}	78	FTB^{SE1}
	79	FTB^{BRK}	70	FTB^{SE1}	74	FTB^{SE1}
	81	FTB^{BRK}	72	FTB^{SE1}	81	FTB^{SE1}
	80	FTB^{BRK}	72	FTB^{SE1}	80	FTB^{SE1}
Avg.	80		71		78	
S.D.	1		1		3	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 9.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47572 31-Aug-99
CLIENT SAMPLE ID **: DS- 78 P184/ 186**

	BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB^{BRK}	74	FTB^{SE1}	75	FTB^{SE1}
	79	FTB^{BRK}	74	FTB^{SE1}	76	FTB^{SE1}
	76	FTB^{BRK}	74	FTB^{SE1}	76	FTB^{SE1}
	79	FTB^{BRK}	74	FTB^{SE1}	77	FTB^{SE1}
	77	FTB^{BRK}	77	FTB^{SE1}	77	FTB^{SE1}
Avg.	78		75		76	
S.D.	1		1		1	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 10.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47573 31-Aug-99
CLIENT SAMPLE ID : **DS- 79 P186/ 187**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	78	FTB^{BRK}	72	FTB^{SE1}	74	FTB^{SE1}
	79	FTB^{BRK}	75	FTB^{SE1}	78	FTB^{SE1}
	77	FTB^{BRK}	74	FTB^{SE1}	74	FTB^{SE1}
	78	FTB^{BRK}	75	FTB^{SE1}	76	FTB^{SE1}
	77	FTB^{BRK}	70	FTB^{SE1}	78	FTB^{SE1}
Avg.	78		73		76	
S.D.	1		2		2	
Specs	***40*** *min.*		***36*** *min.*		***33*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 11.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47574 31-Aug-99
CLIENT SAMPLE ID : **DS- 80 P189/ 192**

BONDED SEAM STRENGTH			SEAM PEEL ADHESION			
	SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
	79	FTB^{BRK}	72	FTB^{SE1}	76	FTB^{SE1}
	79	FTB^{BRK}	69	FTB^{SE1}	74	FTB^{SE1}
	78	FTB^{BRK}	70	FTB^{SE1}	74	FTB^{SE1}
	78	FTB^{BRK}	74	FTB^{SE1}	78	FTB^{SE1}
	77	FTB^{BRK}	74	FTB^{SE1}	76	FTB^{SE1}
Avg.	78		72		76	
S.D.	1		2		2	
Specs	***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR BOND.

Precision Geosynthetic Laboratories

TABLE 12.
MATERIAL PROPERTIES
40 Mil LLDPE Seam
Norfolk, Job #1584 / P.O. No. 1584-1881
FOR: GEOPACIFIC LINING, INC.

PGL JOB NO. : 991274
PGL CONTROL NO. : 47575 31-Aug-99
CLIENT SAMPLE ID **: DS- 81 P173/ 195**

BONDED SEAM STRENGTH		SEAM PEEL ADHESION			
SHEAR STRENGTH (lbs/in)	BREAK TYPE	INNER TRACK LOAD (lbs/in)	BREAK TYPE	OUTER TRACK LOAD (lbs/in)	BREAK TYPE
79	FTB^{BRK}	72	FTB^{SE1}	75	FTB^{SE1}
81	FTB^{BRK}	70	FTB^{SE1}	76	FTB^{SE1}
79	FTB^{BRK}	74	FTB^{SE1}	74	FTB^{SE1}
80	FTB^{BRK}	76	FTB^{SE1}	76	FTB^{SE1}
76	FTB^{BRK}	72	FTB^{SE1}	76	FTB^{SE1}
Avg. 79		73		75	
S.D. 2		2		1	
Specs ***40*** *min.*		***36*** *min.*		***36*** *min.*	

BREAK DESCRIPTION, HOT- WEDGE SEAM:

AD	ADHESION FAILURE.
BRK	BREAK IN SHEETING.
SE1	BREAK AT OUTER EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
FTB	FILM-TEAR-BOND.

Precision Geosynthetic Laboratories

POLY-FLEX, INC.
2000 W. Marshall Drive Grand Prairie, Texas 75051 USA
888-765-9359 972-337-7113 FAX 972-337-7233

CERTIFICATION DOCUMENTS

To: GeoPacific Lining, Inc.
1300 Dexter Ave. North, Suite 205
Seattle, Washington 98109

Date: 07/08/99
Poly-Flex Proj # : 990057
Customer PO: 1584-1699
Project Name: Norfolk

Attn: Kirk Lilleskare
Fax No: **206-298-5155**
Number of pages including cover: 10

Departure Date: 07/01/99
Destination: Norfolk, VA.
Carrier: Digby

Trip No: 0705-150CF
0705-151CF
Freight: PP

RECEIVED
JUL 1 2 1999
GEOPACIFIC LINING

Additional Notes:

Distribution of Documents:

Shipment Inspection Sheet:	2
Roll Certification:	2
Resin Certification:	2
Other:	3

Attached please find documents for the above referenced shipment. Please let us know if you have any questions.

Sincerely,

Doug Glotfelty
1-888-765-9359 ext 7269

CERTIFICATION SHEET

DATE: 07/02/

POLY-FLEX, INC

2000 W. Marshall Drive
Grand Prairie, Texas 75051

PROJECT NO: 990057

ORDER NO: 309942

TRIP NO: 0705-151CF

CERTIFIED BY: L. Jacobsen

TEST DESCRIPTION			THICKNESS	CARBON BLACK	TEAR	PUNCTURE	TENSILE @ YIELD	ELONG @ YIELD	TENSILE @ BREAK	ELONG @ BREAK	CAR. BLK. DISPERSION	DENSITY	ESCR (cond. B)
ASTM METHOD			D1593	D1603	D1004	TMS 10	D638	D638	D638	D638	D3015	D1505	D1693
(modifications)			min/avg			2065							2000 hrs
UNITS			mils	%	lb	lb	ppi	%	ppi	%		gm/cc	PASS
SPECIFICATION			36/ 40	2%-3%	23	48	58	13	80	350	A1,A2,B1	0.915	
ROLL NUMBER		BLEND											(Start)
PR-4-99	302-7	8290609	36/ 41	2.5	28	54	66	20	106	508	A-1	0.933	06/15/99
PR-4-99	339-7	8290188	36/ 43	2.4	27	51	71	20	92	458	A-1	0.934	06/26/99
PR-4-99	340-7	8290188	36/ 43	2.4	27	51	71	20	92	458	A-1	0.934	06/26/99
PR-4-99	341-7	8290188	36/ 43	2.4	27	51	71	20	92	458	A-1	0.934	06/26/99
PR-4-99	342-7	8290188	36/ 43	2.4	29	53	70	20	118	544	A-1	0.934	06/26/99
PR-4-99	343-7	8290188	36/ 43	2.4	29	53	70	20	118	544	A-1	0.934	06/26/99
PR-4-99	344-7	8290188	36/ 43	2.4	29	53	70	20	118	544	A-1	0.934	06/26/99
PR-4-99	345-7	8290188	37/ 43	2.5	25	53	69	20	89	462	A-2	0.936	06/26/99
PR-4-99	346-7	8290188	37/ 43	2.5	25	53	69	20	89	462	A-2	0.936	06/26/99
PR-4-99	347-7	8290188	37/ 43	2.5	25	53	69	20	89	462	A-2	0.936	06/26/99
PR-4-99	348-7	8290188	37/ 43	2.4	30	52	72	34	111	517	A-2	0.936	06/26/99
PR-4-99	349-7	8290188	37/ 43	2.4	30	52	72	34	111	517	A-2	0.936	06/26/99

Poly-Flex

Geomembrane Shipment Inspection

Tractor # 9609 Trailer # 9012 Date: 1-Jul-99 TRIP 0705-151CF

Drop #	1	Drop #		Drop #		Drop #	
Poly-Flex #	990057(309942)	Poly-Flex #		Poly-Flex #		Poly-Flex #	
Customer:	GEOPACIFIC	Customer:		Customer:		Customer:	
Destination:	NORFOLK,VA	Destination:		Destination:		Destination:	
Carrier:	DIGBY	Carrier:		Carrier:		Carrier:	

	Blend	Roll Number	Weight	Roll Description
1	8290118	PR-4-99- 0302- 7	3,246	23' X 700' X .040LLR
2	8290118	PR-4-99- 0339- 7	3,398	23' X 700' X .040LLR
3	8290118	PR-4-99- 0340- 7	3,399	23' X 700' X .040LLR
4	8290118	PR-4-99- 0341- 7	3,398	23' X 700' X .040LLR
5	8290118	PR-4-99- 0342- 7	3,405	23' X 700' X .040LLR
6	8290118	PR-4-99- 0343- 7	3,402	23' X 700' X .040LLR
7	8290118	PR-4-99- 0344- 7	3,416	23' X 700' X .040LLR
8	8290118	PR-4-99- 0345- 7	3,398	23' X 700' X .040LLR
9	8290118	PR-4-99- 0346- 7	3,390	23' X 700' X .040LLR
10	8290118	PR-4-99- 0347- 7	3,400	23' X 700' X .040LLR
11	8290118	PR-4-99- 0348- 7	3,390	23' X 700' X .040LLR
12	8290118	PR-4-99- 0349- 7	3,393	23' X 700' X .040LLR
13				
14				
15				
16				
17				
18	shipped pieces		**40,635**	
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

I certify that all loading requirements and roll conditions were inspected and approved.

GENE RODRIGUEZ
Truck Loader

CERTIFICATION SHEET

DATE: 07/02/

POLY-FLEX, INC

2000 W. Marshall Drive
Grand Prairie, Texas 75051

PROJECT NO: 990057

ORDER NO: 309939

TRIP NO: 0705-150CF

CERTIFIED BY: L. Jackson

TEST DESCRIPTION		THICKNESS	CARBON BLACK	TEAR	PUNCTURE	TENSILE @ YIELD	ELONG @ YIELD	TENSILE @ BREAK	ELONG @ BREAK	CAR. BLK. DISPERSION	DENSITY	ESCR (cond. B)
ASTM METHOD		D1593	D1603	D1004	TMS 10	D638	D638	D638	D638	D3015	D1505	D1693
(modifications)		min/avg			2065							2000 hrs
UNITS		mils	%	lb	lb	ppi	%	ppi	%		gm/cc	PASS
SPECIFICATION		36/ 40	2%-3%	23	48	58	13	80	350	A1,A2,B1	0.915	
ROLL NUMBER	BLEND											(Start)
PR-4-99 325-7	8290188	36/ 43	2.4	30	50	73	22	103	444	A-1	0.935	06/26/99
PR-4-99 326-7	8290188	36/ 43	2.4	30	50	73	22	103	444	A-1	0.935	06/26/99
PR-4-99 327-7	8290188	36/ 43	2.2	27	51	77	20	98	474	A-1	0.935	06/26/99
PR-4-99 328-7	8290188	36/ 43	2.2	27	51	77	20	98	474	A-1	0.935	06/26/99
PR-4-99 329-7	8290188	36/ 43	2.2	27	51	77	20	98	474	A-1	0.935	06/26/99
PR-4-99 330-7	8290188	36/ 43	2.5	30	54	72	32	118	524	A-1	0.935	06/26/99
PR-4-99 331-7	8290188	36/ 43	2.5	30	54	72	32	118	524	A-1	0.935	06/26/99
PR-4-99 332-7	8290188	36/ 43	2.5	30	54	72	32	118	524	A-1	0.935	06/26/99
PR-4-99 333-7	8290188	36/ 43	2.4	28	55	78	19	94	422	A-1	0.935	06/26/99
PR-4-99 335-7	8290188	36/ 43	2.4	28	55	78	19	94	422	A-1	0.935	06/26/99
PR-4-99 336-7	8290188	36/ 43	2.5	28	53	71	20	91	460	A-1	0.934	06/26/99
PR-4-99 337-7	8290188	36/ 43	2.5	28	53	71	20	91	460	A-1	0.934	06/26/99

Poly-Flex

Geomembrane Shipment Inspection

Tractor # 9646 Trailer # 9045 Date: 1-Jul-99 TRIP 0705-150CF

Drop #	1	Drop #	1	Drop #		Drop #	
Poly-Flex #	990057(309939)	Poly-Flex #	990057(317779)	Poly-Flex #		Poly-Flex #	
Customer:	GEOPACIFIC	Customer:	GEOPACIFIC	Customer:		Customer:	
Destination:	NORFOLK,VA	Destination:	NORFOLK,VA	Destination:		Destination:	
Carrier:	DIGBY	Carrier:	DIGBY	Carrier:		Carrier:	

	Blend	Roll Number	Weight	Roll Description
1	8290188	PR-4-99- 0325- 7	3,424	23' X 700' X .040LLR
2	8290188	PR-4-99- 0326- 7	3,390	23' X 700' X .040LLR
3	8290188	PR-4-99- 0327- 7	3,395	23' X 700' X .040LLR
4	8290188	PR-4-99- 0328- 7	3,409	23' X 700' X .040LLR
5	8290188	PR-4-99- 0329- 7	3,410	23' X 700' X .040LLR
6	8290188	PR-4-99- 0330- 7	3,416	23' X 700' X .040LLR
7	8290188	PR-4-99- 0331- 7	3,440	23' X 700' X .040LLR
8	8290188	PR-4-99- 0332- 7	3,428	23' X 700' X .040LLR
9	8290188	PR-4-99- 0333- 7	3,425	23' X 700' X .040LLR
10	8290188	PR-4-99- 0335- 7	3,400	23' X 700' X .040LLR
11	8290188	PR-4-99- 0336- 7	3,410	23' X 700' X .040LLR
12	8290188	PR-4-99- 0337- 7	3,407	23' X 700' X .040LLR
13	18 CASES	GWR-LL5	555	5MM GEO WELDING ROD - LLDPE
14				
15				
16				
17				
18	shipped pieces		**41,509**	
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

I certify that all loading requirements and roll conditions were inspected and approved.

GENE RODRIGUEZ
Truck Loader

STRAIGHT BILL OF LADING - SHORT FORM

ORIGINAL - NOT NEGOTIABLE

009283

SHIPPER'S NO. GY 309942

CARRIER:

CARRIER NO. (SCAC) 990057

RECEIVED, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper on request

At WAREHOUSE 01 6/23 199 9 From Poly-Flex, Inc.

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as shown below, which said carrier agrees to carry to destination, if on its route, otherwise to deliver to another carrier on the route to said destination. Every service to be performed hereunder shall be subject to all the terms and conditions not prohibited by law.

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

CONSIGNED TO

GEOPACIFIC LINING INC.
C/O GRACE INDUSTRIES
NORFOLK, VA

PHONE 206-284-2378

P.O. 1584-1699

COMMENTS

QUANTITY	CODE	DESCRIPTION
12 R	GLT-040-0700	23" X 700' .040 LL TX

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier should not make delivery of this shipment without payment of freight and all other lawful charges.

Poly-Flex, Inc.

(Signature of Consignor)

If charges are to be prepaid, write or stamp here: "To be Prepaid."

PRE-PAID

Date

Pulled

Checked

Loaded

ANY DISAGREEMENT ARISING OUT OF THE SALE, USE, OR TRANSPORTATION OF THIS SHIPMENT OR THE EXECUTION AND/OR TERMS OF THIS BILL OF LADING SHALL BE SUBMITTED TO BINDING ARBITRATION ADMINISTERED BY THE AMERICAN ARBITRATION ASSOCIATION. THE PARTIES HEREBY AGREE THAT NEITHER PARTY SHALL BE *ENTITLED TO AN AWARD FOR PUNITIVE DAMAGES* OR ATTORNEY COSTS. THE JUDGEMENT OF THE ARBITRATION MAY BE ENTERED IN ANY COURT HAVING JURISDICTION THEREOF.

WHSE ID #

TOTAL WEIGHT 38,872

PIECES SHIPPED

PIECES RECEIVED

RECEIVER SIGNATURE

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is a carrier's or shipper's weight.

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

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding:

per

SIGNATURE CERTIFIES ACCEPTANCE OF QUANTITIES AND SIZES OF MATERIALS AS INDICATED.

Carrier hereby designates the broker (if any) as its agent for the collection of prepaid freight charges. When freight charges are paid to broker, carrier agrees not to hold shipper or consignee liable for said charges.

Poly-Flex, Inc. Shipper, Carrier Per Driver Date

PA 7-98, 2591.5 2000 W. Marshall Dr., Grand Prairie TX 75051

Pe post-office address of shipper, Time

1454530623 TRAFFIC (972) 647-4374

MEM INC. (817) 831-7215

RAIGHT BILL OF LADING - SHORT FORM

ORIGINAL - NOT NEGOTIABLE

0092

SHIPPER'S NO. GY 317779

CARRIER:

CARRIER NO. (SCAC) 990057

RECEIVED, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper on request

At WAREHOUSE 01 6/23 199 9 From Poly-Flex, Inc.

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as shown below, which said carrier agrees to carry to destination, if on its route, otherwise to deliver to another carrier on the route to said destination. Every service to be performed hereunder shall be subject to all the terms and conditions not prohibited by law.

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

CONSIGNED TO

GEOPACIFIC LINING INC.
C/O GRACE INDUSTRIES
NORFOLK, VA

PHONE 206-284-2378 P.O. 1584-1699

COMMENTS

QUANTITY	CODE	DESCRIPTION
18 C	GWR-LL5	5MM GEO WELDING ROD - LLD

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier should not make delivery of this shipment without payment of freight and all other lawful charges.

Poly-Flex, Inc.
(Signature of Consignor)

If charges are to be prepaid, write or stamp here: "To be Prepaid."

PRE-PAID

Date 6/23/99

Pulled

Checked

Loaded

ANY DISAGREEMENT ARISING OUT OF THE SALE, USE, OR TRANSPORTATION OF THIS SHIPMENT OR THE EXECUTION AND/OR TERMS OF THIS BILL OF LADING SHALL BE SUBMITTED TO BINDING ARBITRATION ADMINISTERED BY THE AMERICAN ARBITRATION ASSOCIATION. THE PARTIES HEREBY AGREE THAT NEITHER PARTY SHALL BE ENTITLED TO AN AWARD FOR PUNITIVE DAMAGES OR ATTORNEY COSTS. THE JUDGEMENT OF THE ARBITRATION MAY BE ENTERED IN ANY COURT HAVING JURISDICTION THEREOF.

WHSE ID #

TOTAL WEIGHT 555

18

PIECES SHIPPED

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is a carrier's or shipper's weight.

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

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding:

per

PIECES RECEIVED

SIGNATURE CERTIFIES ACCEPTANCE OF QUANTITIES AND SIZES OF MATERIALS AS INDICATED.

Carrier hereby designates the broker (if any) as its agent for the collection of prepaid freight charges. When freight charges are paid to broker, carrier agrees not to hold shipper or consignee liable for said charges.

RECEIVER SIGNATURE

Poly-Flex, Inc. Shipper, Carrier _____ Per _____ Driver _____ Date _____

PAI-101-R-7-98, 2591.5

Permanent post-office address of shipper, 2000 W. Marshall Dr., Grand Prairie TX 75051

Time _____

TRAFFIC

1716390623 (972) 647-4374

STRAIGHT BILL OF LADING - SHORT FORM

ORIGINAL - NOT NEGOTIABLE

009283

SHIPPER'S NO. GY 309939

CARRIER:

CARRIER NO. (SCAC) 990057

RECEIVED, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper on request

At WAREHOUSE 01 6/23 199 9 From Poly-Flex, Inc.

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as shown below, which said carrier agrees to carry to destination, if on its route, otherwise to deliver to another carrier on the route to said destination. Every service to be performed hereunder shall be subject to all the terms and conditions not prohibited by law.

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

CONSIGNED TO

GEOPACIFIC LINING INC.
C/O GRACE INDUSTRIES
NORFOLK, VA

PHONE 206-284-2378 P.O. 1584-1699

COMMENTS

QUANTITY	CODE	DESCRIPTION
12 R	GLT-040-0700	23' X 700' .040 LL TX

WHSE ID #

TOTAL WEIGHT 38,872

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is a carrier's or shipper's weight.

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

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding:

per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier should not make delivery of this shipment without payment of freight and all other lawful charges.

Poly-Flex, Inc.
(Signature of Consignor)

If charges are to be prepaid, write or stamp here: "To be Prepaid."

PRE-PAID

Date

Pulled

Checked

Loaded

ANY DISAGREEMENT ARISING OUT OF THE SALE, USE, OR TRANSPORTATION OF THIS SHIPMENT OR THE EXECUTION AND/OR TERMS OF THIS BILL OF LADING SHALL BE SUBMITTED TO BINDING ARBITRATION ADMINISTERED BY THE AMERICAN ARBITRATION ASSOCIATION. THE PARTIES HEREBY AGREE THAT NEITHER PARTY SHALL BE ENTITLED TO AN AWARD FOR PUNITIVE DAMAGES OR ATTORNEY COSTS. THE JUDGEMENT OF THE ARBITRATION MAY BE ENTERED IN ANY COURT HAVING JURISDICTION THEREOF.

12

PIECES SHIPPED

PIECES RECEIVED

RECEIVER SIGNATURE

SIGNATURE CERTIFIES ACCEPTANCE OF QUANTITIES AND SIZES OF MATERIALS AS INDICATED.

Carrier hereby designates the broker (if any) as its agent for the collection of prepaid freight charges. When freight charges are paid to broker, carrier agrees not to hold shipper or consignee liable for said charges.

Poly-Flex, Inc. Shipper, Carrier Per Driver Date

)-R-7-98, 2591.5
hent post-office address of shipper, 2000 W. Marshall Dr., Grand Prairie TX 75051 Time

TRAFFIC

(972) 647-4374

MGM, INC. (817) 831-7215

POLY-FLEX, INC.
2000 W. Marshall Drive Grand Prairie, Texas 75051 USA
888-765-9359 972-337-7113 FAX 972-337-7233

CERTIFICATION DOCUMENTS

To: GeoPacific Lining, Inc.
1300 Dexter Ave. North, Suite 205
Seattle, Washington 98109

Date: 07/09/99
Poly-Flex Proj # : 990057
Customer PO: 1584-1699
Project Name: Norfolk

Attn: Kirk Lilleskare
Fax No: 206-298-5155
Number of pages including cover: 7

RECEIVED
JUL 26 1999
DESMONT INC

Departure Date: 07/06/99
Destination: Norfolk, VA.
Carrier:

Trip No: 0705-158CF
Freight: PP

Additional Notes:

Distribution of Documents:

Shipment Inspection Sheet:	1
Roll Certification:	1
Resin Certification:	3
Other:	1

Attached please find documents for the above referenced shipment. Please let us know if you have any questions.

Sincerely,

Doug Glotfelty
1-888-765-9359 ext 7269

Poly-Flex

Geomembrane Shipment Inspection

Tractor # 152 Trailer # 1018 Date: 02-Jul-99 TRIP 0705-158CF

Drop #	1	Drop #		Drop #		Drop #	
Poly-Flex #	990057(309941)	Poly-Flex #		Poly-Flex #		Poly-Flex #	
Customer:	GEOPACIFIC	Customer:		Customer:		Customer:	
Destination:	NORFOLK,VA	Destination:		Destination:		Destination:	
Carrier:	21ST AMERICAN	Carrier:		Carrier:		Carrier:	

	Blend	Roll Number	Weight	Roll Description
1	8280708	PR-4-99- 0182- 7	3,258	23' X 700' X .040LLR
2	8290609	PR-4-99- 0238- 7	3,382	23' X 700' X .040LLR
3	8290609	PR-4-99- 0239- 7	3,361	23' X 700' X .040LLR
4	8290609	PR-4-99- 0240- 7	3,350	23' X 700' X .040LLR
5	8290609	PR-4-99- 0241- 7	3,330	23' X 700' X .040LLR
6	8290609	PR-4-99- 0243- 7	3,214	23' X 700' X .040LLR
7	8290609	PR-4-99- 0244- 7	3,249	23' X 700' X .040LLR
8	8290609	PR-4-99- 0245- 7	3,258	23' X 700' X .040LLR
9	8290609	PR-4-99- 0248- 7	3,274	23' X 700' X .040LLR
10	8290188	PR-4-99- 0304- 7	3,300	23' X 700' X .040LLR
11	8290188	PR-4-99- 0308- 7	3,394	23' X 700' X .040LLR
12	8290188	PR-4-99- 0312- 7	3,418	23' X 700' X .040LLR
13				
14				
15				
16				
17				
18	shipped pieces		39,788	
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

I certify that all loading requirements and roll conditions were inspected and approved.

GENE RODRIGUEZ
Truck Loader

CERTIFICATION SHEET

DATE: 07/06/99

POLY-FLEX, INC.
2000 W. Marshall Drive
Grand Prairie, Texas 75051

PROJECT NO: 990057

ORDER NO: 309941

TRIP NO: 0705-158CF

CERTIFIED BY: L. Jackson

TEST DESCRIPTION		THICKNESS	CARBON BLACK	TEAR	PUNCTURE	TENSILE @ YIELD	ELONG @ YIELD	TENSILE @ BREAK	ELONG @ BREAK	CAR. BLK. DISPERSION	DENSITY	ESCR (cond. B)
ASTM METHOD		D1593	D1603	D1004	TMS 10	D638	D638	D638	D638	D3015	D1505	D1693
(modifications)		min/avg			2065							2000 hrs
UNITS		mils	%	lb	lb	ppi	%	ppi	%		gm/cc	PASS
SPECIFICATION		36/ 40	2%-3%	23	48	58	13	80	350	A1,A2,B1	0.915	
ROLL NUMBER	BLEND											(Start)
PR-4-99 182-7	8280708	39/ 41	2.6	30	63	69	20	145	656	A-1	0.936	PASS
PR-4-99 238-7	8290609	36/ 43	2.8	25	66	63	22	114	567	A-1	0.930	06/15/99
PR-4-99 239-7	8290609	36/ 42	2.8	25	66	63	22	114	567	A-1	0.930	06/15/99
PR-4-99 240-7	8290609	36/ 42	2.5	26	57	70	16	86	545	A-1	0.934	06/15/99
PR-4-99 241-7	8290609	36/ 42	2.5	26	57	70	16	86	545	A-1	0.934	06/15/99
PR-4-99 243-7	8290609	36/ 40	2.5	26	57	70	16	86	539	A-1	0.934	06/15/99
PR-4-99 244-7	8290609	36/ 41	2.5	26	57	70	16	86	539	A-1	0.934	06/15/99
PR-4-99 245-7	8290609	36/ 41	2.5	26	57	70	16	86	539	A-1	0.934	06/15/99
PR-4-99 248-7	8290609	36/ 41	2.6	24	54	65	20	113	549	A-1	0.933	06/15/99
PR-4-99 304-7	8290188	36/ 41	2.5	25	50	71	25	108	505	A-1	0.933	06/15/99
PR-4-99 308-7	8290188	36/ 43	2.9	29	51	77	19	121	516	A-2	0.932	06/15/99
PR-4-99 312-7	8290188	36/ 43	2.5	26	52	73	26	116	486	A-1	0.930	06/15/99

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

May 25, 1999

KSL# 14995-99

FAX: 972-337-7407

Poly America, Inc.
2000 West Marshall Drive
Grand Prairie, TX 75051

Dee Averitte

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

Type:	K203
Lot Number:	8290188
P.O. Number:	23463
Date Shipped:	05/26/99
Package:	HT
Quantity:	45000 LBS. (EST.)
Melt Index, ASTM D1238:	.180 G/10 MIN
Density, ASTM D1505:	.923 G/CC
HLMI Flow Rate, ASTM D1238:	16.5 G/10 MIN
Production Date:	02/11/99

Karen S. Lively
Quality Assurance Manager

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

* Reg. U.S. Pat. Off.

cc: QA-File-RC

Lisa
FAX: 972-337-7233

Jim Nobert
FAX: 972-337-7396

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

May 06, 1999

JHV# 12982-99

FAX: 972-337-7407

Poly America, Inc.
2000 West Marshall Drive
Grand Prairie, TX 75051

Dee Averitte

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

Type:	K203
Lot Number:	8290609
P.O. Number:	23463
Date Shipped:	05/05/99
Package:	PSPX 6436
Quantity:	177400 LBS.
Melt Index, ASTM D1238:	.190 G/10 MIN
Density, ASTM D1505:	.923 G/CC
HLMI Flow Rate, ASTM D1238:	15.9 G/10 MIN
Production Date:	04/30/99

J. H. Vaden
Quality Assurance Manager

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

* Reg. U.S. Pat. Off.

cc: QA-File-RC

Lisa
FAX: 972-337-7233

Jim Nobert
FAX: 972-337-7396

PHILLIPS 66 COMPANY
A DIVISION OF PHILLIPS PETROLEUM COMPANY
PASADENA, TEXAS 77501-0792
BOX 792 PHONE 713-475-3666

PHILLIPS PLASTICS RESINS
Houston Chemical Complex

May 27, 1998

JHV# 11454-98

FAX: 972-337-7407

Poly America, Inc.
2000 West Marshall Drive
Grand Prairie, TX 75051

Dee Averitte

A shipment of Marlex* resin was recently sent to you by Phillips Chemical Company. Data on the shipment are listed below.

Type:	K203
Lot Number:	8280708
P.O. Number:	19605
Date Shipped:	05/25/98
Package:	PSPK 2071
Quantity:	179300 LBS.
Melt Index, ASTM D1238:	.20 G/10 MIN
Density, ASTM D1505:	.923 G/CC
HLMI Flow Rate, ASTM D1238:	15.2 G/10 MIN

J. H. Vaden
Quality Assurance Manager

For COA questions call Sharon Robinette, 713-475-3625

* Reg. U.S. Pat. Off.

cc: QA-File-RC

Mr. Jim Nobert
Poly America, Inc.
2000 West Marshall Drive
Grand Prairie, TX 75051

STRAIGHT BILL OF LADING - SHORT FORM

ORIGINAL - NOT NEGOTIABLE

009283

SHIPPER'S NO. GY 309941

CARRIER:

CARRIER NO. (SCAC) 990057

RECEIVED, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper on request

At WAREHOUSE 01 6/23 199 9 From Poly-Flex, Inc.

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as shown below, which said carrier agrees to carry to destination, if on its route, otherwise to deliver to another carrier on the route to said destination. Every service to be performed hereunder shall be subject to all the terms and conditions not prohibited by law.

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

CONSIGNED TO

GEOPACIFIC LINING INC.
C/O GRACE INDUSTRIES
NORFOLK, VA

PHONE 206-284-2378 P.O. 1584-1699

COMMENTS

QUANTITY	CODE	DESCRIPTION
12 R	GLT-040-0700	23' X 700' .040 LL TX

WHSE ID #

TOTAL WEIGHT 38,872

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is a carrier's or shipper's weight.

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

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding:

per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier should not make delivery of this shipment without payment of freight and all other lawful charges.

Poly-Flex, Inc.
(Signature of Consignor)

If charges are to be prepaid, write or stamp here: "To be Prepaid."

PRE-PAID

Date

Pulled

Checked

Loaded

ANY DISAGREEMENT ARISING OUT OF THE SALE, USE, OR TRANSPORTATION OF THIS SHIPMENT OR THE EXECUTION AND/OR TERMS OF THIS BILL OF LADING SHALL BE SUBMITTED TO BINDING ARBITRATION ADMINISTERED BY THE AMERICAN ARBITRATION ASSOCIATION. THE PARTIES HEREBY AGREE THAT NEITHER PARTY SHALL BE ENTITLED TO AN AWARD FOR PUNITIVE DAMAGES OR ATTORNEY COSTS. THE JUDGEMENT OF THE ARBITRATION MAY BE ENTERED IN ANY COURT HAVING JURISDICTION THEREOF.

12

PIECES SHIPPED

PIECES RECEIVED

RECEIVER SIGNATURE

SIGNATURE CERTIFIES ACCEPTANCE OF QUANTITIES AND SIZES OF MATERIALS AS INDICATED.

Carrier hereby designates the broker (if any) as its agent for the collection of prepaid freight charges. When freight charges are paid to broker, carrier agrees not to hold shipper or consignee liable for said charges.

Poly-Flex, Inc. Shipper Carrier Per Driver Date

PAI-1 8, 2591.5 Perm ost-office address of shipper, 2000 W. Marshall Dr., Grand irie TX 75051 Time

TRAFFIC

1 1530623 (972) 647-4374

MGM, INC. (817) 831-7215

POLY-FLEX, INC.
2000 W. Marshall Drive Grand Prairie, Texas 75051 USA
888-765-9359 972-337-7113 FAX 972-337-7233

CERTIFICATION DOCUMENTS

To: GeoPacific Lining, Inc.
1300 Dexter Ave. North, Suite 205
Seattle, Washington 98109

Date: 07/08/99
Poly-Flex Proj # : 990057
Customer PO: 1584-1699
Project Name: Norfolk

Attn: Kirk Lilleskare
Fax No: 206-298-5155
Number of pages including cover: 6

RECEIVED
JUL 26 1999
GEOPACIFIC LINING

Departure Date: 07/01/99
Destination: Norfolk, VA.
Carrier:

Trip No: 0705-159CF
Freight: PP

Additional Notes:

Distribution of Documents:

Shipment Inspection Sheet:	1
Roll Certification:	1
Resin Certification:	2
Other:	1

Attached please find documents for the above referenced shipment. Please let us know if you have any questions.

Sincerely,

Doug Glotfelty
1-888-765-9359 ext 7269

CERTIFICATION SHEET

DATE: 07/06/99

POLY-FLEX, INC.
2000 W. Marshall Drive
Grand Prairie, Texas 75051

PROJECT NO: 990057

ORDER NO: 309940

TRIP NO: 0705-159CF

CERTIFIED BY: L. Judson

TEST DESCRIPTION		THICKNESS	CARBON BLACK	TEAR	PUNCTURE	TENSILE @ YIELD	ELONG @ YIELD	TENSILE @ BREAK	ELONG @ BREAK	CAR. BLK. DISPERSION	DENSITY	ESCR (cond. B)
ASTM METHOD		D1593	D1603	D1004	TMS 10	D638	D638	D638	D638	D3015	D1505	D1693
(modifications)		min/avg			2065							2000 hrs
UNITS		mils	%	lb	lb	ppi	%	ppi	%		gm/cc	PASS
SPECIFICATION		36/ 40	2%-3%	23	48	58	13	80	350	A1,A2,B1	0.915	
ROLL NUMBER	BLEND											(Start)
PR-4-99 292-7	8290609	36/ 41	2.4	25	49	68	19	82	418	A-1	0.936	06/15/99
PR-4-99 293-7	8290609	36/ 41	2.4	25	49	68	19	82	418	A-1	0.936	06/15/99
PR-4-99 294-7	8290609	36/ 41	2.3	27	49	70	29	116	537	A-1	0.936	06/15/99
PR-4-99 295-7	8290609	36/ 41	2.3	27	49	70	29	116	537	A-1	0.936	06/15/99
PR-4-99 296-7	8290609	36/ 41	2.3	27	49	70	29	116	537	A-1	0.936	06/15/99
PR-4-99 297-7	8290609	36/ 41	2.4	25	53	63	20	85	463	A-1	0.936	06/15/99
PR-4-99 298-7	8290609	36/ 41	2.4	25	53	63	20	85	463	A-1	0.936	06/15/99
PR-4-99 299-7	8290609	36/ 41	2.4	25	53	63	20	85	463	A-1	0.936	06/15/99
PR-4-99 300-7	8290609	36/ 41	2.5	28	54	66	20	106	508	A-1	0.933	06/15/99
PR-4-99 301-7	8290609	36/ 41	2.5	28	54	66	20	106	508	A-1	0.933	06/15/99
PR-4-99 303-7	8290609	36/ 41	2.5	25	50	68	18	82	433	A-1	0.933	06/15/99
PR-4-99 338-7	8290188	36/ 43	2.5	28	53	71	20	91	460	A-1	0.934	06/15/99

Poly-Flex

Geomembrane Shipment Inspection

Tractor # 76 Trailer # 4414 Date: 02-Jul-99 TRIP 0705-159CF

Drop #	1	Drop #		Drop #		Drop #	
Poly-Flex #	990057(309940)	Poly-Flex #		Poly-Flex #		Poly-Flex #	
Customer:	GEOPACIFIC	Customer:		Customer:		Customer	
Destination:	NORFOLK,VA	Destination:		Destination:		Destination:	
Carrier:		Carrier:		Carrier:		Carrier:	

	Blend	Roll Number	Weight	Roll Description
1	8290609	PR-4-99- 0292- 7	3,286	23' X 700' X .040LLR
2	8290609	PR-4-99- 0293- 7	3,294	23' X 700' X .040LLR
3	8290609	PR-4-99- 0294- 7	3,270	23' X 700' X .040LLR
4	8290609	PR-4-99- 0295- 7	3,258	23' X 700' X .040LLR
5	8290609	PR-4-99- 0296- 7	3,252	23' X 700' X .040LLR
6	8290609	PR-4-99- 0297- 7	3,254	23' X 700' X .040LLR
7	8290609	PR-4-99- 0298- 7	3,270	23' X 700' X .040LLR
8	8290609	PR-4-99- 0299- 7	3,242	23' X 700' X .040LLR
9	8290609	PR-4-99- 0300- 7	3,248	23' X 700' X .040LLR
10	8290609	PR-4-99- 0301- 7	3,240	23' X 700' X .040LLR
11	8290609	PR-4-99- 0303- 7	3,242	23' X 700' X .040LLR
12	8290188	PR-4-99- 0338- 7	3,418	23' X 700' X .040LLR
13				
14				
15				
16				
17				
18	shipped pieces		**39,274**	
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

I certify that all loading requirements and roll conditions were inspected and approved.

GENE RODRIGUEZ
Truck Loader

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

May 24, 1999

KSL# 14861-99

FAX: 972-337-7407

Poly America, Inc.
2000 West Marshall Drive
Grand Prairie, TX 75051

Dee Averitte

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

Type:	K203
Lot Number:	8290188
P.O. Number:	23463
Date Shipped:	05/25/99
Package:	HT
Quantity:	45000 LBS. (EST.)
Melt Index, ASTM D1238:	.180 G/10 MIN
Density, ASTM D1505:	.923 G/CC
HLMI Flow Rate, ASTM D1238:	16.5 G/10 MIN
Production Date:	02/11/99

Karen S. Lively
Quality Assurance Manager

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

* Reg. U.S. Pat. Off.

cc: QA-File-RC

Lisa
FAX: 972-337-7233

Jim Nobert
FAX: 972-337-7396

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

May 06, 1999

JHV# 12982-99

FAX: 972-337-7407

Poly America, Inc.
2000 West Marshall Drive
Grand Prairie, TX 75051

Dee Averitte

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

Type:	K203
Lot Number:	8290609
P.O. Number:	23463
Date Shipped:	05/05/99
Package:	PSPX 6436
Quantity:	177400 LBS.
Melt Index, ASTM D1238:	.190 G/10 MIN
Density, ASTM D1505:	.923 G/CC
HLMI Flow Rate,ASTM D1238:	15.9 G/10 MIN
Production Date:	04/30/99

J. H. Vaden
Quality Assurance Manager

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

* Reg. U.S. Pat. Off.

cc: QA-File-RC

Lisa
FAX: 972-337-7233

Jim Nobert
FAX: 972-337-7396

STRAIGHT BILL OF LADING - SHORT FORM

ORIGINAL - NOT NEGOTIABLE

009283

SHIPPER'S NO. GY 309940

CARRIER:

CARRIER NO. (SCAC) 990057

RECEIVED, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper on request

At WAREHOUSE 01 6/23 199 9 From Poly-Flex, Inc.

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as shown below, which said carrier agrees to carry to destination, if on its route, otherwise to deliver to another carrier on the route to said destination. Every service to be performed hereunder shall be subject to all the terms and conditions not prohibited by law.

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

CONSIGNED TO

GEOPACIFIC LINING INC.
C/O GRACE INDUSTRIES
NORFOLK, VA

PHONE 206-284-2378 P.O. 1584-1699

COMMENTS

QUANTITY	CODE	DESCRIPTION
12 R	GLT-040-0700	23' X 700' .040 LL TX

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier should not make delivery of this shipment without payment of freight and all other lawful charges.

Poly-Flex, Inc.
(Signature of Consignor)

If charges are to be prepaid, write or stamp here: "To be Prepaid."

PRE-PAID

Date 7/2/99
Pulled
Checked
Loaded

ANY DISAGREEMENT ARISING OUT OF THE SALE, USE, OR TRANSPORTATION OF THIS SHIPMENT OR THE EXECUTION AND/OR TERMS OF THIS BILL OF LADING SHALL BE SUBMITTED TO BINDING ARBITRATION ADMINISTERED BY THE AMERICAN ARBITRATION ASSOCIATION. THE PARTIES HEREBY AGREE THAT NEITHER PARTY SHALL BE ENTITLED TO AN AWARD FOR PUNITIVE DAMAGES OR ATTORNEY COSTS. THE JUDGEMENT OF THE ARBITRATION MAY BE ENTERED IN ANY COURT HAVING JURISDICTION THEREOF.

WHSE ID.#

TOTAL WEIGHT 38,872

12
PIECES SHIPPED

PIECES RECEIVED

RECEIVER SIGNATURE

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is a carrier's or shipper's weight.
NOTE-Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding:

per

SIGNATURE CERTIFIES ACCEPTANCE OF QUANTITIES AND SIZES OF MATERIALS AS INDICATED.

Carrier hereby designates the broker (if any) as its agent for the collection of prepaid freight charges. When freight charges are paid to broker, carrier agrees not to hold shipper or consignee liable for said charges.

Poly-Flex, Inc. Shipper, Carrier Per Driver Date

01-R-7-98, 2591.5
nanent post-office address of shipper, 2000 W. Marshall Dr., Gra Prairie TX 75051 Time

TRAFFIC (972) 647-4374

1454530623

MCIL INC (817) 831-7215

POLY-FLEX, INC.
2000 W. Marshall Drive Grand Prairie, Texas 75051 USA
888-765-9359 972-337-7113 FAX 972-337-7233

CERTIFICATION DOCUMENTS

To: GeoPacific Lining, Inc.
1300 Dexter Ave. North, Suite 205
Seattle, Washington 98109

Date: 08/09/99
Poly-Flex Proj # : 990057
Customer PO: 1584-1699
Project Name: Norfolk

Attn: Kirk Lilleskare
Fax No: 206-298-5155
Number of pages including cover: 5

Departure Date: 08/04/99
Destination: Norfolk, VA.
Carrier: Wilkinson

Trip No: 0802-157CF
Freight: PP

Additional Notes:

Distribution of Documents:

Shipment Inspection Sheet:	1
Roll Certification:	1
Resin Certification:	1
Other:	1

RECEIVED
SEP 0 2 1999
GEOPACIFIC LINING

Attached please find documents for the above referenced shipment. Please let us know if you have any questions.

Sincerely,

Doug Glotfelty
1-888-765-9359 ext 7269

CERTIFICATION SHEET

DATE: 08/06/99

POLY-FLEX, INC.

2000 W. Marshall Drive
Grand Prairie, Texas 75051

PROJECT NO: 990057

ORDER NO: 309943

TRIP NO: 0802-157CF

CERTIFIED BY: L. Jacobsen

TEST DESCRIPTION		THICKNESS	CARBON BLACK	TEAR	PUNCTURE	TENSILE @ YIELD	ELONG @ YIELD	TENSILE @ BREAK	ELONG @ BREAK	CAR. BLK. DISPERSION	DENSITY	ESCR (cond. B)
ASTM METHOD		D1593	D1603	D1004	TMS 10	D638	D638	D638	D638	D3015	D1505	D1693
(modifications)		min/avg			2065							2000 hrs
UNITS		mils	%	lb	lb	ppi	%	ppi	%		gm/cc	PASS
SPECIFICATION		36/ 40	2%-3%	23	48	58	13	80	350	A1,A2,B1	0.915	
ROLL NUMBER	BLEND											(Start)
PR-4-99 277-7	8290609	36/ 41	2.5	28	52	69	29	101	458	A-2	0.936	6/15/99
PR-4-99 278-7	8290609	36/ 41	2.5	28	52	69	29	101	458	A-2	0.936	06/15/99
PR-4-99 279-7	8290609	36/ 41	2.4	25	55	70	18	94	477	A-2	0.936	06/15/99
PR-4-99 280-7	8290609	38/ 41	2.4	25	55	70	18	94	477	A-2	0.936	06/15/99
PR-4-99 281-7	8290609	38/ 41	2.4	25	55	70	18	94	477	A-2	0.936	06/15/99
PR-4-99 282-7	8290609	39/ 41	2.4	27	54	68	20	109	518	A-1	0.932	06/15/99
PR-4-99 283-7	8290609	39/ 41	2.4	27	54	68	20	109	518	A-1	0.932	06/15/99
PR-4-99 284-7	8290609	39/ 41	2.4	27	54	68	20	109	518	A-1	0.932	06/15/99
PR-4-99 286-7	8290609	39/ 41	2.6	26	54	70	20	86	407	A-1	0.932	06/15/99
PR-4-99 287-7	8290609	39/ 41	2.6	26	54	70	20	86	407	A-1	0.932	06/15/99
PR-4-99 288-7	8290609	39/ 41	2.6	28	52	67	20	111	640	A-1	0.932	06/15/99

Poly-Flex

Geomembrane Shipment Inspection

Tractor # 78W Trailer # 4828 Date: 04-Aug-99 TRIP 0802-157CF

Drop #	1	Drop #		Drop #		Drop #	
Poly-Flex #	990057(309943)	Poly-Flex #		Poly-Flex #		Poly-Flex #	
Customer:	GEOPACIFIC	Customer:		Customer:		Customer:	
Destination:	NORFOLK,VA	Destination:		Destination:		Destination:	
Carrier:	WILKINSON	Carrier:		Carrier:		Carrier:	

	Blend	Roll Number	Weight	Roll Description
1	8290609	P9-4-99- 0277- 75	3,252	23' X 750' X .040LL
2	8290609	P9-4-99- 0278- 75	3,252	23' X 750' X .040LL
3	8290609	P9-4-99- 0279- 75	3,274	23' X 750' X .040LL
4	8290609	P9-4-99- 0280- 75	3,250	23' X 750' X .040LL
5	8290609	P9-4-99- 0281- 75	3,251	23' X 750' X .040LL
6	8290609	P9-4-99- 0282- 75	3,246	23' X 750' X .040LL
7	8290609	P9-4-99- 0283- 75	3,244	23' X 750' X .040LL
8	8290609	P9-4-99- 0284- 75	3,266	23' X 750' X .040LL
9	8290609	P9-4-99- 0286- 75	3,261	23' X 750' X .040LL
10	8290609	P9-4-99- 0287- 75	3,272	23' X 750' X .040LL
11	8290609	P9-4-99- 0288- 75	3,267	23' X 750' X .040LL
12				
13				
14				
15				
16				
17				
18	shipped pieces		**35,835**	
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

I certify that all loading requirements and roll conditions were inspected and approved.

GENE RODRIGUEZ
Truck Loader

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

May 06, 1999

JHV# 12982-99

FAX: 972-337-7407

Poly America, Inc.
2000 West Marshall Drive
Grand Prairie, TX 75051

Dee Averitte

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

Type:	K203
Lot Number:	8290609
P.O. Number:	23463
Date Shipped:	05/05/99
Package:	PSPX 6436
Quantity:	177400 LBS.
Melt Index, ASTM D1238:	.190 G/10 MIN
Density, ASTM D1505:	.923 G/CC
HLMI Flow Rate, ASTM D1238:	15.9 G/10 MIN
Production Date:	04/30/99

J. H. Vaden
Quality Assurance Manager

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

* Reg. U.S. Pat. Off.

cc: QA-File-RC

Lisa
FAX: 972-337-7233

Jim Nobert
FAX: 972-337-7396

STRAIGHT BILL OF LADING - SHORT FORM

ORIGINAL - NOT NEGOTIABLE

009283

SHIPPER'S NO. GY 309943

CARRIER: Wilkinson

CARRIER NO. (SCAC) 990057

RECEIVED, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are availbable to the shipper on request

At WAREHOUSE 01 7/20 1999 From Poly-Flex, Inc.

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as shown below, which said carrier agrees to carry to destination, if on its route, otherwise to deliver to another carrier on the route to said destination. Every service to be performed hereunder shall be subject to all the terms and conditions not prohibited by law.

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

CONSIGNED TO
GEOPACIFIC LINING INC.
C/O GRACE INDUSTRIES
NORFOLK, VA

PHONE 206-284-2378 P.O. 1584-1699

COMMENTS

189,750 sf

QUANTITY	CODE	DESCRIPTION
~~12~~ R	GLT-040-0700	23' X 700' .040 LL TX

WHSE ID #

TOTAL WEIGHT 38,872

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier should not make delivery of this shipment without payment of freight and all other lawful charges.

Poly-Flex, Inc.
(Signature of Consignor)

If charges are to be prepaid, write or stamp here: "To be Prepaid."

PRE-PAID

Date 8-4-99
Pulled TM / GR
Checked TM / GR
Loaded TM /

ANY DISAGREEMENT ARISING OUT OF THE SALE, USE, OR TRANSPORTATION OF THIS SHIPMENT OR THE EXECUTION AND/OR TERMS OF THIS BILL OF LADING SHALL BE SUBMITTED TO BINDING ARBITRATION ADMINISTERED BY THE AMERICAN ARBITRATION ASSOCIATION. THE PARTIES HEREBY AGREE THAT NEITHER PARTY SHALL BE ENTITLED TO AN AWARD FOR PUNITIVE DAMAGES OR ATTORNEY COSTS. THE JUDGEMENT OF THE ARBITRATION MAY BE ENTERED IN ANY COURT HAVING JURISDICTION THEREOF.

11

PIECES SHIPPED

PIECES RECEIVED

RECEIVER SIGNATURE

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is a carrier's or shipper's weight.
NOTE-Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding:

per

SIGNATURE CERTIFIES ACCEPTANCE OF QUANTITIES AND SIZES OF MATERIALS AS INDICATED.

Carrier hereby designates the broker (if any) as its agent for the collection of prepaid freight charges. When freight charges are paid to broker, carrier agrees not to hold shipper or consignee liable for said charges.

Poly-Flex, Inc. Shipper, Carrier _____ Per _____ Driver Date _____

PAI-101-R-7-98, 2591.5
Permanent post-office address of shipper, 2000 W. Marshall Dr., Gr[illegible]d Prairie TX 75051 Time _____

TR[illegible]IC

1632300720 (972) 647-4374

MGM, INC. (817) 831-7215

Appendix C

Composite Drainage Net Certification

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 1 of ____

Project: Norfolk CO

Project No.: 1584

Date: 7-22-99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		249'	3361.5
		240'	3240
		235'	3172.5
		227'	3064.5
		169'	2281.5
		142'	1917
		124'	1674
		114'	1539
		110'	1485
		85'	1147.5
		60'	810
		40'	540

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 24232.5

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: ____

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 2 of ____

Project: Norfolk CD

Project No.: 1584

Date: 7/28

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		74'	999
		218'	2943
		240'	3240
		52'	702
		40'	540
		262'	3537
		192'	2592
		39'	526.5
		32'	432
		44'	594
		44'	594

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 16,699.5

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 40,932

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 3 of ____

Project: Norfolk CD

Project No.: 1584

Date: 7/29/99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC ____ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		247x11	2717
		296	3996
		244'	3294
		249'	3362
		249'	3362
		252'	3402
		248'	3321
		248	3348
		248	3348
		226	3051
		232	3132
		189	2552
		157	2120
		123	1661
		85'	1148
		237	3200

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 44,294

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 85,226

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 4 of ____

Project: Norfolk CD

Project No.: 1584

Date: 8/2

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		36'	486
		54'	729
		52'	702
		59'	796.5
		52'	702
		58'	783
		54'	729
		55'	742.5

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 5,670

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 90,896

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 5 of ____

Project: NORFOLK CD

Project No.: 1584

Date: 8/3/98

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X ____ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		155'	2029.5

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 2029.5

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 92,925.5

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 6 of ____

Project: NORFOLK

Project No.: 1584

Date: 8/5/99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		246'	3321
		233'	3146
		239'	3227
		230'	3105
		249'	3362
		250'	3375
		250'	3375
		84'	1134

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 24,044

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 116,969.5

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 7 of ____

Project: Norfolk CD

Project No.: 1584

Date: 8/11/99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		250'	3375
		250'	3375
		250'	3375
		250'	3375
		250'	3375
		250'	3375
		250'	3375
		220'	2970

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 26,595

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 143,565 143,564.5

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 8 of _____

Project: NORFOLK CD

Project No.: 1585

Date: 8/12/99

Product (check one):

FML _____ GT _____ GCL _____

Sector: _____

GC X GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		102'	1,377
		36X13.5÷2=	243
		52X13.5÷2=	351
		65X13.5÷2=	439

BEGINNING BALANCE: _____ TOTAL INSTALLED TODAY: 42,910

RECEIVED TODAY: _____

TOTAL MATERIAL ON HAND: _____ TOTAL INSTALLED TO DATE: 186,475

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 9 of ____

Project: Norfolk CD

Project No.: 1584

Date: 8/13

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		232'	3132
		247'	3,334.5
		247'	3,334.5
		247'	3334.5
		247'	3,334.5
		247'	3,334.5
		247'	3,334.5
		247'	3,334.5
		247'	3,334.5
		247'	3,334.5
		247'	3,334.5
		247'	3,334.5
		247'	3,334.5
		247'	3,334.5
		247'	3,334.5
		247'	3,334.5
		247'	3,334.5

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 56,484

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 242,959

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 10 of ____

Project: NORFOLKCO

Project No.: 1584

Date: 8/17/99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		162X9	1458
		227	3064.5
		250	3375
		250	3375
		250	3375
		250	3375
		250	3375
		250	3375
		250	3375
		250	3375
		250	3375
		250	3375
		250	3375
		250	3375

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 45,022.5

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 287,981.5

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 11 of ____

Project: NORFOLK CD

Project No.: 1584

Date: 8/18/99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		247'	3334.5
		247'	3334.5
		247'	3334.5
		247'	3334.5
		247'	3334.5
		247'	3334.5
		247'	3334.5
		247'	3334.5
		247	3334.5
		247	3334.5
		247	3334.5
		247	3334.5
		247	3334.5
		247	3334.5
		247	3334.5

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 50,017.5

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: ~~292,977~~ 337,999

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION ~~43~~

Page 12

Project: Norfolk

Project No.: 1584

Date: 8-19

Product (check one):

FML _____ GT _____ GCL _____

Sector: GC ✓ GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		226	~~3074~~ 3051
		243	3280.5
		248	3348
		245	~~3397.5~~ 3307.5
		245	3307.5
		227	3064.5
	234 x 9.5	234	3159
		238	3213
		245	3307.5
		245	3307.5
		245	3307.5
		245	3307.5
		245	3307.5
		245	3307.5
		245	3307.5
		241	3253.5
		242	3267

55,40

BEGINNING BALANCE:

TOTAL INSTALLED TODAY: 55404

RECEIVED TODAY:

TOTAL MATERIAL ON HAND:

TOTAL INSTALLED TO DATE: ~~348,381~~ 393,403

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 13

Project: Norfolk

Project No.: 1584

Date: ~~8-13~~ 8-19

Product (check one):

FML ____ GT ____ GCL ____

Sector: GC ✓ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		242	3267
		221	2983.5
		245	3307.5
	20 Rolls		
		Total =	64,962

BEGINNING BALANCE:

TOTAL INSTALLED TODAY: 9,558

RECEIVED TODAY:

TOTAL MATERIAL ON HAND:

TOTAL INSTALLED TO DATE: ~~2,357,939~~ 402,961

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 14 of _____

Project: Norfolk CD

Project No.: 1584

Date: 8-20-99

Product (check one):

FML _____ GT _____ GCL _____

Sector: _____ GC ✓ GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		244'	3,294
7 Rolls		236'	3,186
		238'	3,213
		234'	3,159
		228'	3,078
		246'	3,321
		~~33~~ 242'	3,261

22,518

BEGINNING BALANCE: _____ TOTAL INSTALLED TODAY: 22,512

RECEIVED TODAY: _____

TOTAL MATERIAL ON HAND: _____ TOTAL INSTALLED TO DATE: ~~380,451~~ 425,473

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 15 of ____

Project: Norfolk

Project No.: 1584

Date: 8-21

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC ✓ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		242	3,267
		232	3,132
		244	3,294
		248 x 12.5'	3,348
		246	3,321
		247	3,334.5
		247	3,334.5
		247	3,334.5
		247	3,334.5
		247	3,334.5
		247	3,334.5
		247	3,334.5
		247	3,334.5
		247	3,334.5
		247	3,334.5
		247	3,334.5
		247 x 11.5'	3,334.5
		247 x 12'	3334.5

56,376

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 56,376

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: ~~436,827~~ 481,849

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page ~~15~~ 16 of _____

Project: Norfolk

Project No.: 1584

Date: 8-21-99

Product (check one):

FML _____ GT _____ GCL _____

Sector: _____ GC ✓ GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		247	3334.5
		247	3,334.5
		243	3,280.5
		245	3,307.5
		244	3,294
23		245	3,307.5
24		245	3,307.5
25		245	3,307.5
26		245	3,307.5
		245	3,307.5
		245	3,307.5
		245	3,307.5 ~~245~~
		245	3,307.5
		245	3,307.5
31 Rolls			
		Total	102,694.5

BEGINNING BALANCE: _____ TOTAL INSTALLED TODAY: 46,318.5

RECEIVED TODAY: _____

TOTAL MATERIAL ON HAND: _____ TOTAL INSTALLED TO DATE: ~~483,145.5~~ 528,167.5

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 17 of ____

Project: ~~Work~~ Norfolk

Project No.: 1584

Date: 8-22-99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC ✓ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		237	3199.5
		231	3118.5
		215	2902.5
		231	3118.5
		225 x 10'	3037.5
		242	3,267
		236	3,186
		234	3,159
		229	3,091.5
		225	3037.5
		220	2,970
		214	2889
		208 x 12.5	2808
		201	2713.5
		200	2700
		201	2713.5
		193	2605.5

50,517

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 50,517

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: ~~533,662.5~~ 578,684.5

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 18 of ____

Project: Norfolk

Project No.: 1584

Date: 8-22

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC ✓ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		190	2565
		193	2605.5
		192	2592
20 ~~Roll~~ Rolls			
		Total=58,279.5	

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 7762.5

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: ~~541,725~~ 586,447

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 19 of _____

Project: Norfolk

Project No.: 1584

Date: 8-23-99

Product (check one):

FML _____ GT _____ GCL _____

Sector: _____ GC ✓ GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		186	2,511
		184	2,484
		181	2443.5
		181	2443.5
		180	2430
		165	2227.5
		168	2268
		169	2281.5
		200	2200
		194	2619
		192	2592
		245	3307.5
		250	3375
		241	3253.5
		241	3253.5
		245	3307.5
		242	3267 ~~3262~~

46264

BEGINNING BALANCE: _____ TOTAL INSTALLED TODAY: 46,264

RECEIVED TODAY: _____

TOTAL MATERIAL ON HAND: _____ TOTAL INSTALLED TO DATE: ~~587,649~~ ~~495,761~~ 632,711

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 20 of _____

Project: Norfolk

Project No.: 1584

Date: 8-23-99

Product (check one):

FML _____ GT _____ GCL _____

Sector: _____

GC ✓ GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		243	3280.5
		247	3334.5
		242	3267
		245	3307.5
		245	3307.5
		37	499.5
		57x13.5÷2	~~385~~ 384.75 ~~384.75~~
		61'x 11'	671
		74'x 14'	1036
		41'	553.5
		12x21÷2	126
		55'x 2.5	137.5
		16.5	222.75
		13	175.5
		26	351
		16x13.5÷2	108
		11x12÷2	66

20,828.5

BEGINNING BALANCE: _____ TOTAL INSTALLED TODAY: 20,828.5

RECEIVED TODAY: _____

TOTAL MATERIAL ON HAND: _____ TOTAL INSTALLED TO DATE: ~~608,519.5~~ ~~515,989.5~~ 653,539.5

QA Signature: _____

Date: _____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 21 of ____

Project: Norfolk

Project No.: 1584

Date: 8-23-99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC ✓ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		~~175~~ 19.5	263.25
		31	418.5
		48	648
		56	756
		51	688.5
		57	769.5
		73	985.5
		67	904.5
		53	715.5
		45	607.5
		41	553.5
		16x24÷2	192
		18·13.5/2	121.5
		51	688.5
	Total = 75,404.75		

8312.25

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 8312.25

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: ~~616,829~~ ~~616,830~~ 661,852

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 22 of ____

Project: Norfolk

Project No.: 1584

Date: 8-26-99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____

GC ✓ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		30	405
		27	364.5
		21	283.5
		31 x 7 ÷ 2	108.5
		20 x 6	120
		86	1161
		10 x 13.5 ÷ 2	67.5
		82	1107
		80	1080
		~~78~~ 79	1066.5
		77	1039.5
		77	1039.5
		74	999
		123	1660.5
		124	1674
		135	1822.5
		134	1809

← 8841.5

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 15,807.5

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 677,659.5

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 23 of ____

Project: Norfolk

Project No.: 1584

Date: 8-26-99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC ✓ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		41'	553.5
		41'x15'÷2'	307.5
		30	405
		32	432
		29	391.5
		35	472.5
		82	1107
		91	1228.5
		85	1147.5
		74	999
		71	958.5
		64	864
		58	783
		48	648
		44	594
		44	594
		34	459

11,944.5

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 11,944.5

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 689,604

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 24 of ____

Project: Norfolk

Project No.: 1584

Date: 8-26-99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC ✓ GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		189	2551.5
		191	2578.5
			5130
			15,807.5
			11,944.5
		Total	32,882

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 5,130

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 694,734

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Project: Norfolk

P28
Project No.: 1564

Date:

~~Rolls GPL~~
Sector:

Product (check one):
FML _____ GT _____ GCL _____
GC _____ GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
	odd Rolls		
	Dates		
	8-19	234' x 9.5'	2,223
	8-21	248' x 12.5'	3100
	↓	247' x 11.5'	2840.5
		247' x 12'	2,964
	8-22	225' x 10'	2250
		208 x 12.5'	2600
			19021.5
			- 15977.5
			= 3,044
			LOSS - 3,044 SQ FT

3159 - 2223
936
3348 - 3100
248
3334.5 -
494
3334.5
370.5
3037.5
787.5
2808
208

Total loss
3,044

BEGINNING BALANCE: TOTAL INSTALLED TODAY:

RECEIVED TODAY:

TOTAL MATERIAL ON HAND: TOTAL INSTALLED TO DATE:

6/13/96

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 26 of ____

Project: NORFOLK CD

Project No.: 1584

*Date: 8/27/99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		250	3,375
		250	3,375
		250	3,375
		250	3,375
		250	3,375
		250	3,375
		250	3,375
		250	3,375
		225	3,037.5
		250	3,375
		250	3,375
		250	3,375
		250	3,375
		250	3,375
		250	3,375
		250	3,375
		250	3,375

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: See next page →

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: see next page →

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 27 of ____

Project: Norfolk CD

Project No.: 1584

Date: 8/27/99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____

GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		250	3,375
		250	3,375
		250	3,375
		260	3,510
		250	3,375
		250	3,375
		250	3,375
		41	553.5
		7X17÷2	525

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 81,410.5

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 776,144.5

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 28 of ____

Project: NORFOLK CD

Project No.: 1584

Date: 8-26 / 8-27

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ (GC) X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
	ODD ROLLS	240 X 12	2880
		267 X 11	2937
		265 X 11	2915
		235 X 12	2820
		265 X 12	3180
		250 X 11	2750
		250 X 12	3000
		125 X 11	1375
		150 X 10	1500
		162 X 9	1458
			29821.5
			-24815
			= 5006.5
			LOSS - 5006.5

3240-2880
360
667.5
662.5
352.5
3975
625
375
312.5
52
2187-1458
729

SAFT

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: ____

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: ____

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

P29

Project: NORFOLK CD

Project No.: 1584

Date: 9/22/99

Product (check one):

FML _____ GT _____ GCL _____

Sector: GC X GN _____ other _____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		247	3,335
		247	3,335
		247	3,335
		247	3,335
		247	3,335
		247	3,335
		247	3,335
		247	3,335
		247	3,335
		247	3,335
		247	3,335
		247	3,335
		247	3,335

BEGINNING BALANCE:

TOTAL INSTALLED TODAY: 43,349

RECEIVED TODAY:

TOTAL MATERIAL ON HAND:

TOTAL INSTALLED TO DATE: 819,493.5

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 30 of ____

Project: Norfolk C.O.

Project No.: 1584

Date: 9/23/99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		248	3348
		248	3348
		248	3348
		248	3348
		248	3348
		248	3348
		248	3348
		248	3348
		248	3348
		248 X 11.5	2852

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 32,984

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 852,477.5

QA Signature: ____

Date: ____

6/22/98

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 31 of ____

Project: NORFOLK CD

Project No.: 1584

Date: 9/24/99

Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		250	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		170'	2,295

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 56,295

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 908,772.5

QA Signature: ____

Date: ____

6/22/98

0170

GeoPacific Lining Inc.

DAILY PANEL PLACEMENT /PRODUCTION

Page 32 of ____

Project: NORFOLK C.O. Project No.: 1584

Date: 9/27/99 Product (check one):

FML ____ GT ____ GCL ____

Sector: ____ GC X GN ____ other ____

PANEL NO.	ROLL NO.	LENGTH	SQUARE FOOTAGE
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		250'	3,375
		10'	135

BEGINNING BALANCE: ____ TOTAL INSTALLED TODAY: 17,010

RECEIVED TODAY: ____

TOTAL MATERIAL ON HAND: ____ TOTAL INSTALLED TO DATE: 925,782.5

QA Signature: ____

Date: ____

6/22/98

SKAPS Industries

SKAPS Industries
571 Industrial Pkwy
Commerce, GA

Phone: 706-336-7000
Fax: 706-336-7007

Wednesday July 7, 1999
Ms. Nicole Miller
Geopacific Lining
1300 Dexter Ave N 205 - Seattle, WA 98109

Ref. : Norfolk Naval Base., Norfolk, VA
Transnet 220-2-6 Geocomposite
Shipper # 1104, # 1105, # 1106, # 1107, # 1108

Ms. Nicole Miller,
We certify that the Transnet 220-2-6 double sided drainage composite, shipped on the above shipper Nos., meets the project requirements as stated in Section 02073, of the specifications. The properties listed in this section include :

Net Property	Test Method	Unit	Minimum Required Value
Mass per Unit Area	ASTM D 3776	lbs/ft^2	0.162
Thickness	ASTM D 5199	inches	.22 Minimum
Density	ASTM D 1505	lb/in	0.94
Carbon Black	ASTM D 1603	%	2
Tensile Strength	ASTM D 5035	lb/in	50
Composite Property	**Test Method**	**Unit**	**Minimum Required Value**
Transmissivity	ASTM D 4716	m^2/s	3×10^{-4} *
Ply Adhesion	ASTM D 413	lb/in	1
Fabric Property	**Test Method**	**Unit**	**Minimum Required Value**
Fabric Weight	ASTM D 5261	oz/yd^2	6
Grab Tensile Strength	ASTM D 4632	lbs	145
Grab Elongation	ASTM D 4632	lbs	50
Thickness	ASTM D 1777	lbs	55
Puncture Resistance	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	220
Water Flow Rate	ASTM D 4491	gpm/ft^2	125
Permittivity	ASTM D 4491	1/sec	1.6
Permeability	ASTM D 4491	cm/sec	0.25
AOS	ASTM D 4751	US Sieve	70

* Transmissivity measured using water 20 Degree C (68 degree F) with a gradient of 0.05 & 0.33, between two steel plates, under a confining pressure of 1,000 psf, after 15 min.

Sincerely,
Dipa Patel
QA Manager

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

SHIPPERS NO.
1104

EXTERNAL REF # GEOPACIFIC LIVING
CONSIGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA - 23513

COMMENTS FROM M.R.

Nicole Miller
206-284-2378

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

DATE SHIPPED 07/02/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1104
MATERIAL REQ # 1561
JOB #
SHIPPERS # 1104
BUS / MARKET SEQ #
TERMS: PREPAID

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	24354	220 NT-2 SD 6 OZ
3500.0	TN22066	24353	220 NT-2 SD 6 OZ
3500.0	TN22066	24352	220 NT-2 SD 6 OZ
3500.0	TN22066	24316	220 NT-2 SD 6 OZ
3500.0	TN22066	24312	220 NT-2 SD 6 OZ
3500.0	TN22066	24317	220 NT-2 SD 6 OZ
3500.0	TN22066	24333	220 NT-2 SD 6 OZ
3500.0	TN22066	24332	220 NT-2 SD 6 OZ
3500.0	TN22066	24336	220 NT-2 SD 6 OZ
3500.0	TN22066	24338	220 NT-2 SD 6 OZ
3500.0	TN22066	24337	220 NT-2 SD 6 OZ
3500.0	TN22066	24342	220 NT-2 SD 6 OZ
3500.0	TN22066	24340	220 NT-2 SD 6 OZ
3500.0	TN22066	24343	220 NT-2 SD 6 OZ
3500.0	TN22066	24344	220 NT-2 SD 6 OZ
3500.0	TN22066	24341	220 NT-2 SD 6 OZ
3500.0	TN22066	24334	220 NT-2 SD 6 OZ
3500.0	TN22066	24335	220 NT-2 SD 6 OZ
3500.0	TN22066	24321	220 NT-2 SD 6 OZ
3500.0	TN22066	24330	220 NT-2 SD 6 OZ
3500.0	TN22066	24318	220 NT-2 SD 6 OZ
3500.0	TN22066	24324	220 NT-2 SD 6 OZ
3500.0	TN22066	24351	220 NT-2 SD 6 OZ
3500.0	TN22066	24356	220 NT-2 SD 6 OZ
3500.0	TN22066	24355	220 NT-2 SD 6 OZ
3500.0	TN22066	24350	220 NT-2 SD 6 OZ
3500.0	TN22066	24357	220 NT-2 SD 6 OZ

2 Bags of Ties

TOTAL SQFT: 91500 TOTAL WEIGHT: 32942

TRUCK / CONTAINER #
SEAL #
CARRIER REF. WRIGHT TRUCKING
CARRIER NAME
CARRIER SIGN _____ DATE: _____

LOAD VERIFICATION SIGNED X _____
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER
SHIPPER: _____ 7/2/99
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT
OF SHIPPER _____

AGENT FOR SHIPPER: _____

Received, subject to the terms herein, from Skaps Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the Shipper noted herein is Skaps Industries as indicated by the designation of the Shipper" to be Skaps Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not Skaps Industries then Skaps Industries acting solely as the agent for the named Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth in (1) the Illinois Southern Western and Illinois Freight Classifications in effect on the date hereof, if this is a railwater shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for Shipper in placing the material in transit on behalf of a Shipper, Skaps Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement will be initiated by the Shipper and not by Skaps Industries.

Subject to the above terms and conditions as to which party to the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

SHIPPERS NO.
1105

EXTERNAL REF # GEOPACIFIC LINING
CONSIGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA23513

COMMENTS FROM M.R.
Nicole Miller
206-284-2378

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

DATE SHIPPED 07/05/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1105
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1105
BUS / MARKET SEQ #
TERMS: PREPAID

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	24389	220 NT-2 SD 6 OZ
3500.0	TN22066	24390	220 NT-2 SD 6 OZ
3500.0	TN22066	24360	220 NT-2 SD 6 OZ
3500.0	TN22066	24391	220 NT-2 SD 6 OZ
3500.0	TN22066	24359	220 NT-2 SD 6 OZ
3500.0	TN22066	24363	220 NT-2 SD 6 OZ
3500.0	TN22066	24358	220 NT-2 SD 6 OZ
3500.0	TN22066	24362	220 NT-2 SD 6 OZ
3500.0	TN22066	24371	220 NT-2 SD 6 OZ
3500.0	TN22066	24361	220 NT-2 SD 6 OZ
3500.0	TN22066	24382	220 NT-2 SD 6 OZ
3500.0	TN22066	24379	220 NT-2 SD 6 OZ
3500.0	TN22066	24392	220 NT-2 SD 6 OZ
3500.0	TN22066	24393	220 NT-2 SD 6 OZ
3500.0	TN22066	24292	220 NT-2 SD 6 OZ
3500.0	TN22066	24387	220 NT-2 SD 6 OZ
3500.0	TN22066	24381	220 NT-2 SD 6 OZ
3500.0	TN22066	24386	220 NT-2 SD 6 OZ
3500.0	TN22066	24388	220 NT-2 SD 6 OZ
3500.0	TN22066	24385	220 NT-2 SD 6 OZ
3500.0	TN22066	24383	220 NT-2 SD 6 OZ
3500.0	TN22066	24374	220 NT-2 SD 6 OZ
3500.0	TN22066	24289	220 NT-2 SD 6 OZ
3500.0	TN22066	24384	220 NT-2 SD 6 OZ
3500.0	TN22066	24380	220 NT-2 SD 6 OZ
3500.0	TN22066	24378	220 NT-2 SD 6 OZ
3500.0	TN22066	24377	220 NT-2 SD 6 OZ

2 Bags of Ties

TOTAL SQFT: 94500 TOTAL WEIGHT: 33214

TRUCK / CONTAINER #
SEAL #
CARRIER REF. TEI
CARRIER NAME
CARRIER SIGN _____ DATE: _____

LOAD VERIFICATION SIGNED X _____
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER 7/5/99
SHIPPER: _____
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT OF SHIPPER _____
AGENT FOR SHIPPER: _____

TEI UNIT 1443

Received at Commerce, GA from Skaps Industries the property described above in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, [illegible] portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the Shipper noted herein is Skaps Industries as indicated by the [illegible] "Shipper" to be Skaps Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not Skaps Industries then [illegible] acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading [illegible] (1) [illegible] Official, Southern, Western, and Illinois Freight Classifications in effect on the date hereof. If this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment, which acting in the capacity of [illegible] Shipper in placing the material in transit on behalf of a Shipper, Skaps Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation [illegible] initiated by the Shipper and not by Skaps Industries.

Subject to the above terms and conditions as to which carrier is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are [illegible] and accepted for himself and his assigns.

SHIPPING ORDER / PACKING LIST

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

SHIPPERS NO.
1106

EXTERNAL REF # GEOPACIFIC LINING
CONSIGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA 23513

COMMENTS FROM M.R. Nicole Milla
206-284-2378

DATE SHIPPED 07/06/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1106
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1106
BUS / MARKET SEQ #
TERMS: PREPAID

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	24414	220 NT-2 SD 6 OZ
3500.0	TN22066	24413	220 NT-2 SD 6 OZ
3500.0	TN22066	24403	220 NT-2 SD 6 OZ
3500.0	TN22066	24439	220 NT-2 SD 6 OZ
3500.0	TN22066	24407	220 NT-2 SD 6 OZ
3500.0	TN22066	24405	220 NT-2 SD 6 OZ
3500.0	TN22066	24400	220 NT-2 SD 6 OZ
3500.0	TN22066	24406	220 NT-2 SD 6 OZ
3500.0	TN22066	24412	220 NT-2 SD 6 OZ
3500.0	TN22066	24440	220 NT-2 SD 6 OZ
3500.0	TN22066	24448	220 NT-2 SD 6 OZ
3500.0	TN22066	24430	220 NT-2 SD 6 OZ
3500.0	TN22066	24411	220 NT-2 SD 6 OZ
3500.0	TN22066	24404	220 NT-2 SD 5 OZ
3500.0	TN22066	24397	220 NT-2 SD 6 OZ
3500.0	TN22066	24449	220 NT-2 SD 6 OZ
3500.0	TN22066	24422	220 NT-2 SD 6 OZ
3500.0	TN22066	24409	220 NT-2 SD 6 OZ
3500.0	TN22066	24401	220 NT-2 SD 6 OZ
3500.0	TN22066	24394	220 NT-2 SD 6 OZ
3500.0	TN22066	24450	220 NT-2 SD 6 OZ
3500.0	TN22066	24441	220 NT-2 SD 6 OZ
3500.0	TN22066	24410	220 NT-2 SD 6 OZ
3500.0	TN22066	24398	220 NT-2 SD 6 OZ
3500.0	TN22066	24395	220 NT-2 SD 6 OZ
3500.0	TN22066	24442	220 NT-2 SD 6 OZ
3500.0	TN22066	24408	220 NT-2 SD 6 OZ

TOTAL SQFT: 94500 TOTAL WEIGHT: 34625

TRUCK / CONTAINER #
SEAL #
CARRIER REF. LANDSTAR
CARRIER NAME
CARRIER SIGN _____ DATE: _____

LOAD VERIFICATION SIGNED X _____
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER
SHIPPER. _____
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT
OF SHIPPER _____

AGENT FOR SHIPPER: _____

Received [illegible] Commerce, GA from Skaps Industries the property described above in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being used throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination, it is mutually agreed as to each Carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either (a) if the Shipper noted herein is Skaps Industries as indicated by the designation of "Shipper" to be Skaps Industries then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not Skaps Industries then Skaps Industries acting solely as the agent for the denoted Shipper and thus every Aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth in the Official, Southern, Western and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, Skaps Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation, Carrier having agreed that the transportation arrangement is initiated by the Shipper and not by Skaps Industries.

Subject to the above terms and conditions as to which party is the Shipper. Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

SHIPPERS NO.
1107

EXTERNAL REF # GEOPACIFIC LINING
CONSIGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA 23513

COMMENTS FROM M.R. Nicole Miller
206-284-2378

DATE SHIPPED 07/06/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1107
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1107
BUS / MARKET SEQ #
TERMS: PREPAID

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	24451	220 NT-2 SD 6 OZ
3500.0	TN22066	24443	220 NT-2 SD 6 OZ
3500.0	TN22066	24453	220 NT-2 SD 6 OZ
3500.0	TN22066	24452	220 NT-2 SD 6 OZ
3500.0	TN22066	24424	220 NT-2 SD 6 OZ
3500.0	TN22066	24425	220 NT-2 SD 6 OZ
3500.0	TN22066	24446	220 NT-2 SD 6 OZ
3500.0	TN22066	24428	220 NT-2 SD 6 OZ
3500.0	TN22066	24418	220 NT-2 SD 6 OZ
3500.0	TN22066	24293	220 NT-2 SD 6 OZ
3500.0	TN22066	24417	220 NT-2 SD 6 OZ
3500.0	TN22066	24419	220 NT-2 SD 6 OZ
3500.0	TN22066	24455	220 NT-2 SD 6 OZ
3500.0	TN22066	24447	220 NT-2 SD 6 OZ
3500.0	TN22066	24454	220 NT-2 SD 6 OZ
3500.0	TN22066	24445	220 NT-2 SD 6 OZ
3500.0	TN22066	24434	220 NT-2 SD 6 OZ
3500.0	TN22066	24435	220 NT-2 SD 6 OZ
3500.0	TN22066	24427	220 NT-2 SD 6 OZ
3500.0	TN22066	24438	220 NT-2 SD 6 OZ
3500.0	TN22066	24432	220 NT-2 SD 6 OZ
3500.0	TN22066	24420	220 NT-2 SD 6 OZ
3500.0	TN22066	24375	220 NT-2 SD 6 OZ
3500.0	TN22066	24433	220 NT-2 SD 6 OZ
3500.0	TN22066	24436	220 NT-2 SD 6 OZ
3500.0	TN22066	24437	220 NT-2 SD 6 OZ
3500.0	TN22066	24421	220 NT-2 SD 6 OZ

TOTAL SQFT: 74500 TOTAL WEIGHT: 34218

TRUCK / CONTAINER #
SEAL #
CARRIER REF. LANDSTAR
CARRIER NAME
CARRIER SIGN _____ DATE: 6/6/99 409570

LOAD VERIFICATION SIGNED X _____
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER
SHIPPER: _____
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT
OF SHIPPER _____

AGENT FOR SHIPPER: _____

Received at Commerce, GA from Skaps Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the "Carrier" being understood throughout this Shipping Order, as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination, it is mutually agreed as to each Carrier of all or any of said property over all or any portion of said route to destination, and as to each carrier at any time interested in all or any of said property, that every service performed hereunder shall be subject to either (a) if the Shipper noted herein is Skaps Industries as indicated by the d[illegible] Shipper to be Skaps Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not Skaps Industries then Skaps [illegible] acting solely as the Agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading adopted [illegible] Shipper in placing the material in transit on behalf of a Shipper, Skaps Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by Skaps Industries.

Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

SHIPPING ORDER PACKING LIST ORIGINAL NOT NEGO

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

SHIPPERS NO.
1108

EXTERNAL REF # GEOPACIFIC LINING
C IGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA 23513

COMMENTS FROM M.R. Nicole Miller
206-284-2378

DATE SHIPPED 07/06/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1108
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1108
BUS / MARKET SEQ #
TERMS: PREPAID

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	24426	220 NT-2 SD 6 OZ
3500.0	TN22066	24423	220 NT-2 SD 6 OZ
3500.0	TN22066	24429	220 NT-2 SD 6 OZ
3500.0	TN22066	24396	220 NT-2 SD 6 OZ
3500.0	TN22066	24402	220 NT-2 SD 6 OZ
3500.0	TN22066	24431	220 NT-2 SD 6 OZ
3500.0	TN22066	24286	220 NT-2 SD 6 OZ
3500.0	TN22066	24294	220 NT-2 SD 6 OZ
3500.0	TN22066	24370	220 NT-2 SD 6 OZ
3500.0	TN22066	24291	220 NT-2 SD 6 OZ
3500.0	TN22066	24373	220 NT-2 SD 6 OZ
3500.0	TN22066	24368	220 NT-2 SD 6 OZ
3500.0	TN22066	24372	220 NT-2 SD 6 OZ
3500.0	TN22066	24376	220 NT-2 SD 6 OZ
3500.0	TN22066	24367	220 NT-2 SD 6 OZ
3500.0	TN22066	24416	220 NT-2 SD 6 OZ
3500.0	TN22066	24345	220 NT-2 SD 6 OZ
3500.0	TN22066	24346	220 NT-2 SD 6 OZ
3500.0	TN22066	24347	220 NT-2 SD 6 OZ
3500.0	TN22066	24348	220 NT-2 SD 6 OZ
3500.0	TN22066	24349	220 NT-2 SD 6 OZ
3500.0	TN22066	24329	220 NT-2 SD 6 OZ
3500.0	TN22066	24328	220 NT-2 SD 6 OZ
3500.0	TN22066	24326	220 NT-2 SD 6 OZ
3500.0	TN22066	24336	220 NT-2 SD 6 OZ
3500.0	TN22066	24327	220 NT-2 SD 6 OZ
3500.0	TN22066	24323	220 NT-2 SD 6 OZ

TOTAL SQFT: 94500 TOTAL WEIGHT: 32918

TRUCK / CONTAINER #
SEAL #
CARRIER REF. TEI
CARRIER NAME
CARRIER SIGN _____ DATE: _____

LOAD VERIFICATION SIGNED X _____
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER
SHIPPER: _____
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT
OF SHIPPER _____

AGENT FOR SHIPPER: _____

[illegible] Commerce, GA from Skaps Industries the property described above in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being used throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination, it is mutually agreed as to each Carrier of all or any of said property over all or any of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the Shipper noted herein is Skaps Industries as indicated by the designation of "Shipper" to be Skaps Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not Skaps Industries then Skaps Industries is acting solely as the agent for the denoted Shipper and that every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth in Official, Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for Shipper in placing the material in transit on behalf of a Shipper, Skaps Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangements are initiated by the Shipper and not by Skaps Industries.

Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

TNS Advanced Technologies

Nonwoven Quality Data

Date:07/12/99

Bill of Lading #: 31643

Roll #'s	Style	Weight	Thick-ness	Grab Tensile MD	Grab Tensile XMD	Elng MD	Elng XMD	Trap MD	Trap XMD	Punc Rest	Brst Strg	Water Flow	Perm-eability	Perm-ittivity	AOS
300004916	H060	6.9	94	184	222	66	61	68	90	108	396	149	.410	2.34	100
300004917-300004920	H060	6.5	103	186	203	73	67	68	90	108	396	149	.410	2.34	100
300004921-300004924	H060	6.5	97	181	195	71	68	68	90	108	396	149	.410	2.34	100
300004925-300004926	H060	6.5	103	189	201	76	73	73	98	108	401	149	.410	2.34	100
300004932	H060	6.8	105	198	206	75	76	88	120	109	357	149	.410	2.34	100
300004933-300004937	H060	6.7	108	184	204	71	76	80	116	112	377	149	.410	2.34	100
300004938-300004941	H060	7.1	109	196	211	76	74	82	116	118	377	149	.410	2.34	100
300004942-300004948	H060	7.0	112	197	212	67	68	73	93	110	368	149	.410	2.34	100

Bill of Lading# 31644

TNS Advanced Technologies

Nonwoven Quality Data

Date 07/12/99

Bill of Lading #: 31644

Roll #'s	Style	Weight	Thick-ness	Grab Tensile MD	Grab Tensile XMD	Elng MD	Elng XMD	Trap MD	Trap XMD	Punc Rest	Brst Strg	Water Flow	Perm-cability	Perm-ittivity	AOS
300004949	H060	7.0	109	193	218	68	68	75	101	119	367	149	.410	2.34	100
300004950	H060	7.0	106	234	208	65	64	71	97	114	363	149	.410	2.34	100
300004951	H060	7.0	106	234	208	65	64	71	97	114	363	149	.410	2.34	100
300004952	H060	7.0	106	234	208	65	64	71	97	114	363	149	.410	2.34	100
300004954	H060	7.2	108	192	214	63	67	80	89	107	379	149	.410	2.34	100
300004955	H060	7.2	108	192	214	63	67	80	89	107	379	149	.410	2.34	100
300004956	H060	7.2	108	192	214	63	67	80	89	107	379	149	.410	2.34	100
300004957	H060	7.2	108	192	214	663	67	80	89	107	379	149	.410	2.34	100
300004958	H060	6.8	94	196	190	54	73	103	120	123	420	143	.400	2.31	100
300004959	H060	7.0	105	190	223	66	70	72	88	110	360	149	.410	2.34	100
300004960	H060	7.0	105	190	223	66	70	72	88	110	360	149	.410	2.34	100
300004961	H060	7.0	105	190	223	66	70	72	88	110	360	149	.410	2.34	100
300004962	H060	6.8	107	187	217	68	66	73	107	115	362	149	.410	2.34	100
300004963	H060	6.8	107	187	217	68	66	73	107	115	362	149	410	2.34	100
300004964	H060	6.8	107	187	217	68	66	73	107	115	362	149	.410	2.34	100
300004965	H060	6.8	107	187	217	68	66	73	107	115	362	149	.410	2.34	100
300004966	H060	7.0	111	194	223	69	70	74	114	106	379	149	.410	2.34	100
300004967	H060	7.0	111	194	223	69	70	74	114	106	379	149	.410	2.34	100
300004968	H060	7.0	111	194	223	69	70	74	114	106	379	149	.410	2.34	100
300004969	H060	7.0	111	194	223	69	70	74	114	106	379	149	410	2.34	100

TNS Advanced Technologies

Nonwoven Quality Data

Date 07/12/99

Bill of Lading #: 31648

Roll #'s	Style	Weight	Thick-ness	Grab Tensile MD	Grab Tensile XMD	Elng MD	Elng XMD	Trap MD	Trap XMD	Punc Rest	Brst Strg	Water Flow	Perm-eability	Perm-ittivity	AOS
300004995	H060	7.1	109	204	219	68	67	89	124	119	395	149	.410	2.34	100
300004996	H060	7.1	109	204	219	68	67	89	124	119	395	149	.410	2.34	100
300004997	H060	7.0	109	193	219	73	72	89	125	114	366	149	.410	2.34	100
300004999	H060	7.0	109	193	219	73	72	89	125	114	366	149	.410	2.34	100
300005000	H060	7.0	109	193	219	73	72	89	125	114	366	149	.410	2.34	100
300005001	H060	6.9	107	202	216	86	84	95	114	106	391	149	.410	2.34	100
300005002	H060	6.9	107	202	216	86	84	95	114	106	391	149	.410	2.34	100
300005003	H060	6.9	107	202	216	86	84	95	114	106	391	149	.410	2.34	100
300005004	H060	6.9	107	202	216	86	84	95	114	106	391	149	.410	2.34	100
300005005	H060	6.9	110	199	220	84	88	91	110	106	387	149	.410	2.34	100
300005006	H060	6.9	110	199	220	84	88	91	110	106	387	149	.410	2.34	100
300005007	H060	6.9	110	199	220	84	88	91	110	106	387	149	.410	2.34	100
300005008	H060	6.9	110	199	220	84	88	91	110	106	387	149	.410	2.34	100
300005009	H060	7.0	115	185	194	81	91	86	103	100	370	149	410	2.34	100
300005010	H060	7.0	115	185	194	81	91	86	103	100	370	149	410	2.34	100
300005011	H060	7.0	115	185	194	81	91	86	103	100	370	149	.410	2.34	100
300005012	H060	7.0	115	185	194	81	91	86	103	100	370	149	.410	2.34	100
300005013	H060	7.1	90	155	176	72	60	86	103	100	370	149	.410	2.34	100
300005014	H060	7.1	90	155	176	72	60	86	103	100	370	149	.410	2.34	100
300005015	H060	7.1	115	199	211	86	91	87	104	103	366	149	.410	2.34	100

Bill of Lading 31648 Page 2

300005016	H060	7.1	115	199	211	86	91	87	104	103	366	149	.410	2.34	100
300005017	H060	7.2	114	196	203	81	89	81	95	102	359	149	.410	2.34	100
300005018	H060	7.2	114	196	203	81	89	81	95	102	359	149	.410	2.34	100
300005019	H060	7.2	114	196	203	81	89	81	95	102	359	149	.410	2.34	100
300005020	H060	7.2	114	196	203	81	89	81	95	102	359	149	.410	2.34	100
300005021	H060	7.5	124	193	212	84	93	83	109	102	363	149	.410	2.34	100
300005022	H060	7.5	124	196	212	84	93	83	109	102	363	149	.410	2.34	100

Engineered Synthetic Products, Inc.

SKAPS Industries

Composite Ply Adhesion

NORFOLK, VA

Roll #	Net #	Side A Min. MD Top (g/in)	Side A Avg. MD Top (g/in)	Side B Min. MD Top (g/in)	Side B Avg. MD Top (g/in)	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #
24285	25187	1135	1407	1225	1462	24286	28706	24287	28705	24288	28739	24289	28710
24290	28737	1135	1316	1180	1362	24291	28736	24292	28740	24293	28738	24294	28741
24315	28657	1180	1362	1225	1543	24316	28717	24317	28722	24318	28728	24319	28672
24320	28671	1271	1543	1180	1589	24321	28658	24322	28656	24323	28654	24324	28655
24325	28674	1180	1362	1135	1407	24326	28663	24327	28719	24328	28718	24329	28682
24330	28716	1135	1316	1180	1452	24331	28667	24332	28666	24333	28680	24334	28684
24335	28659	1180	1498	1225	1589	24336	28688	24337	28681	24338	28660	24339	28695
24340	28675	1135	1488	1180	1634	24341	28673	24342	28697	24343	28662	24344	28676
24345	28677	1089	1362	1135	1452	24346	28670	24347	28679	24348	28696	24349	28715
24350	28714	1149	1407	1180	1498	24351	28691	24352	28744	24353	28683	24354	28745
24355	28693	1189	1452	1225	1543	24356	28711	24357	28686	24358	28746	24359	28750
24360	28702	1135	1407	1180	1498	24361	28747	24362	28701	24363	28694	24364	28692
24365	28709	998	1316	1135	1362	24366	28749	24367	28700	24368	28696	24369	28828
24370	28790	1044	1271	1089	1415	24371	28800	24372	28789	24373	26681	24374	28826
24375	28818	1089	1470	1056	1455	24376	28810	24377	28827	24378	28799	24379	28791
24380	28808	1135	1498	1180	1436	24381	28860	24382	28807	24383	28796	24384	28797
24385	28806	1190	1498	1271	1543	24386	28825	24387	28824	24388	28820	24389	28822
24390	28816	998	1861	1159	1770	24391	28819	24392	28812	24393	28814	24394	28792
24395	28809	1089	1770	1180	1861	24396	28801	24397	28803	24398	28802	24399	28840-B
24400	28795	1135	1770	1089	1362	24401	28806	24402	28798	24403	28817	24404	28840
24405	28834	998	1725	1089	1770	24406	28832	24407	28841	24408	28858	24409	28859
24410	28848	1089	1679	1135	1362	24411	28837	24412	28849	24413	28847	24414	28850
24415	28836	998	1239	1140	1407	24416	28839	24417	28853	24418	28855	24419	28830
24420	28829	1135	1725	1180	1770	24421	28852	24422	28831	24423	28851	24424	28846
24425	28844	1089	1316	1135	1362	24426	28884	24427	28887	24428	28794	24429	28856
24430	28815	1135	1634	1180	1725	24431	28859	24432	28842	24433	28804	24434	28813
24435	28811	1089	1679	1135	1770	24436	28783	24437	28778	24438	28788	24439	28779
24440	28782	1135	1634	1180	1679	24441	28787	24442	28773	24443	28777	24444	28772
24445	28782	1225	1906	1271	1543	24446	28770	24447	28775	24448	28776	24449	28761
24450	28766	1271	1770	1180	1861	24451	28762	24452	28764	24453	28760	24454	28785
24455	28774	998	1271	953	1362	24456	28222	24457	28890	24458	28894	24459	28892

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: 706-336-7000 Fax: 706-336-7007

Wednesday, July 07, 1999

APPROVED 5 QA

SKAPS Industries

Engineered Synthetic Products, inc

Geonet

NORFOLK, VA

Roll #	Lot #	Min. Thickness (mil)	Carbon Black (%)	Density (g/cc)	Wt/Unit Area (net) lb/sf	TS@Break, MD (ppi)
028650	J041104	220	2.4	.945	.191	68
028655	J041104	240	2.1	.945	.205	69
028660	J041104	235	2.1	.945	.192	62
028665	J041104	230	2.5	.945	.212	74
028670	J041104	224	2.4	.945	.220	72
028675	J041104	228	2.5	.945	.220	73
028680	J041104	235	2.2	.945	.240	65
028685	J041104	239	2.4	.945	.204	68
028690	J041104	240	2.2	.945	.216	69
028695	J041104	235	2.1	.945	.210	68
028700	J041104	240	2.0	.945	.212	62
028705	J041104	240	2.2	.945	.215	64
028710	J041104	238	2.0	.945	.202	64
028715	J041104	235	2.3	.945	.201	65
028720	J041104	235	2.1	.945	.195	61
028725	J041104	230	2.1	.945	.241	63
028735	J041104	240	2.1	.945	.201	61
028740	J041104	243	2.1	.945	.225	65
028745	J041104	225	2.1	.945	.221	69
028750	J041104	220	2.3	.945	.190	67
028760	J041104	235	2.5	.945	.234	69
028765	J041104	240	2.5	.945	.240	75
028770	J041104	240	2.7	.945	.214	65
028775	J041104	238	2.6	.945	.222	73
028780	J041104	220	2.1	.945	.190	62
028785	J041104	230	2.0	.945	.230	65
028790	J041104	245	2.5	.945	.242	69
028795	J041104	240	2.6	.945	.231	75
028800	J041104	240	2.4	.945	.211	67
028805	J041104	235	2.3	.945	.211	63
028810	J041104	240	2.1	.945	.221	64
028815	J041104	235	2.6	.945	.221	75
028820	1848	225	2.0	.951	.191	63
028825	1848	230	2.6	.951	.220	74
028830	1848	230	2.6	.951	.201	73
028840	1848	240	2.3	.951	.225	63
028845	1848	240	2.4	.951	.214	65

PLEASE NOTE: TESTING IS PERFORMED EVERY 5TH ROLL

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: (706) 336-7000 Fax: (706) 336-7007

Thursday, July 08, 1999

APPROVED 5

SKAPS Industries

Engineered Synthetic Products, Inc

Geonet

NORFOLK, VA

Roll #	Lot #	Min. Thickness (mil)	Carbon Black (%)	Density (g/cc)	Wt/Unit Area (net) lb/sf	TS@Break, MD (ppi)
028850	1848	240	2.4	.951	.221	65
028855	1848	235	2.2	.951	.220	69

PLEASE NOTE: TESTING IS PERFORMED EVERY 5TH ROLL

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: (706) 336-7000 Fax: (706) 336-7007

Thursday, July 08, 1999

SKAPS Industries

SKAPS Industries
571 Industrial Pkwy
Commerce, GA

Phone: 706-336-7000
Fax: 706-336-7007

Thursday July 22, 1999
Ms. Nicole Miller
Geopacific Lining
1300 Dexter Ave N 205 - Seattle, WA 98109

Ref. : Norfolk Naval Base., Norfolk, VA
Transnet 220-2-6 Geocomposite
Shipper # 1132, # 1134, # 1137

Ms. Nicole Miller,
We certify that the Transnet 220-2-6 double sided drainage composite, shipped on the above shipper Nos., meets the project requirements as stated in Section 02073, of the specifications. The properties listed in this section include :

Net Property	Test Method	Unit	Minimum Required Value
Mass per Unit Area	ASTM D 3776	lbs/ft^2	0.162
Thickness	ASTM D 5199	inches	.22 Minimum
Density	ASTM D 1505	lb/in	0.94
Carbon Black	ASTM D 1603	%	2
Tensile Strength	ASTM D 5035	lb/in	50
Composite Property	**Test Method**	**Unit**	**Minimum Required Value**
Transmissivity	ASTM D 4716	m^2/s	3×10^{-4} *
Ply Adhesion	ASTM D 413	lb/in	1
Fabric Property	**Test Method**	**Unit**	**Minimum Required Value**
Fabric Weight	ASTM D 5261	oz/yd^2	6
Grab Tensile Strength	ASTM D 4632	lbs	145
Grab Elongation	ASTM D 4632	lbs	50
Thickness	ASTM D 1777	lbs	55
Puncture Resistance	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	220
Water Flow Rate	ASTM D 4491	gpm/ft^2	125
Permittivity	ASTM D 4491	1/sec	1.6
Permeability	ASTM D 4491	cm/sec	0.25
AOS	ASTM D 4751	US Sieve	70

* Transmissivity measured using water 20 Degree C (68 degree F) with a gradient of 0.05 & 0.33, between two steel plates, under a confining pressure of 1,000 psf, after 15 min.

Sincerely,

Dipa Patel
QA Manager

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

SHIPPERS NO.
1132

EXTERNAL REF # GEOPACIFIC LINING
CONSIGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA23513

DATE SHIPPED 07 20/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1132
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1132
BUS / MARKET SEQ #
TERMS: PREPAID

COMMENTS FROM M.R. Nicole Miller 206-284-2378

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	24310	220 NT-2 SD 6 OZ
3500.0	TN22066	24307	220 NT-2 SD 6 OZ
3500.0	TN22066	24311	220 NT-2 SD 6 OZ
3500.0	TN22066	24302	220 NT-2 SD 6 OZ
3500.0	TN22066	24364	220 NT-2 SD 6 OZ
3500.0	TN22066	24298	220 NT-2 SD 6 OZ
3500.0	TN22066	24308	220 NT-2 SD 6 OZ
3500.0	TN22066	24365	220 NT-2 SD 6 OZ
3500.0	TN22066	24306	220 NT-2 SD 6 OZ
3500.0	TN22066	24290	220 NT-2 SD 6 OZ
3500.0	TN22066	24309	220 NT-2 SD 6 OZ
3500.0	TN22066	24366	220 NT-2 SD 6 OZ
3500.0	TN22066	24304	220 NT-2 SD 6 OZ
3500.0	TN22066	24296	220 NT-2 SD 6 OZ
3500.0	TN22066	24315	220 NT-2 SD 6 OZ
3500.0	TN22066	24320	220 NT-2 SD 6 OZ
3500.0	TN22066	24303	220 NT-2 SD 6 OZ
3500.0	TN22066	24299	220 NT-2 SD 6 OZ
3500.0	TN22066	24305	220 NT-2 SD 6 OZ
3500.0	TN22066	24297	220 NT-2 SD 6 OZ
3500.0	TN22066	24288	220 NT-2 SD 6 OZ
3500.0	TN22066	24295	220 NT-2 SD 6 OZ
3500.0	TN22066	24301	220 NT-2 SD 6 OZ
3500.0	TN22066	24325	220 NT-2 SD 6 OZ
3500.0	TN22066	24300	220 NT-2 SD 6 OZ
3500.0	TN22066	24561	220 NT-2 SD 6 OZ
3500.0	TN22066	24562	220 NT-2 SD 6 OZ

2 Bags of Ties

TOTAL SQFT: 94500 TOTAL WEIGHT: 32942

TRUCK / CONTAINER #
SEAL #
CARRIER REF. TEI
CARRIER NAME
CARRIER SIGN _____ DATE: _____

LOAD VERIFICATION SIGNED X _____
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER
SHIPPER: _____
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

7/20/99

SIGN HERE FOR AGENT OF SHIPPER _____

AGENT FOR SHIPPER: _____

Received at Commerce, GA from Skaps Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the Carrier being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the Shipper noted herein is Skaps Industries as indicated by the designation of the "Shipper" to be Skaps Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not Skaps Industries then Skaps Industries is acting solely as the agent for the denoted Shipper and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official, Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for Shipper in placing the material in transit on behalf of a Shipper, Skaps Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by Skaps Industries.

Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are

SHIPPING ORDER PACKING LIST ORIGINAL NOT NEGOTIABLE

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

SHIPPERS NO. 1134

EXTERNAL REF # GEOPACIFIC LINING
SIGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA23513

COMMENTS FROM M.R. Nicole Miller 206-284-2378

DATE SHIPPED 07/20/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1134
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1134
BUS / MARKET SEQ #
TERMS: PREPAID

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	25158	220 NT-2 SD 6 OZ
3500.0	TN22066	25160	220 NT-2 SD 6 OZ
3500.0	TN22066	25166	220 NT-2 SD 6 OZ
3500.0	TN22066	25161	220 NT-2 SD 6 OZ
3500.0	TN22066	25157	220 NT-2 SD 6 OZ
3500.0	TN22066	25154	220 NT-2 SD 6 OZ
3500.0	TN22066	24564	220 NT-2 SD 6 OZ
3500.0	TN22066	25167	220 NT-2 SD 6 OZ
3500.0	TN22066	25162	220 NT-2 SD 6 OZ
3500.0	TN22066	25163	220 NT-2 SD 6 OZ
3500.0	TN22066	25155	220 NT-2 SD 6 OZ
3500.0	TN22066	25153	220 NT-2 SD 6 OZ
3500.0	TN22066	25164	220 NT-2 SD 6 OZ
3500.0	TN22066	25156	220 NT-2 SD 6 OZ
3500.0	TN22066	25169	220 NT-2 SD 6 OZ
3500.0	TN22066	25168	220 NT-2 SD 6 OZ
3500.0	TN22066	25165	220 NT-2 SD 6 OZ
3500.0	TN22066	25159	220 NT-2 SD 6 OZ
3500.0	TN22066	24331	220 NT-2 SD 6 OZ
3500.0	TN22066	24563	220 NT-2 SD 6 OZ
3500.0	TN22066	24322	220 NT-2 SD 6 OZ
3500.0	TN22066	24312	220 NT-2 SD 6 OZ
3500.0	TN22066	25170	220 NT-2 SD 6 OZ
3500.0	TN22066	24314	220 NT-2 SD 6 OZ
3500.0	TN22066	24313	220 NT-2 SD 6 OZ
3500.0	TN22066	25172	220 NT-2 SD 6 OZ
3500.0	TN22066	25171	220 NT-2 SD 6 OZ

2 Bags of Ties

TOTAL SQFT: 94350 TOTAL WEIGHT: 32349

TRUCK / CONTAINER #
SEAL #
CARRIER REF. WR. TRUCKING
CARRIER NAME
CARRIER SIGN _____ DATE: _____

LOAD VERIFICATION SIGNED X _____
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER 7/20/99
SHIPPER: _____
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT OF SHIPPER _____
AGENT FOR SHIPPER: _____

Received [illegible] Commerce, GA from Skaps Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either (a) if the Shipper named herein is Skaps Industries as indicated by the designation of "Shipper" to be Skaps Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not Skaps Industries then Skaps Industries is acting solely as the agent for the denoted Shipper and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in the Official, Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for Shipper in placing the material in transit on behalf of a Shipper, Skaps Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by Skaps Industries.

Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

BILL OF LADING LIST ORIGINAL NOT NEGOTIABLE

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

SHIPPER NO. 1137

EXTERNAL REF # GEOPACIFIC LINING
CONSIGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA23513

DATE SHIPPED 07/21/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1137
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1137
BUS / MARKET SEQ #
TERMS: PREPAID

COMMENTS FROM M.R.

Nicole Miller
206-284-2378

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	25125	220 NT-2 SD 6 OZ
3500.0	TN22066	25133	220 NT-2 SD 6 OZ
3500.0	TN22066	25139	220 NT-2 SD 6 OZ
3500.0	TN22066	25127	220 NT-2 SD 6 OZ
3500.0	TN22066	25135	220 NT-2 SD 6 OZ
3500.0	TN22066	25128	220 NT-2 SD 6 OZ
3500.0	TN22066	25134	220 NT-2 SD 6 OZ
3500.0	TN22066	25136	220 NT-2 SD 6 OZ
3500.0	TN22066	25143	220 NT-2 SD 6 OZ
3500.0	TN22066	25129	220 NT-2 SD 6 OZ
3500.0	TN22066	25130	220 NT-2 SD 6 OZ
3500.0	TN22066	25137	220 NT-2 SD 6 OZ
3500.0	TN22066	25131	220 NT-2 SD 6 OZ
3500.0	TN22066	25138	220 NT-2 SD 6 OZ
3500.0	TN22066	25132	220 NT-2 SD 6 OZ
3500.0	TN22066	25142	220 NT-2 SD 6 OZ
3500.0	TN22066	25141	220 NT-2 SD 6 OZ
3500.0	TN22066	25140	220 NT-2 SD 6 OZ
3500.0	TN22066	25146	220 NT-2 SD 6 OZ
3500.0	TN22066	25145	220 NT-2 SD 6 OZ
3500.0	TN22066	25149	220 NT-2 SD 6 OZ
3500.0	TN22066	25144	220 NT-2 SD 6 OZ
3500.0	TN22066	25148	220 NT-2 SD 6 OZ
3500.0	TN22066	25151	220 NT-2 SD 6 OZ
3500.0	TN22066	25152	220 NT-2 SD 6 OZ
3500.0	TN22066	25150	220 NT-2 SD 6 OZ
3500.0	TN22066	25147	220 NT-2 SD 6 OZ

TOTAL SQFT: 94500 TOTAL WEIGHT: 34026

TRUCK / CONTAINER #
SEAL #
CARRIER REF. TEI
CARRIER NAME
CARRIER SIGN _____ DATE: _____

LOAD VERIFICATION SIGNED X
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER
SHIPPER: _____ 7/21/99
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT
OF SHIPPER _____

AGENT FOR SHIPPER: _____

Received at Commerce, GA from Skaps Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) If the Shipper noted herein is Skaps Industries as indicated by the deal, or if the "Shipper" to be Skaps Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) If the Shipper noted herein is not Skaps Industries then Skaps Industries acting solely as the agent for the denoted Shipper, and thus every aspect of the services to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth in Official, Southern, Western, and Illinois Freight Classifications in effect on the date hereof. If this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for Shipper in placing the material in transit on behalf of a Shipper, Skaps Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangements are initiated by the Shipper and not by Skaps Industries.

Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

Engineered Synthet Products, Inc

SKAPS Industries

Composite Ply Adhesion

NORFOLK, VA

		Side A		Side B									
Roll #	Net #	Min. MD Top (g/in)	Avg. MD Top (g/in)	Min. MD Top (g/in)	Avg. MD Top (g/in)	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #
24280	25124	1180	1452	1135	1498	24281	25162	24282	25195	24283	25114	24284	25156
24290	28737	1135	1316	1180	1362	24291	28736	24292	28740	24293	28738	24294	28741
24295	28733	1180	1407	1225	1452	24296	28742	24297	28720	24298	28735	24299	28731
24300	28730	1135	1452	1180	1498	24301	28732	24302	28734	24303	28725	24304	28726
24305	28727	1180	1362	1225	1452	24306	28724	24307	28729	24308	28668	24309	28685
24310	28721	1225	1407	1180	1498	24311	28689	24312	28664	24313	28665	24314	28687
24315	28657	1180	1362	1225	1543	24316	28717	24317	28722	24318	28728	24319	28672
24320	28671	1271	1543	1180	1589	24321	28658	24322	28656	24323	28654	24324	28655
24325	28674	1180	1362	1135	1407	24326	28663	24327	28719	24328	28718	24329	28682
24330	28716	1135	1316	1180	1452	24331	28667	24332	28666	24333	28680	24334	28684
24360	28702	1135	1407	1180	1498	24361	28747	24362	28701	24363	28694	24364	28692
24365	28709	998	1316	1135	1362	24366	28749	24367	28700	24368	28696	24369	28828
24560	28980	1089	1634	1135	1725	24561	28781	24562	28754	24563	28753	24564	28752
25125	28771	1089	1452	1225	1906	25126	29450	25127	29468-B	25128	29461-B	25129	29471-B
25130	29469-B	1135	1770	1089	1634	25131	29467-B	25132	29470-B	25133	29350	25134	29462-B
25135	29463-B	1044	1362	1135	1725	25136	29465-B	25137	29460-B	25138	29464	25139	29458-B
25140	29466-B	1089	1770	1180	1816	25141	29452-B	25142	29454-B	25143	29457-B	25144	29449-B
25145	29458-B	1044	1180	1089	1180	25146	29448-B	25147	29457-B	25148	29455-B	25149	29444-B
[illegible]50	29442-B	1089	1271	1135	1362	25151	29443-B	25152	29441-B	25153	29377	25154	29440-B
[illegible]55	29453-B	1044	1316	1089	1452	25156	29445-B	25157	29446-B	25158	29451-B	25159	29447-B
25160	29382-A	1180	1816	1135	1770	25161	29381-A	25162	29379-A	25163	29372-A	25164	29367-A
25[illegible]	29360-A	1089	1770	1180	1816	25166	25166	25167	28759	25168	28758	25169	29373
25[illegible]	29438-B	1135	1906	1089	1770	25171	29368-A	25172	28723	25173	29436-B	25174	29369-A

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: 706-336-7000 Fax: 706-336-7007

APPROVED 5 QA

Thursday, July 22, 1999

SKAPS Industries

Engineered Synthetic Products, Inc.

Geonet

NORFOLK, VA

Roll #	Lot #	Min. Thickness (mil)	Carbon Black (%)	Density (g/cc)	Wt/Unit Area (net) lb/sf	TS@Break, MD (ppi)
028655	J041104	240	2.1	.945	.205	69
028660	J041104	235	2.1	.945	.192	62
028665	J041104	230	2.5	.945	.212	74
028670	J041104	224	2.4	.945	.220	72
028685	J041104	239	2.4	.945	.204	68
028690	J041104	240	2.2	.945	.218	69
028705	J041104	240	2.2	.945	.215	64
028720	J041104	235	2.1	.945	.195	61
028725	J041104	230	2.1	.945	.241	63
028730	J041104	240	2.0	.945	.205	64
028735	J041104	240	2.1	.945	.201	61
028745	J041104	225	2.1	.945	.221	69
028750	J041104	225	2.3	.945	.190	67
028755-A	J041104	230	2.5	.945	.201	66
028770	J041104	240	2.7	.945	.214	65
028780	J041104	225	2.1	.945	.190	62
029360-A	J051287	240	2.5	.956	.242	71
029365-A	J051287	240	2.5	.956	.245	72
029370-A	J051287	235	3.1	.956	.261	75
029375-A	J051287	235	2.4	.956	.230	65
029380-A	J051287	235	2.4	.956	.235	69
029435-B	J051287	235	2.6	.956	.224	73
029440-B	J051287	235	2.7	.956	.245	71
029445-B	J051287	242	2.9	.956	.230	72
029450-B	J051287	240	2.8	.956	.226	75
029455-B	J051287	240	2.9	.956	.240	71
029460-B	J051287	235	2.8	.956	.235	74
029465-B	J051287	235	2.9	.956	.252	72
029470-B	J051287	230	2.7	.956	.227	71

PLEASE NOTE: TESTING IS PERFORMED EVERY 5TH ROLL

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: (706) 336-7000 Fax: (706) 336-7007

APPROVED 5

Thursday, July 22, 1999

Engineered Synthetic Products/Skaps Industries

571 Industrial Pkwy.
Commerce, GA 30529
Phone : 706-336-7000 Fax : 706-336-7007

July 22, 1999

Norfolk, VA

Dear Sir/Madam:

This is to certify the transmissivity of GeoComposite. Testing was performed every 100,000 square feet of production using ASTM 4716.

GeoComposite				
Roll Number	**Gradient/Load**	**Normal Time (min)**	**Transmissivity (gal/ft/min)**	**Transmissivity (m^2/sec)**
24,280	0.33/1000	15	5.67	1.17×10^{-3}
24,280	0.05/1000	15	7.32	1.52×10^{-3}
24,320	0.33/1000	15	6.64	1.37×10^{-3}
24,320	0.05/1000	15	7.39	1.53×10^{-3}
25,130	0.33/1000	15	8.00	1.66×10^{-3}
25,130	0.05/1000	15	8.88	1.84×10^{-3}

TNS
ADVANCED TECHNOLOGIES

681 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0592
Fax: (864) 879-4639
Toll Free: (800) 867-5181

July 7, 1999
REF: TNS H060
Quantity Shipped: 27 rolls
BOL#: 31649
Skaps
571 Industrial Pkwy.
Commerce, GA 30529

Dear Sir/Madam:

This is to certify that TNS H060 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS H060 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 H060 conforms to the physical properties listed in the following table:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V
Weight	ASTM D 3776	oz/sy	6.0
Thickness	ASTM D 1777	mils	55
Grab Tensile	ASTM D 4632	lbs	160
Grab Elongation	ASTM D 4632	%	50
Trap Tear	ASTM D 4533	lbs	55
Puncture	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	350
A.O.S.	ASTM D 4751	U.S. Sieve	100
Permitivity	ASTM D 4491	1/sec	1.6
Water Flow	ASTM D 4491	gpm/sq.ft.	125
Permeability	ASTM D 4491	cm/sec	.25

Regards,

J. Melissa Keller
TNS Advanced Technologies

Bill of Lading# 31649

DATE: 7/07/99

TNS MILLS, INC.
NONWOVEN QUALITY DATA

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
300005031	H060	180	900	7.0	118	172	162	69	73	75	80	100	391	149	.410	2.34	100
300005032	H060	180	900	7.0	118	172	162	69	73	75	80	100	391	149	.410	2.34	100
300005033	H060	180	900	6.6	116	170	161	55	72	80	91	101	356	149	.410	2.34	100
300005035	H060	180	900	6.6	116	170	161	55	72	80	91	101	356	149	.410	2.34	100
300005036	H060	180	900	6.6	116	170	161	55	72	80	91	101	356	149	.410	2.34	100
300005040	H060	180	900	7.2	112	179	194	65	74	82	112	106	376	149	.410	2.34	100
300005041	H060	180	900	7.2	112	179	194	65	74	82	112	106	376	149	.410	2.34	100
300005042	H060	180	900	7.1	112	185	184	60	74	89	95	111	416	149	.410	2.34	100
300005044	H060	180	900	7.1	112	185	184	60	74	89	95	111	416	149	.410	2.34	100
300005045	H060	180	900	7.1	112	185	184	60	74	89	95	111	416	149	.410	2.34	100
300005046	H060	180	900	7.1	112	185	184	60	74	89	95	111	416	149	.410	2.34	100
300005047	H060	180	900	7.0	107	184	167	51	65	86	82	118	399	149	.410	2.34	100
300005048	H060	180	900	7.0	107	184	167	51	65	86	82	118	399	149	.410	2.34	100
300005049	H060	180	900	7.0	107	184	167	51	65	86	82	118	399	149	.410	2.34	100
300005051	H060	180	900	7.0	107	184	167	51	65	86	82	118	399	149	.410	2.34	100
300005054	H060	180	900	7.1	112	173	187	57	66	81	83	111	420	149	.410	2.34	100
300005055	H060	180	900	7.1	112	173	187	57	66	81	83	111	420	149	.410	2.34	100
300005056	H060	180	900	6.5	103	166	160	57	67	83	85	116	393	149	.410	2.34	100
300005057	H060	180	900	6.5	103	166	160	57	67	83	85	116	393	149	.410	2.34	100
300005058	H060	180	900	6.5	103	166	160	57	67	83	85	116	393	149	.410	2.34	100
300005062	H060	180	900	7.6	108	208	196	63	74	82	99	109	433	149	.410	2.34	100
300005063	H060	180	900	7.6	108	208	196	63	74	82	99	109	433	149	.410	2.34	100
300005065	H060	180	900	7.6	108	208	196	63	74	82	99	109	433	149	.410	2.34	100
300005066	H060	180	900	6.9	102	181	162	55	65	79	90	102	388	149	.410	2.34	100
300005067	H060	180	900	6.9	102	181	162	55	65	79	90	102	388	149	.410	2.34	100
300005068	H060	180	900	6.9	102	181	162	55	65	79	90	102	388	149	.410	2.34	100
300005069	H060	180	900	6.9	102	181	162	55	65	79	90	102	388	149	.410	2.34	100

TNS
ADVANCED TECHNOLOGIES

681 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0592
Fax: (864) 879-4639
Toll Free: (800) 867-5181

July 7, 1999
REF: TNS H060
Quantity Shipped: 27 rolls
BOL#: 31651
Skaps
571 Industrial Pkwy.
Commerce, GA 30529

Dear Sir/Madam:

This is to certify that TNS H060 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS H060 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 H060 conforms to the physical properties listed in the following table:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V
Weight	ASTM D 3776	oz/sy	6.0
Thickness	ASTM D 1777	mils	55
Grab Tensile	ASTM D 4632	lbs	160
Grab Elongation	ASTM D 4632	%	50
Trap Tear	ASTM D 4533	lbs	55
Puncture	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	350
A.O.S.	ASTM D 4751	U.S. Sieve	100
Permitivity	ASTM D 4491	1/sec	1.6
Water Flow	ASTM D 4491	gpm/sq.ft.	125
Permeability	ASTM D 4491	cm/sec	.25

Regards,

J. Melissa Keller
TNS Advanced Technologies

DATE: 7/07/99

TWS MILLS, INC.
NONWOVEN QUALITY DATA

ROLL #	STYL	WDT	LNG	FABR WGHT	THCK	GRAB MD	GRAB XMD	ELNG MD	ELNG XMD	TRAP MD	TRAP XMD	PUNC REST	BRST STRG	FLOW RATE	PERM -ABL	PERM -ITY	AOS
300004976	H060	180	900	7.0	108	192	221	70	76	87	123	111	383	149	.410	2.34	100
300004977	H060	180	900	7.0	108	192	221	70	76	87	123	111	383	149	.410	2.34	100
300004978	H060	180	900	7.0	108	192	221	70	76	87	123	111	383	149	.410	2.34	100
300004979	H060	180	900	7.0	108	192	221	70	76	87	123	111	383	149	.410	2.34	100
300004980	H060	180	900	7.1	112	192	216	67	70	84	117	104	397	149	.410	2.34	100
300004981	H060	180	900	7.1	112	192	216	67	70	84	117	104	397	149	.410	2.34	100
300004982	H060	180	900	7.1	112	192	216	67	70	84	117	104	397	149	.410	2.34	100
300004983	H060	180	900	7.1	112	192	216	67	70	84	117	104	397	149	.410	2.34	100
300004984	H060	180	900	6.9	108	197	220	72	68	85	116	121	405	149	.410	2.34	100
300004985	H060	180	900	6.9	108	197	220	72	68	85	116	121	405	149	.410	2.34	100
300004987	H060	180	900	6.9	108	197	220	72	68	85	116	121	405	149	.410	2.34	100
300004988	H060	180	900	6.8	106	184	219	65	68	84	126	109	391	149	.410	2.34	100
300004989	H060	180	900	6.8	106	184	219	65	68	84	126	109	391	149	.410	2.34	100
300004990	H060	180	900	6.8	106	184	219	65	68	84	126	109	391	149	.410	2.34	100
300004991	H060	180	900	6.8	106	184	219	65	68	84	126	109	391	149	.410	2.34	100
300004992	H060	180	900	7.1	109	204	219	68	67	89	124	119	395	149	.410	2.34	100
300004993	H060	180	900	7.1	109	204	219	68	67	89	124	119	395	149	.410	2.34	100
300004994	H060	180	900	7.1	109	204	219	68	67	89	124	119	395	149	.410	2.34	100
300004998	H060	180	900	7.0	109	193	219	73	72	89	125	114	366	149	.410	2.34	100
300005023	H060	180	900	7.5	124	193	212	84	93	83	109	102	363	149	.410	2.34	100
300005024	H060	180	900	7.5	124	193	212	84	93	83	109	102	363	149	.410	2.34	100
300005025	H060	180	900	6.7	115	173	166	71	85	76	86	98	365	149	.410	2.34	100
300005026	H060	180	900	6.7	115	173	166	71	85	76	86	98	365	149	.410	2.34	100
300005027	H060	180	900	6.7	115	173	166	71	85	76	86	98	365	149	.410	2.34	100
300005028	H060	180	900	6.7	115	173	166	71	85	76	86	98	365	149	.410	2.34	100
300005029	H060	180	900	7.0	118	172	162	69	73	75	80	100	391	149	.410	2.34	100
300005030	H060	180	900	7.0	118	172	162	69	73	75	80	100	391	149	.410	2.34	100

Bill of Lading # 31651

SKAPS Industries

SKAPS Industries
571 Industrial Pkwy
Commerce, GA

Phone: 706-336-7000
Fax: 706-336-7007

Thursday July 29, 1999
Ms. Nicole Miller
Geopacific Lining
1300 Dexter Ave N 205 - Seattle, WA 98109

Ref. : Norfolk Naval Base., Norfolk, VA
Transnet 220-2-6 Geocomposite
Shipper # 1141

Ms. Nicole Miller,
We certify that the Transnet 220-2-6 double sided drainage composite, shipped on the above shipper Nos., meets the project requirements as stated in Section 02073, of the specifications. The properties listed in this section include :

Net Property	Test Method	Unit	Minimum Required Value
Mass per Unit Area	ASTM D 3776	lbs/ft^2	0.162
Thickness	ASTM D 5199	inches	.22 Minimum
Density	ASTM D 1505	lb/in	0.94
Carbon Black	ASTM D 1603	%	2
Tensile Strength	ASTM D 5035	lb/in	50
Composite Property	**Test Method**	**Unit**	**Minimum Required Value**
Transmissivity	ASTM D 4716	m^2/s	3×10^{-4} *
Ply Adhesion	ASTM D 413	lb/in	1
Fabric Property	**Test Method**	**Unit**	**Minimum Required Value**
Fabric Weight	ASTM D 5261	oz/yd^2	6
Grab Tensile Strength	ASTM D 4632	lbs	145
Grab Elongation	ASTM D 4632	lbs	50
Thickness	ASTM D 1777	lbs	55
Puncture Resistance	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	220
Water Flow Rate	ASTM D 4491	gpm/ft^2	125
Permittivity	ASTM D 4491	1/sec	1.6
Permeability	ASTM D 4491	cm/sec	0.25
AOS	ASTM D 4751	US Sieve	70

* Transmissivity measured using water 20 Degree C (68 degree F) with a gradient of 0.05 & 0.33, between two steel plates, under a confining pressure of 1,000 psf, after 15 min

Sincerely,

Dipa Patel
QA Manager

SHIPPING ORDER PACKING LIST—ORIGINAL—NOT NEGOTIABLE

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

SHIPPERS NO. 1141

EXTERNAL REF # GEOPACIFIC LINING
SIGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA23513

DATE SHIPPED 07/22/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1141
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1141
BUS / MARKET SEQ #
TERMS: PREPAID

COMMENTS FROM M.R.

Nicole Miller
206-284-2378

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	25189	220 NT-2 SD 6 OZ
3500.0	TN22066	25187	220 NT-2 SD 6 OZ
3500.0	TN22066	25192	220 NT-2 SD 6 OZ
3500.0	TN22066	25184	220 NT-2 SD 6 OZ
3500.0	TN22066	25186	220 NT-2 SD 6 OZ
3500.0	TN22066	25183	220 NT-2 SD 6 OZ
3500.0	TN22066	25179	220 NT-2 SD 6 OZ
3500.0	TN22066	25190	220 NT-2 SD 6 OZ
3500.0	TN22066	25182	220 NT-2 SD 6 OZ
3500.0	TN22066	25188	220 NT-2 SD 6 OZ
3500.0	TN22066	25195	220 NT-2 SD 6 OZ
3500.0	TN22066	25194	220 NT-2 SD 6 OZ
3500.0	TN22066	25181	220 NT-2 SD 6 OZ
3500.0	TN22066	25191	220 NT-2 SD 6 OZ
3500.0	TN22066	25180	220 NT-2 SD 6 OZ
3360.0	TN22066	25196	220 NT-2 SD 6 OZ
3500.0	TN22066	25193	220 NT-2 SD 6 OZ
3500.0	TN22066	25185	220 NT-2 SD 6 OZ
3500.0	TN22066	25198	220 NT-2 SD 6 OZ
3500.0	TN22066	24565	220 NT-2 SD 6 OZ
3500.0	TN22066	25197	220 NT-2 SD 6 OZ
3500.0	TN22066	25174	220 NT-2 SD 6 OZ
3500.0	TN22066	25199	220 NT-2 SD 6 OZ
3500.0	TN22066	25201	220 NT-2 SD 6 OZ
3500.0	TN22066	25202	220 NT-2 SD 6 OZ
3500.0	TN22066	25173	220 NT-2 SD 6 OZ
3500.0	TN22066	25204	220 NT-2 SD 6 OZ

TOTAL SQFT: 94360 TOTAL WEIGHT: 33520

TRUCK / CONTAINER #
SEAL #
CARRIER REF. WR.TRUCKING
CARRIER NAME
CARRIER SIGN D Wright DATE: _____

LOAD VERIFICATION SIGNED X _____
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER
SHIPPER: Rafael 7/22/99
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT OF SHIPPER _____

AGENT FOR SHIPPER: _____

Received [illegible] erce, GA from Skaps Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being under[illegible] throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the Shipper noted herein is Skaps Industries as indicated by the designation of the Shipper" to be Skaps Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not Skaps Industries then Skaps Industries [illegible] acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) Middle, Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for Shipper in placing the material in transit on behalf of a Shipper, Skaps Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was [illegible] by the Shipper and not by Skaps Industries.

Subject to the above terms and conditions as to which party is the Shipper. Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are [illegible]

Engineered Synthetic Products, Inc

SKAPS Industries

Composite Ply Adhesion

NORFOLK, VA

		Side A		Side B									
Roll #	Net #	Min. MD Top (g/in)	Avg. MD Top (g/in)	Min. MD Top (g/in)	Avg. MD Top (g/in)	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #
24565	28769	1135	1770	1180	1861	24566	29013	24567	29012	24568	29014	24569	29016
25170	29438-B	1135	1906	1089	1770	25171	29368-A	25172	28723	25173	29436-B	25174	29369-A
25175	29439-B	1089	1725	1135	1861	25176	29378-A	25177	29375	25178	29434-B	25179	29376-A
25180	29437-B	1135	1861	1180	1906	25181	29435-B	25182	29433-B	25183	29428-B	25184	29383-A
25185	29432-B	1044	1634	1135	1861	25186	29430-B	25187	28371-A	25188	29429-B	25189	28757
25190	29366-A	998	1089	1180	1725	25191	29357-A	25192	25308	25193	28756	25194	293700
25195	29364-A	1089	1770	1135	1816	25196	29347-A	25197	29363-A	25198	29352	25199	29362-A
25200	29351-A	1135	1861	1180	1952	25201	28823	25202	29361-A	25203	29356-A	25204	29365

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: 706-336-7000 Fax: 706-336-7007

Thursday, July 29, 1999

APPROVED 5 QA

SKAPS Industries

Engineered Synthetic Products, Inc.

Geonet

NORFOLK, VA

Roll #	Lot #	Min. Thickness (mil)	Carbon Black (%)	Density (g/cc)	Wt/Unit Area (net) lb/sf	TS@Break, MD (ppi)
025305	1750	245	2.1	.950	.250	67
028755-A	J041104	230	2.5	.945	.201	66
028765	J041104	240	2.5	.945	.240	75
029345	J051287	235	2.2	.956	.180	66
029350	J051287	238	2.2	.956	.203	65
029355-A	J051287	235	2.2	.956	.231	69
029360-A	J051287	240	2.5	.956	.242	71
029365-A	J051287	240	2.5	.956	.245	72
029370-A	J051287	235	3.1	.956	.261	75
029375-A	J051287	235	2.4	.956	.230	65
029380-A	J051287	235	2.4	.956	.235	69
029425-B	J051287	235	2.4	.956	.204	63
029430-B	J051287	233	2.6	.956	.241	71
029435-B	J051287	235	2.6	.956	.224	73

PLEASE NOTE: TESTING IS PERFORMED EVERY 5TH ROLL

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: (706) 336-7000 Fax: (706) 336-7007

APPROVED 5

Thursday, July 29, 1999

Engineered Synthetic Products/Skaps Industries

571 Industrial Pkwy.
Commerce, GA 30529
Phone : 706-336-7000 Fax : 706-336-7007

July 29, 1999

Norfolk, VA

Dear Sir/Madam:

This is to certify the transmissivity of GeoComposite. Testing was performed every 100,000 square feet of production using ASTM 4716.

GeoComposite				
Roll Number	**Gradient/Load**	**Normal Time (min)**	**Transmissivity (gal/ft/min)**	**Transmissivity (m^2/sec)**
25,175	0.33/1000	15	5.70	1.18×10^{-3}
25,175	0.05/1000	15	6.81	1.41×10^{-3}

TNS
DVANCED TECHNOLOGIES

881 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0592
Fax: (864) 879-4839
Toll Free: (800) 867-5181

July 26, 1999
REF TNS H060
Quantity Shipped: 35 rolls
BOL# 31708

Skaps
571 Industrial Pkwy
Commerce, GA 30529

Dear Sir/Madam:

This is to certify that TNS H060 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS H060 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 H060 conforms to the physical properties listed in the following table.

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V
Weight	ASTM D 3776	oz/sy	6.0
Thickness	ASTM D 1777	mils	70
Grab Tensile	ASTM D 4632	lbs	140
Grab Elongation	ASTM D 4632	%	50
Trap Tear	ASTM D 4533	lbs	55
Puncture	ASTM D 4833	lbs	80
Mullen Burst	ASTM D 3786	psi	350
A.O.S.	ASTM D 4751	U.S. Sieve	80
Permitivity	ASTM D 4491	1/sec	1.6
Water Flow	ASTM D 4491	gpm/sq.ft.	125
Permeability	ASTM D 4491	cm/sec	.25

Regards,

J. Melissa Keller
TNS Advanced Technologies

TMS MILLS, INC.
NONWOVEN QUALITY DATA

ROLL #	STYL	WDT	LNG	FABR WGHT	THCK	GRAB MD	GRAB XMD	ELNG MD	ELNG XMD	TRAP MD	TRAP XMD	PUNC REST	BRST STRG	FLOW RATE	PERM -ABL	PERM -ITY	AOS
300005817	H060	180	900	6.8	111	178	200	68	80	86	104	92	417	183	.750	2.86	80
300005818	H060	180	900	7.1	116	206	210	71	82	100	118	109	417	183	.750	2.86	80
300005819	H060	180	900	6.9	119	186	202	67	81	100	118	105	417	183	.750	2.86	80
300005820	H060	180	900	6.8	115	203	200	72	82	100	118	81	417	183	.750	2.86	80
300005821	H060	180	900	7.2	115	206	210	71	82	100	118	92	417	183	.750	2.86	80
300005822	H060	180	900	6.9	115	206	210	71	82	100	118	90	417	183	.750	2.86	80
300005823	H060	180	900	7.7	118	210	255	74	86	104	110	134	422	183	.750	2.86	80
300005824	H060	180	900	7.7	118	210	255	74	88	104	110	134	422	183	.750	2.86	80
300005826	H060	180	900	7.7	118	210	235	74	88	104	110	134	422	183	.750	2.86	80
300005827	H060	180	900	7.5	115	215	226	71	85	91	107	124	399	183	.750	2.86	80
300005828	H060	180	900	7.5	115	215	226	71	85	91	107	124	399	183	.750	2.86	80
300005829	H060	180	900	7.5	115	215	226	71	85	91	107	124	399	183	.750	2.86	80
300005830	H060	180	900	7.5	115	215	226	71	85	91	107	124	399	183	.750	2.86	80
300005831	H060	180	900	6.9	112	205	211	79	87	91	107	124	399	183	.750	2.86	80
300005832	H060	180	900	6.9	112	205	211	79	87	91	107	124	399	183	.750	2.86	80
300005835	H060	180	900	6.3	105	167	201	77	98	91	107	124	399	183	.750	2.86	80
300005836	H060	180	900	6.3	105	187	201	77	98	91	107	124	399	183	.750	2.86	80
300005837	H060	180	900	6.3	105	187	201	77	98	91	107	124	399	183	.750	2.86	80
300005838	H060	180	900	6.3	105	187	201	77	98	91	107	124	399	183	.750	2.86	80
300005839	H060	180	900	6.3	105	187	201	77	98	91	107	124	399	183	.750	2.86	80
300005888	H060	180	900	6.0	104	160	197	74	92	76	91	99	356	183	.750	2.86	80
300005992	H060	180	900	6.3	116	166	180	65	73	83	109	98	382	235	1.070	3.69	100
300005993	H060	180	900	6.3	116	166	180	65	73	83	109	98	382	235	1.070	3.69	100
300005994	H060	180	900	6.3	116	166	180	65	73	83	109	98	382	235	1.070	3.69	100
300005996	H060	180	900	7.0	125	188	207	69	77	74	92	115	387	235	1.070	3.69	100
300005997	H060	180	900	7.0	125	188	207	69	77	74	92	115	387	235	1.070	3.69	100
300005998	H060	180	900	7.0	125	188	207	69	77	74	92	115	387	235	1.070	3.69	100
300005999	H060	180	900	7.0	125	188	207	69	77	74	92	115	387	235	1.070	3.69	100
300006000	H060	180	900	6.8	125	170	197	65	81	83	109	98	382	235	1.070	3.69	100
300006001	H060	180	900	6.8	125	170	197	65	81	83	109	98	382	235	1.070	3.69	100
300006002	H060	180	900	6.8	125	170	197	65	81	83	109	98	382	235	1.070	3.69	100
300006003	H060	180	900	6.8	125	170	197	65	81	83	109	98	382	235	1.070	3.69	100
300006004	H060	180	900	6.4	125	163	186	65	81	83	109	98	382	235	1.070	3.69	100
300006005	H060	180	900	6.4	125	163	186	65	81	83	109	98	382	235	1.070	3.69	100
300006006	H060	180	900	6.4	125	163	186	65	81	83	109	98	382	235	1.070	3.69	100

SCHAS

BOL 31708

SKAPS Industries

SKAPS Industries
571 Industrial Pkwy
Commerce, GA

Phone: 706-336-7000
Fax: 706-336-7007

Thursday July 29, 1999
Ms. Nicole Miller
Geopacific Lining
1300 Dexter Ave N 205 - Seattle, WA 98109

Ref. : Norfolk Naval Base., Norfolk, VA
Transnet 220-2-6 Geocomposite
Shipper # 1141

Ms. Nicole Miller,
We certify that the Transnet 220-2-6 double sided drainage composite, shipped on the above shipper Nos., meets the project requirements as stated in Section 02073, of the specifications. The properties listed in this section include :

Net Property	Test Method	Unit	Minimum Required Value
Mass per Unit Area	ASTM D 3776	lbs/ft^2	0.162
Thickness	ASTM D 5199	inches	.22 Minimum
Density	ASTM D 1505	lb/in	0.94
Carbon Black	ASTM D 1603	%	2
Tensile Strength	ASTM D 5035	lb/in	50
Composite Property	**Test Method**	**Unit**	**Minimum Required Value**
Transmissivity	ASTM D 4716	m^2/s	3×10^{-4} *
Ply Adhesion	ASTM D 413	lb/in	1
Fabric Property	**Test Method**	**Unit**	**Minimum Required Value**
Fabric Weight	ASTM D 5261	oz/yd^2	6
Grab Tensile Strength	ASTM D 4632	lbs	145
Grab Elongation	ASTM D 4632	lbs	50
Thickness	ASTM D 1777	lbs	55
Puncture Resistance	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	220
Water Flow Rate	ASTM D 4491	gpm/ft^2	125
Permittivity	ASTM D 4491	1/sec	1.6
Permeability	ASTM D 4491	cm/sec	0.25
AOS	ASTM D 4751	US Sieve	70

* Transmissivity measured using water 20 Degree C (68 degree F) with a gradient of 0.05 & 0.33, between two steel plates, under a confining pressure of 1,000 psf, after 15 min.

Sincerely,

Dipa Patel
QA Manager

SHIPPING ORDER PACKING LIST

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

SHIPPERS NO. 1141

EXTERNAL REF # GEOPACIFIC LINING
CONSIGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA23513

DATE SHIPPED 07/22/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1141
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1141
BUS / MARKET SEQ #
TERMS: PREPAID

COMMENTS FROM M.R.

Nicole Miller
206-284-2378

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	25189	220 NT-2 SD 6 OZ
3500.0	TN22066	25187	220 NT-2 SD 6 OZ
3500.0	TN22066	25192	220 NT-2 SD 6 OZ
3500.0	TN22066	25184	220 NT-2 SD 6 OZ
3500.0	TN22066	25186	220 NT-2 SD 6 OZ
3500.0	TN22066	25183	220 NT-2 SD 6 OZ
3500.0	TN22066	25179	220 NT-2 SD 6 OZ
3500.0	TN22066	25190	220 NT-2 SD 6 OZ
3500.0	TN22066	25182	220 NT-2 SD 6 OZ
3500.0	TN22066	25188	220 NT-2 SD 6 OZ
3500.0	TN22066	25195	220 NT-2 SD 6 OZ
3500.0	TN22066	25194	220 NT-2 SD 6 OZ
3500.0	TN22066	25181	220 NT-2 SD 6 OZ
3500.0	TN22066	25191	220 NT-2 SD 6 OZ
3500.0	TN22066	25180	220 NT-2 SD 6 OZ
3360.0	TN22066	25196	220 NT-2 SD 6 OZ
3500.0	TN22066	25193	220 NT-2 SD 6 OZ
3500.0	TN22066	25185	220 NT-2 SD 6 OZ
3500.0	TN22066	25198	220 NT-2 SD 6 OZ
3500.0	TN22066	24565	220 NT-2 SD 6 OZ
3500.0	TN22066	25197	220 NT-2 SD 6 OZ
3500.0	TN22066	25174	220 NT-2 SD 6 OZ
3500.0	TN22066	25199	220 NT-2 SD 6 OZ
3500.0	TN22066	25201	220 NT-2 SD 6 OZ
3500.0	TN22066	25202	220 NT-2 SD 6 OZ
3500.0	TN22066	25173	220 NT-2 SD 6 OZ
3500.0	TN22066	25204	220 NT-2 SD 6 OZ

TOTAL SQFT: 94360 TOTAL WEIGHT: 33520

TRUCK / CONTAINER #
SEAL #
CARRIER REF. WR.TRUCKING
CARRIER NAME
CARRIER SIGN D Wright DATE: _____

LOAD VERIFICATION SIGNED X _____
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER
SHIPPER: Rafael 7/22/99
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT
OF SHIPPER _____

AGENT FOR SHIPPER: _____

Received at Commerce, GA from Skaps Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property [illegible] portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the Shipper noted herein is Skaps Industries as indicated by the [illegible] "Shipper" to be Skaps Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not Skaps Industries then Sk[illegible] acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) Official, Southern, Western and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for Shipper in placing the material in transit on behalf of a Shipper, Skaps Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement is initiated by the Shipper and not by Skaps Industries.

Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions [illegible] hereby agreed and accepted for himself and his assigns.

Engineered Synthetic Products, Inc.

SKAPS Industries

Composite Ply Adhesion

NORFOLK, VA

		Side A		Side B									
Roll #	Net #	Min. MD Top (g/in)	Avg. MD Top (g/in)	Min. MD Top (g/in)	Avg. MD Top (g/in)	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #
24565	28769	1135	1770	1180	1861	24566	29013	24567	29012	24568	29014	24569	29016
25170	29438-B	1135	1906	1089	1770	25171	28368-A	25172	28723	25173	29436-B	25174	29369-A
25175	29439-B	1089	1725	1135	1861	25176	28378-A	25177	29375	25178	29434-B	25179	29376-A
25180	29437-B	1135	1861	1180	1906	25181	29435-B	25182	29433-B	25183	29428-B	25184	29383-A
25185	29432-B	1044	1634	1135	1861	25186	29430-B	25187	29371-A	25188	29429-B	25189	28757
25190	29366-A	998	1089	1180	1725	25191	29357-A	25192	25308	25193	28756	25194	293700
25195	29364-A	1089	1770	1135	1816	25196	29347-A	25197	29363-A	25198	29352	25199	29362-A
25200	29351-A	1135	1861	1180	1952	25201	28823	25202	29361-A	25203	29356-A	25204	29355

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: 706-336-7000 Fax: 706-336-7007

APPROVED 5

SKAPS Industries

Engineered Synthetic Products, Inc

Geonet

NORFOLK, VA

Roll #	Lot #	Min. Thickness (mil)	Carbon Black (%)	Density (g/cc)	Wt/Unit Area (net) lb/sf	TS@Break, MD (ppi)
025305	1750	245	2.1	.950	.250	67
028755-A	J041104	230	2.5	.945	.201	66
028765	J041104	240	2.5	.945	.240	75
029345	J051287	235	2.2	.956	.180	66
029350	J051287	238	2.2	.956	.203	65
029355-A	J051287	235	2.2	.956	.231	69
029360-A	J051287	240	2.5	.956	.242	71
029365-A	J051287	240	2.5	.956	.245	72
029370-A	J051287	235	3.1	.956	.281	75
029375-A	J051287	235	2.4	.956	.230	65
029380-A	J051287	235	2.4	.956	.235	69
029425-B	J051287	235	2.4	.956	.204	63
029430-B	J051287	233	2.6	.956	.241	71
029435-B	J051287	235	2.6	.956	.224	73

PLEASE NOTE: TESTING IS PERFORMED EVERY 5TH ROLL

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: (706) 336-7000 Fax: (706) 336-7007

APPROVED 5 QA

Engineered Synthetic Products/Skaps Industries

571 Industrial Pkwy.
Commerce, GA 30529
Phone : 706-336-7000 Fax : 706-336-7007

July 29, 1999

Norfolk, VA

Dear Sir/Madam:

This is to certify the transmissivity of GeoComposite. Testing was performed every 100,000 square feet of production using ASTM 4716.

GeoComposite				
Roll Number	**Gradient/Load**	**Normal Time (min)**	**Transmissivity (gal/ft/min)**	**Transmissivity (m^2/sec)**
25,175	0.33/1000	15	5.70	1.18×10^{-3}
25,175	0.05/1000	15	6.81	1.41×10^{-3}

TNS
ADVANCED TECHNOLOGIES

881 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0592
Fax: (864) 879-4839
Toll Free: (800) 867-5181

July 26, 1999
REF: TNS H060
Quantity Shipped: 35 rolls
BOL#: 31708

Skaps
571 Industrial Pkwy.
Commerce, GA 30529

Dear Sir/Madam:

This is to certify that TNS H060 is a 100% polypropylene, nonwoven, needle-punched fabric TNS H060 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 H060 conforms to the physical properties listed in the following table:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V
Weight	ASTM D 3776	oz/sy	6.0
Thickness	ASTM D 1777	mils	70
Grab Tensile	ASTM D 4632	lbs	140
Grab Elongation	ASTM D 4632	%	50
Trap Tear	ASTM D 4533	lbs	55
Puncture	ASTM D 4833	lbs	80
Mullen Burst	ASTM D 3786	psi	350
A.O.S.	ASTM D 4751	U.S. Sieve	80
Permitivity	ASTM D 4491	1/sec	1.6
Water Flow	ASTM D 4491	gpm/sq ft.	125
Permeability	ASTM D 4491	cm/sec	.25

Regards,

J. Melissa Keller
TNS Advanced Technologies

NONWOVEN QUALITY DATA

ROLL #	STYL	WDT	LNG	FABR WGHT	THCK	GRAB MD	GRAB XMD	ELNG MD	ELNG XMD	TRAP MD	TRAP XMD	PUNC REST	BRST STRG	FLOW RATE	PERM -ABL	PERM -ITY	AOS
300005817	H060	180	900	6.8	111	178	200	68	80	86	104	92	417	183	.750	2.86	80
300005818	H060	180	900	7.1	116	206	210	71	82	100	118	109	417	183	.750	2.86	80
300005819	H060	180	900	6.9	119	186	202	67	81	100	118	105	417	183	.750	2.86	80
300005820	H060	180	900	6.8	115	203	200	72	82	100	118	81	417	183	.750	2.86	80
300005821	H060	180	900	7.2	115	206	210	71	82	100	118	92	417	183	.750	2.86	80
300005822	H060	180	900	6.9	115	206	210	71	82	100	118	90	417	183	.750	2.86	80
300005823	H060	180	900	7.7	118	210	255	74	88	104	110	134	422	183	.750	2.86	80
300005824	H060	180	900	7.7	118	210	255	74	88	104	110	134	422	183	.750	2.86	80
300005826	H060	180	900	7.7	118	210	255	74	88	104	110	134	422	183	.750	2.86	80
300005827	H060	180	900	7.5	115	215	226	71	85	91	107	124	399	183	.750	2.86	80
300005828	H060	180	900	7.5	115	215	226	71	85	91	107	124	399	183	.750	2.86	80
300005829	H060	180	900	7.5	115	215	226	71	85	91	107	124	399	183	.750	2.86	80
300005830	H060	180	900	7.5	115	215	226	71	85	91	107	124	399	183	.750	2.86	80
300005831	H060	180	900	6.9	112	205	211	79	87	91	107	124	399	183	.750	2.86	80
300005832	H060	180	900	6.9	112	205	211	79	87	91	107	124	399	183	.750	2.86	80
300005835	H060	180	900	6.3	105	187	201	77	98	91	107	124	399	183	.750	2.86	80
300005836	H060	180	900	6.3	105	187	201	77	98	91	107	124	399	183	.750	2.86	80
300005837	H060	180	900	6.3	105	187	201	77	98	91	107	124	399	183	.750	2.86	80
300005838	H060	180	900	6.3	105	187	201	77	98	91	107	124	399	183	.750	2.86	80
300005839	H060	180	900	6.3	105	187	201	77	98	91	107	124	399	183	.750	2.86	80
300005888	H060	180	900	6.0	104	160	197	74	92	76	91	99	356	183	.750	2.86	80
300005992	H060	180	900	6.3	116	166	180	65	73	83	109	98	382	235	1.070	3.69	100
300005993	H060	180	900	6.3	116	166	180	65	73	83	109	98	382	235	1.070	3.69	100
300005994	H060	180	900	6.3	116	166	180	65	73	83	109	98	382	235	1.070	3.69	100
300005996	H060	180	900	7.0	125	188	207	69	77	74	92	115	387	235	1.070	3.69	100
300005997	H060	180	900	7.0	125	188	207	69	77	74	92	115	387	235	1.070	3.69	100
300005998	H060	180	900	7.0	125	188	207	69	77	74	92	115	387	235	1.070	3.69	100
300005999	H060	180	900	7.0	125	188	207	69	77	74	92	115	387	235	1.070	3.69	100
300006000	H060	180	900	6.8	125	170	197	65	81	83	109	98	382	235	1.070	3.69	100
300006001	H060	180	900	6.8	125	170	197	65	81	83	109	98	382	235	1.070	3.69	100
300006002	H060	180	900	6.8	125	170	197	65	81	83	109	98	382	235	1.070	3.69	100
300006003	H060	180	900	6.8	125	170	197	65	81	83	109	98	382	235	1.070	3.69	100
300006004	H060	180	900	6.4	125	163	186	65	81	83	109	98	382	235	1.070	3.69	100
300006005	H060	180	900	6.4	125	163	186	65	81	83	109	98	382	235	1.070	3.69	100
300006006	H060	180	900	6.4	125	163	186	65	81	83	109	98	382	235	1.070	3.69	100

SCHAPS

BOL 31708

SKAPS Industries

SKAPS Industries
571 Industrial Pkwy
Commerce, GA

Phone: 706-336-7000
Fax: 706-336-7007

Wednesday Aug 11, 1999
Ms. Nicole Miller
Geopacific Lining
1300 Dexter Ave N 205 - Seattle, WA 98109

Ref. : Norfolk Naval Base., Norfolk, VA
Transnet 220-2-6 Geocomposite
Shipper # 1180

Ms. Nicole Miller,
We certify that the Transnet 220-2-6 double sided drainage composite, shipped on the above shipper Nos., meets the project requirements as stated in Section 02073, of the specifications. The properties listed in this section include :

Net Property	Test Method	Unit	Minimum Required Value
Mass per Unit Area	ASTM D 3776	lbs/ft^2	0.162
Thickness	ASTM D 5199	inches	.22 Minimum
Density	ASTM D 1505	lb/in	0.94
Carbon Black	ASTM D 1603	%	2
Tensile Strength	ASTM D 5035	lb/in	50
Composite Property	**Test Method**	**Unit**	**Minimum Required Value**
Transmissivity	ASTM D 4716	m^2/s	3×10^{-4} *
Ply Adhesion	ASTM D 413	lb/in	1
Fabric Property	**Test Method**	**Unit**	**Minimum Required Value**
Fabric Weight	ASTM D 5261	oz/yd^2	6
Grab Tensile Strength	ASTM D 4632	lbs	145
Grab Elongation	ASTM D 4632	lbs	50
Thickness	ASTM D 1777	lbs	55
Puncture Resistance	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	220
Water Flow Rate	ASTM D 4491	gpm/ft^2	125
Permittivity	ASTM D 4491	1/sec	1.6
Permeability	ASTM D 4491	cm/sec	0.25
AOS	ASTM D 4751	US Sieve	70

* Transmissivity measured using water 20 Degree C (68 degree F) with a gradient of 0.05 & 0.33, between two steel plates, under a confining pressure of 1,000 psf, after 15 min.

Sincerely,
Dipa Patel
QA Manager

[redacted]
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

EXTERNAL REF # GEOPACIFIC LINING
CONSIGNED TO - NORFOLK NAVAL BASE
TINATION - NORFOLK, VA23513

DATE SHIPPED 08/06/99
CUST. P.O. # 1584
STATE: NA
INTERNAL REF # 1180
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1180
BUS / MARKET SEG #
TERMS: PREPAID

COMMENTS FROM M.R.

Nicole Miller
206-284-2378

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	26102	220 NT-2 SD 6 OZ
3500.0	TN22066	26103	220 NT-2 SD 6 OZ
3500.0	TN22066	26099	220 NT-2 SD 6 OZ
3500.0	TN22066	26100	220 NT-2 SD 6 OZ
3500.0	TN22066	26098	220 NT-2 SD 6 OZ
3500.0	TN22066	26096	220 NT-2 SD 6 OZ
3500.0	TN22066	26101	220 NT-2 SD 6 OZ
3500.0	TN22066	25200	220 NT-2 SD 6 OZ
3500.0	TN22066	25177	220 NT-2 SD 6 OZ
3500.0	TN22066	25203	220 NT-2 SD 6 OZ
3500.0	TN22066	25175	220 NT-2 SD 6 OZ
3500.0	TN22066	25178	220 NT-2 SD 6 OZ
3500.0	TN22066	26097	220 NT-2 SD 6 OZ
3500.0	TN22066	26095	220 NT-2 SD 6 OZ
3500.0	TN22066	25205	220 NT-2 SD 6 OZ
3500.0	TN22066	25176	220 NT-2 SD 6 OZ
3360.0	TN22066	25206	220 NT-2 SD 6 OZ
3500.0	TN22066	26094	220 NT-2 SD 6 OZ
3220.0	TN22066	24369	220 NT-2 SD 6 OZ
3500.0	TN22066	26093	220 NT-2 SD 6 OZ
3500.0	TN22066	26092	220 NT-2 SD 6 OZ
3500.0	TN22066	26091	220 NT-2 SD 6 OZ
3500.0	TN22066	26090	220 NT-2 SD 6 OZ
3500.0	TN22066	26089	220 NT-2 SD 6 OZ
3500.0	TN22066	26088	220 NT-2 SD 6 OZ
3500.0	TN22066	26087	220 NT-2 SD 6 OZ
3220.0	TN22066	24287	220 NT-2 SD 6 OZ

2 Bags of Ties

93,800 SF

TOTAL SQFT: 93800 TOTAL WEIGHT: 35020

TRUCK / CONTAINER #
SEAL #
CARRIER REF.
CARRIER NAME WR TRUCKING
CARRIER SIGN W Wright DATE:

LOAD VERIFICATION SIGNED X
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER
SHIPPER: 8/6/99
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT
OF SHIPPER
AGENT FOR SHIPPER:

[illegible]

SKAPS Industries

Engineered Synthetic Products, Inc.

Composite Ply Adhesion

NORFOLK, VA

		Side A		Side B									
Roll #	Net #	Min. MD Top (g/in)	Avg. MD Top (g/in)	Min. MD Top (g/in)	Avg. MD Top (g/in)	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #
24285	25167	1135	1407	1225	1452	24286	28706	24287	28705	24288	28739	24289	28710
24365	28709	999	1316	1135	1362	24366	28749	24367	28700	24368	28696	24369	28828
25175	29439-B	1089	1725	1135	1861	25176	29378-A	25177	29375	25178	29434-B	25179	29376-A
26085	29981	1021	1589	1091	1634	26086	29981	26087	29973	26088	29975	26089	29980
26090	29978	1085	1679	1135	1725	26091	29989	26092	29981	26093	29970	26094	29974
26095	29959	998	1458	1032	1543	26096	29958	26097	29986	26098	29972	26099	29966
26100	29979	1034	1225	1075	1452	26101	29971	26102	29968	26103	29965	26104	29984
26200	28315-B	1044	1543	1011	1361	26201	30090	26202	27994	26203	30092	26204	28333
26205	26280	998	1361	998	1449	26206	30100	26207	30101	26208	30176	26209	30175

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: 706-336-7000 Fax: 706-336-7007

APPROVED 5 QA

Engineered Synthetic Products, Inc.

SKAPS Industries

Geonet

NORFOLK, VA

Roll #	Lot #	Min. Thickness (mil)	Carbon Black (%)	Density (g/cc)	Wt/Unit Area (net) lb/sf	TS@Break, MD (ppi)
028695	J041104	235	2.1	.945	.210	66
028705	J041104	240	2.2	.945	.215	64
028750	J041104	225	2.3	.945	.190	67
028825	1848	230	2.6	.951	.220	74
028830	1848	230	2.6	.951	.201	73
029355-A	J051287	235	2.2	.956	.231	69
029375-A	J051287	235	2.4	.956	.230	65
029430-B	J051287	233	2.6	.956	.241	71
029435-B	J051287	235	2.6	.956	.224	73
029630	J051287	238	2.4	.956	.197	69
029955	J051287	250	2.2	.956	.283	60
029960	J051287	245	2.2	.956	.260	62
029965	1895	245	2.2	.953	.260	62
029970	1895	248	2.1	.953	.235	60
029975	1895	245	2.2	.953	.245	63
029980	1895	252	2.3	.953	.235	65

PLEASE NOTE: TESTING IS PERFORMED EVERY 5TH ROLL

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: (706) 336-7000 Fax: (706) 336-7007

APPROVED 5 QA

Wednesday, August 11, 1999

Engineered Synthetic Products/Skaps Industries

571 Industrial Pkwy.
Commerce, GA 30529
Phone : 706-336-7000 Fax : 706-336-7007

August 11, 1999

Norfolk, VA

Dear Sir/Madam:

This is to certify the transmissivity of GeoComposite. Testing was performed every 100,000 square feet of production using ASTM 4716.

GeoComposite				
Roll Number	**Gradient/Load**	**Normal Time (min)**	**Transmissivity (gal/ft/min)**	**Transmissivity (m^2/sec)**
26,095	0.33/1000	15	7.26	1.50×10^{-3}
26,095	0.05/1000	15	8.59	1.78×10^{-3}

TNS
ADVANCED TECHNOLOGIES

881 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0582
Fax: (864) 879-4039
Toll Free: (800) 867-5181

July 26, 1999
REF: TNS H060
Quantity Shipped: 36 rolls
BOL#: 31699

Skaps
571 Industrial Pkwy
Commerce, GA 30529

Dear Sir/Madam:

This is to certify that TNS H060 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS H060 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 H060 conforms to the physical properties listed in the following table:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V
Weight	ASTM D 3776	oz/sy	6.0
Thickness	ASTM D 1777	mils	70
Grab Tensile	ASTM D 4632	lbs	140
Grab Elongation	ASTM D 4632	%	50
Trap Tear	ASTM D 4533	lbs	55
Puncture	ASTM D 4833	lbs	80
Mullen Burst	ASTM D 3786	psi	350
A.O.S.	ASTM D 4751	U.S. Sieve	80
Permitivity	ASTM D 4491	1/sec	1.6
Water Flow	ASTM D 4491	gpm/sq.ft.	125
Permeability	ASTM D 4491	cm/sec	.25

Regards,

J. Melissa Keller
TNS Advanced Technologies

ROLL #	STYL	WDT	LNG	FABR WGHT	THCK	GRAB MD	GRAB XMD	ELNG MD	ELNG XMD	TRAP MD	TRAP XMD	PUNC BRST	BRST STRG	FLOW RATE	PERM -ABL	PERM -ITY	AOS
------	------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
				4.0	30	140		30		35		80	250	125	.025	1.2	80
300005876	H060	180	900	6.1	106	182	184	77	86	76	91	99	356	183	.750	2.86	80
300005877	H060	180	900	6.1	106	182	184	77	86	76	91	99	356	183	.750	2.86	80
300005878	H060	180	900	6.1	106	182	184	77	86	76	91	99	356	183	.750	2.86	80
300005879	H060	180	900	6.1	106	182	184	77	86	76	91	99	356	183	.750	2.86	80
300005880	H060	180	900	6.1	106	182	184	77	86	76	91	99	356	183	.750	2.86	80
300005881	H060	180	900	6.1	106	182	184	77	86	76	91	99	356	183	.750	2.86	80
300005882	H060	180	900	6.0	104	160	197	74	92	76	91	99	356	183	.750	2.86	80
300005883	H060	180	900	6.0	104	160	197	74	92	76	91	99	356	183	.750	2.86	80
300005884	H060	180	900	6.0	104	160	197	74	92	76	91	99	356	183	.750	2.86	80
300005885	H060	180	900	6.0	104	160	197	74	92	76	91	99	356	183	.750	2.86	80
300005886	H060	180	900	6.0	104	160	197	74	92	76	91	99	356	183	.750	2.86	80
300005889	H060	180	900	6.0	104	160	197	74	92	76	91	99	356	183	.750	2.86	80
300005890	H060	180	900	6.0	104	160	197	74	92	76	91	99	356	183	.750	2.86	80
300005891	H060	180	900	6.3	108	184	196	71	75	77	104	122	385	183	.750	2.86	80
300005892	H060	180	900	6.3	108	184	196	71	75	77	104	122	385	183	.750	2.86	80
300005893	H060	180	900	6.3	108	184	196	71	75	77	104	122	385	183	.750	2.86	80
300005894	H060	180	900	6.3	108	184	196	71	75	77	104	122	385	183	.750	2.86	80
300005895	H060	180	900	6.3	106	190	185	72	81	77	104	122	385	183	.750	2.86	80
300005896	H060	180	900	6.3	106	190	185	72	81	77	104	122	385	183	.750	2.86	80
300005897	H060	180	900	6.3	106	190	185	72	81	77	104	122	385	183	.750	2.86	80
300005899	H060	180	900	6.3	106	173	202	73	87	77	104	122	385	183	.750	2.86	80
300005900	H060	180	900	6.3	106	173	202	73	87	77	104	122	385	183	.750	2.86	80
300005901	H060	180	900	6.3	106	173	202	73	87	77	104	122	385	183	.750	2.86	80
300005902	H060	180	900	6.3	106	173	202	73	87	77	104	122	385	183	.750	2.86	80
300005903	H060	180	900	6.2	108	185	184	74	85	77	104	122	385	183	.750	2.86	80
300005904	H060	180	900	6.2	108	185	184	74	85	77	104	122	385	183	.750	2.86	80
300005905	H060	180	900	6.2	108	185	184	74	85	77	104	122	385	183	.750	2.86	80
300005906	H060	180	900	6.2	108	185	184	74	85	77	104	122	385	183	.750	2.86	80
300005907	H060	180	900	6.2	108	185	184	74	85	77	104	122	385	183	.750	2.86	80
300005908	H060	180	900	6.4	105	185	193	73	89	76	91	99	356	183	.750	2.86	80
300005909	H060	180	900	6.4	105	185	193	73	89	76	91	99	356	183	.750	2.86	80
300005910	H060	180	900	6.4	105	185	193	73	89	76	91	99	356	183	.750	2.86	80
300005911	H060	180	900	6.4	105	185	193	73	89	76	91	99	356	183	.750	2.86	80
300005912	H060	180	900	6.4	105	185	193	73	89	76	91	99	356	183	.750	2.86	80
300005913	H060	180	900	6.4	105	185	193	73	89	76	91	99	356	183	.750	2.86	80
300005998	H060	180	900	7.0	125	188	207	69	77	74	92	115	387	235	1.070	3.69	100

Bill of Lading 31699

SKAPS Industries

SKAPS Industries
571 Industrial Pkwy
Commerce, GA

Phone: 706-336-7000
Fax: 706-336-7007

Monday Sept. 20, 1999
Ms. Nicole Miller
Geopacific Lining
1300 Dexter Ave N 205 - Seattle, WA 98109

Ref. : Norfolk Naval Base., Norfolk, VA
Transnet 220-2-6 Geocomposite
Shipper # 1294

Ms. Nicole Miller,
We certify that the Transnet 220-2-6 double sided drainage composite, shipped on the above shipper Nos., meets the project requirements as stated in Section 02073, of the specifications. The properties listed in this section include :

Net Property	Test Method	Unit	Minimum Required Value
Mass per Unit Area	ASTM D 3776	lbs/ft^2	0.162
Thickness	ASTM D 5199	inches	.22 Minimum
Density	ASTM D 1505	lb/in	0.94
Carbon Black	ASTM D 1603	%	2
Tensile Strength	ASTM D 5035	lb/in	50
Composite Property	**Test Method**	**Unit**	**Minimum Required Value**
Transmissivity	ASTM D 4716	m^2/s	3×10^{-4} *
Ply Adhesion	ASTM D 413	lb/in	1
Fabric Property	**Test Method**	**Unit**	**Minimum Required Value**
Fabric Weight	ASTM D 5261	oz/yd^2	6
Grab Tensile Strength	ASTM D 4632	lbs	145
Grab Elongation	ASTM D 4632	lbs	50
Thickness	ASTM D 1777	lbs	55
Puncture Resistance	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	220
Water Flow Rate	ASTM D 4491	gpm/ft^2	125
Permittivity	ASTM D 4491	1/sec	1.6
Permeability	ASTM D 4491	cm/sec	0.25
AOS	ASTM D 4751	US Sieve	70

* Transmissivity measured using water 20 Degree C (68 degree F) with a gradient of 0.05 & 0.33, between two steel plates, under a confining pressure of 1,000 psf. after 15 min.

Sincerely,

Dipa Patel
QA Manager

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 338-7000

Deliver by

EXTERNAL REF # GEOPACIFIC LINING
CONSIGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA23511

DATE SHIPPED 09/14/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1294
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1294
BUS / MARKET SEQ #
TERMS: SKAPS

COMMENTS FROM M.R.

Nicole Miller
206-284-2378

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	28274	220 NT-2 SD 6 OZ
3500.0	TN22066	28272	220 NT-2 SD 6 OZ
3500.0	TN22066	28261	220 NT-2 SD 6 OZ
3500.0	TN22066	28262	220 NT-2 SD 6 OZ
3500.0	TN22066	28265	220 NT-2 SD 6 OZ
3500.0	TN22066	28266	220 NT-2 SD 6 OZ
3500.0	TN22066	28268	220 NT-2 SD 6 OZ
3500.0	TN22066	28264	220 NT-2 SD 6 OZ
3500.0	TN22066	28267	220 NT-2 SD 6 OZ
3500.0	TN22066	28269	220 NT-2 SD 6 OZ
3500.0	TN22066	28270	220 NT-2 SD 6 OZ
3500.0	TN22066	28271	220 NT-2 SD 6 OZ

1 Bag of Ties

42,000 lb

Driver : Ronald Jones
Trucking Co. : TEI
Telephone No:

TOTAL SQFT: 42000
TOTAL WEIGHT: 15040
TRUCK / CONTAINER #
LOAD VERIFICATION SIGNED X _____
SEAL #
TRUCKERS P.O. # 1584
CARRIER REF. TEI
CARRIER NAME
CARRIER SIGN _____ DATE: _____

SIGN HERE FOR SHIPPER
SHIPPER: _____ 9/14
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT OF SHIPPER Ronald Jones

AGENT FOR SHIPPER: _____

Received at Commerce, Ga. from Skaps Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the Shipper noted herein is Skaps Industries as indicated by the designation "Shipper" in the Skaps Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Carrier's Truck Transportation existing between the parties or (b) if the Shipper noted herein is not Skaps Industries then Skaps Industries acting in the agent for the designated Shipper, and that every service of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Bill of Lading and terms Official, Southern, Western and Illinois Freight Classifications in effect on the date hereof, if this is a railroad shipment, or (2) to the applicable motor carrier classification or tariff if this is a motor carrier shipment, when acting in the capacity of an agent. Shipper in placing the material in valid on behalf of a Shipper, Skaps Industries accepts no liability for loss of cargo, damage to consignment, or any other consequences arising during transportation. Carrier having agreed upon the transportation arrangement related by the Shipper and not by Skaps Industries.

Subject to the above rates and conditions as to which parts to the Shipper. Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the rate shown and agreed to herein and has authority to sign and execute for himself and his principal.

Engineered Synthetic Products, Inc.

SKAPS Industries

Composite Ply Adhesion

NORFOLK, VA

		Side A		Side B									
Roll #	Net #	Min. MD Top (g/in)	Avg. MD Top (g/in)	Min. MD Top (g/in)	Avg. MD Top (g/in)	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #
28260	29181-A	908	1225	953	1180	28261	29185-A	28262	29190-A	28263	29187-A	28264	29183
28265	29182-A	1011	1271	654	1362	28266	29177-A	28267	29179-A	28268	29175	28269	29184-A
28270	29178-A	999	1318	953	1225	28271	25297	28272	29215-A	28273	24254	28274	29216-A

APPROVED 5

SKAPS Industries

Engineered Synthetic Products, Inc.

Geonet

NORFOLK, VA

Roll #	Lot #	Min. Thickness (mil)	Carbon Black (%)	Density (g/cc)	Wt/Unit Area (net) lb/sf	TS@Break, MD (ppi)
025295	1750	250	2.3	.950	.250	74
029175-A	J041262	225	2.0	.941	.232	60
029180-A	J041262	235	2.0	.941	.224	61
029185-A	J041262	240	2.1	.941	.243	63
029215-A	J041262	228	2.1	.941	.210	68

PLEASE NOTE: TESTING IS PERFORMED EVERY 5TH ROLL

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone : 706-336-7000 Fax : 706-338-7007
Please visit our website @ www.skaps.com

Monday, September 20, 1999

Engineered Synthetic Products/Skaps Industries

571 Industrial Pkwy.
Commerce, GA 30529
Phone : 706-336-7000 Fax : 706-336-7007

September 20, 1999

Norfolk, VA

Dear Sir/Madam:

This is to certify the transmissivity of GeoComposite. Testing was performed every 100,000 square feet of production using ASTM 4716.

GeoComposite				
Roll Number	**Gradient/Load**	**Normal Time (min)**	**Transmissivity (gal/ft/min)**	**Transmissivity (m^2/sec)**
28,265	0.33/1000	15	3.60	7.45×10^{-4}
28,265	0.05/1000	15	5.75	1.19×10^{-3}

TNS
ADVANCED TECHNOLOGIES

681 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0592
Fax: (864) 879-4639
Toll Free: (800) 887-5161

September 8, 1999
REF: TNS H060
Quantity Shipped: 27 rolls
BOL#: 30730

Skaps
571 Industrial Pkwy.
Commerce, GA 30529

Dear Sir/Madam:

This is to certify that TNS H060 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS H060 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 H060 conforms to the physical properties listed in the following table:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V
Weight	ASTM D 3776	oz/sy	6.0
Thickness	ASTM D 1777	mils	55
Grab Tensile	ASTM D 4632	lbs	160
Grab Elongation	ASTM D 4632	%	50
Trap Tear	ASTM D 4533	lbs	55
Puncture	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	350
A.O.S.	ASTM D 4751	U.S. Sieve	100
Permitivity	ASTM D 4491	1/sec	1.6
Water Flow	ASTM D 4491	gpm/sq.ft.	125
Permeability	ASTM D 4491	cm/sec	25

Regards,

J. Melissa Keller
TNS Advanced Technologies

TNS MILLS, INC.
NONWOVEN QUALITY DATA
FOR ROLL# 300009598 THROUGH 300009598

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
300009598	H060	180	900	6.3	88	183	207	77	77	78	102	112	375	139	.460	2.18	100
300009600	H060	180	900	6.3	88	183	207	77	77	78	102	112	375	139	.460	2.38	100
300009603	H060	180	900	6.1	85	164	193	69	64	72	105	97	354	190	.640	2.99	100
300009605	H060	180	900	6.1	85	164	193	69	64	72	105	97	354	190	.640	2.99	100
300009606	H060	180	900	6.3	86	199	181	61	72	72	105	97	354	190	.640	2.99	100
300009607	H060	180	900	6.3	86	199	181	61	72	72	105	97	354	190	.640	2.99	100
300009608	H060	180	900	6.3	86	199	181	61	72	72	105	97	354	190	.640	2.99	100
300009609	H060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009610	H060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009611	H060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009612	H060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009613	H060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009614	H060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009615	H060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009616	H060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009617	H060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009618	H060	180	900	6.5	86	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009619	H060	180	900	6.5	86	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009620	H060	180	900	6.5	86	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009621	H060	180	900	6.5	86	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009622	H060	180	900	6.5	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009623	H060	180	900	6.5	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009624	H060	180	900	6.5	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009625	H060	180	900	6.5	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009626	H060	180	900	6.4	90	201	178	69	63	83	95	104	359	146	.500	2.29	100
300009627	H060	180	900	6.4	90	201	178	69	63	83	95	104	359	146	.500	2.29	100
300009628	H060	180	900	6.4	90	201	178	69	63	83	95	104	359	146	.500	2.29	100

Bill of Lading# 30730

TOTAL P.15

SKAPS Industries

SKAPS Industries
571 Industrial Pkwy
Commerce, GA

Phone: 706-336-7000
Fax: 706-336-7007

Monday Sept. 20, 1999
Ms. Nicole Miller
Geopacific Lining
1300 Dexter Ave N 205 - Seattle, WA 98109

Ref. : Norfolk Naval Base., Norfolk, VA
Transnet 220-2-6 Geocomposite
Shipper # 1294

Ms. Nicole Miller,
We certify that the Transnet 220-2-6 double sided drainage composite, shipped on the above shipper Nos., meets the project requirements as stated in Section 02073, of the specifications. The properties listed in this section include :

Net Property	Test Method	Unit	Minimum Required Value
Mass per Unit Area	ASTM D 3776	lbs/ft^2	0.162
Thickness	ASTM D 5199	inches	.22 Minimum
Density	ASTM D 1505	lb/in	0.94
Carbon Black	ASTM D 1603	%	2
Tensile Strength	ASTM D 5035	lb/in	50
Composite Property	**Test Method**	**Unit**	**Minimum Required Value**
Transmissivity	ASTM D 4716	m^2/s	3×10^{-4} *
Ply Adhesion	ASTM D 413	lb/in	1
Fabric Property	**Test Method**	**Unit**	**Minimum Required Value**
Fabric Weight	ASTM D 5261	oz/yd^2	6
Grab Tensile Strength	ASTM D 4632	lbs	145
Grab Elongation	ASTM D 4632	lbs	50
Thickness	ASTM D 1777	lbs	55
Puncture Resistance	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	220
Water Flow Rate	ASTM D 4491	gpm/ft^2	125
Permittivity	ASTM D 4491	1/sec	1.6
Permeability	ASTM D 4491	cm/sec	0.25
AOS	ASTM D 4751	US Sieve	70

* Transmissivity measured using water 20 Degree C (68 degree F) with a gradient of 0.05 & 0.33, between two steel plates. under a confining pressure of 1,000 psf, after 15 min.

Sincerely,

Dipa Patel
QA Manager

[redacted]
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

Deliver by

1294

EXTERNAL REF # GEOPACIFIC LINING
CONSIGNED TO - NORFOLK NAVAL BASE
DE ATION - NORFOLK, VA23513

DATE SHIPPED 09/14/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1294
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1294
BUS / MARKET SEQ #
TERMS: SKAPS

COMMENTS FROM M.R.

Nicole Miller
206-284-2378

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	28274	220 NT-2 SD 6 OZ
3500.0	TN22066	28272	220 NT-2 SD 6 OZ
3500.0	TN22066	28261	220 NT-2 SD 6 OZ
3500.0	TN22066	28262	220 NT-2 SD 6 OZ
3500.0	TN22066	28265	220 NT-2 SD 6 OZ
3500.0	TN22066	28266	220 NT-2 SD 6 OZ
3500.0	TN22066	28268	220 NT-2 SD 6 OZ
3500.0	TN22066	28264	220 NT-2 SD 6 OZ
3500.0	TN22066	28267	220 NT-2 SD 6 OZ
3500.0	TN22066	28269	220 NT-2 SD 6 OZ
3500.0	TN22066	28270	220 NT-2 SD 6 OZ
3500.0	TN22066	28271	220 NT-2 SD 6 OZ

1 Bag of Ties

Driver : Ronald Jones
Trucking Co. : TEI
Telephone No.:

TOTAL SQFT: 42000

TOTAL WEIGHT: 15040

TRUCK / CONTAINER #
SEAL #
CARRIER REF. TEI
CARRIER NAME
CARRIER SIGN _____ DATE: _____

LOAD VERIFICATION SIGNED X _____
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER [signature] 9/14
SHIPPER: _____
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT OF SHIPPER Ronald Jones

AGENT FOR SHIPPER: _____

[illegible] at Commerce, GA from Skaps Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" [illegible] understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any [illegible] of said route to destination, and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the Shipper noted herein is Skaps Industries as indicated by the designation of the [illegible] "Shipper" to be Skaps Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not Skaps Industries then Skaps Industries [illegible] solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) [illegible] Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for [illegible]

Engineered Synthetic Products, Inc.

SKAPS Industries

Composite Ply Adhesion

NORFOLK, VA

		Side A		Side B									
Roll #	Net #	Min. MD Top (g/in)	Avg. MD Top (g/in)	Min. MD Top (g/in)	Avg. MD Top (g/in)	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #
28260	29181-A	908	1225	953	1180	28261	29185-A	28262	29180-A	28263	29187-A	28264	29183
28265	29182-A	1011	1271	854	1362	28266	29177-A	28267	29179-A	28268	29175	28269	29184-A
28270	29178-A	998	1316	953	1225	28271	25297	28272	29215-A	28273	24254	28274	29216-A

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone: 706-336-7000 Fax: 706-336-7007

Monday, September 20, 1999

Please visit our website @www.skaps.com

APPROVED 5 QA

SKAPS Industries

Engineered Synthetic Products, Inc.

Geonet

NORFOLK, VA

Roll #	Lot #	Min. Thickness (mil)	Carbon Black (%)	Density (g/cc)	Wt/Unit Area (net) lb/sf	TS@Break, MD (ppi)
025295	1750	250	2.3	.950	.250	74
029175-A	J041262	225	2.0	.941	.232	60
029180-A	J041262	235	2.0	.941	.224	61
029185-A	J041262	240	2.1	.941	.243	63
029215-A	J041262	228	2.1	.941	.210	68

PLEASE NOTE: TESTING IS PERFORMED EVERY 5TH ROLL

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone : 706-336-7000 Fax : 706-336-7007
Please visit our website @ www.skaps.com

APPROVED 5

Monday, September 20, 1999

Engineered Synthetic Products/Skaps Industries

571 Industrial Pkwy.
Commerce, GA 30529
Phone : 706-336-7000 Fax : 706-336-7007

September 20, 1999

Norfolk, VA

Dear Sir/Madam:

This is to certify the transmissivity of GeoComposite. Testing was performed every 100,000 square feet of production using ASTM 4716.

GeoComposite				
Roll Number	**Gradient/Load**	**Normal Time (min)**	**Transmissivity (gal/ft/min)**	**Transmissivity (m^2/sec)**
28,265	0.33/1000	15	3.60	7.45×10^{-4}
28,265	0.05/1000	15	5.75	1.19×10^{-3}

TNS
ADVANCED TECHNOLOGIES

681 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0592
Fax: (864) 879-4639
Toll Free: (800) 867-5181

September 8, 1999
REF: TNS H060
Quantity Shipped: 27 rolls
BOL#: 30730

Skaps
571 Industrial Pkwy.
Commerce, GA 30529

Dear Sir/Madam:

This is to certify that TNS H060 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS H060 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 H060 conforms to the physical properties listed in the following table:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V
Weight	ASTM D 3776	oz/sy	6.0
Thickness	ASTM D 1777	mils	55
Grab Tensile	ASTM D 4632	lbs	160
Grab Elongation	ASTM D 4632	%	50
Trap Tear	ASTM D 4533	lbs	55
Puncture	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	350
A.O.S.	ASTM D 4751	U.S. Sieve	100
Permitivity	ASTM D 4491	1/sec	1.6
Water Flow	ASTM D 4491	gpm/sq.ft.	125
Permeability	ASTM D 4491	cm/sec	.25

Regards,

J. Melissa Keller
TNS Advanced Technologies

DATE: 9/08/99

TNS MILLS, INC.
NONWOVEN QUALITY DATA
FOR ROLL# 300009598 THROUGH 300009598

PAGE

ROLL #	STYL	WDT	LNG	FABR WGHT	THCK	GRAB MD	GRAB XMD	ELNG MD	ELNG XMD	TRAP MD	TRAP XMD	PUNC REST	BRST STRG	FLOW RATE	PERM -ABL	PERM -ITY	ADS
300009598	H060	180	900	6.3	88	183	207	77	77	78	102	112	375	139	.460	2.18	100
300009600	H060	180	900	6.3	88	183	207	77	77	78	102	112	375	139	.460	2.18	100
300009603	H060	180	900	6.1	85	164	193	69	64	72	105	97	354	190	.640	2.99	100
300009605	H060	180	900	6.1	85	164	193	69	64	72	105	97	354	190	.640	2.99	100
300009606	H060	180	900	6.3	86	199	181	61	72	72	105	97	354	190	.640	2.99	100
300009607	H060	180	900	6.3	86	199	181	61	72	72	105	97	354	190	.640	2.99	100
300009608	H060	180	900	6.3	86	199	181	61	72	72	105	97	354	190	.640	2.99	100
300009609	H060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009610	H060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009611	H060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009612	H060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009613	H060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009614	H060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009615	H060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009616	H060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009617	H060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009618	H060	180	900	6.5	86	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009619	H060	180	900	6.5	86	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009620	H060	180	900	6.5	86	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009621	H060	180	900	6.5	86	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009622	H060	180	900	6.5	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009623	H060	180	900	6.5	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009624	H060	180	900	6.5	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009625	H060	180	900	6.5	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009626	H060	180	900	6.4	90	201	178	69	63	83	95	104	359	146	.500	2.29	100
300009627	H060	180	900	6.4	90	201	178	69	63	83	95	104	359	146	.500	2.29	100
300009628	H060	180	900	6.4	90	201	178	69	63	83	95	104	359	146	.500	2.29	100

Bill of Lading# 30730

DEC-14-1999 15:12 E.S.P. Inc. 770 564 1818 P.08/14

SHIPPING ORDER

SKAPS INDUSTRIES
571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529
(706) 336-7000

SHIPPING NO.
1322

ERNAL REF # GEOPACIFIC LINING
SIGNED TO - NORFOLK NAVAL BASE
DESTINATION - NORFOLK, VA23513

COMMENTS FROM M.R. Nicole Miller
206-284-2378

DATE SHIPPED 09/25/99
CUST. P.O. # 1584
STATE: WA
INTERNAL REF # 1322
MATERIAL REQ # 1584
JOB #
SHIPPERS # 1322
BUS / MARKET SEQ #
TERMS: SKAPS

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

NO # SQ FT	PRODUCT CODE #	ROLL #	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS
3500.0	TN22066	28779	220 NT-2 SD 6 OZ
3500.0	TN22066	28780	220 NT-2 SD 6 OZ
3500.0	TN22066	28781	220 NT-2 SD 6 OZ
3500.0	TN22066	28782	220 NT-2 SD 6 OZ

TOTAL SQFT: 14000 TOTAL WEIGHT: 4561

TRUCK / CONTAINER #
SEAL #
CARRIER REF. CO. TRUCK th. D.W. Evans
CARRIER NAME
CARRIER SIGN _____ DATE: _____

LOAD VERIFICATION SIGNED X _____
TRUCKERS P.O. # 1584

SIGN HERE FOR SHIPPER [signature] 9/25/99
SHIPPER: _____
ADDRESS: 571 INDUSTRIAL PARKWAY
COMMERCE, GA 30529

SIGN HERE FOR AGENT OF SHIPPER _____
AGENT FOR SHIPPER: _____

[illegible]

SKAPS Industries

SKAPS Industries
571 Industrial Pkwy
Cassville, GA

Phone: 706-336-7000
Fax: 706-336-7007

Thursday Sept. 30, 1999
Ms. Nicole Miller
Geopacific Lining
1300 Dexter Ave N 205 - Seattle, WA 98109

Ref. : Norfolk Naval Base., Norfolk, VA
Transnet 220-2-6 Geocomposite
Shipper # 1322

Ms. Nicole Miller,
We certify that the Transnet 220-2-6 double sided drainage composite, shipped on the above shipper Nos., meets the project requirements as stated in Section 02073, of the specifications. The properties listed in this section include :

Net Property	Test Method	Unit	Minimum Required Value
Mass per Unit Area	ASTM D 3776	lbs/ft^2	0.162
Thickness	ASTM D 5199	inches	.22 Minimum
Density	ASTM D 1505	lb/in	0.94
Carbon Black	ASTM D 1603	%	2
Tensile Strength	ASTM D 5035	lb/in	50
Composite Property	**Test Method**	**Unit**	**Minimum Required Value**
Transmissivity	ASTM D 4716	m^2/s	3×10^{-4} *
Ply Adhesion	ASTM D 413	lb/in	1
Fabric Property	**Test Method**	**Unit**	**Minimum Required Value**
Fabric Weight	ASTM D 5261	oz/yd^2	6
Grab Tensile Strength	ASTM D 4632	lbs	145
Grab Elongation	ASTM D 4632	lbs	50
Thickness	ASTM D 1777	lbs	55
Puncture Resistance	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	220
Water Flow Rate	ASTM D 4491	gpm/ft^2	125
Permittivity	ASTM D 4491	1/sec	1.6
Permeability	ASTM D 4491	cm/sec	0.25
AOS	ASTM D 4751	US Sieve	70

* Transmissivity measured using water 20 Degree C (68 degree F) with a gradient of 0.05 & 0.33. between two steel plates. under a confining pressure of 1,000 psf, after 15 min.

Sincerely,

Dipa Patel
QA Manager

Engineered Synthetic Products, Inc.

SKAPS Industries

Composite Ply Adhesion

NORFOLK, VA

		Side A		Side B									
Roll #	Net #	Min. MD Top (g/in)	Avg. MD Top (g/in)	Min. MD Top (g/in)	Avg. MD Top (g/in)	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #	Other Roll	Net #
28775	29883-A	1180	1543	998	1316	28776	29844-A	28777	29836-A	28778	29840-A	28779	29884-A
28780	29886-A	998	1316	953	1362	28781	29839-A	28782	29835-A	28783	29824-A	28784	29834-A

Engineered Synthetic Products, Inc

SKAPS Industries

Geonet

NORFOLK, VA

Roll #	Lot #	Min. Thickness (mil)	Carbon Black (%)	Density (g/cc)	Wt/Unit Area (nat) lb/sf	TS@Break, MD (ppi)
029835-A	CB19981402	235	2.5	.953	.224	68
029860-A	223734	230	2.5	.950	.210	65
029865-A	223734	230	2.5	.950	.243	65

PLEASE NOTE: TESTING IS PERFORMED EVERY 5TH ROLL

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Phone : 706-335-7000 Fax : 706-335-7007
Please visit our website @ www.skaps.com

Thursday, September 30, 1999

TNS
ADVANCED TECHNOLOGIES

881 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0692
Fax: (864) 879-4639
Toll Free: (800) 887-5181

September 8, 1999
REF: TNS H060
Quantity Shipped: 27 rolls
BOL#: 30730

Skaps
571 Industrial Pkwy.
Commerce, GA 30529

Dear Sir/Madam:

This is to certify that TNS H060 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS H060 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 H060 conforms to the physical properties listed in the following table:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V
Weight	ASTM D 3776	oz/sy	6.0
Thickness	ASTM D 1777	mils	55
Grab Tensile	ASTM D 4632	lbs	160
Grab Elongation	ASTM D 4632	%	50
Trap Tear	ASTM D 4533	lbs	55
Puncture	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	350
A.O.S.	ASTM D 4751	U.S. Sieve	100
Permitivity	ASTM D 4491	1/sec	1.6
Water Flow	ASTM D 4491	gpm/sq.ft.	125
Permeability	ASTM D 4491	cm/sec	.25

Regards,

J. Melissa Keller
TNS Advanced Technologies

DATE: 9/08/99

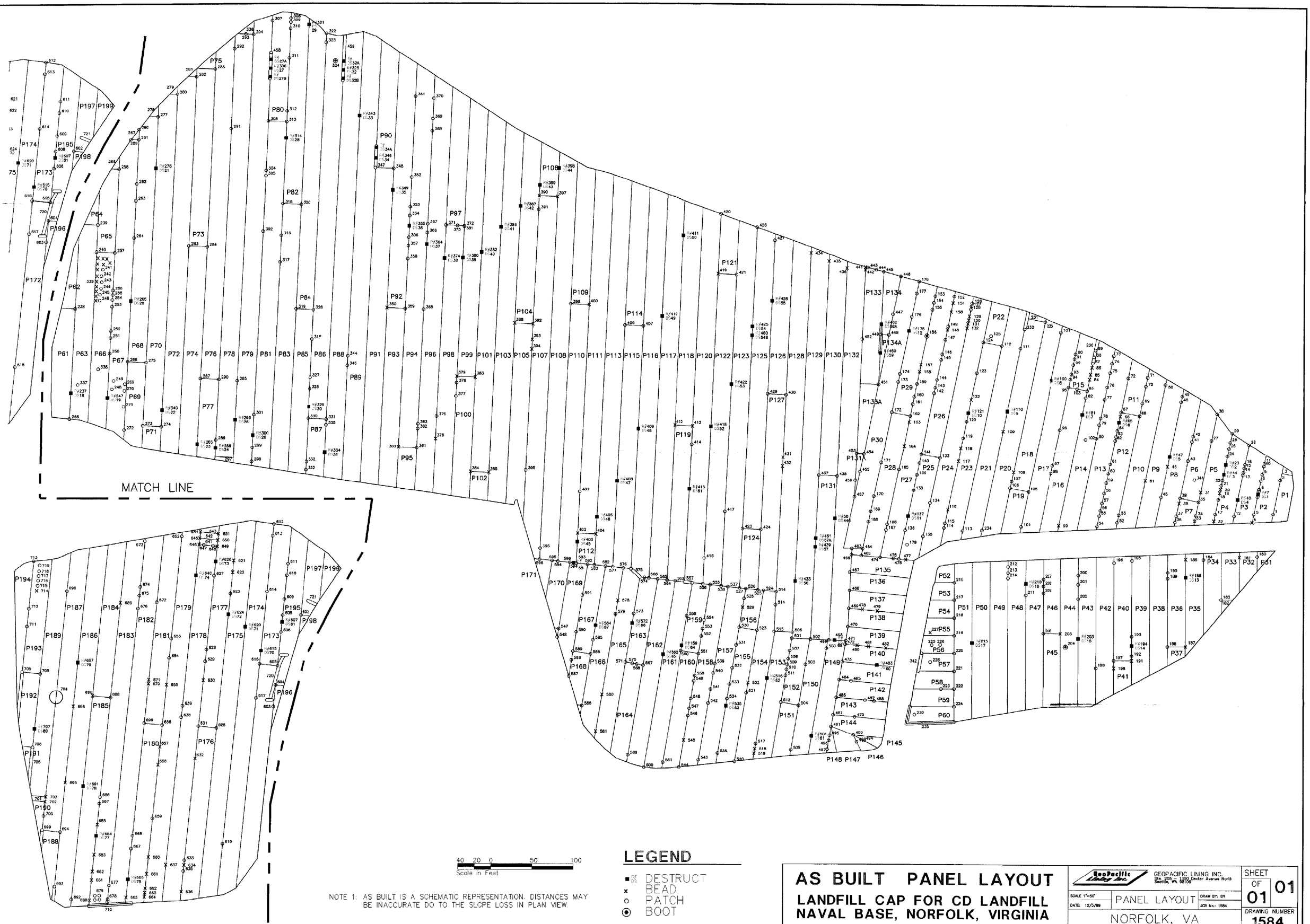
TWS MILLS, INC.
NONWOVEN QUALITY DATA
FOR ROLLS 300009594 THROUGH 300009598

ROLL #	STYL	WDT	LNG	FABR WGHT	THCK	GRAB MD	GRAB XMD	ELNG MD	ELNG XMD	TRAP MD	TRAP XMD	PUNC RESS	BURS STRC	FLOW RATE	FRIN -ABL	FRIN -ITZ	AOS
300009594	8060	180	900	6.1	88	183	207	77	77	76	102	112	373	139	.460	2.18	100
300009600	8060	180	900	6.1	88	183	207	77	77	79	102	112	373	139	.460	2.18	100
300009602	8060	180	900	5.1	85	164	193	69	64	72	105	97	334	190	.640	2.99	100
300009603	8060	180	900	6.1	85	164	193	69	64	72	105	97	334	190	.640	2.99	100
300009604	8060	180	900	6.3	86	159	181	61	72	72	105	97	334	190	.640	2.99	100
300009607	8060	180	900	6.3	86	159	181	61	72	72	105	97	334	190	.640	2.99	100
300009608	8060	180	900	6.3	86	159	181	61	72	72	105	97	334	190	.640	2.99	100
300009609	8060	180	900	6.5	88	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009610	8060	180	900	6.5	85	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009611	8060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009612	8060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009613	8060	180	900	6.5	86	198	198	61	62	82	99	105	380	146	.500	2.29	100
300009614	8060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009615	8060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009616	8060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009617	8060	180	900	6.3	85	185	185	59	61	82	99	105	380	146	.500	2.29	100
300009618	8060	180	900	6.3	85	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009619	8060	180	900	6.3	86	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009620	8060	180	900	6.3	86	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009621	8060	180	900	6.3	86	189	190	57	61	82	99	105	380	146	.500	2.29	100
300009622	8060	180	900	6.3	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009623	8060	180	900	6.3	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009624	8060	180	900	6.3	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009625	8060	180	900	6.3	90	193	189	57	63	82	99	105	380	146	.500	2.29	100
300009626	8060	180	900	6.4	90	201	178	69	63	83	95	104	359	145	.500	2.29	100
300009627	8060	180	900	6.4	90	201	178	69	63	83	95	104	359	145	.500	2.29	100
300009628	8060	180	900	6.4	90	201	178	69	63	83	95	104	359	145	.500	2.29	100

Bill of Lading # 30730

Appendix D

As-Built Drawings



NOTE 1: AS BUILT IS A SCHEMATIC REPRESENTATION. DISTANCES MAY BE INACCURATE DO TO THE SLOPE LOSS IN PLAN VIEW.

LEGEND

- DESTRUCT
- BEAD
- PATCH
- BOOT

AS BUILT PANEL LAYOUT

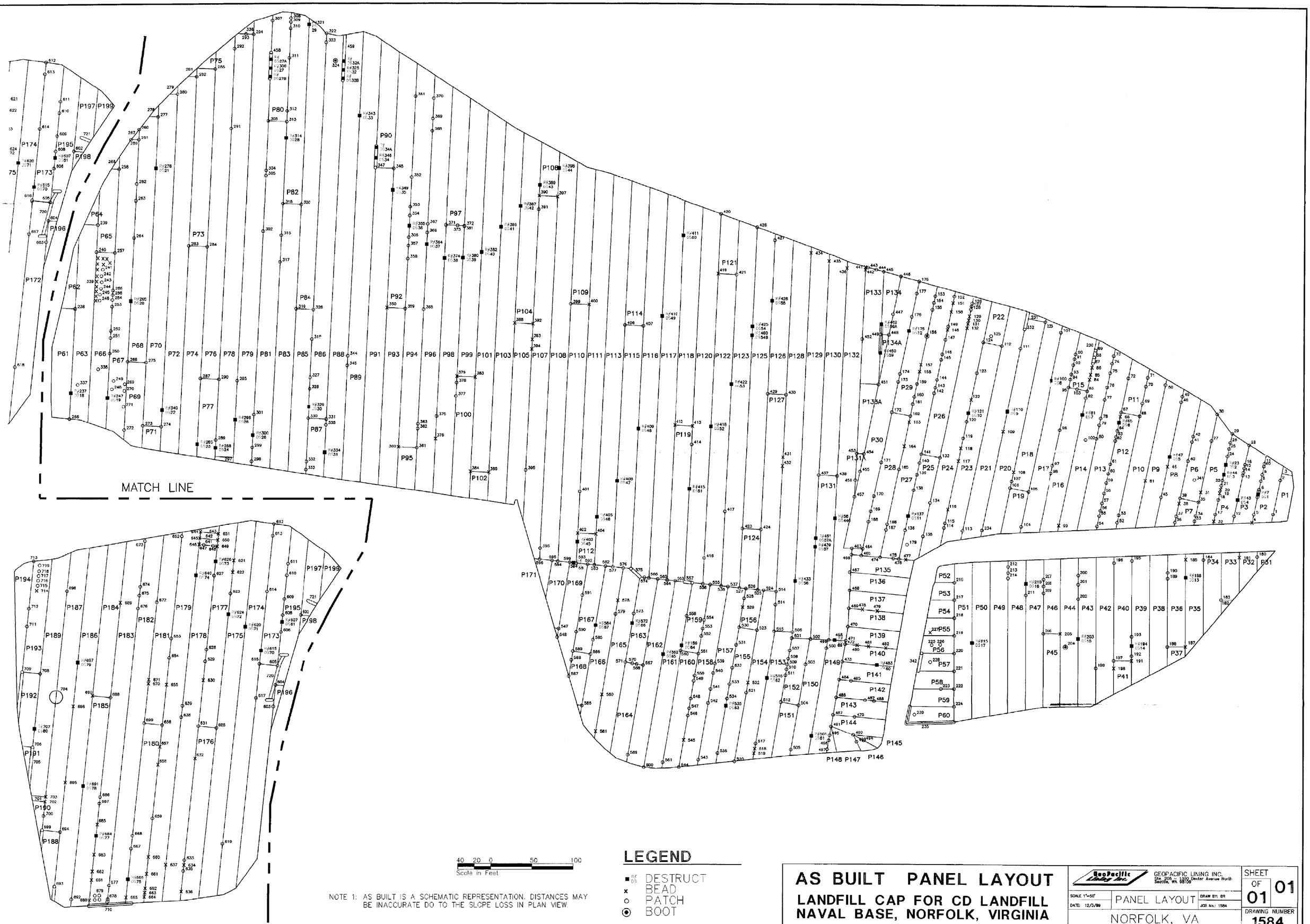
LANDFILL CAP FOR CD LANDFILL
NAVAL BASE, NORFOLK, VIRGINIA

GEOPACIFIC LINING INC.
Ste. 205 - 1300 Dexter Avenue North
Seattle, WA 98109

SCALE 1"=50'
DATE: 12/3/99
PANEL LAYOUT
DRAW BY: BR
JOB No.: 1584
NORFOLK, VA

SHEET 01 OF 01

DRAWING NUMBER 1584



NOTE 1: AS BUILT IS A SCHEMATIC REPRESENTATION. DISTANCES MAY BE INACCURATE DO TO THE SLOPE LOSS IN PLAN VIEW.

LEGEND

- DESTRUCT
- BEAD
- PATCH
- BOOT

AS BUILT PANEL LAYOUT

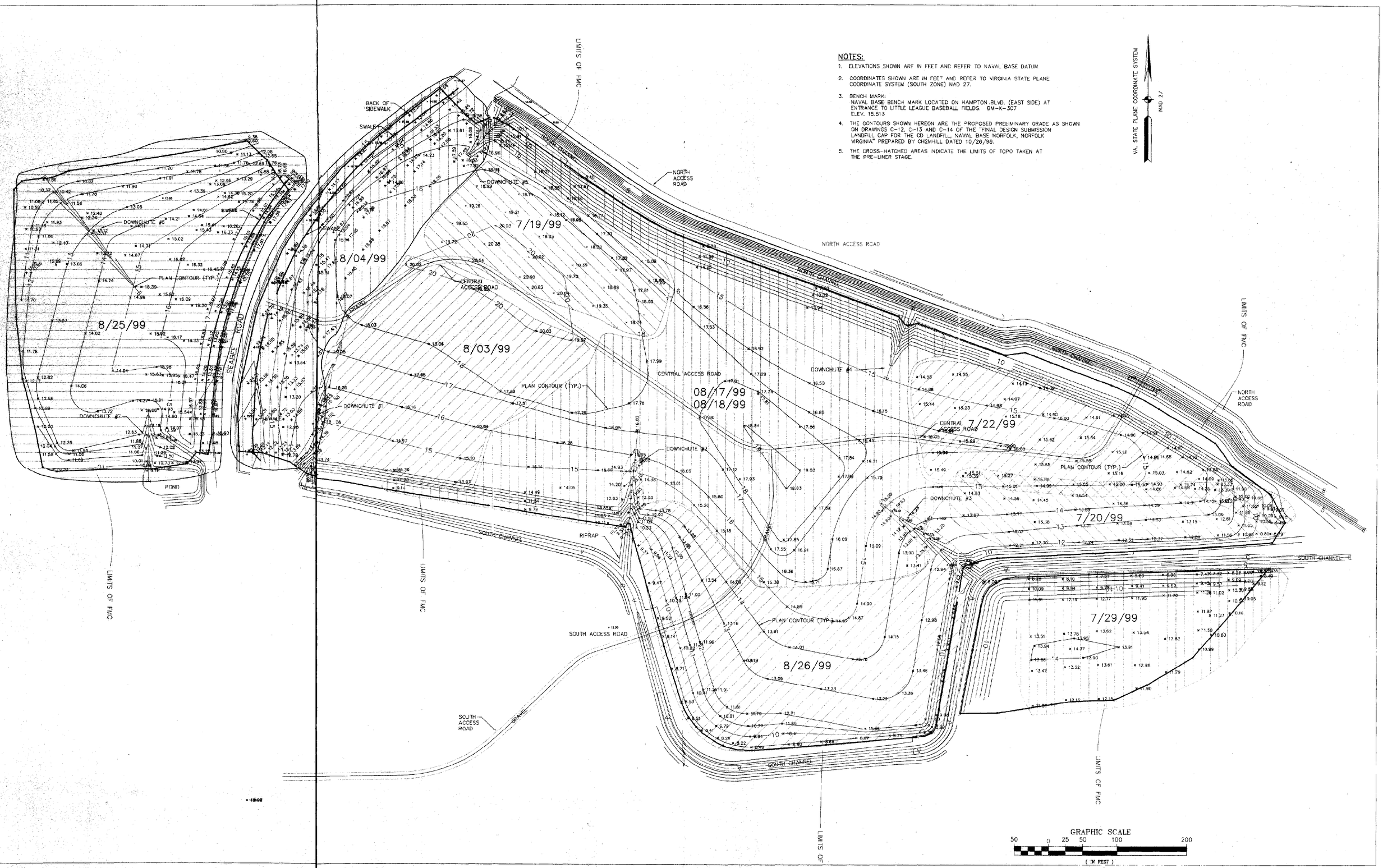
LANDFILL CAP FOR CD LANDFILL
NAVAL BASE, NORFOLK, VIRGINIA

GEOPACIFIC LINING INC.
Ste. 205 - 1300 Dexter Avenue North
Seattle, WA 98109

SCALE 1"=50'
DATE: 12/3/99
PANEL LAYOUT
DRAW BY: BR
JOB No.: 1584
NORFOLK, VA

SHEET 01 OF 01

DRAWING NUMBER 1584



NO.	DESCRIPTION	DATE	RVSD BY	REV BY	APPROVED	DATE

REVISION APPROVED BY

PROFESSIONAL SEAL

COMMONWEALTH OF VIRGINIA
BRUCE A. FREDERICK
No. 002146
4/7/00
LAND SURVEYOR

PROJECT:

CD LANDFILL
NORFOLK NAVAL BASE
NORFOLK, VA.

TITLE:

TOPOGRAPHIC SURVEY OF
CD LANDFILL CLOSURE AT
PRE-LINER STAGE

PHR&A

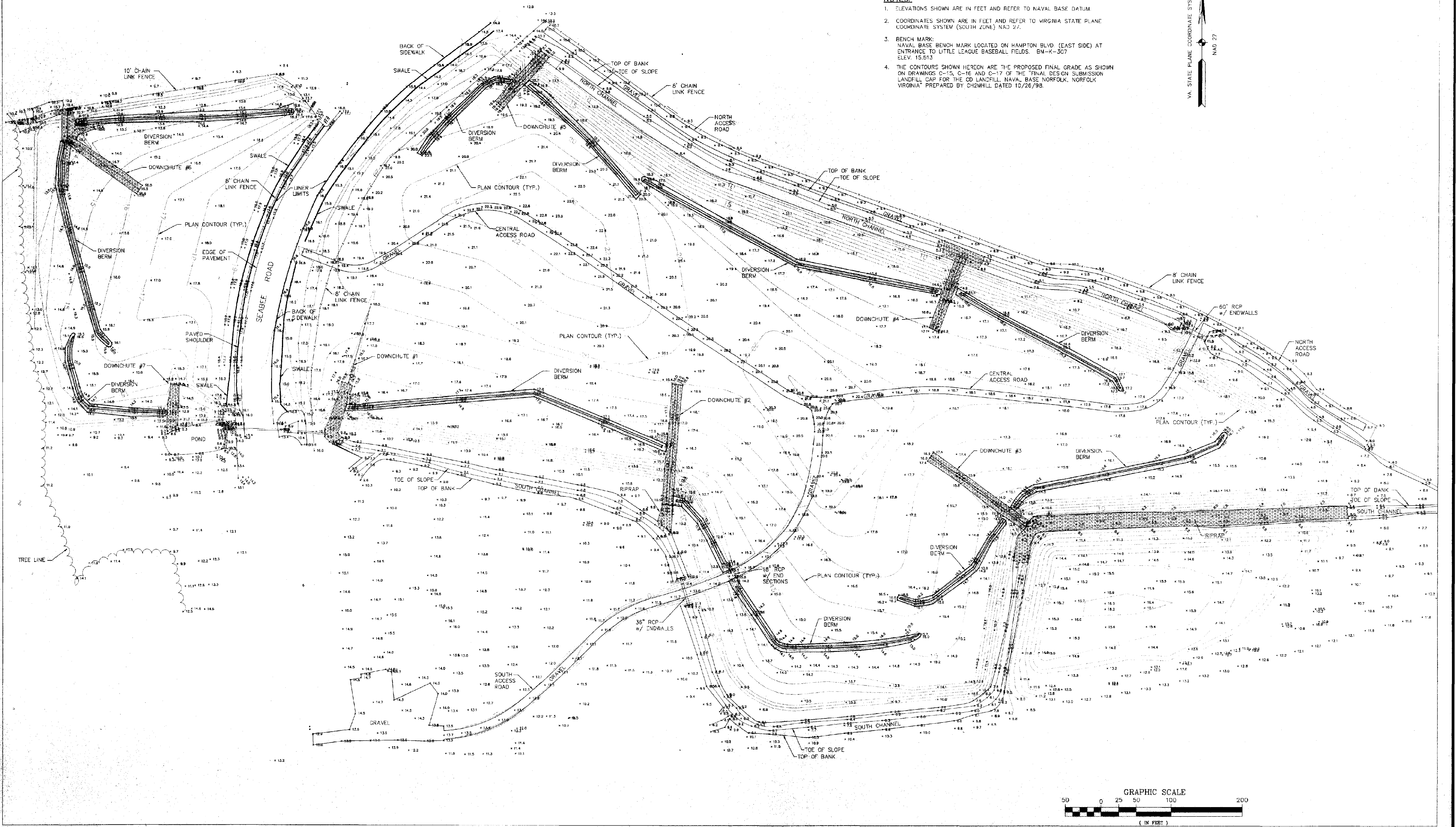
Patton Harris Rust & Associates, pc.
Engineers, Surveyors, Planners, Landscape Architects
4342 Bonney Road
Virginia Beach, Virginia 23462-3818
ph 757-497-7472
fax 757-497-0250

Offices:
Bridgewater, Va.
Leesburg, Va.
Virginia Beach, Va.
Chantilly, Va.
Winchester, Va.

SURVEY PHR&A	DATE REV 02/15/00
DESIGN	DRAWN TFF
CHKD.	SCALE 1"=50'
CHKD. BJF	FILE NO. 10458-1-0

NOTES:

1. ELEVATIONS SHOWN ARE IN FEET AND REFER TO NAVAL BASE DATUM.
2. COORDINATES SHOWN ARE IN FEET AND REFER TO VIRGINIA STATE PLANE COORDINATE SYSTEM (SOUTH ZONE) NAD 27.
3. BENCH MARK:
   NAVAL BASE BENCH MARK LOCATED ON HAMPTON BLVD. (EAST SIDE) AT ENTRANCE TO LITTLE LEAGUE BASEBALL FIELDS. BM-K-307
   ELEV. 15.513
4. THE CONTOURS SHOWN HEREON ARE THE PROPOSED FINAL GRADE AS SHOWN ON DRAWINGS C-15, C-16 AND C-17 OF THE "FINAL DESIGN SUBMISSION LANDFILL CAP FOR THE CD LANDFILL, NAVAL BASE NORFOLK, NORFOLK VIRGINIA" PREPARED BY CH2MHILL DATED 10/26/98.



GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)

NO.	DESCRIPTION	DATE	RVSD BY	REV BY	APPROVED	DATE

REVISION APPROVED BY

PROFESSIONAL SEAL: COMMONWEALTH OF VIRGINIA · BRUCE A. FREDERICK · No. 002149 · LAND SURVEYOR · 4/7/00

PROJECT:
CD LANDFILL
NORFOLK NAVAL BASE
NORFOLK, VA.

TITLE:
TOPOGRAPHIC SURVEY OF
CD LANDFILL CLOSURE AT
FINAL STAGE

PHR&A
Patton Harris Rust & Associates, pc.
Engineers, Surveyors, Planners, Landscape Architects
4542 Bonney Road
Virginia Beach, Virginia 23462-3816
ph. 757-497-7472
fax 757-497-0250
Offices:
Bridgewater, Va.
Leesburg, Va.
Virginia Beach, Va.
Chantilly, Va.
Winchester, Va.

SURVEY PHR&A	DATE 01/18/00
DESIGN	DRAWN TFF
CHKD.	SCALE 1"=50'
CHKD. BJF	FILE NO. 10458-1-0