HARDEE COUNTY LANDFILL

WAUCHULA, FLORIDA

VOLUME 2 OF 2

LATERAL EXPANSION AND LEACHATE STORAGE TANK FACILITY

CERTIFICATION DOCUMENT

JULY 2000

Prepared for:

BOARD OF COUNTY COMMISSIONERS
HARDEE COUNTY, FLORIDA
412 W. Orange Street
Wauchula, Florida 33873

Prepared by:

PBS&J
1560 Orange Avenue, Suite 700
Winter Park, Florida 32789

070862.--

HARDEE COUNTY LANDFILL
WAUCHULA, FLORIDA

LATERAL EXPANSION AND LEACHATE STORAGE TANK FACILITY

VOLUME II

HARDEE COUNTY LANDFILL
WAUCHULA, FLORIDA

LATERAL EXPANSION AND LEACHATE STORAGE TANK FACILITY

VOLUME II (cont.)

SECTION 3.1

LINER CQA PLAN

No changes were done to the Hardee County Landfill, Lateral Expansion and Leachate Storage Tank Facility Construction Quality Assurance.

Please refer to the above document for information on Geomembrane installation Specifications.

SECTION 3.2

LINER CONSTRUCTION SPECIFICATIONS

CONTRACT DOCUMENTS AND SPECIFICATIONS
HARDEE COUNTY LANDFILL
LATERAL EXPANSION AND
LEACHATE STORAGE TANK FACILITY

HARDEE COUNTY, FLORIDA
JUNE 1997

CONTRACT DOCUMENTS

AND

SPECIFICATIONS

HARDEE COUNTY LANDFILL

LATERAL EXPANSION AND LEACHATE STORAGE TANK FACILITY

HARDEE COUNTY, FLORIDA

JUNE 1997

Prepared for

BOARD OF COUNTY COMMISSIONERS
HARDEE COUNTY, FLORIDA

Prepared by

POST, BUCKLEY, SCHUH & JERNIGAN, INC.
1560 Orange Avenue, Suite 700
Winter Park, Florida 32789

07-862.35

No changes were done to the Hardee County Landfill, Lateral Expansion and Leachate Storage Tank Facility Conformed Contract Document and Specifications.

Please refer to Section 02776 , HIGH DENSITY POLYETHYLENE (HDPE) GEOMEMBRANE" of the above document for information on Geomembrane installation Specifications.

SECTION 3.3

GEOMEMBRANE INSTALLATION DAILY FIELD REPORT

PBS&J, INC.

SHEET OF

PROJECT:	HARDEE COUNTY	DATE:	NOV. 09, 1999
LOCATION:	WAUCHULA	DAY:	S M T W TH F S
OWNER:	HARDEE COUNTY	WEATHER:	clear overcast rain
OWNER REP.:	PBS&J	TEMP:	55-70 70-85 85-90 90-105
CQA MANAGER:	RAYMUNDO CASTRO	WIND:	still moderate high
PBSJ PROJ. NO.:	07-862.39	HUMIDITY:	dry moderate humid

DAILY FIELD REPORT

On site @ 7:30

- Comanco (the liner installer) is preparing to start HDPE liner deployment on the west corner.
- Installer deployed and seamed 21 HDPE liner panels.
- All fusion welded seams were air tested.
- Some of the repairs were patched and vacuum tested. The rest of the repairs will be completed tomorrow.
- Two destructive samples were cut and sent to the lab for testing.
- Comanco shut down at approximately 4:30 pm.
- Contractor started clay placement at the bottom of the slope.

Site Visit:	Janice Williams	(Hardee County)
	Susan Peltz	(FDEP)

FILE: DFREPORT.XLS

CHECKED BY: Raymundo Castro

SIGNATURE: Raymundo Castro

PBS&J, INC.

SHEET 1 OF 1

PROJECT:	HARDEE COUNTY	DATE:	NOV. 12, 1999
LOCATION:	WAUCHULA	DAY:	S M T W TH F S
OWNER:	HARDEE COUNTY	WEATHER:	clear overcast rain
OWNER REP.:	PBS&J	TEMP:	55-70 70-85 85-90 90-105
CQA MANAGER:	RAYMUNDO CASTRO	WIND:	still moderate high
PBSJ PROJ. NO.:	07-862.39	HUMIDITY:	dry moderate humid

DAILY FIELD REPORT

On site @ 8:30

- Comanco resumed HDPE liner deployment next to the last panel installed on 11/09/99.
- Installer deployed and seamed 16 HDPE liner panels.
- All fusion welded seams were air tested.
- All of the repairs were patched and vacuum tested.
- One destructive samples was cut and sent to the lab for testing.
- Comanco shut down at approximately 4:30 pm.
- Contractor proceeded with clay placement at the bottom of the slope.

Site Visit: Janice Williams (Hardee County)

FILE: DFREPORT.XLS

CHECKED BY: Raymundo Castro

SIGNATURE: Raymundo Castro

PBS&J, INC.

PROJECT:	HARDEE COUNTY	DATE:	NOV. 15, 1999
LOCATION:	WAUCHULA	DAY:	S M T W TH F S
OWNER:	HARDEE COUNTY	WEATHER:	clear overcast rain
OWNER REP.:	PBS&J	TEMP:	55-70 70-85 85-90 90-105
CQA MANAGER:	RAYMUNDO CASTRO	WIND:	still moderate high
PBSJ PROJ. NO.:	07-862.39	HUMIDITY:	dry moderate humid

DAILY FIELD REPORT

On site @ 8:30

- Comanco resumed HDPE liner deployment next to the last panel installed on 11/12/99.
- Installer deployed and seamed 9 HDPE liner panels.
- All fusion welded seams were air tested.
- All of the repairs were patched and vacuum tested.
- Comanco shut down at approximately 3:00 p.m.

Site Visit: Janice Williams (Hardee County)

FILE: DFREPORT.XLS

CHECKED BY: Raymundo Castro

SIGNATURE: Raymundo Castro

PBS&J, INC.

SHEET 1 OF 1

PROJECT:	HARDEE COUNTY	DATE:	NOV. 19, 1999
LOCATION:	WAUCHULA	DAY:	S M T W TH F S
OWNER:	HARDEE COUNTY	WEATHER:	clear overcast rain
OWNER REP.:	PBS&J	TEMP:	55-70 70-85 85-90 90-105
CQA MANAGER:	JEFF WILD	WIND:	still moderate high
PBSJ PROJ. NO.:	07-862.39	HUMIDITY:	dry moderate humid

DAILY FIELD REPORT

On site @ 6:30 am.

- Comanco resumed liner installation on the east end adjacent to the old existing liner.
- Installer deployed and seamed 7 HDPE liner panels.
- All fusion welded seams were air tested.
- All of the repairs were patched and vacuum tested.
- One destructive sample was cut and sent to the lab for testing.
- Comanco shut down at approximately noon.

FILE: DFREPORT.XLS

CHECKED BY: Jeff Wild

SIGNATURE: Raymundo Castro

SECTION 3.4

CERTIFICATE OF ACCEPTANCE FORM

CERTIFICATE OF ACCEPTANCE
OF SOIL SUBGRADE BY INSTALLER

INSTALLER: COMANCO

ADDRESS:

PROJECT NAME: HARDEE CO. L.F.

PROJECT LOC.: NAVCHULA

OWNER: HARDEE COUNTY

I the Undersigned, duly authorized representative of COMANCO shall be responsible for the soil subgrade's acceptability and suitability, in accordance with the contract documents from this date to completion acceptance by owner of the installation. This acceptability and suitability considers at the time of placement that the structure of the subgrade, which is the responsibility of others, meets or exceeds the requirements of the contract documents.

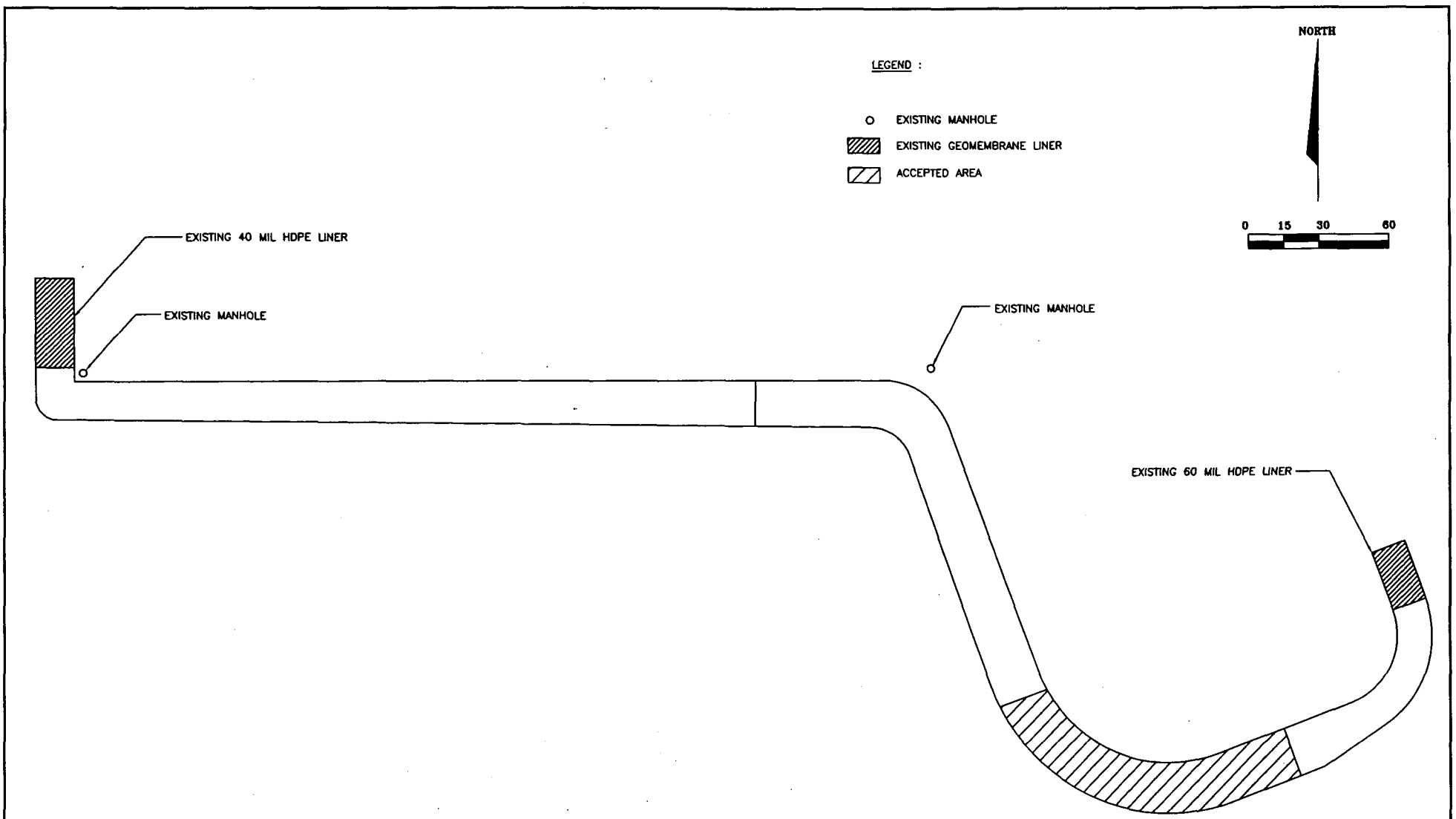
SHARON ICERSTEN — QA/QC
Name — Title

Sharon Kersten — 11-15-99
Signature — Date

CERTIFICATION ACCEPTED BY PBS&J'S CQA MANAGER:

RAYMUNDO CASTRO — CQA MANAGER
Name — Title

Raymundo Castro — 11/15/99
Signature — Date



PBS
1560 ORANGE AVENUE
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WINTER PARK, FL. 32789
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FAX. (407) 647-0624
www.pbsj.com

CLIENT	PROJECT	TASK
HARDEE COUNTY	HARDEE COUNTY LANDFILL	GEOMEMBRANE LINER
BOARD OF COUNTY COMMISSIONERS	LATERAL EXPANSION AND	ACCEPTED AREA
	LEACHATE STORAGE TANK FACILITY	

ORIGINAL FEB. 1999
REVISIONS:
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CHECKED
Q.C.
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AutoCAD - Release 13

CERTIFICATE OF ACCEPTANCE
OF SOIL SUBGRADE BY INSTALLER

INSTALLER: COMANCO

ADDRESS:

PROJECT NAME: HARDEE CO. L.F.

PROJECT LOC.: WAUCHULA, FL

OWNER: HARDEE COUNTY

I the Undersigned, duly authorized representative of COMANCO shall be responsible for the soil subgrade's acceptability and suitability, in accordance with the contract documents from this date to completion acceptance by owner of the installation. This acceptability and suitability considers at the time of placement that the structure of the subgrade, which is the responsibility of others, meets or exceeds the requirements of the contract documents.

BRIAN BAUER — Name

QA/QC — Title

[signature] — Signature

1/5/2000 — Date

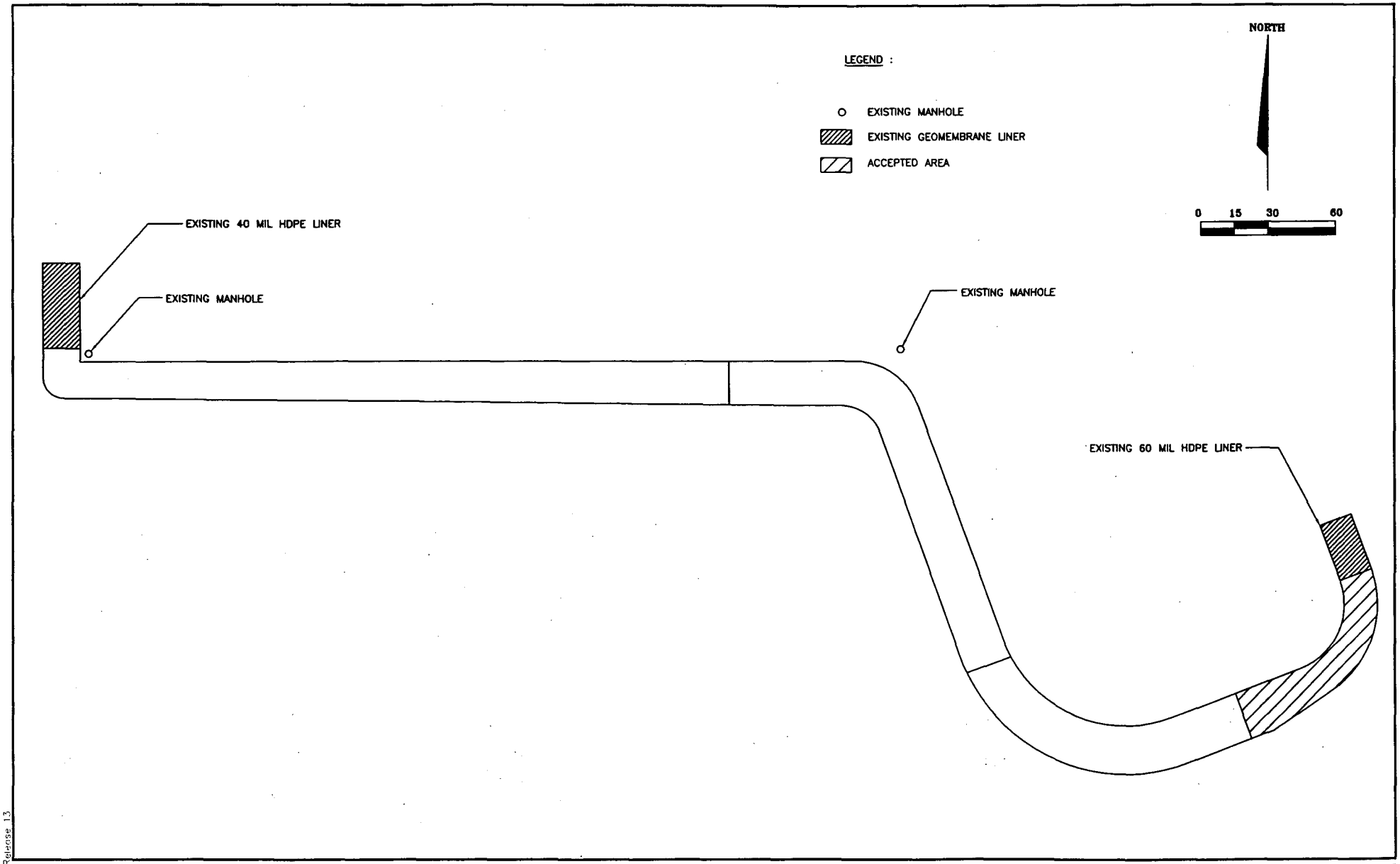
CERTIFICATION ACCEPTED BY PBS&J'S CQA MANAGER:

JEFF WILD — Name

CQA MANAGER — Title

[signature] — Signature

11/19/99 — Date



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SUITE 700
WINTER PARK, FL. 32789
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FAX. (407) 647-0624
www.pbsj.com

CLIENT	PROJECT	TASK
HARDEE COUNTY	HARDEE COUNTY LANDFILL	GEOMEMBRANE LINER
BOARD OF COUNTY COMMISSIONERS	LATERAL EXPANSION AND	ACCEPTED AREA
	LEACHATE STORAGE TANK FACILITY	

ORIGINAL FEB. 1999
REVISIONS:
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6 7 8 9 10 11 12

JOB NO. 07-982.35
DRAWN
DESIGN
CHECKED
Q.C.

CERTIFICATE OF ACCEPTANCE
OF SOIL SUBGRADE BY INSTALLER

INSTALLER: COMANCO

ADDRESS: 7911 PROFESSIONAL PL.
TAMPA FL 33637

PROJECT NAME: HARDEE CO. LF.

PROJECT LOC.:

OWNER: HARDEE CO.

I the Undersigned, duly authorized representative of Comanco shall be responsible for the soil subgrade's acceptability and suitability, in accordance with the contract documents from this date to completion acceptance by owner of the installation. This acceptability and suitability considers at the time of placement that the structure of the subgrade, which is the responsibility of others, meets or exceeds the requirements of the contract documents.

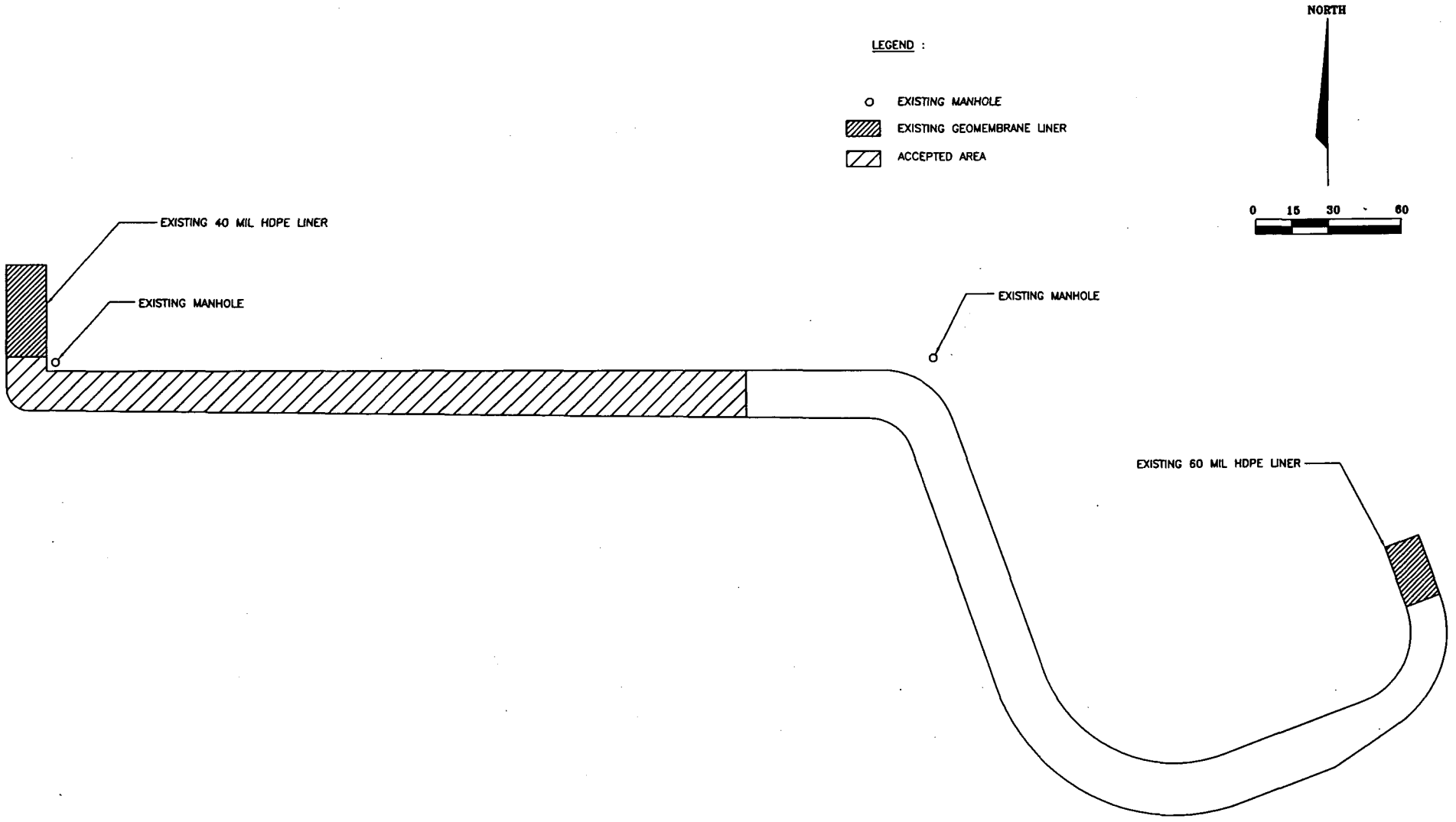
Sharon Kersten QA/QC
Name Title

Sharon Kersten 11/9/99
Signature Date

CERTIFICATION ACCEPTED BY PBS&J'S CQA MANAGER:

RAYMUNDO CASTRO CQA MANAGER
Name Title

Raymundo Castro 11/9/99
Signature Date



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1500 ORANGE AVENUE
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FAX. (407) 647-0824
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CLIENT	PROJECT	TASK
HARDEE COUNTY	HARDEE COUNTY LANDFILL	GEOMEMBRANE LINER
BOARD OF COUNTY COMMISSIONERS	LATERAL EXPANSION AND	ACCEPTED AREA
	LEACHATE STORAGE TANK FACILITY	

ORIGINAL FEB. 1999
REVISIONS:
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CERTIFICATE OF ACCEPTANCE
OF SOIL SUBGRADE BY INSTALLER

INSTALLER: COMANCO

ADDRESS:

PROJECT NAME: HARDEE CO. LF

PROJECT LOC.:

OWNER: HARDEE CO.

I the Undersigned, duly authorized representative of COMANCO shall be responsible for the soil subgrade's acceptability and suitability, in accordance with the contract documents from this date to completion acceptance by owner of the installation. This acceptability and suitability considers at the time of placement that the structure of the subgrade, which is the responsibility of others, meets or exceeds the requirements of the contract documents.

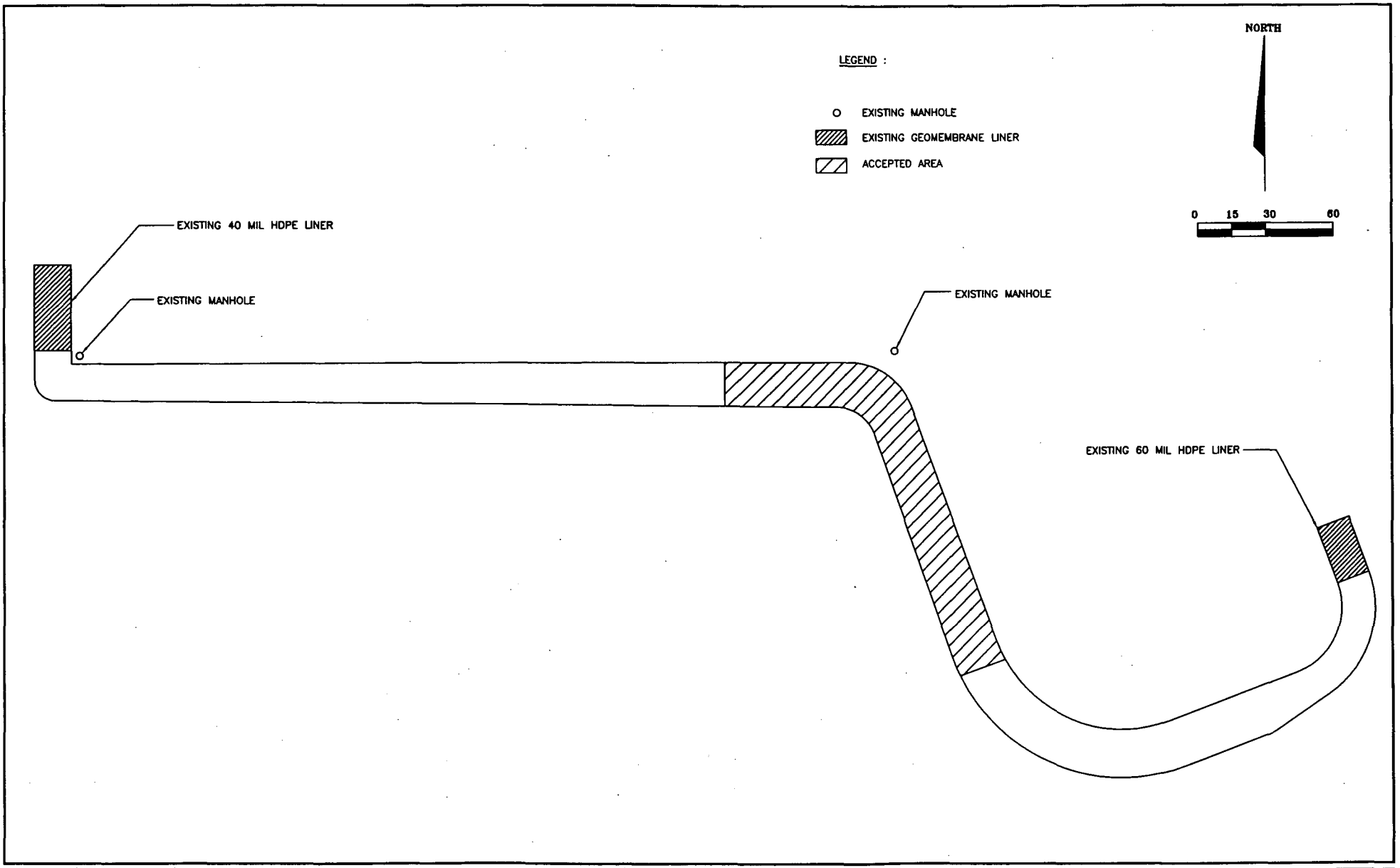
Sharon Kersten — QA/QC
Name — Title

Sharon Kersten — 11-12-99
Signature — Date

CERTIFICATION ACCEPTED BY PBS&J'S CQA MANAGER:

RAYMUNDO CASTRO — CQA MANAGER
Name — Title

Raymundo Castro — 11/12/99
Signature — Date



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FAX. (407) 647-0824
www.pbsj.com

CLIENT	PROJECT	TASK
HARDEE COUNTY	HARDEE COUNTY LANDFILL	GEOMEMBRANE LINER
BOARD OF COUNTY COMMISSIONERS	LATERAL EXPANSION AND	ACCEPTED AREA
	LEACHATE STORAGE TANK FACILITY	

ORIGINAL FEB. 1999
REVISIONS:
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SECTION 3.5

SYNTHETIC LINER ACCEPTANCE FORM

PBS&J, INC.

SHEET 1 OF 2

PROJECT NAME: HARDEE CO. LANDFILL PROJ. LOCATION: WAUCHULA

PROJECT NO. 07-86232 CONTRACTOR: ECLIPSE/OMNI

SYNTHETIC LINER ACCEPTANCE FORM
FOR ALLOWANCE OF SAND DRAINAGE LAYER INSTALLATION

PBS&J, INC. hereby gives acceptance of the synthetic liner installation at grid location number 1 in the cell/pond area. This acceptance allows the Contractor to place the sand drainage layer and leachate collection piping and ballast rock in the grid area listed above. This approval does not relieve the Contractor of his responsibilities to meet the clay and synthetic liner performance requirements of the Contract Specifications.

- ✓ Synthetic liner seams tested, repaired, and passed.
- ✓ Large wrinkles and bridges removed.
- ✓ Liner panels visually inspected and defects repaired.
- ✓ As-built survey completed and checked
- Other:
- Comments: _____

If PBS&J observes any deviations of the requirements listed above or the Contractor damages the liner system during the installation of the leachate collection and removal system, work in contact with the liner will be halted in the designated grid area and repairs will be made to the satisfaction of PBS&J, INC.

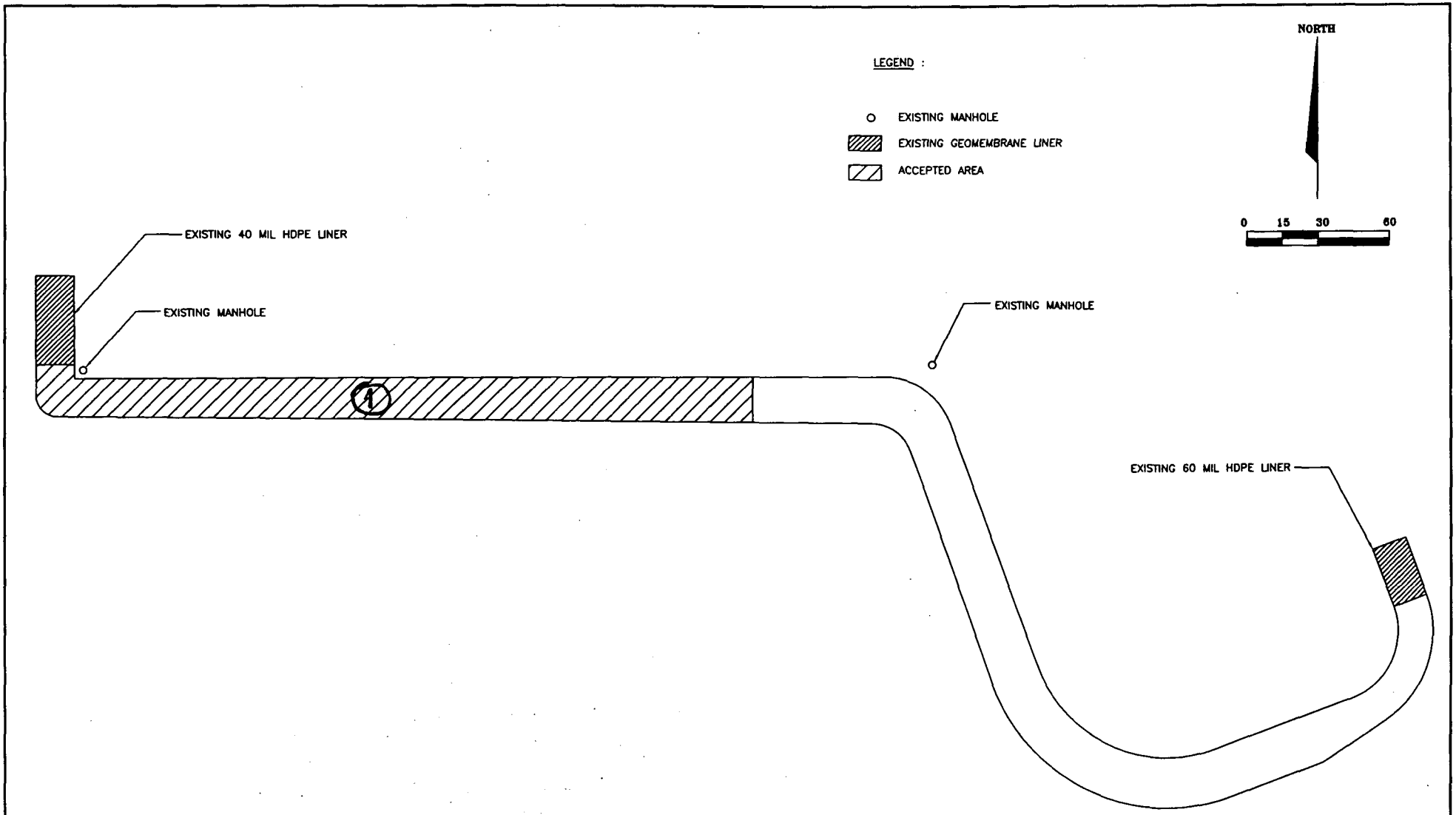
Raymundo Castro
PBS&J, INC.

11/12/99
DATE

Steve Moore
CONTRACTOR

11/12/99
DATE

FILE: LINACEPT.XLS



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FAX. (407) 647-0624
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CLIENT	PROJECT	TASK
HARDEE COUNTY	HARDEE COUNTY LANDFILL	GEOMEMBRANE LINER
BOARD OF COUNTY COMMISSIONERS	LATERAL EXPANSION AND	ACCEPTED AREA
	LEACHATE STORAGE TANK FACILITY	

ORIGINAL FEB. 1999
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PBS&J, INC.

SHEET 1 OF 2

PROJECT NAME: HARDEE CO. LANDFILL PROJ. LOCATION: WAUCHULA

PROJECT NO. 07-862.32 CONTRACTOR: ECUPSE/OMNI

SYNTHETIC LINER ACCEPTANCE FORM
FOR ALLOWANCE OF SAND DRAINAGE LAYER INSTALLATION

PBS&J, INC. hereby gives acceptance of the synthetic liner installation at grid location number 2 in the cell/pond area. This acceptance allows the Contractor to place the sand drainage layer and leachate collection piping and ballast rock in the grid area listed above. This approval does not relieve the Contractor of his responsibilities to meet the clay and synthetic liner performance requirements of the Contract Specifications.

- ✓ Synthetic liner seams tested, repaired, and passed.
- ✓ Large wrinkles and bridges removed.
- ✓ Liner panels visually inspected and defects repaired.
- ✓ As-built survey completed and checked
- ___ Other:
- ___ Comments: _____

If PBS&J observes any deviations of the requirements listed above or the Contractor damages the liner system during the installation of the leachate collection and removal system, work in contact with the liner will be halted in the designated grid area and repairs will be made to the satisfaction of PBS&J, INC.

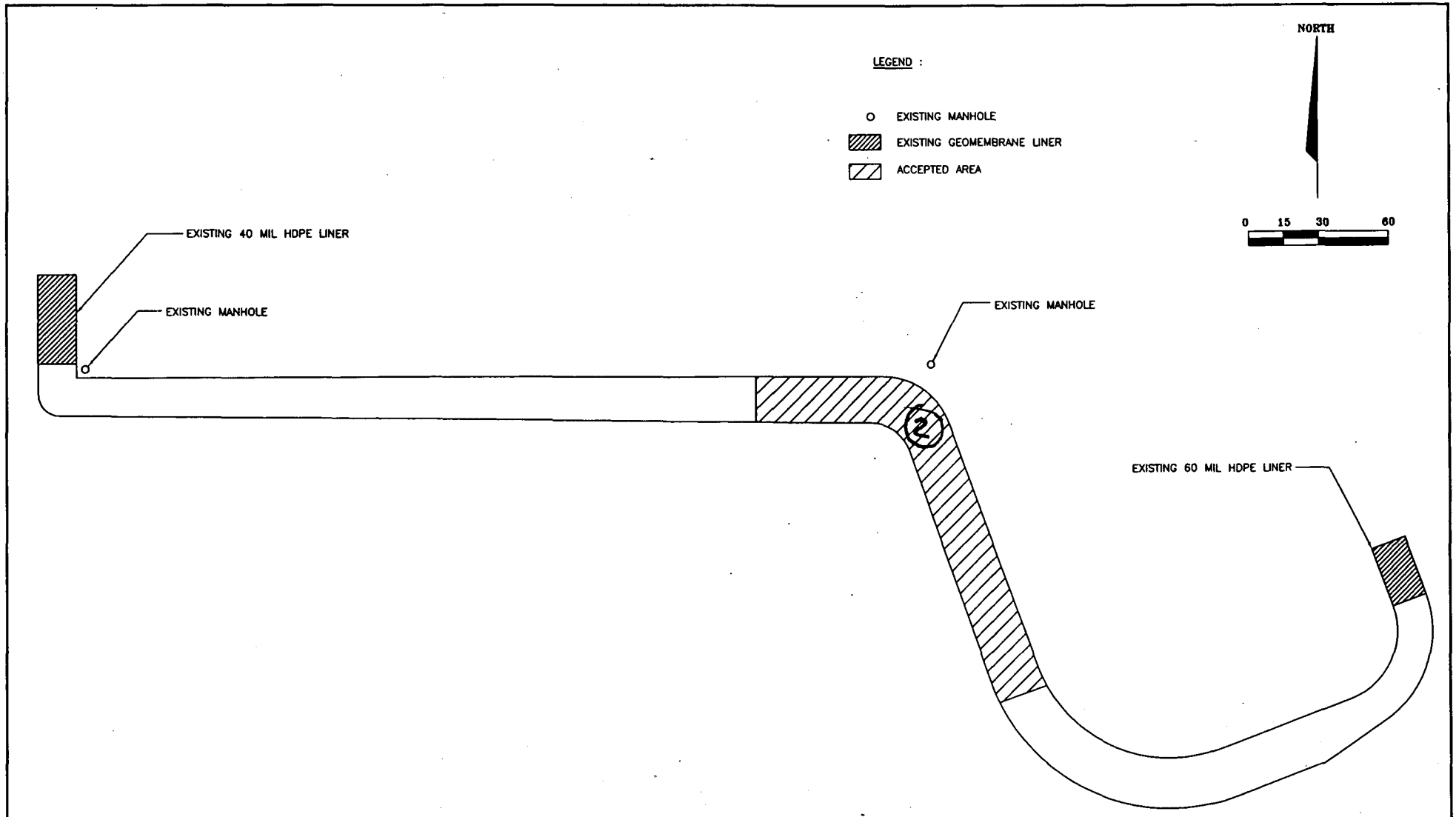
Raymundo Castro
PBS&J, INC.

11/9/99
DATE

Steve Moore
CONTRACTOR

11/9/99
DATE

FILE: LINACEPT.XLS



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FAX. (407) 647-0624
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CLIENT	PROJECT	TASK
HARDEE COUNTY	HARDEE COUNTY LANDFILL	GEOMEMBRANE LINER
BOARD OF COUNTY COMMISSIONERS	LATERAL EXPANSION AND	ACCEPTED AREA
	LEACHATE STORAGE TANK FACILITY	

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PBS&J, INC.

SHEET 1 OF 2

PROJECT NAME: HARDEE CO LANDFILL PROJ. LOCATION: WAUCHULA

PROJECT NO. 07-962.32 CONTRACTOR: ECLIPSE/OMNI

SYNTHETIC LINER ACCEPTANCE FORM
FOR ALLOWANCE OF SAND DRAINAGE LAYER INSTALLATION

PBS&J, INC. hereby gives acceptance of the synthetic liner installation at grid location number 3 in the cell/pond area. This acceptance allows the Contractor to place the sand drainage layer and leachate collection piping and ballast rock in the grid area listed above. This approval does not relieve the Contractor of his responsibilities to meet the clay and synthetic liner performance requirements of the Contract Specifications.

- ✓ Synthetic liner seams tested, repaired, and passed.
- ✓ Large wrinkles and bridges removed.
- ✓ Liner panels visually inspected and defects repaired.
- ✓ As-built survey completed and checked
- ____ Other:
- Comments: _____

If PBS&J observes any deviations of the requirements listed above or the Contractor damages the liner system during the installation of the leachate collection and removal system, work in contact with the liner will be halted in the designated grid area and repairs will be made to the satisfaction of PBS&J, INC.

Raymundo Castro
PBS&J, INC.

11/15/99
DATE

Steve Moore
CONTRACTOR

11/15/99
DATE

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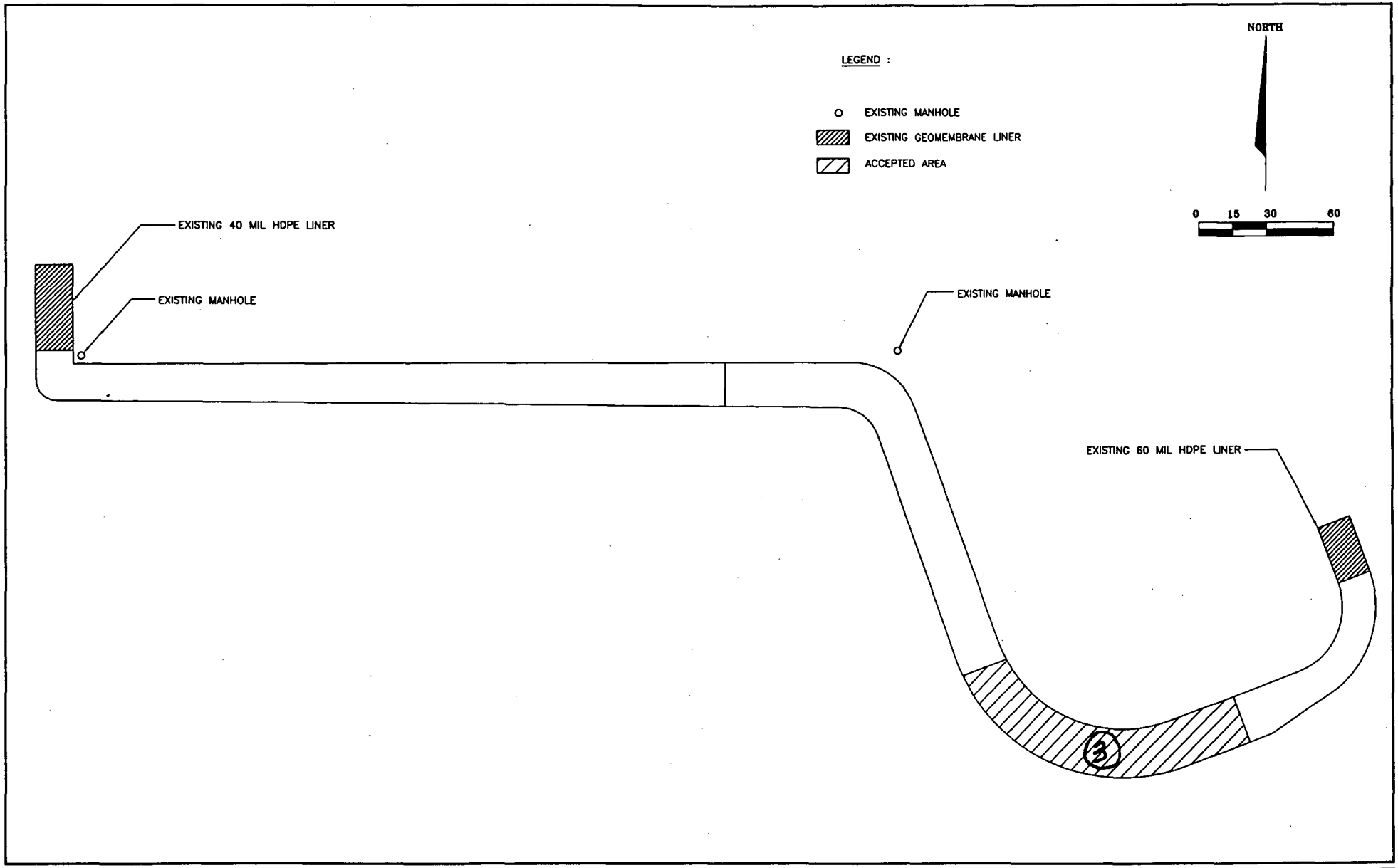

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FAX. (407) 647-0624
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CLIENT	PROJECT	TASK
HARDEE COUNTY	HARDEE COUNTY LANDFILL	GEOMEMBRANE LINER
BOARD OF COUNTY COMMISSIONERS	LATERAL EXPANSION AND	ACCEPTED AREA
	LEACHATE STORAGE TANK FACILITY	

ORIGINAL FEB. 1999
REVISIONS:
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Q.C.
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PBS&J, INC.

SHEET 1 OF 2

PROJECT NAME: HARDEE CO. LANDFILL PROJ. LOCATION: WAUCHULA, FL

PROJECT NO. 07-862.32 CONTRACTOR: ECLIPSE/OMNI

SYNTHETIC LINER ACCEPTANCE FORM
FOR ALLOWANCE OF SAND DRAINAGE LAYER INSTALLATION

PBS&J, INC. hereby gives acceptance of the synthetic liner installation at grid location number 4 in the cell/pond area. This acceptance allows the Contractor to place the sand drainage layer and leachate collection piping and ballast rock in the grid area listed above. This approval does not relieve the Contractor of his responsibilities to meet the clay and synthetic liner performance requirements of the Contract Specifications.

- ✓ Synthetic liner seams tested, repaired, and passed.
- ✓ Large wrinkles and bridges removed.
- ✓ Liner panels visually inspected and defects repaired.
- ✓ As-built survey completed and checked
- ____ Other:
- ____ Comments: _____

If PBS&J observes any deviations of the requirements listed above or the Contractor damages the liner system during the installation of the leachate collection and removal system, work in contact with the liner will be halted in the designated grid area and repairs will be made to the satisfaction of PBS&J, INC.

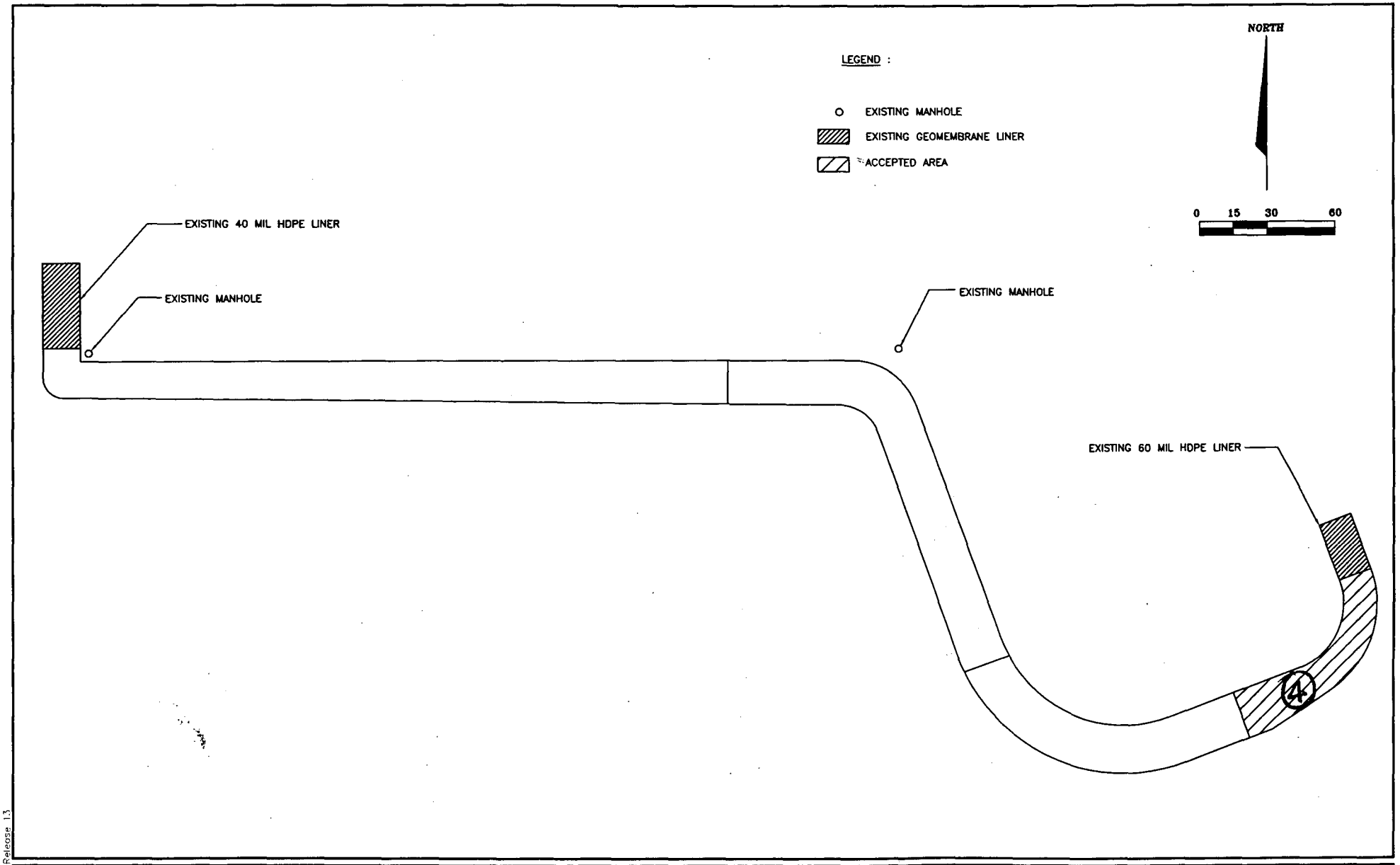
Raymundo Castro
PBS&J, INC.

11/19/99
DATE

Steve Moore
CONTRACTOR

11/19/99
DATE

FILE: LINACEPT.XLS



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FAX. (407) 647-0624
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CLIENT	PROJECT	TASK
HARDEE COUNTY	HARDEE COUNTY LANDFILL	GEOMEMBRANE LINER
BOARD OF COUNTY COMMISSIONERS	LATERAL EXPANSION AND	ACCEPTED AREA
	LEACHATE STORAGE TANK FACILITY	

ORIGINAL FEB. 1999
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SECTION 3.6

GEOMEMBRANE PANEL PLACEMENT LOG

PBS&J, INC.

SHEET 1 OF 1

PROJECT NAME: HARDEE COUNTY

PROJECT NO.: 07-862.39

DATE: NOV. 09, 1999

PANEL PLACEMENT LOG

TIME	PANEL #	ROLL #	THICKNESS	REPAIRS				L/W	CQA ID.
				Y/N	#	REPAIRED	TESTED		
8:15	1	115105710	61.5	N				27	RGC
8:18	2	115105710	62.5	N				27	RGC
8:20	3	115105710	61.0	N				28	RGC
8:25	4	115105710	61.4	N				28	RGC
8:30	5	115105710	61.1	N				29	RGC
8:34	6	115105710	62.0	N				29	RGC
8:38	7	115105710	62.5	N				30	RGC
9:02	8	115105710	61.6	N				30	RGC
9:02	9	115105710	62.6	N				30	RGC
9:30	10	115105710	61.0	N				31	RGC
9:55	11	115105710	63.6	N				31	RGC
10:40	12	115105710	62.8	N				31	RGC
11:00	13	115105710	63.0	N				32	RGC
11:04	14	115105710	61.4	N				32	RGC
11:10	15	115105710	62.0	N				32	RGC
12:45	16	115105710	61.9	N				32	RGC
12:55	17	115105708	62.5	N				32	RGC
1:15	18	115105708	61.0	N				32	RGC
1:20	19	115105708	61.3	N				32	RGC
1:25	20	115105708	61.1	N				32	RGC
1:30	21	115105708	63.0	N				32	RGC

COMMENTS:

CHECKED BY: RAYMUNDO CASTRO SIGNATURE: Raymundo Castro

FILE: PANPLACE.XLS

PBS&J, INC.

SHEET 1 OF 1

PROJECT NAME: HARDEE COUNTY

PROJECT NO.: 07-862.39

DATE: NOV. 12, 1999

PANEL PLACEMENT LOG

TIME	PANEL #	ROLL #	THICKNESS	REPAIRS				L/W	CQA ID.
				Y/N	#	REPAIRED	TESTED		
7:45	22	115105710	62.5	N				32	RGC
7:55	23	115105710	61.5	N				32	RGC
8:00	24	115105710	62.1	N				33	RGC
9:30	25	115105710	61.4	Y		JM	JM	35	RGC
10:00	26	115105710	62.5	N				35	RGC
10:15	27	115105710	62.0	N				35*	RGC
10:20	28	115105710	61.4	N				35	RGC
10:30	29	115105710	62.5	N				35	RGC
10:35	30	115105710	61.7	N				35	RGC
10:40	31	115105710	60.6	N				35	RGC
11:00	32	115105710	62.0	N				35	RGC
12:40	33	115105710	62.0	N				35	RGC
12:47	34	115105710	60.7	N				35	RGC
1:15	35	115105710	62.0	N				35	RGC
1:25	36	115105710	62.4	N				35	RGC
3:00	37	115105710	60.8	N				35	RGC

COMMENTS: * Panel 27 is a pie shape

CHECKED BY: RAYMUNDO CASTRO SIGNATURE: Raymundo Castro

FILE: PANPLACE.XLS

PBS&J, INC.

SHEET 1 OF 1

PROJECT NAME: HARDEE COUNTY

PROJECT NO.: 07-862.39

DATE: NOV. 15, 1999

PANEL PLACEMENT LOG

TIME	PANEL #	ROLL #	THICKNESS	REPAIRS				L/W	CQA ID.
				Y/N	#	REPAIRED	TESTED		
8:30	38	115105710	62.5	N				32	RGC
8:45	39	115105710	61.0	N				32	RGC
8:55	40	115105710	60.6	N				33	RGC
9:00	41	115105710	61.0	N				35	RGC
9:02	42	115105710	61.1	N				35	RGC
9:30	43	115105710	61.3	N				35	RGC
9:40	44	115105710	61.1	N				35	RGC
10:46	45	115105710	62.0	N				35	RGC
10:50	46	115105710	61.1	N				35	RGC
1:30	47	115105710	60.6	N				35	RGC

COMMENTS:

CHECKED BY: RAYMUNDO CASTRO SIGNATURE: Raymundo Castro

FILE: PANPLACE.XLS

PBS&J, INC.

SHEET 1 OF 1

PROJECT NAME: HARDEE COUNTY

PROJECT NO.: 07-862.39

DATE: NOV. 19, 1999

PANEL PLACEMENT LOG

TIME	PANEL #	ROLL #	THICKNESS	REPAIRS				L/W	CQA ID.
				Y/N	#	REPAIRED	TESTED		
8:28	48	115105723	62.5	N				25	JHW
8:38	49	115105723	61.0	N				25	JHW
8:45	50	115105723	60.6	N				25	JHW
8:55	51	115105723	61.0	N				28	JHW
9:05	52	115105723	61.1	N				28	JHW
9:15	53	115105723	61.3	N				35	JHW
9:30	54	115105723	61.1	N				35	JHW

COMMENTS:

CHECKED BY: JEFF WILD SIGNATURE: Raymundo Castro

FILE: PANPLACE.XLS

SECTION 3.7

GEOMEMBRANE SEAMING LOG

PBS&J, INC.

SHEET: 1 OF 1

PROJECT NAME: HARDEE COUNTY

PROJECT NO.: 07-862.39
DATE: NOV. 09, 1999

SEAMING LOG

SEAM #	TIME	TECH.	EQUIP. #	WELD. TEMP.	WELD. SPEED	TEMPERATURE SHEET	TEMPERATURE AMB.	TEST TYPE	REPAIRS Y/N	REPAIRS #	REPAIRS REP'D/TEST'D	DEST. SAMPLE #	DEST. SAMPLE REP'D/TEST'D	LENGTH FT.	CQA ID.
1-2	8:30	A.B.	7503	760	6	75	75	AP	Y	1	JM/JM	1	JM/JM	27	RGC
2-3	8:35	A.B.	7503	760	6	75	75	AP	N		JM/JM			27	RGC
3-4	8:40	A.B.	7503	760	6	75	80	AP	N		JM/JM			28	RGC
4-5	8:50	A.B.	7503	760	6	75	80	AP	Y	1	JM/JM			28	RGC
5-6	9:05	A.B.	7503	760	6	75	80	AP	N		JM/JM			29	RGC
6-7	9:10	A.B.	7503	760	6	80	85	AP	N		JM/JM			30	RGC
7-8	9:30	A.B.	7503	760	6	80	85	AP	N		JM/JM			30	RGC
8-9	9:55	A.B.	7503	760	6	80	85	AP	N		JM/JM			30	RGC
9-10	10:22	A.B.	7503	760	6	80	90	AP	Y	1	JM/JM			30	RGC
10-11	10:50	A.B.	7503	760	6	80	90	AP	Y	1	JM/JM			31	RGC
11-12	11:00	A.B.	7503	760	6	85	90	AP	Y	1	JM/JM			31	RGC
12-13	11:05	A.B.	7503	760	6	85	90	AP	N		JM/JM			31	RGC
13-14	11:11	A.B.	7503	760	6	85	90	AP	Y	1	JM/JM			31	RGC
14-15	11:27	A.B.	7503	760	6	85	90	AP	Y	1	JM/JM			31	RGC
15-16	1:00	A.B.	7503	760	6	85	90	AP	Y	2	JM/JM	2	JM/JM	31	RGC
16-17	1:10	A.B.	7503	760	6	85	90	AP	Y	2	JM/JM			31	RGC
17-18	1:28	A.B.	7503	760	6	85	90	AP	Y	2	JM/JM			32	RGC
18-19	1:45	A.B.	7503	760	6	85	90	AP	Y	1	JM/JM			32	RGC
19-20	1:55	A.B.	7503	760	6	85	90	AP	N		JM/JM				
20-21	2:20	A.B.	7503	760	6	85	90	AP	N		JM/JM				

COMMENTS:

* V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

CHECKED BY: RAYMUNDO CASTRO SIGNATURE: Raymundo Castro

PBS&J, INC.

SHEET: 1 OF 1

PROJECT NAME: HARDEE COUNTY

PROJECT NO.: 07-862.39

DATE: NOV. 12, 1999

SEAMING LOG

SEAM #	TIME	TECH.	EQUIP. #	WELD. TEMP.	WELD. SPEED	TEMPERATURE SHEET	TEMPERATURE AMB.	TEST TYPE	REPAIRS Y/N	REPAIRS #	REPAIRS REP'D/TEST'D	DEST. SAMPLE #	DEST. SAMPLE REP'D/TEST'D	LENGTH FT.	CQA ID.
21-22	8:00	A.B.	7503	760	6	75	75	AP	N					32	RGC
22-23	8:30	A.B.	7503	760	6	75	75	AP	N					32	RGC
23-24	8:40	A.B.	7503	760	6	80	85	AP	Y	2	JM/JM			33	RGC
24-25	9:42	A.B.	7503	760	6	80	85	AP	Y	5	JM/JM			35	RGC
25-26	10:15	A.B.	7503	760	6	80	85	AP	Y	2	JM/JM			35	RGC
26-27	10:20	A.B.	7503	760	6	85	90	AP	Y	1	JM/JM			35	RGC
27-28	10:30	A.B.	7503	760	6	85	90	AP	Y	1	JM/JM			35	RGC
28-29	10:45	A.B.	7503	760	6	85	90	AP	Y	1	JM/JM			35	RGC
29-30	10:50	A.B.	7503	760	6	85	90	AP	Y	1	JM/JM			35	RGC
30-31	11:05	A.B.	7503	760	6	85	90	AP	N					35	RGC
31-32	11:20	A.B.	7503	760	6	90	95	AP	N					35	RGC
32-33	1:00	A.B.	7503	760	6	90	95	AP	Y	1	JM/JM			35	RGC
33-34	1:10	A.B.	7503	760	6	90	95	AP	Y	1	JM/JM	3	JM/JM	35	RGC
34-35	1:30	A.B.	7503	760	6	90	95	AP	N					35	RGC
35-36	1:45	A.B.	7503	760	6	90	95	AP	N					35	RGC
36-37	3:30	A.B.	7503	760	6	90	95	AP	N					35	RGC

COMMENTS:

* V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

CHECKED BY: RAYMUNDO CASTRO SIGNATURE: Raymundo Castro

FILE: SEAMLOG.XLS

PBS&J, INC.

SHEET: 1 OF 1

PROJECT NAME: HARDEE COUNTY

PROJECT NO.: 07-862.39

DATE: NOV. 15, 1999

SEAMING LOG

SEAM #	TIME	TECH.	EQUIP. #	WELD. TEMP.	WELD. SPEED	TEMPERATURE SHEET	TEMPERATURE AMB.	TEST TYPE	REPAIRS Y/N	REPAIRS #	REPAIRS REP'D/TEST'D	DEST. SAMPLE #	DEST. SAMPLE REP'D/TEST'D	LENGTH FT.	CQA ID.
37-38	9:25	A.L.	7503	760	6	75	75	AP	Y	2	JM/JM			35	RGC
38-39	9:05	A.L.	7503	760	6	75	75	AP	Y	1	JM/JM			35	RGC
39-40	9:30	A.L.	7503	760	6	80	85	AP	Y	1	JM/JM			35	RGC
40-41	9:35	A.L.	7503	760	6	80	85	AP	Y	2	JM/JM			35	RGC
41-42	9:40	A.L.	7503	760	6	80	85	AP	Y	3	JM/JM			35	RGC
42-43	10:20	A.L.	7503	760	6	85	90	AP	Y	1	JM/JM			35	RGC
43-44	10:50	A.L.	7503	760	6	85	90	AP	Y	3	JM/JM			35	RGC
44-45	11:40	A.L.	7503	760	6	85	90	AP	Y	2	JM/JM			35	RGC
45-46	11:55	A.L.	7503	760	6	85	90	AP	Y	3	JM/JM			35	RGC

COMMENTS:

* V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

CHECKED BY: RAYMUNDO CASTRO

SIGNATURE: Raymundo Castro

FILE: SEAMLOG.XLS

PBS&J, INC.

SHEET: 1 OF 1

PROJECT NAME: HARDEE COUNTY

PROJECT NO.: 07-862.39

DATE: NOV. 19, 1999

SEAMING LOG

SEAM #	TIME	TECH.	EQUIP. #	WELD. TEMP.	WELD. SPEED	TEMPERATURE SHEET	TEMPERATURE AMB.	TEST TYPE	REPAIRS Y/N	REPAIRS #	REPAIRS REP'D/TEST'D	DEST. SAMPLE #	DEST. SAMPLE REP'D/TEST'D	LENGTH FT.	CQA ID.
54-EXIST	10:00	TS	9522	765	6	75	75	AP	Y	1	JM/JM			25	JHW
54-53	10:10	TS	9522	765	6	75	75	AP	Y	1	JM/JM			25	JHW
53-52	10:20	TS	9522	765	6	80	85	AP	N					25	JHW
52-51	10:35	TS	9522	765	6	80	85	AP	N					25	JHW
51-50	10:50	TS	9522	765	6	80	85	AP	N					26	JHW
50-49	11:05	TS	9522	765	6	85	90	AP	N					28	JHW
49-48	11:25	TS	9522	765	6	85	90	AP	Y	1	JM/JM			35	JHW
48-46	11:45	TS	9522	765	6	85	90	AP	Y	1	JM/JM			35	JHW

COMMENTS:

* V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

CHECKED BY: JEFF WILD

SIGNATURE: Raymundo Costa

FILE: SEAMLOG.XLS

SECTION 3.8

NON-DESTRUCTIVE LOG

PBS&J, INC.

SHEET OF

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY
DATE: 11/9/99

PROJECT NO.: 07-862.39
CQA MANAGER: RAYMUNDO CASTRO

NONDESTRUCTIVE TESTING LOG

SEAM NUMBER	TEST TYPE	TIME		PRESSURE (psi)		TECH ID	P/F	CQA ID
		START	END	START	END			
1-2	AP	9:29	9:34	30	28	SH	P	RGC
2-3	AP	9:47	9:52	30	28	SH	P	RGC
3-4	AP	10:11	10:16	30	28	SH	P	RGC
4-5	AP	9:54	9:59	30	29	SH	P	RGC
5-6	AP	9:57	10:02	30	30	SH	P	RGC
6-7	AP	10:00	10:05	30	28	SH	P	RGC
7-8	AP	10:52	10:57	30	30	SH	P	RGC
8-9	AP	10:58	11:03	30	28	SH	P	RGC
9-10	AP	11:03	11:08	30	29	SH	P	RGC
10-11	AP	11:47	11:52	30	28	SH	P	RGC
11-12	AP	1:47	1:52	30	30	SH	P	RGC
12-13	AP	1:13	1:18	30	28	SH	P	RGC
13-14	AP	1:14	1:19	30	28	SH	P	RGC
14-15	AP	1:19	1:24	30	28	SH	P	RGC
15-16	AP	2:18	2:23	30	29	SH	P	RGC
16-17	AP	3:47	3:52	30	29	SH	P	RGC
17-18	AP	2:52	2:57	26	24	SH	P	RGC
18-19	AP	3:58	4:03	30	29	SH	P	RGC
19-20	AP	3:14	3:19	30	28	SH	P	RGC
20-21	AP	4:03	4:08	30	28	SH	P	RGC

VACUUM TEST PRESSURE: 5 (PSI) DURATION: 30 (SEC.)

AIR TEST PRESSURE: 25-30 (PSI) DURATION: 5 (MIN.)

PBS&J, INC.

SHEET OF

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY
DATE: 11/12/99

PROJECT NO.: 07-862.39
CQA MANAGER: RAYMUNDO CASTRO

NONDESTRUCTIVE TESTING LOG

SEAM NUMBER	TEST TYPE	TIME		PRESSURE (psi)		TECH ID	P/F	CQA ID
		START	END	START	END			
21-22	AP	10:11	10:16	30	28	SH	P	RGC
22-23	AP	10:11	10:16	30	28	SH	P	RGC
23-24	AP	10:55	11:00	30	29	SH	P	RGC
24-25	AP	10:25	10:30	30	24	SH	P	RGC
25-26	AP	11:08	11:13	30	29	SH	P	RGC
26-27	AP	12:37	12:42	30	29	SH	P	RGC
27-28	AP	12:40	12:45	30	28	SH	P	RGC
28-29	AP	2:21	2:26	30	28	SH	P	RGC
29-30	AP	2:22	2:27	30	28	SH	P	RGC
30-31	AP	1:53	1:58	30	28	SH	P	RGC
31-32	AP	2:04	2:09	30	29	SH	P	RGC
32-33	AP	1:54	1:59	30	28	SH	P	RGC
33-34	AP	1:54	1:59	30	28	SH	P	RGC
34-35	AP	1:58	2:03	30	28	SH	P	RGC
35-36	AP	3:55	4:00	30	28	SH	P	RGC
36-37	AP	3:55	4:00	30	29	SH	P	RGC

VACUUM TEST PRESSURE: 5 (PSI) DURATION: 30 (SEC.)

AIR TEST PRESSURE: 25-30 (PSI) DURATION: 5 (MIN.)

FILE: NONDEST2.XLS

PBS&J, INC.

SHEET OF

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY
DATE: 11/15/99

PROJECT NO.: 07-862.39
CQA MANAGER: RAYMUNDO CASTRO

NONDESTRUCTIVE TESTING LOG

SEAM NUMBER	TEST TYPE	TIME		PRESSURE (psi)		TECH ID	P/F	CQA ID
		START	END	START	END			
37-38	AP	9:32	9:37	30	28	SH	P	RGC
38-39	AP	9:28	9:33	30	28	SH	P	RGC
39-40	AP	9:45	9:50	30	29	SH	P	RGC
40-41	AP	9:56	10:01	30	24	SH	P	RGC
41-42	AP	10:27	10:32	30	29	SH	P	RGC
41-42	AP	10:15	10:20	30	29	SH	P	RGC
42-43	AP	10:41	10:46	30	29	SH	P	RGC
43-44	AP	10:58	11:03	30	28	SH	P	RGC
43-44	AP	11:18	1:23	30	28	SH	P	RGC
44-45	AP	1:41	1:46	30	28	SH	P	RGC
45-46	AP	1:52	1:57	30	28	SH	P	RGC
45-46	AP	2:01	2:06	30	29	SH	P	RGC
47-1	AP	2:20	2:25	30	30	SH	P	RGC

VACUUM TEST PRESSURE: 5 (PSI) DURATION: 30 (SEC.)

AIR TEST PRESSURE: 25-30 (PSI) DURATION: 5 (MIN.)

PBS&J, INC.

SHEET OF

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY
DATE: 11/19/99

PROJECT NO.: 07-862.39
CQA MANAGER: JEFF WILD

NONDESTRUCTIVE TESTING LOG

SEAM NUMBER	TEST TYPE	TIME		PRESSURE (psi)		TECH ID	P/F	CQA ID
		START	END	START	END			
54-EXIST	AP	11:05	11:10	30	29	B.B.	P	JHW
54-53	AP	12:33	13:38	30	29	B.B.	P	JHW
53-52	AP	11:03	11:08	30	29	B.B.	P	JHW
52-51	AP	11:02	11:07	30	30	B.B.	P	JHW
51-50	AP	12:15	12:20	30	29	B.B.	P	JHW
50-49	AP	12:07	12:12	30	29	B.B.	P	JHW
49-48	AP	12:07	12:12	30	30	B.B.	P	JHW
48-47	AP	12:07	12:12	30	30	B.B.	P	JHW

VACUUM TEST PRESSURE: 5 (PSI) DURATION: 30 (SEC.)

AIR TEST PRESSURE: 25-30 (PSI) DURATION: 5 (MIN.)

FILE: NONDEST2.XLS

SECTION 3.9

SEAM DESTRUCTIVE LOG

PBS&J, INC.

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY
PROJECT NO.: 07-862.39
CQA MANAGER: RAY CASTRO
DATE TESTED: NOV. 10, 1999

SEAM DESTRUCTIVE LOG

SAMPLE NO.	DATE CUT	SEAM NO./ LOCATION	PANEL NOS.	TECH ID	UNIT NO.	WELD TYPE	SAMPLE PASS/FAIL	CQA ID
1	11/09/99	1-2	1-2	A.B	74-16	FW	PASS	RGC
2	11/09/99	15-16	15-16	A.B	74-16	FW	PASS	RGC

FILE: SEAMDEST.XLS

EW - EXTRUDED WELD HW - HOT WEDGE

PBS&J, INC.

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY
PROJECT NO.: 07-862.39
CQA MANAGER: RAY CASTRO
DATE TESTED: NOV. 12, 1999

SEAM DESTRUCTIVE LOG

SAMPLE NO.	DATE CUT	SEAM NO./ LOCATION	PANEL NOS.	TECH ID	UNIT NO.	WELD TYPE	SAMPLE PASS/FAIL	CQA ID
3	11/12/99	33-34	33-34	A.B.	74-22	FW	PASS	RGC

FILE: SEAMDEST.XLS

EW - EXTRUDED WELD HW - HOT WEDGE

PBS&J, INC.

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY
PROJECT NO.: 07-862.39
CQA MANAGER: RAY CASTRO
DATE TESTED: NOV. 22, 1999

SEAM DESTRUCTIVE LOG

SAMPLE NO.	DATE CUT	SEAM NO./ LOCATION	PANEL NOS.	TECH ID	UNIT NO.	WELD TYPE	SAMPLE PASS/FAIL	CQA ID
4	11/19/99	50-51	50-51	T.S.	74-21	FW	PASS	JHW

FILE: SEAMDEST.XLS

EW - EXTRUDED WELD HW - HOT WEDGE

SECTION 3.10

GEOMEMBRANE LINER DESTRUCTIVE TEST RESULTS

POST, BUCKLEY, SCHUH, AND JERNIGAN, INC.
CONSTRUCTION QUALITY ASSURANCE TESTING
FOR PEEL AND SHEAR STRENGTHS

Project Name: Hardee County | Date Received: 11/22/99 | Date Tested: 11/10/99
Project No.: 07-862.39 | Weld Type: Double Wedge | Mat'l Tested: 60 mil HDPE

SAMPLE CODE/ COMMENTS	SPECIMEN NUMBER	PEEL (85 pounds) & FTB				SHEAR (120 pounds) & FTB		
		THICKNESS (mil)	FAIL LOAD (lbs)	% SEAM	FAIL CODE	THICKNESS (mil)	FAIL LOAD (lbs)	FAIL CODE
CODE:	1	63.0	130.2	<10	SE-1	63.1	143.0	SE-1
	2	62.4	137.0	<10	SE-1	63.0	139.2	SE-1
DS-1	3	62.3	121.5	<10	SE-1	63.1	143.7	SE-1
	4	63.2	139.5	<10	SE-1	62.9	150.5	SE-1
	5	63.1	133.7	<10	SE-1	62.5	142.0	SE-1
CODE:	1	63.8	132.2	<10	SE-1	63.0	144.0	SE-1
	2	63.0	133.7	<10	SE-1	62.6	133.7	SE-1
DS-2	3	61.8	127.5	<10	SE-1	63.0	136.0	SE-1
	4	62.0	129.7	<10	SE-1	63.0	144.7	SE-1
	5	63.0	138.0	<10	SE-1	62.8	132.2	SE-1
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							

filename: G:\env...hardee/cqatest/test1110.xls

Tested by: Ray Castro
Checked by: _____

Comments: 1. _____
2. _____
3. _____

FAILURES: None

POST, BUCKLEY, SCHUH, AND JERNIGAN, INC.
CONSTRUCTION QUALITY ASSURANCE TESTING
FOR PEEL AND SHEAR STRENGTHS

Project Name: Hardee County | Date Received: 11/22/99 | Date Tested: 11/22/99
Project No.: 07-862.39 | Weld Type: Double Wedge | Mat'l Tested: 60 mil HDPE

SAMPLE CODE/ COMMENTS	SPECIMEN NUMBER	PEEL (85 pounds) & FTB				SHEAR (120 pounds) & FTB		
		THICKNESS (mil)	FAIL LOAD (lbs)	% SEAM	FAIL CODE	THICKNESS (mil)	FAIL LOAD (lbs)	FAIL CODE
CODE:	1	61.8	142.5	<10	SE-1	61.8	139.2	SE-1
	2	62.5	136.7	<10	SE-1	61.5	144.2	SE-1
DS-3	3	62.3	140.0	<10	SE-1	61.5	136.5	SE-1
	4	62.6	140.0	<10	SE-1	61.4	142.7	SE-1
	5	62.0	139.2	<10	SE-1	61.0	135.7	SE-1
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							

filename: G:\env...hardee/cqatest/test1112.xls

Tested by: Ray Castro
Checked by: _____

Comments: 1. _____
2. _____
3. _____

FAILURES: None

POST, BUCKLEY, SCHUH, AND JERNIGAN, INC.
CONSTRUCTION QUALITY ASSURANCE TESTING
FOR PEEL AND SHEAR STRENGTHS

Project Name: Hardee County | Date Received: 11/22/99 | Date Tested: 11/22/99
Project No.: 07-862.39 | Weld Type: Double Wedge | Mat'l Tested: 60 mil HDPE

SAMPLE CODE/ COMMENTS	SPECIMEN NUMBER	PEEL (85 pounds) & FTB				SHEAR (120 pounds) & FTB		
		THICKNESS (mil)	FAIL LOAD (lbs)	% SEAM	FAIL CODE	THICKNESS (mil)	FAIL LOAD (lbs)	FAIL CODE
CODE:	1	60.5	129.2	<10	SE-1	60.4	152.5	SE-1
	2	60.4	130.7	<10	SE-1	60.4	154.0	SE-1
DS-4	3	60.4	130.7	<10	SE-1	60.6	150.7	SE-1
	4	60.3	131.2	<10	SE-1	60.4	153.5	SE-1
	5	60.3	128.5	<10	SE-1	60.3	152.2	SE-1
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							
CODE:	1							
	2							
	3							
	4							
	5							

filename: G:\env...hardee/cqatest/test1122.xls

Tested by: Jeff Wild - Senior Project Engineer
Checked by: _____

Comments: 1. _____
2. _____
3. _____

FAILURES: None

SECTION 3.11

PANEL REPAIR AND TEST LOG

PBS&J, INC.

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: 4	North: 4	North: 4
Panel #: 1	Panel #: 2	Panel #: 3
P-1	P-2	P-3
Completed: YES	Completed: YES	Completed: YES
Date: 11/9/99	Date: 11/9/99	Date: 11/9/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: 4	North: 4	North: 4
Panel #: 4	Panel #: 5	Panel #: 6
P-4	P-5	P-6
Completed: YES	Completed: YES	Completed: YES
Date: 11/9/99	Date: 11/9/99	Date: 11/9/99
Time:	Time:	Time:
CQA ID: EGC	CQA ID: EGC	CQA ID: EGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: 4	North: 4	North: 4
Panel #: 7	Panel #: 8	Panel #: 9
P-7	P-8	P-9
Completed: YES	Completed: YES	Completed: YES
Date: 11/9/99	Date: 11/9/99	Date: 11/9/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: 4	North: 4	North: 4
Panel #: 10	Panel #: 11	Panel #: 12
P-10	P-11	P-12
Completed: YES	Completed: YES	Completed: YES
Date: 11/9/99	Date: 11/9/99	Date: 11/9/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY
CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: 4	North: 4	North: 4
Panel #: 13	Panel #: 14	Panel #: 15
P-13	P-14	P-15
Completed: YES	Completed: YES	Completed: YES
Date: 11/9/99	Date: 11/9/99	Date: 11/9/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: 4	North: 4	North: 4
Panel #: 16	Panel #: 17	Panel #: 18
P-16	P-17	P-18
Completed: YES	Completed: YES	Completed: YES
Date: 11/9/99	Date: 11/9/99	Date: 11/9/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: 4	North: 4	North: 4
Panel #: 19	Panel #: 20	Panel #: 21
P-19	P-20	P-21
Completed: YES	Completed: YES	Completed: YES
Date: 11/9/99	Date: 11/9/99	Date: 11/9/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: 4	North: 4	North: 4
Panel #: 22	Panel #: 23	Panel #: 24
P-22	P-23	P-24
Completed: YES	Completed: YES	Completed: YES
Date: 11/12/99	Date: 11/12/99	Date: 11/12/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North:	North:	North:
Panel #: 25	Panel #: 26	Panel #: 27
P-25	P-26	P-27
Completed: YES	Completed: YES	Completed: YES
Date: 11/12/99	Date: 11/12/99	Date: 11/12/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North:	North:	North:
Panel #: 28	Panel #: 29	Panel #: 30
P-29	P-29	P-30
Completed: YES	Completed: YES	Completed: YES
Date: 11/12/99	Date: 11/12/99	Date: 11/12/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North:	North:	North:
Panel #: 31	Panel #: 32	Panel #: 33
P-31	P-32	P-33
Completed: YES	Completed: YES	Completed: YES
Date: 11/12/99	Date: 11/12/99	Date: 11/12/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: [illegible]	North: [illegible]	North: [illegible]
Panel #: 34	Panel #: 35	Panel #: 36
P-34	P-35	P-36
Completed: YES	Completed: YES	Completed: YES
Date: 11/12/99	Date: 11/12/99	Date: 11/12/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: X	North:	North:
Panel #: 37	Panel #:	Panel #:
P-37		
Completed: YES	Completed:	Completed:
Date: 11/12/99	Date:	Date:
Time:	Time:	Time:
CQA ID: RGC	CQA ID:	CQA ID:

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: A	North: A	North: A
Panel #: 38	Panel #: 39	Panel #: 40
P-38	P-39	P-40
Completed: YES	Completed: YES	Completed: YES
Date: 11/15/99	Date: 11/15/99	Date: 11/15/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: A	North: A	North: A
Panel #: 41	Panel #: 42	Panel #: 43
P-41	P-42	P-43
Completed: YES	Completed: YES	Completed: YES
Date: 11/15/99	Date: 11/15/99	Date: 11/15/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: 4	North: 4	North: 4
Panel #: 44	Panel #: 45	Panel #: 46
P-44	P-45	P-46
Completed: YES	Completed: YES	Completed: YES
Date: 11/15/99	Date: 11/15/99	Date: 11/15/99
Time:	Time:	Time:
CQA ID: RGC	CQA ID: RGC	CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North:	North:	North:
Panel #: 47	Panel #:	Panel #:
P-47		
Completed: Yes	Completed:	Completed:
Date: 11/15/99	Date:	Date:
Time:	Time:	Time:
CQA ID: RGC	CQA ID:	CQA ID:

PANEL REPAIR AND TEST LOG

PROJECT:	HARDEE COUNTY	CQA MANAGER:	RAYMUNDO CASTRO
LOCATION:	HARDEE COUNTY	PROJECT NO.:	07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: ↑	North: ↑	North: ↑
Panel #: 48	Panel #: 49	Panel #: 50
P-48	P-49	P-50
Completed: YES	Completed: YES	Completed: YES
Date: 11/19/97	Date: 11/19/97	Date: 11/19/97
Time:	Time:	Time:
CQA ID: JHW	CQA ID: JHW	CQA ID: JHW

PANEL REPAIR AND TEST LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY
CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: 4
Panel #: 51

P-51

Completed: YES
Date: 11/19/99
Time:
CQA ID: RGC

North: 4
Panel #: 52

P-52

Completed: YES
Date: 11/19/99
Time:
CQA ID: RGC

North: 4
Panel #: 53

P-53

Completed: YES
Date: 11/19/99
Time:
CQA ID: RGC

PANEL REPAIR AND TEST LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY
CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 07-862.39

	PATCH	CAP	BEAD	SAMPLE	(60) THICKNESS (MIL)
REPAIR					COMMENTS:
REPAIRED					
TESTED					

North: 4	North: 4	North:
Panel #: 54	Panel #: 55	Panel #:
P-54	P-55	
Completed: YES	Completed: YES	Completed:
Date: 11/19/99	Date: 11/19/99	Date:
Time:	Time:	Time:
CQA ID: JHW	CQA ID: JHW	CQA ID:

SECTION 3.12

SEAM REPAIR AND TEST LOG

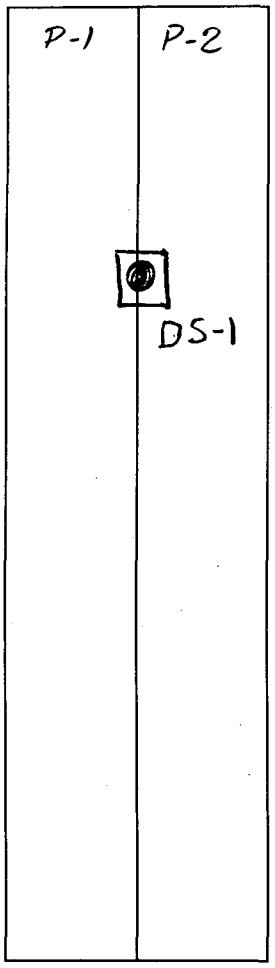
SEAM REPAIR AND TEST LOCATION LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

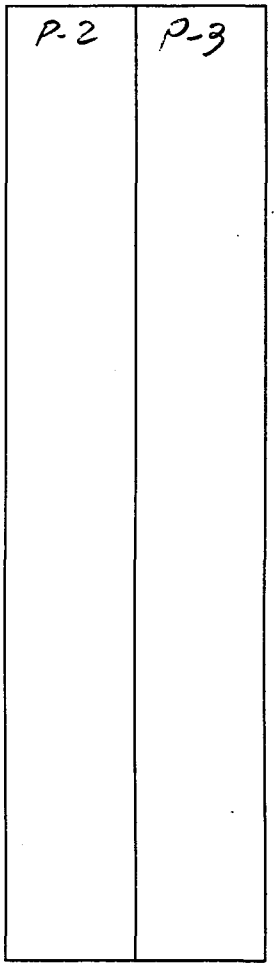
	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: ↑ Seam #: 1-2



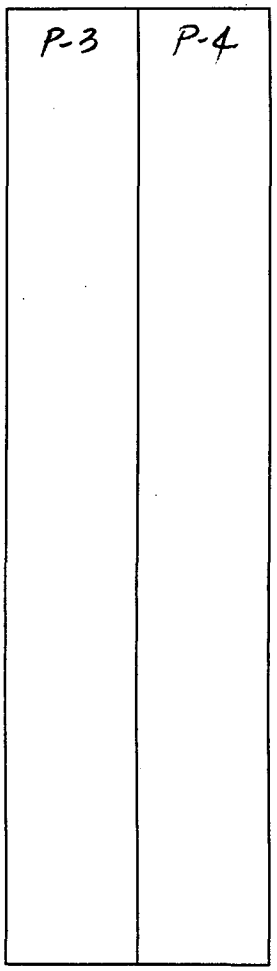
Completed: YES
Date: 11/09
Time:
CQA ID: RGC

North: ↑ Seam #: 2-3



Completed: YES
Date: 11/09
Time:
CQA ID: RGC

North: ↑ Seam #: 3-4



Completed: YES
Date: 11/09
Time:
CQA ID: RGC

SEAM REPAIR AND TEST LOCATION LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: 4
Seam #: 4-5

P-4	P-5

Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: 4
Seam #: 5-6

P-5	P-6

Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: 4
Seam #: 6-7

P-6	P-7

Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

SEAM REPAIR AND TEST LOCATION LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: 4
Seam #: 7-8

P-7	P-8

Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: 4
Seam #: 8-9

P-8	P-9

Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: 4
Seam #: 9-10

P-9	P-10

Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

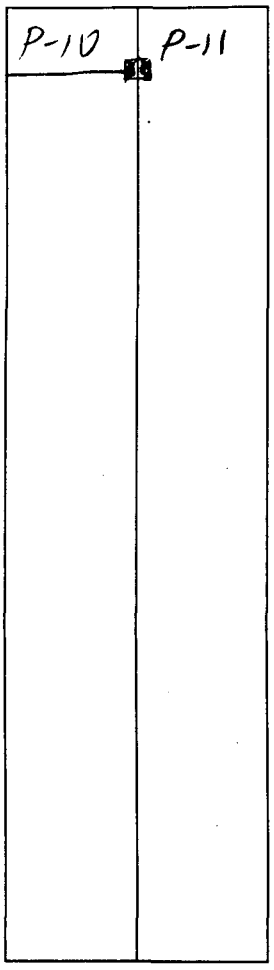
SEAM REPAIR AND TEST LOCATION LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

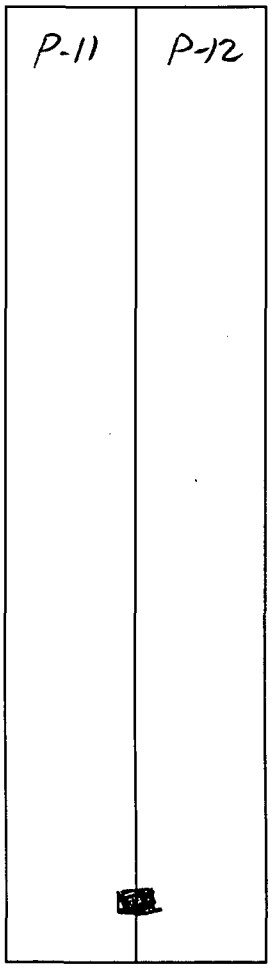
	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: 4
Seam #: 10-11



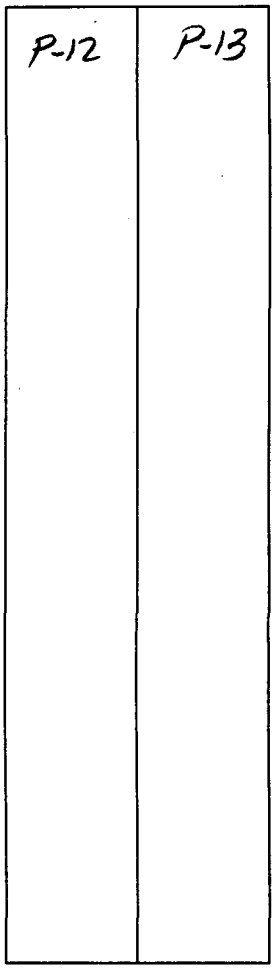
Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: 4
Seam #: 11-12



Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: 4
Seam #: 12-13



Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

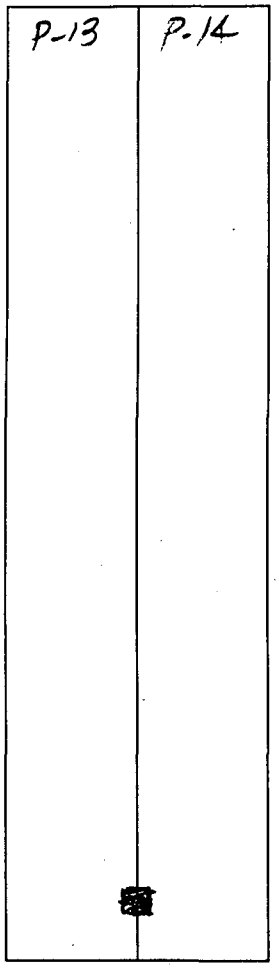
SEAM REPAIR AND TEST LOCATION LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

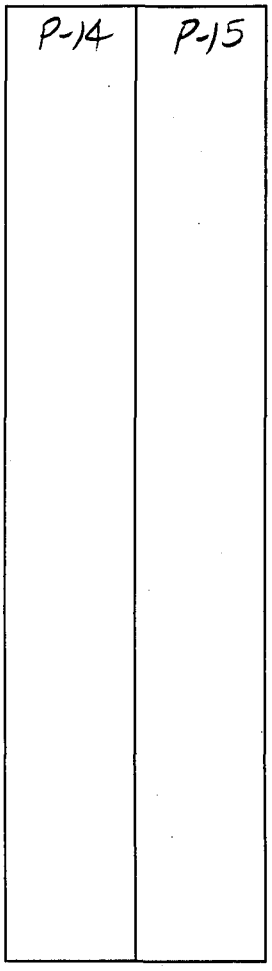
	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: 4
Seam #: 13-14



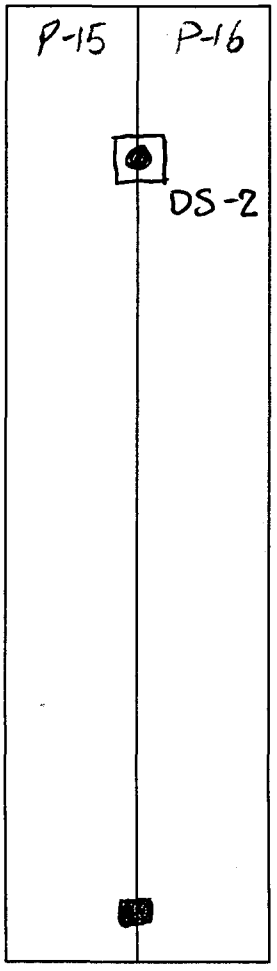
Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: 4
Seam #: 14-15



Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: 4
Seam #: 15-16



Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

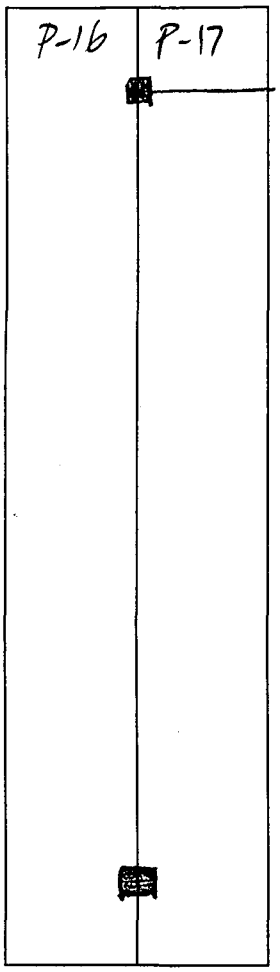
SEAM REPAIR AND TEST LOCATION LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

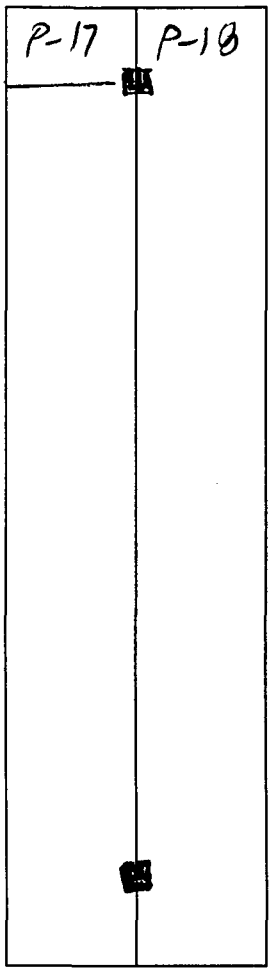
	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: 4
Seam #: 16-17



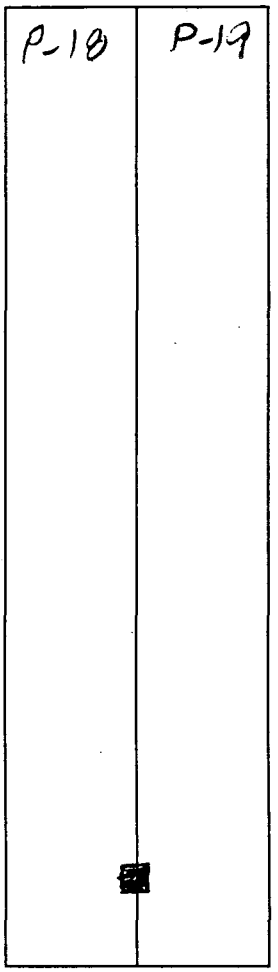
Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: 4
Seam #: 17-18



Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: 4
Seam #: 18-19



Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

SEAM REPAIR AND TEST LOCATION LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: ↑
Seam #: 19-20

P-19	P-20

Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: ↑
Seam #: 20-21

P-20	P-21

Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

North: ↑
Seam #:

Completed: YES
Date: 11/9/99
Time:
CQA ID: RGC

SEAM REPAIR AND TEST LOCATION LOG

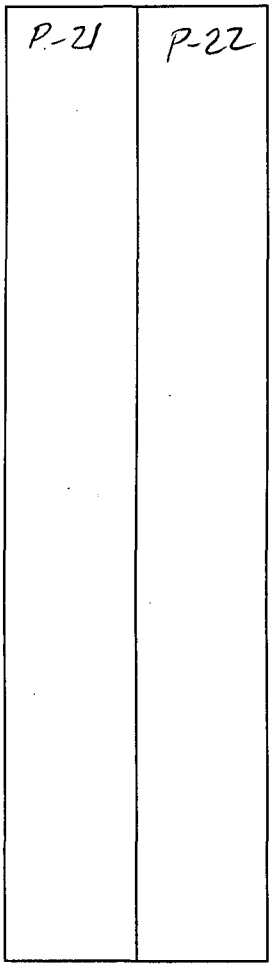
PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: ↑

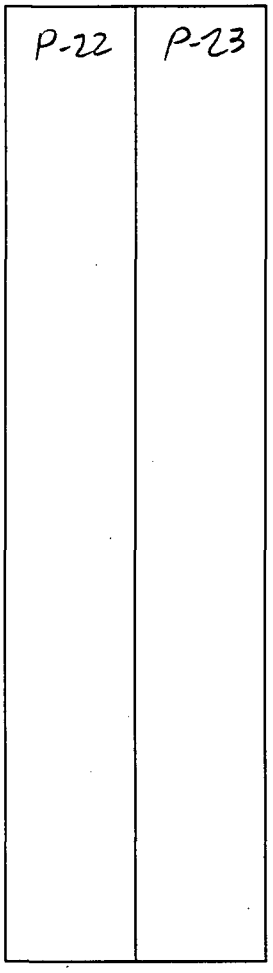
Seam #: 21-22



Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

North: ↑

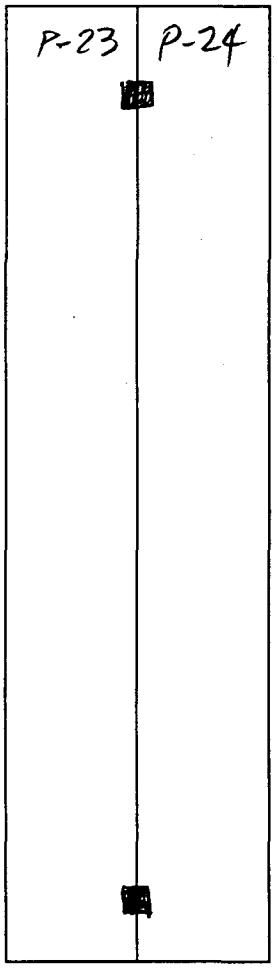
Seam #: 22-23



Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

North: ↑

Seam #: 23-24



Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

SEAM REPAIR AND TEST LOCATION LOG

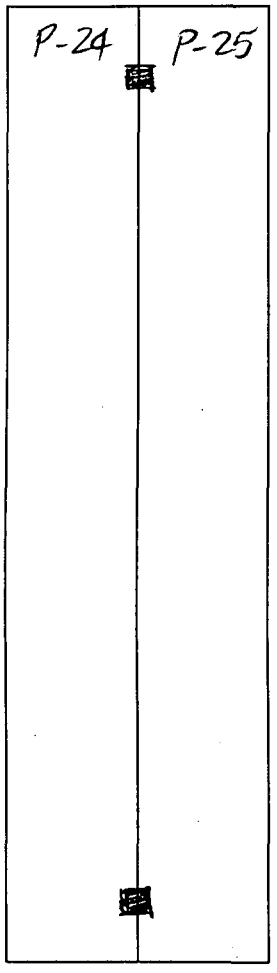
PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

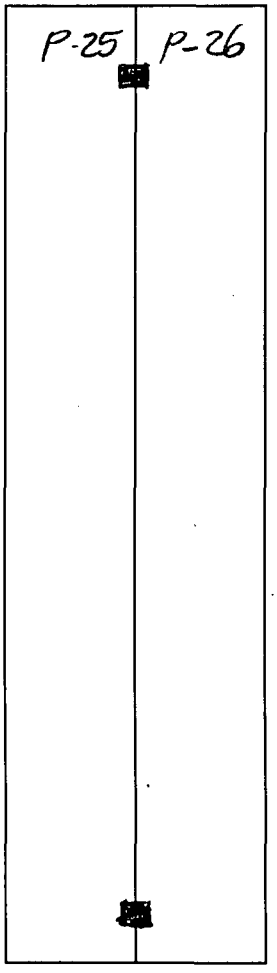
CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

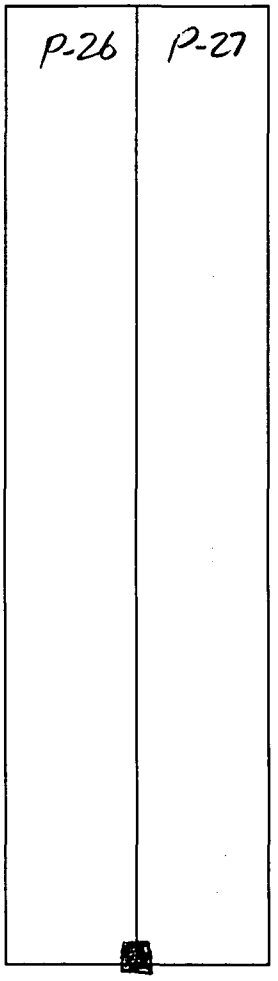
	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: North: North:

Seam #: 24-25 Seam #: 25-26 Seam #: 26-27







Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

SEAM REPAIR AND TEST LOCATION LOG

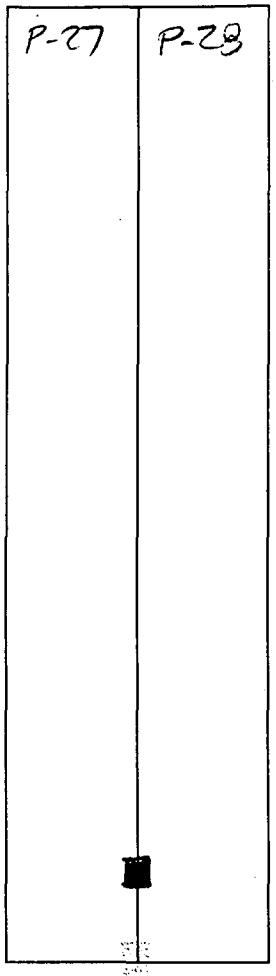
PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: [redacted]

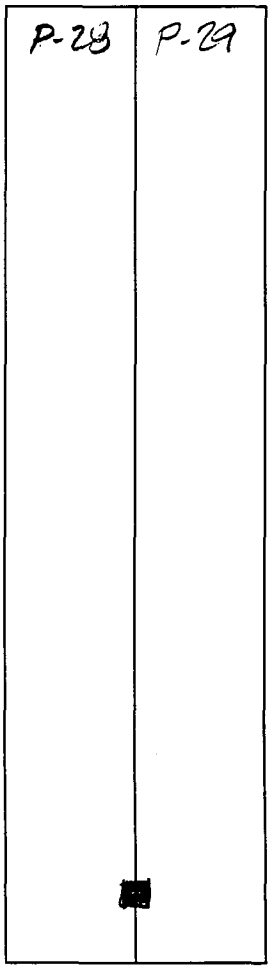
Seam #: 27-28



Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

North: [redacted]

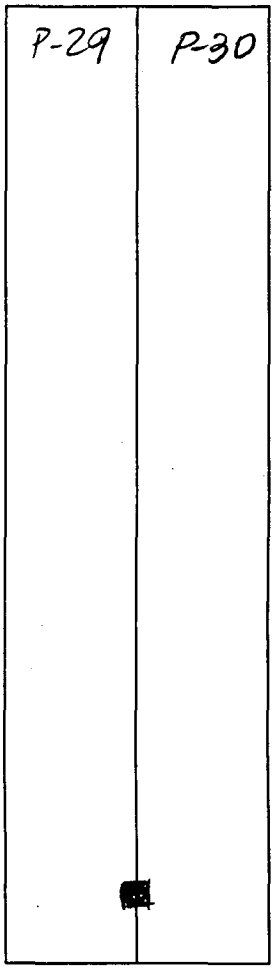
Seam #: 28-29



Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

North: [redacted]

Seam #: 29-30



Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

SEAM REPAIR AND TEST LOCATION LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: ~~↑~~

Seam #: 30-31

P-30 | P-31

Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

North: ~~↑~~

Seam #: 31-32

P-31 | P-32

Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

North: ~~↑~~

Seam #: 32-33

P-32 | P-33

Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

SEAM REPAIR AND TEST LOCATION LOG

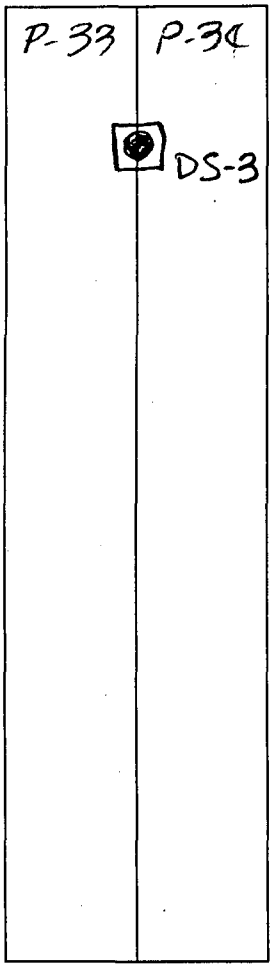
PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: [redacted]

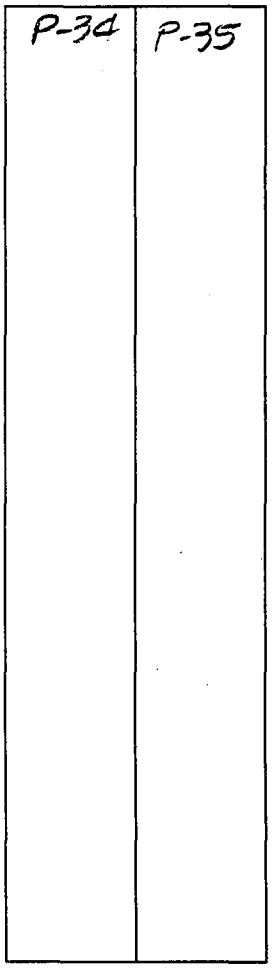
Seam #: 33-34



Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

North: [redacted]

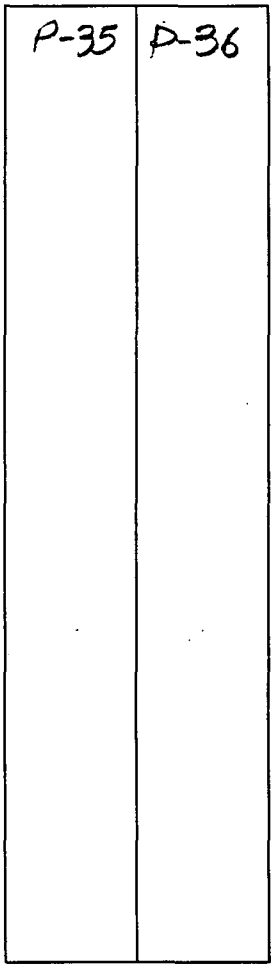
Seam #: 34-35



Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

North: [redacted]

Seam #: 35-36



Completed: YES
Date: 11/12/99
Time:
CQA ID: RGC

SEAM REPAIR AND TEST LOCATION LOG

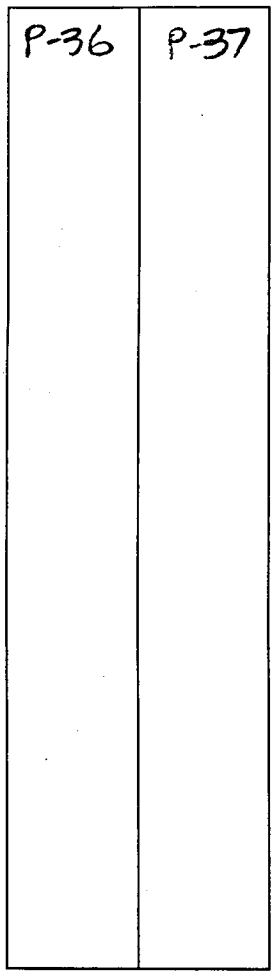
PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: ←

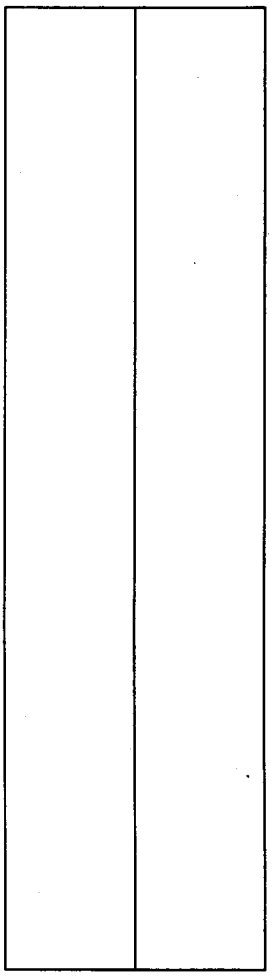
Seam #: 36-37



Completed: YES
Date: 11/12/99
Time:
CQA ID: EGC

North:

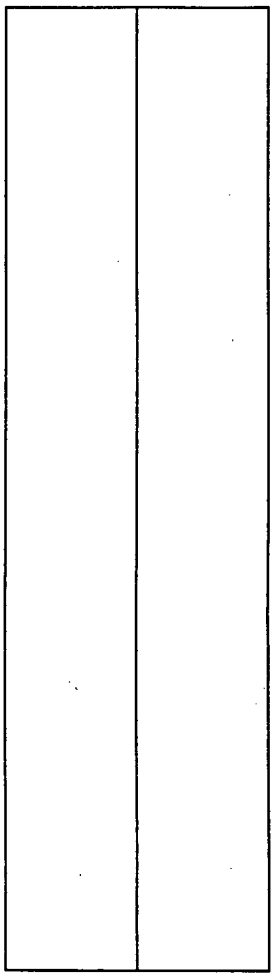
Seam #:



Completed:
Date:
Time:
CQA ID:

North:

Seam #:



Completed:
Date:
Time:
CQA ID:

SEAM REPAIR AND TEST LOCATION LOG

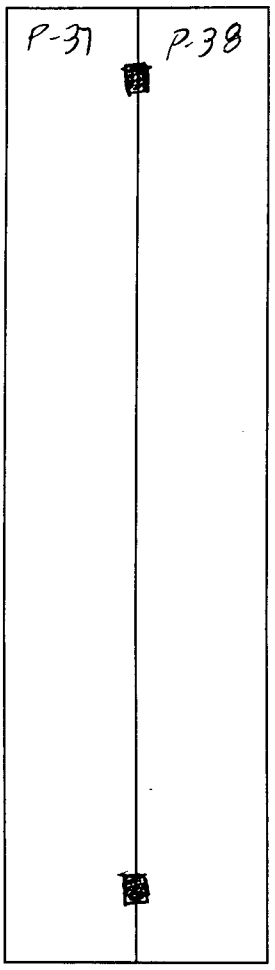
PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North:

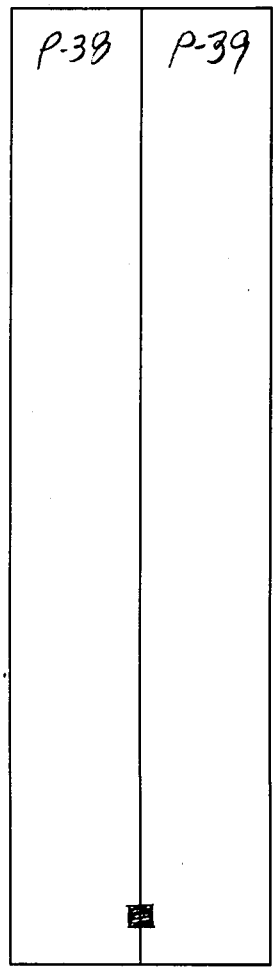
Seam #: 37-38



Completed: YES
Date: 11/15/99
Time:
CQA ID: RGC

North:

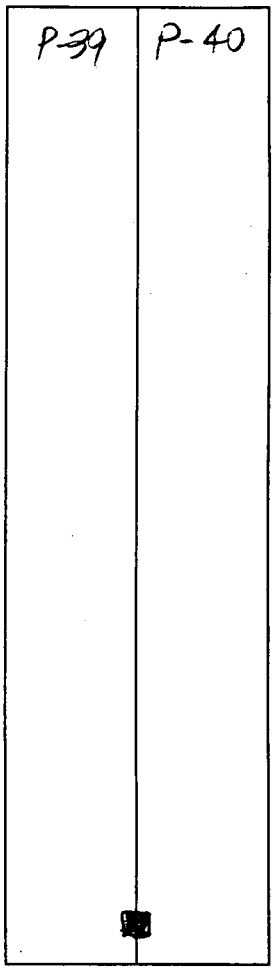
Seam #: 38-39



Completed: YES
Date: 11/15/99
Time:
CQA ID: RGC

North:

Seam #: 39-40



Completed: YES
Date: 11/15/99
Time:
CQA ID: RGC

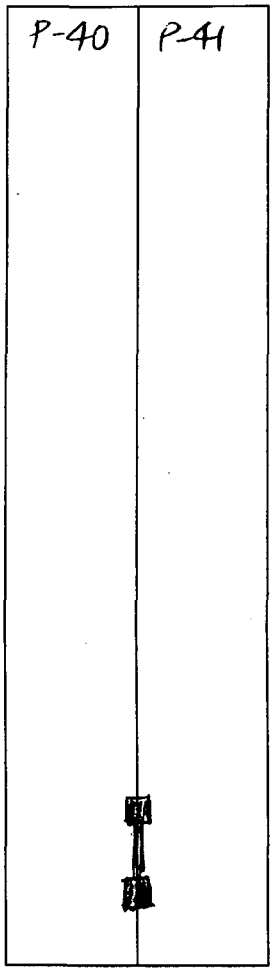
SEAM REPAIR AND TEST LOCATION LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

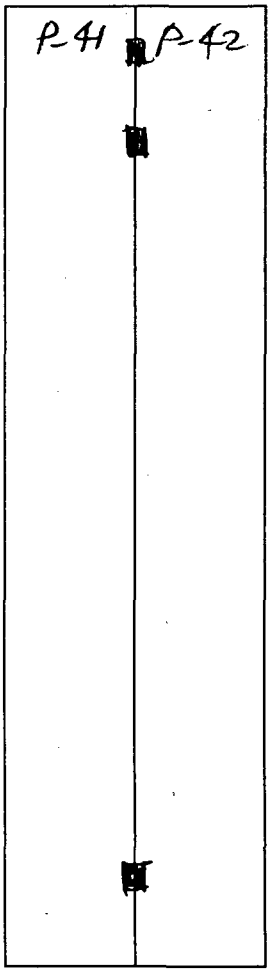
	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: 4
Seam #: 40-41



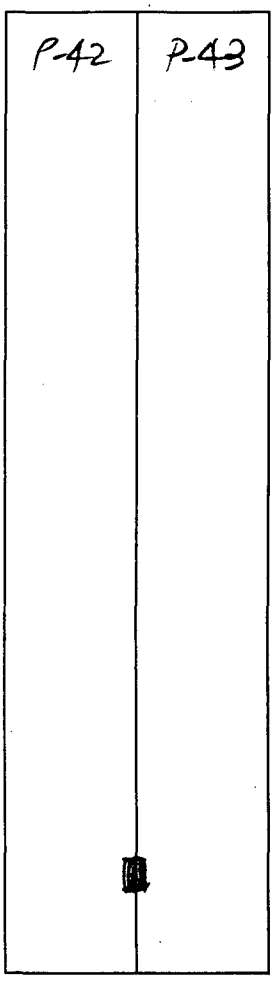
Completed: YES
Date: 11/15/99
Time:
CQA ID: RGC

North: 4
Seam #: 41-42



Completed: YES
Date: 11/15/99
Time:
CQA ID: RGC

North: 4
Seam #: 42-43



Completed: YES
Date: 11/15/99
Time:
CQA ID: RGC

SEAM REPAIR AND TEST LOCATION LOG

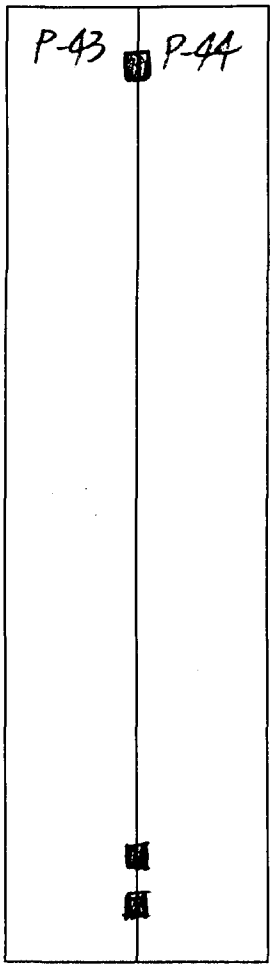
PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: N

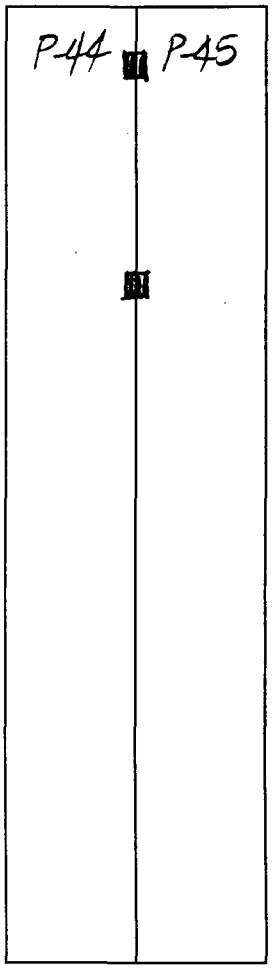
Seam #: 43-44



Completed: YES
Date: 11/15/99
Time:
CQA ID: RGC

North: N

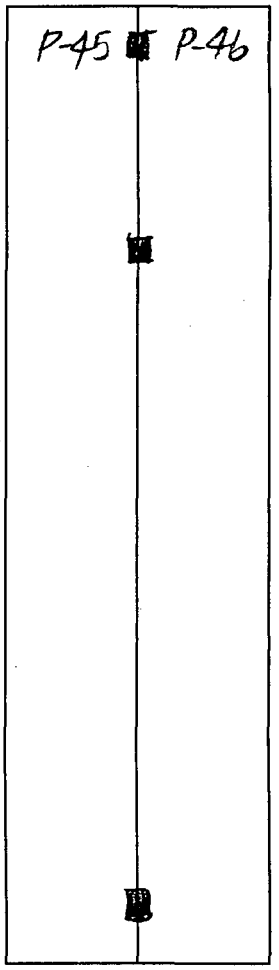
Seam #: 44-45



Completed: YES
Date: 11/15/99
Time:
CQA ID: RGC

North: N

Seam #: 45-46



Completed: YES
Date: 11/15/99
Time:
CQA ID: RGC

SEAM REPAIR AND TEST LOCATION LOG

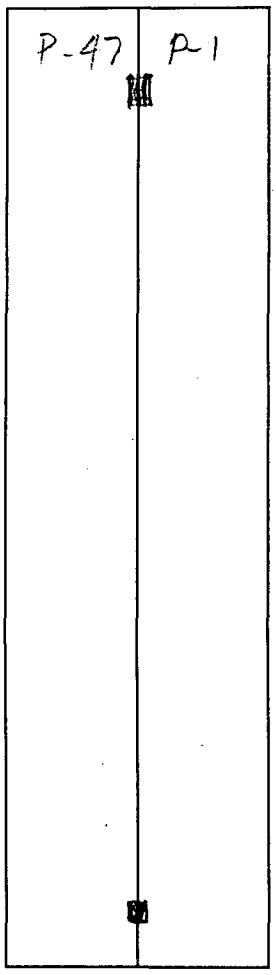
PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: ↑

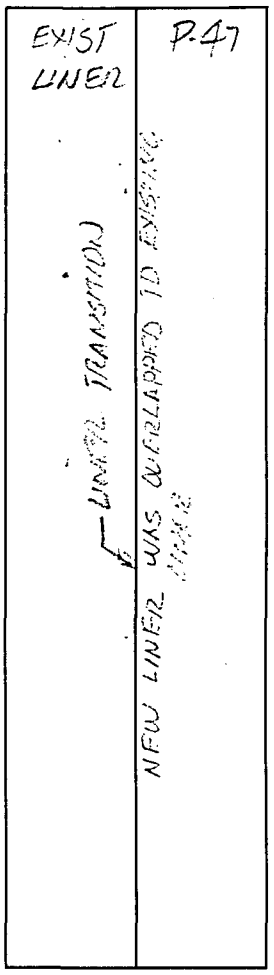
Seam #: 47-1



Completed: YES
Date: 11/15/99
Time:
CQA ID: RGC

North: ←

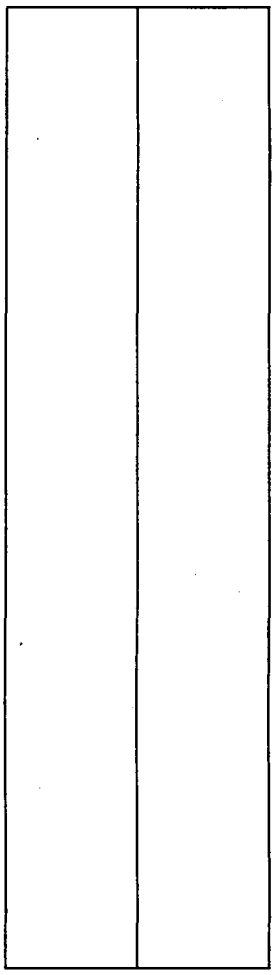
Seam #: 47-TIE IN



Completed:
Date: 11/15/99
Time:
CQA ID: BSO

North:

Seam #:



Completed:
Date:
Time:
CQA ID:

PBS&J, INC.

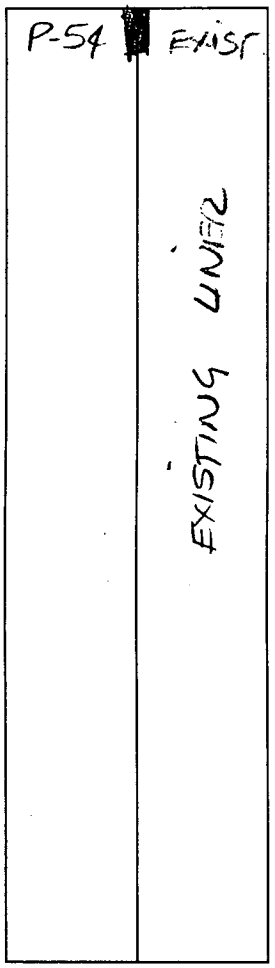
SEAM REPAIR AND TEST LOCATION LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

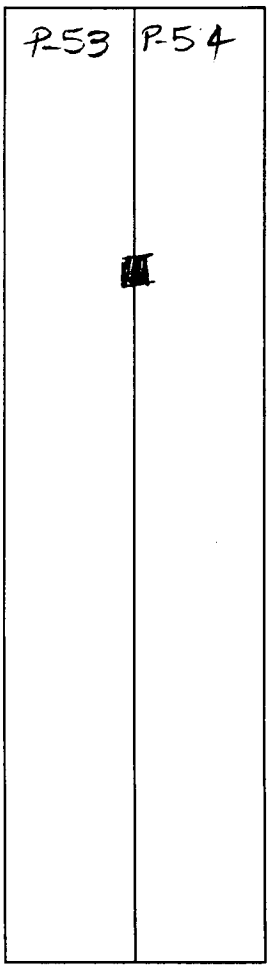
	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: ← Seam #: S4-EXIST



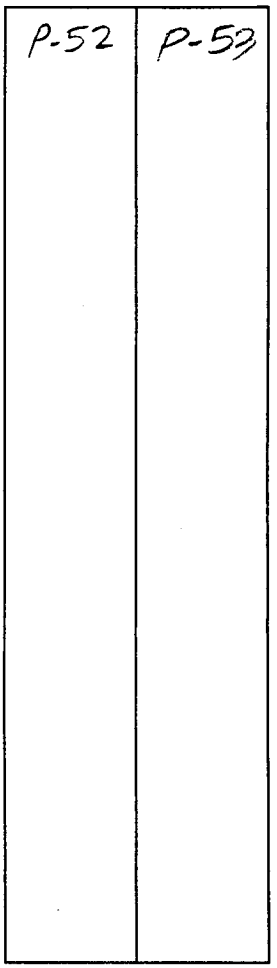
Completed: YES
Date: 11/19/99
Time:
CQA ID: JHW

North: ↑ Seam #: S3-S4



Completed: YES
Date: 11/19/99
Time:
CQA ID: JHW

North: ↑ Seam #: S2-S3



Completed: YES
Date: 11/19/99
Time:
CQA ID: JHW

SEAM REPAIR AND TEST LOCATION LOG

PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: 

Seam #: 51-52

P-51	P-52

Completed: YES
Date: 11/19/99
Time:
CQA ID: JHW

North: 

Seam #: 50-51

P-50	P-51

Completed: YES
Date: 11/19/99
Time:
CQA ID: JHW

North: 

Seam #: 49-50

P-49	P-50

Completed: YES
Date: 11/19/99
Time:
CQA ID: JHW

SEAM REPAIR AND TEST LOCATION LOG

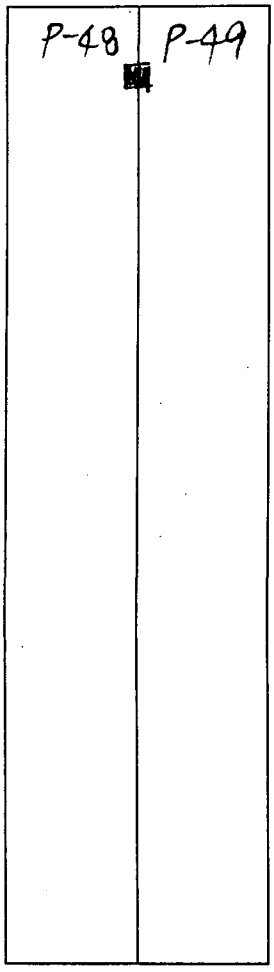
PROJECT: HARDEE COUNTY
LOCATION: HARDEE COUNTY

CQA MANAGER: RAYMUNDO CASTRO
PROJECT NO.: 7862.39

	PATCH	CAP	BEAD	SAMPLE	COMMENTS:
REPAIR					
REPAIRED					
TESTED					

North: 4

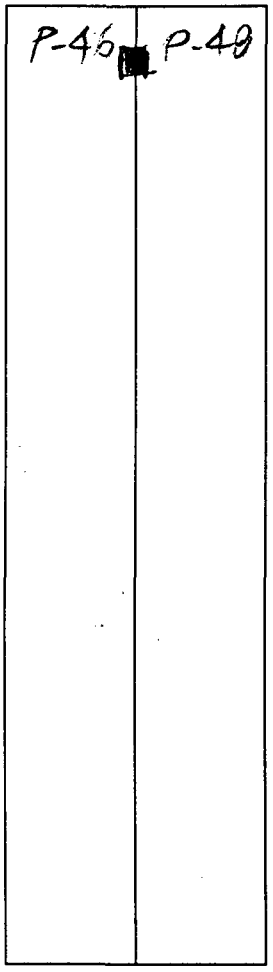
Seam #: 48-49



Completed: YES
Date: 11/19/99
Time:
CQA ID: JHW

North: 4

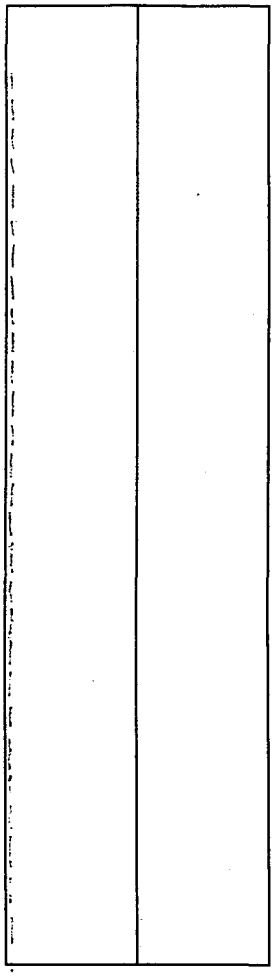
Seam #: 46-48



Completed: YES
Date: 11/19/99
Time:
CQA ID: JHW

North:

Seam #:

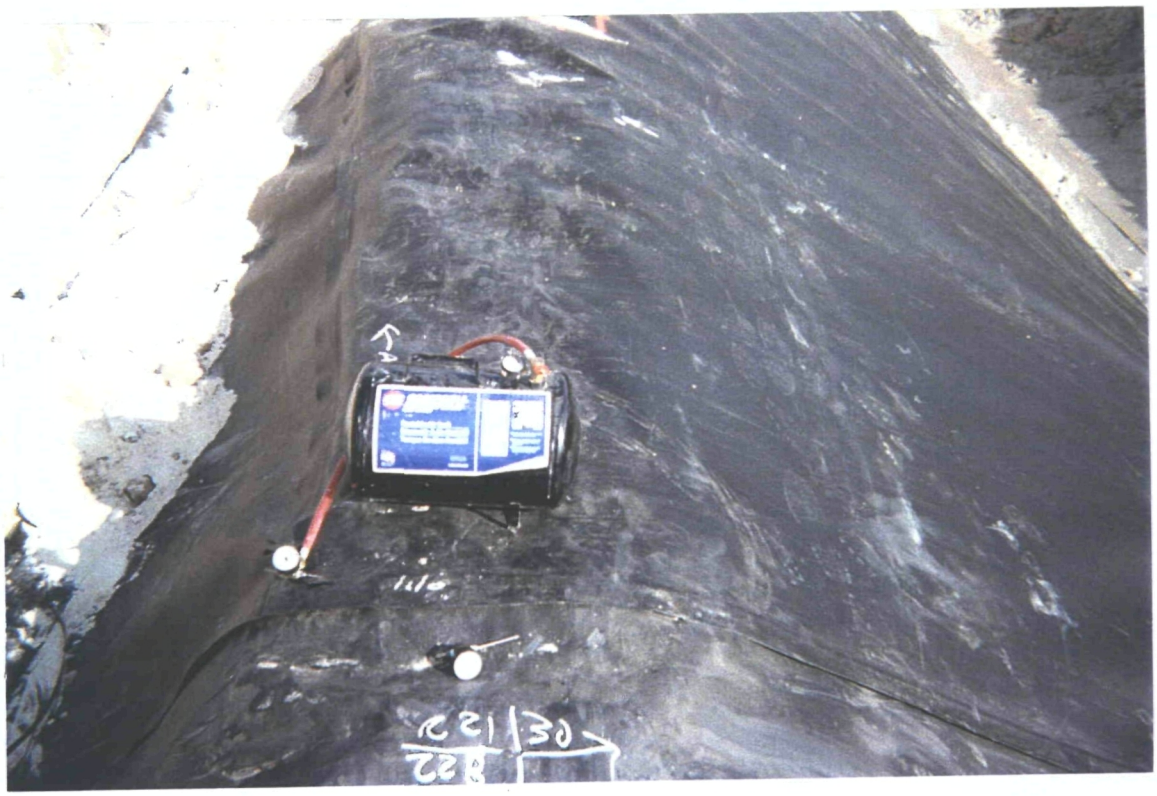


Completed:
Date:
Time:
CQA ID:

SECTION 3.13

INSTALLATION PHOTOGRAPHS

DESTRUCTIVE SAMPLE COLLECTION



AIR PRESSURE TESTING

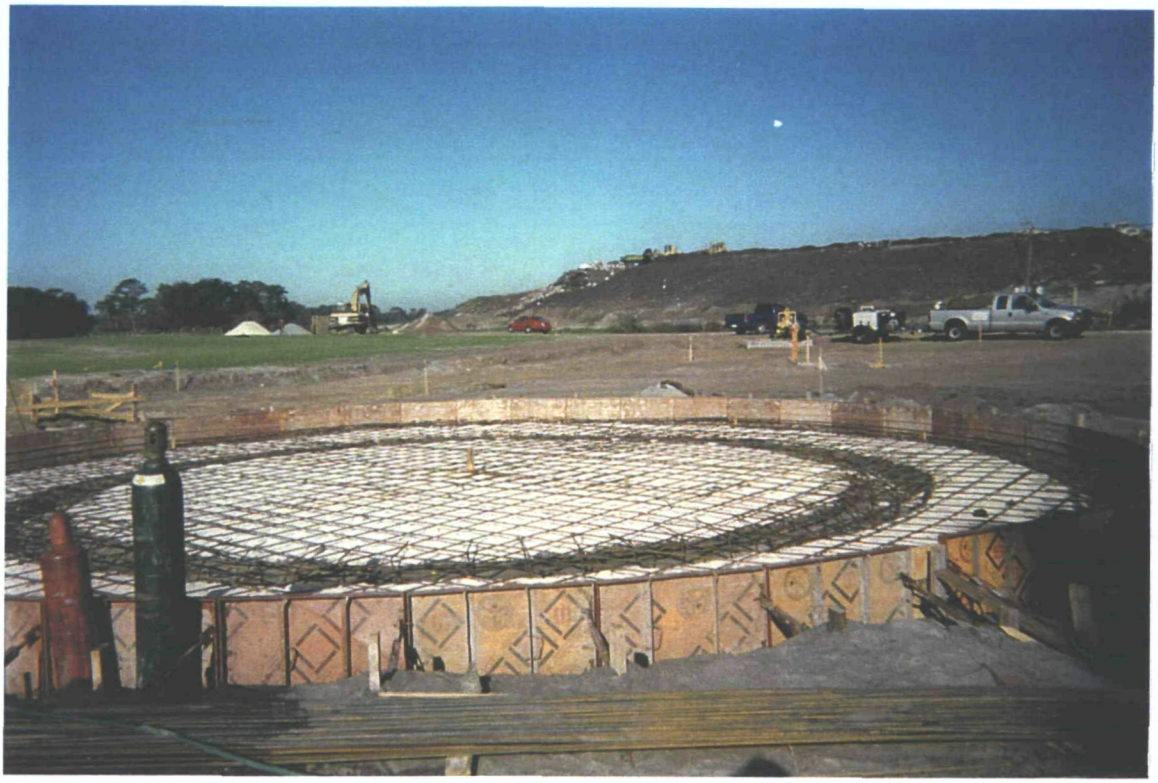
REPAIRING PATCH UTILIZING EXTRUDE WELDING

FUSION WELDING SEAM ON ADJACENT PANELS

VACUUM TESTING REPAIR

PANEL PLACEMENT

COMPACTING COVER SOIL



LEACHATE STORAGE TANK FOUNDATION

LEACHATE STORAGE TANK CONCRETE SLAB

SECTION 3.14

INSTALLER'S PERSONNEL RESUMES

COMANCO RESUMES

COMANCO

COMANCO

ENVIRONMENTAL CORPORATION

TIMOTHY LIMAURO
Liner Technician

PROJECTS

Project Name: Cargill Gypsum Landfill **Liner Manufacturer:** GSE Lining Technology	**Owner:** Cargill Fertilizer, Inc **Liner Type:** 40 mil HDPE Smooth	**Location:** Riverview, FL **Quantity:** 150,000 square feet
Project Name: Cargill Fertilizer Tank **Liner Manufacturer:** GSE Lining Technology	**Owner:** Cargill Fertilizer, Inc. **Liner Type:** 40 mil HDPE Smooth	**Location:** Bartow, FL **Quantity:** 60,000 square feet
Project Name: Cargill Tank "E" **Liner Manufacturer:** GSE Lining Technology	**Owner:** Cargill Fertilizer, Inc **Liner Type:** 40 mil HDPE Smooth	**Location:** Bartow, FL **Quantity:** 60,000 square feet
Project Name: Ocala Fire Rescue **Liner Manufacturer:** GSE Lining Technology	**Owner:** City of Ocala **Liner Type:** 40 mil HDPETextured	**Location:** Ocala, FL **Quantity:** 35,000 square feet
Project Name: Gunn Highway Ret Pond **Liner Manufacturer:** GSE Lining Technology	**Owner:** FDOT **Liner Type:** 60 mil HDPE Smooth	**Location:** Tampa, FL **Quantity:** 35,000 square feet
Project Name: Universal Studios **Liner Manufacturer:** GSE Lining Technology	**Owner:** Universal Studios **Liner Type:** 40 mil HDPE Smooth	**Location:** Orlando, FL **Quantity:** 85,000 square feet
Project Name: IMC-AGRICO Surge Pond **Liner Manufacturer:** GSE Lining Technology	**Owner:** IMC-AGRICO **Liner Type:** 60 mil HDPE	**Location:** Nichols, FL **Quantity:** 300,000 square feet
Project Name: Lady Lake Landfill **Liner Manufacturer:** GSE Lining Technology **Liner Manufacturer:** GSE Lining Technology	**Owner:** Lady Lake B.O.C.C **Liner Type:** 40 mil Ultra-flex **Liner Type:** 40 mil Textured	**Location:** Lake County, FL **Quantity:** 950,000 square feet **Quantity:** 300,000 square feet
Project Name: IMC-AGRICO Ditch Liner **Liner Manufacturer:** GSE Lining Technology **Geocomposite Manufacturer:** GSE Lining Technology	**Owner:** IMC-AGRICO Company **Liner Type:** 60 mil HDPE Smooth **Liner Type:** 60 mil HDPE Textured	**Location:** Bartow, FL **Quantity:** 75,392 square feet **Quantity:** 8,622 square feet
Project Name: Seminole Electric Pond #7 **Liner Manufacturer:** GSE Lining Technology **Liner Manufacturer:** GSE Lining Technology	**Owner:** Seminole Electric Company **Liner Type:** 60 mil HDPE Smooth **Liner Type:** 60 mil HDPE Textured	**Location:** Palatka, FL **Quantity:** 1,500,000 square feet **Quantity:** 1,500,000 square feet
Project Name: Perdido Landfill **Liner Manufacturer:** GSE Lining Technology	**Owner:** Perdido Landfill **Liner Type:** 60 mil HDPE	**Location:** Pensacola, FL **Quantity:** 400,000 square feet
Project Name: GATX French Drain **Liner Manufacturer:** TNS	**Owner:** GATX Terminals **Geotextile Type:** 8 oz.	**Location:** Port of Tampa, FL **Quantity:** 2,000 square feet
Project Name: Cargill Roof **Liner Manufacturer:** GSE Lining Technology **Geotextile Manufacturer:** TNS	**Owner:** Cargill Fertilizer, Inc. **Liner Type:** 80 mil HDPE Textured **Geotextile Type:** 8 oz.	**Location:** Bartow, FL **Quantity:** 6,525 square feet **Quantity:** 6,525 square feet
Project Name: Sarasota County Central Landfill **Liner Manufacturer:** GSE **Liner Manufacturer:** Tenax **Liner Manufacturer:** TNS	**Owner:** Sarasota County B.O.C.C. **Liner Type:** 60 mil HDPE **Liner Type:** Geonet **Liner Type:** Geotextile	**Location:** Sarasota, FL **Quantity:** 3,000,000 square feet **Quantity:** 3,000,000 square feet **Quantity:** 3,000,000 cubic yards
Project Name: Volusia County Landfill **Liner Manufacturer:** GSE	**Owner:** Volusia County B.O.C.C. **Liner Type:** 60 Mil HDPE	**Location:** Daytona, FL. **Quantity:** 3,000,000

Total Geomembrane Liner Installation Quantity: 11,465,539

Total Geotextile Liner Installation Quantity: 3,008,525

Total Geonet Installation Quantity: 3,000,000

Edited May 1, 1998

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CALIXTO PONCE
Liner Technician

PROJECTS

Project Name: Sarasota County Central Landfill	Owner: Sarasota County B.O.C.C.	Location: Sarasota, Florida
Liner Manufacturer: GSE	Liner Type: 60 mil HDPE	Quantity: 3,000,000 square feet
Liner Manufacturer: Tenax	Liner Type: Geonet	Quantity: 3,000,000 square feet
Geonet Manufacturer: TNS	Geonet Type: Geotextile	Quantity: 3,000,,000 square feet
Project Name: New Gypsum Stack	Owner: C. F. Industries	Location: Plant City, Florida
Liner Manufacturer: MFG	Liner Type: 60 mil HDPE	Quantity: 17,000,000 square feet

Total Geomembrane Liner Installation Quantity:	20,000,000
Total Geonet Installation Quantity:	3,000,000
Total Geotextile Installation Quantity:	3,000,000

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FRANK JACKSON
Liner Technician

PROJECTS

Project Name: New Gypsum Stack
Liner Manufacturer: MFG

Owner: C. F. Industries
Liner Type: 60 mil HDPE

Location: Plant City, Florida
Quantity: 17,000,000 square feet

Total Geomembrane Liner Installation Quantity: **17,000,000**

Total Geonet Installation Quantity:

Total Geotextile Installation Quantity:

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REINALDO CUERO
Liner Technician

PROJECTS

Project Name: Hess Tanks
Liner Manufacturer: GSE
Owner: Amerada Hess
Liner Type: 60 mil HDPE
Location: Jacksonville, Tampa, Ft. Lauderdale
Quantity: 530,000 square feet

Project Name: Fuel Oil Containment
Liner Manufacturer:GSE
Owner: Florida Power Corp
Liner Type: 60 Mil HDPE
Location: Bartow, FL.
Quantity: 200,000 square feet

Total Geomembrane Liner Installation Quantity: **730,000**

Total Geonet Installation Quantity:

Total Geotextile Installation Quantity:

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RICKY SMITH

Project Superintendent

PROJECTS

Project Name: Quincy Landfill Cap **Liner Manufacturer**: Poly-Flex **Geotextile Manufacturer**: Geocomposites, Inc.	**Owner**: City of Quincy **Liner Type**: 40 mil HDPE **Geotextile Type**: 6 oz. Polypropylene	**Location**: Quincy, FL **Quantity**: 755,000 square feet **Quantity**: 1,350,000 square feet
Project Name: Quincy Landfill Cell **Liner Manufacturer**: Poly-Flex **Geotextile Manufacturer**: Geocomposites, Inc.	**Owner**: City of Quincy **Liner Type**: 60 mil HDPE **Geotextile Type**: 6 oz. Polypropylene	**Location**: Quincy, FL **Quantity**: 276,100 square feet **Quantity**: 550,000 square feet
Project Name: 80,000 bbl Tank Foundations **Liner Manufacturer**: Poly-Flex	**Owner**: GATX Terminals Corporation **Liner Type**: 60 mil HDPE	**Location**: Tampa, FL **Quantity**: 60,000 square feet
Project Name: 80,000 bbl Tank Foundations **Liner Manufacturer**: Poly-Flex	**Owner**: GATX Terminals Corporation **Liner Type**: 60 mil HDPE	**Location**: Taft, FL **Quantity**: 20,000 square feet
Project Name: Douglass Secondary Containment **Liner Manufacturer**: Poly-Flex	**Owner**: Douglas Fertilizer, Inc. **Liner Type**: 60 mil HDPE	**Location**: Lake Placid, FL **Quantity**: 60,000 square feet
Project Name: Tank #9 Secondary Containment **Liner Manufacturer**: National Seal Corporation	**Owner**: Cargill Fertilizer, Inc. **Liner Type**: 40 mil HDPE	**Location**: Tampa, FL **Quantity**: 90,000 square feet
Project Name: CAP Pond **Liner Manufacturer**: National Seal Corporation	**Owner**: Cargill Fertilizer, Inc. **Liner Type**: 60 mil HDPE	**Location**: Tampa, FL **Quantity**: 65,000 square feet
Project Name: Gypsum Stack Phase I and II **Liner Manufacturer**: N/A **Piping Manufacturer**: Phillips/Drisco	**Owner**: Cargill Fertilizer, Inc. **Liner Type**: Clay **Piping Type**: HDPE	**Location**: Tampa, FL **Quantity**: 14,200,560 square feet **Quantity**: 150,000 linear feet
Project Name: Landfill Volume Control Berms **Liner Manufacturer**: Poly-Flex	**Owner**: Highlands County **Liner Type**: 60 mil	**Location**: Sebring, FL **Quantity**: 10,000 square feet
Project Name: Wright Landfill Cap **Liner Manufacturer**: Poly-Flex	**Owner**: Okaloosa County **Liner Type**: 20 mil HDPE	**Location**: Fort Walton Beach, FL **Quantity**: 565,000 square feet
Project Name: Tillman Ridge Landfill Cap **Liner Manufacturer**: Poly-Flex	**Owner**: St. Johns County **Liner Type**: 40 mil HDPE	**Location**: St. Augustine, FL **Quantity**: 2,300,000 square feet
Project Name: Homestead A.F.B. Tank Liners **Liner Manufacturer**: Poly-Flex	**Owner**: Homestead A.F.B. **Liner Type**: 60 mil HDPE	**Location**: Homestead, FL **Quantity**: 110,000 square feet
Project Name: Pipers Pointe **Liner Manufacturer**: Poly-Flex **Geotextile Manufacturer**: Marafi	**Owner**: Pipers Pointe Condominium **Liner Type**: 40 mil HDPE **Geotextile Type**: 8 oz. Polypropylene	**Location**: Naples, FL **Quantity**: 98,000 square feet **Quantity**: 98,000 square feet
Project Name: Construct Entomology Washrack **Liner Manufacturer**: Poly-Flex	**Owner**: MacDill Air Force Base **Liner Type**: 20mil HDPE	**Location**: Tampa, FL **Quantity**: 2,300 square feet
Project Name: Okaloosa Cell #4 Closure **Liner Manufacturer**: SLT North America	**Owner**: Okaloosa County **Liner Type**: 20 mil HDPE	**Location**: Ft. Walton Beach, FL **Quantity**: 680,000 square feet
Project Name: Drip Pad Slab Liner **Liner Manufacturer**: Poly-Flex	**Owner**: Robbins Manufacturing Co. **Liner Type**: 60 mil HDPE	**Location**: Ft. Myers, FL **Quantity**: 18,000 square feet
Project Name: Gypsum Flyash Stacking Facility **Liner Manufacturer**: Poly-Flex	**Owner**: Georgia Power Co. **Liner Type**: 60 mil HDPE	**Location**: Newnan, Georgia **Quantity**: 325,000 square feet

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Continuation of Liner Experience for RICKY SMITH

Project Name: Punta Gorda Sludge Bed
Liner Manufacturer: SLT North America, Inc.
Geotextile Manufacturer: Geocomposites

Owner: City of Punta Gorda
Liner Type: 40 mil HDPE
Geotextile Type: 12 oz. polypropylene

Location: Punta Gorda, FL
Quantity: 40,000 square feet
Quantity: 40,000 square feet

Project Name: DeSoto County Landfill Expansion
Liner Manufacturer: SLT North America, Inc.
Geomembrane Manufacturer: SLT North America
Geotextile Manufacturer: SLT North America

Owner: DeSoto County
Liner Type: 60 mil HDPE
Geomembrane Type: Geonet
Geotextile Type: 8 oz. Polypropylene

Location: Arcadia, FL
Quantity: 400,000 square feet
Quantity: 400,000 square feet
Quantity: 200,000 square feet

Project Name: Cargill Booster Station
Liner Manufacturer: GSE Lining Technology

Owner: Cargill Fertilizer, Inc.
Liner Type: 60 mil HDPE

Location: Bartow, FL
Quantity: 18,000 square feet

Total Geosynthetic Liner Installation Quantity: 5,892,400

Total Geotextile Installation Quantity: 2,238,000

Total Geomembrane Installation Quantity: 400,000

Total HDPE Piping Installation Quantity: 150,000

Total Clay Liner Installation Quantity: 14,200,560

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ENVIRONMENTAL CORPORATION

CHRIS SOWERS

Project Superintendent

PROJECTS

Project Name: Pinecrest Golf	**Contractor**: Terra Firma	**Location**: Haines City, FL
Liner Manufacturer: National Seal	**Liner Type**: 40 mil HDPE	**Quantity**: 150,000 square feet
Project Name: Pinellas Park	**Owner**: Pinellas County	**Location**: Pinellas Park, FL
Liner Manufacturer: National Seal	**Liner Type**: 60 mil HDPE	**Quantity**: 22,000 square feet
Liner Manufacturer: National Seal	**Liner Type**: 40 mil HDPE	**Quantity**: 118,000 square feet
Project Name: Lake Alfred, FL	**Owner**: Growers Fertilizer	**Location**: Lake Alfred, FL
Liner Manufacturer: National Seal	**Liner Type**: 60 mil HDPE	**Quantity**: 85,000 square feet
Project Name: Orlando Regional Hospital	**Contractor**: Terra Firma	**Location**: Orlando, FL
Liner Manufacturer: National Seal	**Liner Type**: 60 mil HDPE	**Quantity**: 115,000 square feet
Project Name: Columbia Solid Waste	**Owner**: Columbia County, FL	**Location**: Lake City, FL
Liner Manufacturer: National Seal	**Liner Type**: 60 mil HDPE	**Quantity**: 2,000,000 square feet
Project Name: Branford Solid Closure	**Owner**: Banford County	**Location**: Starke, FL
Liner Manufacturer: Environmental Liners	**Liner Type**: 30 mil PVC	**Quantity**: 1,500,000 square feet
Project Name: Walt Disney World	**Contractor**: Terra Firma	**Location**: Kissimmee, FL
Liner Manufacturer: National Seal	**Liner Type**: 60 mil HDPE	**Quantity**: 52,000 square feet
Project Name: Walmart	**Contractor**: Terra Firma	**Location**: Barlow, FL
Liner Manufacturer: Mid-American Liners	**Liner Type**: 30 mil PVC	**Quantity**: 185,000 square feet
Project Name: FL Atlantic University	**Contractor**: Terra Firma	**Location**: Boca Raton, FL
Liner Manufacturer: Mid-American Liners	**Liner Type**: 30 mil PVC	**Quantity**: 250,000 square feet
Project Name: Crystal River Sewer	**Contractor**: Terra Firma	**Location**: Crystal River, FL
Liner Manufacturer: Environmental Liners	**Liner Type**: 30 mil PVC	**Quantity**: 62,500 square feet
Project Name: Hernando School Board	**Owner**: Hernando School Board	**Location**: Brooksville, FL
Liner Manufacturer: Environmental Liners	**Liner Type**: 30 mil PVC	**Quantity**: 185,000 square feet
Project Name: Pickettville Road Landfill	**Owner**: Duval County, FL	**Location**: Jacksonville, FL
Liner Manufacturer: Environmental Liners	**Liner Type**: 40 mil PVC	**Quantity**: 105,000 square feet
Project Name: Lakeland Sewer Treatment	**Contractor**: Terra Firma	**Location**: Lakeland, Fl
Liner Manufacturer: Environmental Liners	**Liner Type**: 30 mil PVC	**Quantity**: 52,600 square feet
Erosion Control Manufacturer: Unknown	**Type**: 4" USM	**Quantity**: 52,600 square feet
Project Name: 49th Street Extension	**Owner**: Pinellas County, FL	**Location**: Pinellas, FL
Liner Manufacturer: Environmental Liners	**Liner Type**: 30 mil PVC	**Quantity**: 218,000 square feet
Project Name: F. D. O. T.	**Contractor**: Terra Firma	**Location**: Gainesville, FL
Liner Manufacturer: Environmental Liners	**Liner Type**: 30 mil PVC	**Quantity**: 28,000 square feet
Project Name: Baker Landfill	**Owner**: Okaloosa County	**Location**: Crestview, FL
Liner Manufacturer: Gundle	**Liner Type**: 60 mil HDPE	**Quantity**: 100,000 square feet
Liner Manufacturer: Gundle	**Liner Type**: 40 mil HDPE	**Quantity**: 150,000 square feet
Geonet Manufacturer: Gundle	**Geonet Type**: Gundnet	**Quantity**: 52,000 square feet

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Continuation of liner experience for CHRIS SOWERS

Project Name: *Kelly and Deerhaven Containment* ***Liner Manufacturer***: *Gundle*	***Owner***: *Gainesville Regional Utilities* ***Liner Type***: *60 mil HDPE*	***Location***: *Gainesville, FL* ***Quantity***: *95,000 square feet*
Project Name: *Manhattan Road Landfill* ***Liner Manufacturer***: *Gundle*	***Owner***: *City of Tampa* ***Liner Type***: *40 mil HD/VL/HD*	***Location***: *Tampa, FL* ***Quantity***: *725,000 square feet*
Project Name: *CF Industries, Inc.* ***Liner Manufacturer***: *Gundle* ***Liner Manufacturer***: *Gundle*	***Owner***: *CF Industries, Inc.* ***Liner Type***: *60 mil HDPE Smooth* ***Liner Type***: *60 mil HDPE Textured*	***Location***: *Tampa, FL* ***Quantity***: *2,800,000 square feet* ***Quantity***: *1,250,000 square feet*
Project Name: *City of Venice* ***Liner Manufacturer***: *Gundle* ***Geotextile Manufacturer***: *Nicolon*	***Owner***: *City of Venice, FL* ***Liner Type***: *60 mil HDPE* ***Geotextile Type***: *6 oz.*	***Location***: *Venice, FL* ***Quantity***: *720,000 square feet* ***Quantity***: *45,000 square feet*
Project Name: *Alcoa Liner Repair* ***Liner Manufacturer***: *Gundle*	***Owner***: *Alcoa Aluminum Co. of America* ***Liner Type***: *60 mil HDPE*	***Location***: *Fort Meade, FL* ***Quantity***: *10,000 square feet*
Project Name: *Peace River Citrus Repair* ***Liner Manufacturer***: *Gundle*	***Owner***: *Peace River Citrus* ***Liner Type***: *40 mil HDPE*	***Location***: *Arcadia, FL* ***Quantity***: *8,000 square feet*
Project Name: *Cargill Gypsum Landfill* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *Cargill Fertilizer, Inc* ***Liner Type***: *40 mil HDPE Smooth*	***Location***: *Riverview, Florida* ***Quantity***: *150,000 square feet*
Project Name: *Cargill Fertilizer Tank* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *Cargill Fertilizer, Inc.* ***Liner Type***: *40 mil HDPE Smooth*	***Location***: *Bartow, Florida* ***Quantity***: *60,000 square feet*
Project Name: *Cargill Tank "E"* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *Cargill Fertilizer, Inc* ***Liner Type***: *40 mil HDPE Smooth*	***Location***: *Bartow, Florida* ***Quantity***: *60,000 square feet*
Project Name: *Ocala Fire Rescue* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *City of Ocala* ***Liner Type***: *40 mil HDPETextured*	***Location***: *Ocala, Florida* ***Quantity***: *35,000 square feet*
Project Name: *Gunn Highway Ret Pond* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *F DOT* ***Liner Type***: *60 mil HDPE Smooth*	***Location***: *Tampa, Florida* ***Quantity***: *35,000 square feet*
Project Name: *Universal Studios* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *Universal Studios* ***Liner Type***: *40 mil HDPE Smooth*	***Location***: *Orlando, Florida* ***Quantity***: *85,000 square feet*
Project Name: *Lady Lake Landfill* ***Liner Manufacturer***: *GSE Lining Technology* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *Lady Lake B.O.C.C* ***Liner Type***: *40 mil Ultra-flex* ***Liner Type***: *40 mil Textured*	***Location***: *Lake County, Florida* ***Quantity***: *950,000 square feet* ***Quantity***: *300,000 square feet*
Project Name: *Universal Studios JBC Ditch Liner* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *Universal Studios* ***Liner Type***: *40 mil HDPE*	***Location***: *Orlando, FL* ***Quantity***: *151,060 square feet*
Project Name: *Shell Grating* ***Concrete Manufacturer***:	***Owner***: *Shell Oil Company* ***Concrete***: *3000 PSI*	***Location***: *Tampa, FL* ***Quantity***: *6 square feet*
Project Name: *Marion County* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***:*Marion County Landfill* ***Liner Type***: *20 mil HDPE white*	***Location***: *Ocala, FL* ***Quantity***: *700,000 square feet*
Project Name: *Chamber Raincover* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *Chambers USA Waste* ***Liner Type***: *20 mil HDPE white on black*	***Location***: *Okeechobee, FL* ***Quantity***: *200,000 square feet*
Project Name: *Woodhills Apartments* ***Liner Manufacturer***: *AMOCO Composite*	***Owner***: *Woodhills Apratments* ***Liner Type***: *60 mil textured*	***Location***: *Orlando, FL* ***Quantity***: *37,000 square feet*
Project Name: *Seminole Electric Pond #7* ***Liner Manufacturer***: *GSE Lining Technology* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *Seminole Electric Company* ***Liner Type***: *60 mil HDPE Smooth* ***Liner Type***: *60 mil HDPE Textured*	***Location***: *Palatka, FL* ***Quantity***: *1,500,000 square feet* ***Quantity***: *1,500,000 square feet*
Project Name: *Miami Police Station* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *Miami County* ***Liner Type***: *80 mil HDPE Smooth*	***Location***: *Miami, FL* ***Quantity***: *1,500 square feet*
Project Name: *Waste Management Pond Liner* ***Liner Manufacturer***: *GSE Lining Technology*	***Owner***: *Pasco County Landfill* ***Liner Type***: *60 mil HDPE Smooth*	***Location***: *Pasco, FL* ***Quantity***: *180,000 square feet*

COMANCO

Continuation of liner experience for CHRIS SOWERS

Project Name: *Perdido Landfill*	***Owner***: *Perdido Landfill*	***Location***: *Cantonment, FL*
Liner Manufacturer: *GSE Lining Technology*	***Liner Type***: *60 mil HDPE Smooth*	***Quantity***: *250,000 square feet*
Geo net Manufacturer: *GSE Lining Technology*	***Geonet Type***:	***Quantity***: *110,000 square feet*
Project Name: *Sterling Pulp Chemicals*	***Owner***: *Sterling Pulp Chemicals*	***Location***: *Valdosta, GA*
Liner Manufacturer: *SLT*	***Liner Type***: *60 mil hyperflex*	***Quantity***: *30,000 square feet*
Liner Manufacturer: *SLT*	***Liner Type***: *12 oz.*	***Quantity***: *30,000 square feet*

Total Geomembrane Liner Installation Quantity:	***16,167,560***
Total PVC Liner Installation Quantity:	***2,586,100***
Total Geotextile Installation Quantity:	***75,000***
Total Geonet Installation Quantity:	***162,000***
Total Concrete Installation Quantity:	***6***

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SECTION 4.1

GEOMEMBRANE MANUFACTURER QUALITY CONTROL TEST RESULTS

COMANCO
ENVIRONMENTAL CORPORATION

October 5, 1999

Larry A. Stark
ECLIPSE CONSTRUCTION COMPANY
2830 Parkway Street
Lakeland, FL 33811

RE: MATERIAL ROLL CERTIFICATES
HARDEE COUNTY LANDFILL EXPANSION
60 MIL HDPE LINER
CEC PROJECT # 99-581

Sent via FEDEX:
(941)644-7082

Dear MR. STARK,

Enclosed are the required material roll certificates for the material to be used in the above referenced project. Additionally, per your instructions, I will be forwarding a copy of this information to PBS&J to the attention of David Deans, PE via fax transmission at (407)647-8945.

Please note that prior to installation we will need a copy for our records of the laboratory results from the material sampling conducted by PBS&J.

Please let me know if you need anything else.

Best regards,

COMANCO ENVIRONMENTAL CORPORATION

PABLO J. RIVERA
Project Manager

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GSE

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

GSE Lining Technology, Inc. at HOUSTON,TEXAS

SHIPPERS NO. 8022

Received at Houston, Texas from GSE Lining Technology, Inc. the property described below, in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated below, 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 GSE Lining Technology, Inc. as indicated by the designation of the "Shipper" to be GSE Lining Technology, Inc., 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 GSE Lining Technology, Inc., then GSE Lining Technology, Inc. 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 a Shipper in placing the material in transit on behalf of a Shipper, GSE Lining Technology, Inc. accepts no liability for loss of cargo, damage to containers, or any other consequences occuring during transportation, Carrier having agreed that the transportation arrangements was initiated by the Shipper and not by GSE Lining Technology, Inc.

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.

Ship To: Comanco/Hardee County Landfill
c/o Eclipse Construction
685 Airport Road
Wauchula FL 33873

Date: 9/11/99

Shipping Instructions: Mark Topp @ 813/988-8829 Ship with Cargil.

Sales Order 8438

No. Line	Roll #	QTY Shipped	UM	Kind of Package, Description of Articles, Special Marks, and Exceptions	Weight
1	115105707	11280	SF	HME060A004 60 mil Avg HyperFlex Blk, HD, Smooth, 23.5'	3,417.71
2	115105708	11280	SF	HME060A004 60 mil Avg HyperFlex Blk, HD, Smooth, 23.5'	3,429.71
3	115105710	11280	SF	HME060A004 60 mil Avg HyperFlex Blk, HD, Smooth, 23.5'	3,422.71
4	115105714	11280	SF	HME060A004 60 mil Avg HyperFlex Blk, HD, Smooth, 23.5'	3,436.72
5	115105718	11280	SF	HME060A004 60 mil Avg HyperFlex Blk, HD, Smooth, 23.5'	3,437.72
6	115105723	11280	SF	HME060A004 60 mil Avg HyperFlex Blk, HD, Smooth, 23.5'	3,426.71

Total Quantity 67,680 Total Weight 20,571.281

Project# 502980

TERMS: 016
Prepaid / Collect

Customer P.O. #: C-99-501-1

Section 7

Load Verification

Signed

X

Pick Up # 4639

Seal #

Truckers P.O. #

Driver Requirements:

1) Driver must pre call 24 hrs prior to delivery and on Friday for Monday delivery.
2) Driver must call (281) 230-6781 when unloaded.
3) Driver must call and advise any delay in transit.
4) A copy of this B/L must accompany Freight Invoice.

CARRIER NAME: _____

CARRIER SIGNATURE: _____

DATE: _____

Sign Here For Shipper
Shipper: _____

Address: GSE Lining Technology Inc.
19103 Gundle Rd.
Houston, Tx. 77073-3599

Sign Here For Agent Of Shipper
Agent for Shipper: _____

(GSE LINING TECHNOLOGY, INC.
APPROVED AGENT FOR SHIPPER)

Agent must sign, detach and retain a copy of this Shipping Order

ORIGINAL

GSE *Lining Technology, Inc.*

Roll Test Data Report

Roll No. 115105707

ROLL IDENTIFICATION

Roll Number	115105707	
Product Name	HME060A004	
Production Date	8/17/99	
Length *≈(+/- 1%)*	480 146	feet meters
Width *(Nominal)*	23.5 7.2	feet meters
Sheet Area	11,280 1,048	sq. feet sq. meters
Weight	3,416 1,549	pounds kilograms

RESIN INFORMATION

Lot Number	A45688
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	*Test Method*	*Results*
Density, g/cc	*ASTM D 1505*	0.935
Melt index, g/10 min.	*ASTM D 1238 (190/2.16)*	0.59

Physical Property	*Test Method*	*Test Frequency*	*Customer Minimum* English	Metric	*Test Results* English	Metric
Thickness, mil (mm)	ASTM D 5199					
Average		every roll	60	(1.51)	61	(1.55)
Minimum		every roll	57	(1.44)	60	(1.52)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	120	(210)	141	(246)
- MD		every roll	120	(210)	139	(243)
Break Strength, ppi (N/cm) - TD		every roll	30	(53)	360	(629)
- MD		every roll	30	(53)	350	(613)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	10		21	
- MD	(33 mm)	every roll	10		21	
Break Elongation, % - TD	gauge length = 2.5"	every roll	100		832	
- MD	(64 mm)	every roll	100		884	
Tear Resistance, lb. (N)	ASTM D 1004					
- TD		every roll	40	(178)	50	(225)
- MD		every roll	40	(178)	50	(224)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.943	
Carbon Black Content, %	ASTM D 1603					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
ESCR, (hr)	ASTM D 1693 Cond. B					
	Start Date = 8/20/99	every roll	1500		Pending	
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	60	(267)	95	(424)

Order No. 8438
Customer Name COMANCO
Location WAUCHULA, FLORIDA

APPROVED
RP.
10/4/99
QA

Roll Test Data Report

GSE Lining Technology, Inc.

Roll No. 115105708

ROLL IDENTIFICATION

Roll Number	115105708	
Product Name	HME060A004	
Production Date	8/17/99	
Length ≈(+/- 1%)	480 146	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,280 1,048	sq. feet sq. meters
Weight	3,428 1,555	pounds kilograms

RESIN INFORMATION

Lot Number	A45688
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.935
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.59

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5199					
Average		every roll	60	(1.51)	62	(1.56)
Minimum		every roll	57	(1.44)	60	(1.52)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	120	(210)	141	(247)
- MD		every roll	120	(210)	140	(245)
Break Strength, ppi (N/cm) - TD		every roll	30	(53)	355	(621)
- MD		every roll	30	(53)	354	(619)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	10		21	
- MD	(33 mm)	every roll	10		21	
Break Elongation, % - TD	gauge length = 2.5"	every roll	100		851	
- MD	(64 mm)	every roll	100		860	
Tear Resistance, lb. (N)	ASTM D 1004					
- TD		every roll	40	(178)	51	(226)
- MD		every roll	40	(178)	50	(224)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.943	
Carbon Black Content, %	ASTM D 1603					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
ESCR, (hr)	ASTM D 1693 Cond. B					
	Start Date = 8/20/99	every roll	1500		Pending	
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	60	(267)	96	(427)

Order No. 8438
Customer Name COMANCO
Location WAUCHULA, FLORIDA

APPROVED
RP.
10/4/99
QA

GSE *Lining Technology, Inc.*

Roll Test Data Report

Roll No. 115105710

ROLL IDENTIFICATION

Roll Number	115105710	
Product Name	HME060A004	
Production Date	8/17/99	
Length *≈(+/- 1%)*	480 146	feet meters
Width *(Nominal)*	23.5 7.2	feet meters
Sheet Area	11,280 1,048	sq. feet sq. meters
Weight	3,421 1,552	pounds kilograms

RESIN INFORMATION

Lot Number	A45688
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	*Test Method*	*Results*
Density, g/cc	*ASTM D 1505*	0.935
Melt index, g/10 min.	*ASTM D 1238 (190/2.16)*	0.59

Physical Property	*Test Method*	*Test Frequency*	*Customer Minimum* English	Metric	*Test Results* English	Metric
Thickness, mil (mm)	ASTM D 5199					
Average		every roll	60	(1.51)	60	(1.53)
Minimum		every roll	57	(1.44)	58	(1.48)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	120	(210)	143	(251)
- MD		every roll	120	(210)	141	(247)
Break Strength, ppi (N/cm) - TD		every roll	30	(53)	355	(621)
- MD		every roll	30	(53)	354	(619)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	10		22	
- MD	(33 mm)	every roll	10		21	
Break Elongation, % - TD	gauge length = 2.5"	every roll	100		841	
- MD	(64 mm)	every roll	100		852	
Tear Resistance, lb. (N)	ASTM D 1004					
- TD		every roll	40	(178)	51	(228)
- MD		every roll	40	(178)	50	(225)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.943	
Carbon Black Content, %	ASTM D 1603					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
ESCR, (hr)	ASTM D 1693 Cond. B					
	Start Date = 8/20/99	every roll	1500		Pending	
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	60	(267)	97	(430)

Order No.	8438
Customer Name	COMANCO
Location	WAUCHULA, FLORIDA

APPROVED
RP.
10/4/99
QA

Roll Test Data Report

GSE Lining Technology, Inc.

Roll No. 115105714

ROLL IDENTIFICATION

Roll Number	115105714	
Product Name	HME060A004	
Production Date	8/18/99	
Length ≈(+/- 1%)	480 146	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,280 1,048	sq. feet sq. meters
Weight	3,435 1,558	pounds kilograms

RESIN INFORMATION

Lot Number	A45688
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.935
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.59

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5199					
Average		every roll	60	(1.51)	61	(1.54)
Minimum		every roll	57	(1.44)	59	(1.50)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	120	(210)	143	(250)
- MD		every roll	120	(210)	141	(247)
Break Strength, ppi (N/cm) - TD		every roll	30	(53)	348	(609)
- MD		every roll	30	(53)	347	(606)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	10		22	
- MD	(33 mm)	every roll	10		20	
Break Elongation, % - TD	gauge length = 2.5"	every roll	100		796	
- MD	(64 mm)	every roll	100		808	
Tear Resistance, lb. (N)	ASTM D 1004					
- TD		every roll	40	(178)	52	(230)
- MD		every roll	40	(178)	51	(228)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.943	
Carbon Black Content, %	ASTM D 1603					
		every 5th	2.0		2.5	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
ESCR, (hr)	ASTM D 1693 Cond. B					
	Start Date = 8/20/99	every roll	1500		Pending	
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	60	(267)	97	(431)

Order No. 8438
Customer Name COMANCO
Location WAUCHULA, FLORIDA

APPROVED
R.P.
10/4/99
QA

Roll Test Data Report

GSE Lining Technology, Inc.

Roll No. 115105718

ROLL IDENTIFICATION

Roll Number	115105718
Product Name	HME060A004
Production Date	8/18/99

Length ≈(+/- 1%)	480 146	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,280 1,048	sq. feet sq. meters
Weight	3,436 1,559	pounds kilograms

RESIN INFORMATION

Lot Number	A45688
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.935
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.59

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5199					
Average		every roll	60	(1.51)	61	(1.56)
Minimum		every roll	57	(1.44)	59	(1.50)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	120	(210)	150	(263)
- MD		every roll	120	(210)	142	(249)
Break Strength, ppi (N/cm) - TD		every roll	30	(53)	358	(626)
- MD		every roll	30	(53)	345	(604)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	10		21	
- MD	(33 mm)	every roll	10		20	
Break Elongation, % - TD	gauge length = 2.5"	every roll	100		797	
- MD	(64 mm)	every roll	100		840	
Tear Resistance, lb. (N)	ASTM D 1004					
- TD		every roll	40	(178)	51	(225)
- MD		every roll	40	(178)	51	(225)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603					
		every 5th	2.0		2.6	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
ESCR, (hr)	ASTM D 1693 Cond. B					
	Start Date = 8/20/99	every roll	1500		Pending	
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	60	(267)	94	(418)

Order No.	8438
Customer Name	COMANCO
Location	WAUCHULA, FLORIDA

APPROVED
R.P.
10/4/99
QA

Roll Test Data Report

GSE Lining Technology, Inc.

Roll No. 115105723

ROLL IDENTIFICATION

Roll Number	115105723	
Product Name	HME060A004	
Production Date	8/18/99	
Length ≈(+/- 1%)	480 146	feet meters
Width (Nominal)	23.5 7.2	feet meters
Sheet Area	11,280 1,048	sq. feet sq. meters
Weight	3,425 1,554	pounds kilograms

RESIN INFORMATION

Lot Number	A45688
Type	HDA601
Supplier	Mobil

GSE RESIN TEST DATA

Property	Test Method	Results
Density, g/cc	ASTM D 1505	0.935
Melt index, g/10 min.	ASTM D 1238 (190/2.16)	0.59

Physical Property	Test Method	Test Frequency	Customer Minimum English	Customer Minimum Metric	Test Results English	Test Results Metric
Thickness, mil (mm)	ASTM D 5199					
Average		every roll	60	(1.51)	60	(1.52)
Minimum		every roll	57	(1.44)	57	(1.45)
Tensile Properties:	ASTM D 638, Type IV					
Yield Strength, ppi (N/cm) - TD		every roll	120	(210)	146	(255)
- MD		every roll	120	(210)	141	(246)
Break Strength, ppi (N/cm) - TD		every roll	30	(53)	343	(601)
- MD		every roll	30	(53)	352	(616)
Yield Elongation, % - TD	gauge length = 1.3"	every roll	10		21	
- MD	(33 mm)	every roll	10		20	
Break Elongation, % - TD	gauge length = 2.5"	every roll	100		818	
- MD	(64 mm)	every roll	100		792	
Tear Resistance, lb. (N)	ASTM D 1004					
- TD		every roll	40	(178)	50	(223)
- MD		every roll	40	(178)	50	(223)
Density, g/cc	ASTM D 1505					
		every 5th	0.940		0.942	
Carbon Black Content, %	ASTM D 1603					
		every 5th	2.0		2.7	
Carbon Black Dispersion	ASTM D 3015					
		every 5th	A2		A2	
ESCR, (hr)	ASTM D 1693 Cond. B					
	Start Date = 8/20/99	every roll	1500		Pending	
Puncture Resistance, lb. (N)	FTMS 101C/2065					
		every 5th	60	(267)	95	(424)

Order No.	8438
Customer Name	COMANCO
Location	WAUCHULA, FLORIDA

APPROVED
RP.
10/4/99
QA

MOBIL CHEMICAL
CERTIFICATE OF ANALYSIS
QUALITY PEOPLE MAKING QUALITY PRODUCTS

DENISE ADAMS
GSE LINING TECHNOLOGY INC
19103 GUNDLE ROAD
HOUSTON, TX 77073

08/02/1999

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

Resin Identification		Resin Analysis Test	Lot Data
Product Type	HDA601	Melt Index (gm/10 min) I2	0.59
Lot Number	A-45688		
Hopper Car Number	MBLX-054030		
Quantity Shipped	189,100 LB		
Date Manufactured	07/04/1999		
Delivery Note	0080065159	Density (gms/cc)	0.9347
Location Shipped To ALDINE, TX			

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

CC: MP-EDISON

Fax To: (281) 230-2510 DENISE ADAMS
JD
DON BOHAC

GSE®
GSE Lining Technology, Inc.

19103 Gundle Road
Houston, Texas 77073
800-435-2008
281-443-8564
Fax: 281-230-8684

DATE: 27 MAY 1999

TO: TONYA SWITALSKI

FROM: JOHN DAVID GRIFFIN

RE: SPECIFICATION REVIEW FOR HARDEE COUNTY
GSE PROJECT NO. 502980

A technical review of the specifications provided for the above referenced project is complete. GSE intends to supply 60 mil average HyperFlex® for this project as specified provided that the following exceptions are approved to replace or amend the original specifications.

SECTION 02776-6 – 2.01.A – Geomembrane Resin Raw Materials
GSE asks that the project specifications be amended to standard GSE specifications.

Property	*Project Specifications*	*GSE Specifications*
Density	*≥ 0.940 g/cc*	*≤ 0.940 g/cc, however, finished HDPE products will have a density of ≥ 0.940 g/cc.*
Melt Index	*0.1 – 1.1 g/10 minutes*	*≤ 1.0 g/10 minutes*

SECTION 02776-8 – Table 02776-A – Material Properties for High Density Polyethylene Liner
GSE asks that the project specifications be amended to standard GSE specifications.

Property	*Project Specifications*	*GSE Specifications*
Thickness	*57 mil minimum*	*54 mil minimum*
Melt Index	*0.1 – 1.1 g/10 minutes*	*Not tested on finished product*
Environmental Stress Crack	*2,000 hours minimum*	*1,500 hours minimum*

SECTION 02776-9 – 2.02.B.3 – Geomembrane Manufacturing Quality Control
GSE asks that the project testing frequencies be amended to standard GSE testing frequencies.

Property	*Project Testing Frequencies*	*GSE Testing Frequencies*
Density, Carbon Black Content, & Carbon Black Dispersion	*1 test per every 40,000 ft²*	*1 test per every 47,250 ft²*

SECTION 02776-10 – 2.02.B.4 – Geomembrane Manufacturing Quality Control
GSE asks that this section be amended with the following statement. GSE will report the average thickness and the lowest individual reading, however, GSE does not report the standard deviation. GSE asks that this be acceptable.

SECTION 02776-11 – 2.02.B.8 – Geomembrane Manufacturing Quality Control
GSE cannot certify to the chemical resistance of an "anticipated waste" since the variety of waste, level of toxicity, and potential hazards are unknown. However, GSE can provide judgements based on previous data and experience if a leachate analysis is provided. Also, GSE can arrange for specific EPA Method 9090 testing for a specific leachate at an associated cost to the customer.

MOBIL CHEMICAL
CERTIFICATE OF ANALYSIS
QUALITY PEOPLE MAKING QUALITY PRODUCTS

DENISE ADAMS
GSE LINING TECHNOLOGY INC
19103 GUNDLE ROAD
HOUSTON, TX 77073

08/02/1999

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

Resin Identification		Resin Analysis Test	Lot Data
Product Type	HDA601	Melt Index (gm/10 min) I2	0.59
Lot Number	A-45688		
Hopper Car Number	MBLX-054030		
Quantity Shipped	189,100 LB		
Date Manufactured	07/04/1999		
Delivery Note	0080065159	Density (gm/cc)	0.9347
Location Shipped To ALDINE, TX			

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

CC: MP-EDISON

Fax To: (281) 230-2510 DENISE ADAMS
JD
DON MCNAC

COMANCO ENVIRONMENTAL CORPORATION
7911 Professional Place
Tampa, Florida 33637
Phone (813)988-8820
Fax (813)988-8779

FAX TRANSMISSION

Date: OCTOBER 5, 1999

Pages: 10 Total (including cover)

Recipient: DAVID DEANS, PE
PBS&J

FAX: (407) 647-8945

Sender: PABLO J. RIVERA

RE: MATERIAL ROLL CERTS.
HARDEE COUNTY

Message:

Dear Dave,

Larry Stark at ECLIPSE CONST. asked me to forward a copy of the Roll Certificates to you upon our receipt of them from the manufacturer.

Best regards,

PJR

SECTION 4.2

GEOMEMBRANE INDEPENDENT LABORATORY CONFORMANCE TEST RESULTS

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

October 7, 1999

Mr. Jeff Wild
PBS & J
1560 Orange Ave.
Winter Park, FL 32789

fax: 407-647-8945

Dear Mr. Wild:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing in support of the Hardee County Landfill project.

TRI Job Reference Number:	E2127-88-09
Date Received:	10-05-99
Material(s) Tested:	2 60 mil HDPE geomembrane
Test(s) Requested:	Carbon Black Content (ASTM D 1603) Carbon Black Dispersion (ASTM D 3015) Density (ASTM D 1505) Tensile Properties (ASTM D 638/NSF 54) Thickness (ASTM D 1593)

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Sam R. Allen

Sam R. Allen
Vice President and Division Manager

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

GEOMEMBRANE TEST RESULTS

Client: PBS & J
Project: Hardee County Landfill

Material: 60 mil HDPE geomembrane
Roll #: 115105708
TRI Log #: 2127-88-09

JAN 10-7-99
Quality Review/Date

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD
Carbon Black Content (ASTM D 1603)	1	2	3	4	5	6	7	8	9	10		
% Carbon Black (%)	2.81	2.75									2.78	0.03
Carbon Black Dispersion (ASTM D 3015/NSF 54)												
Rating	A1	A1	A1	A1	A1	A1					A1	
Density (ASTM D 1505)												
Density (g/cm3)	0.943	0.945	0.945								0.944	0.001
Tensile Properties (ASTM D 638/NSF 54)												
MD Yield Strength (ppi)	147	148	149	149	153						149	2
TD Yield Strength (ppi)	162	158	157	159	159						159	2
MD Break Strength (ppi)	349	322	303	323	308						321	16
TD Break Strength (ppi)	320	299	312	304	338						315	14
MD Yield Elongation (%)	19	19	21	20	19						20	1
TD Yield Elongation (%)	21	19	21	21	21						21	1
MD Break Elongation (%)	771	725	680	726	683						717	33
TD Break Elongation (%)	694	661	712	672	752						698	32
Thickness (ASTM D 751, modifed)												
Thickness (mils)	60	60	60	61	61	61	61	61	61	61	61	0
	61	61	61	61	61	61	61	61	60	60		
	60	61	61	61	61							

MD Machine Direction TD Transverse Direction

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

GEOMEMBRANE TEST RESULTS

Client: PBS & J
Project: Hardee County Landfill

Material: 60 mil HDPE geomembrane
Roll #: 115105718
TRI Log #: 2127-88-09

JAN 10-7-99
Quality Review/Date

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD
	1	2	3	4	5	6	7	8	9	10		
Carbon Black Content (ASTM D 1603)												
% Carbon Black (%)	2.61	2.51									2.56	0.05
Carbon Black Dispersion (ASTM D 3015/NSF 54)												
Rating	A1	A1	A2	A1	A1	A1					A1	
Density (ASTM D 1505)												
Density (g/cm3)	0.941	0.943	0.944								0.943	0.001
Tensile Properties (ASTM D 638/NSF 54)												
MD Yield Strength (ppi)	155	160	153	159	154						156	3
TD Yield Strength (ppi)	161	154	157	155	154						156	3
MD Break Strength (ppi)	338	346	350	334	351						344	7
TD Break Strength (ppi)	342	354	349	339	307						338	16
MD Yield Elongation (%)	24	17	18	21	21						20	2
TD Yield Elongation (%)	19	21	21	21	21						21	1
MD Break Elongation (%)	763	752	795	731	755						759	21
TD Break Elongation (%)	749	803	788	773	697						762	37
Thickness (ASTM D 751, modifed)												
Thickness (mils)	61	61	60	61	60	61	60	61	60	60	61	1
	61	60	61	61	60	60	60	61	62	60		
	61	60	61	60	61							

MD Machine Direction TD Transverse Direction

TELECOPY TRANSMISSION

ORLANDO CORPORATE/ADMINISTRATION

Phone: 407/647-7275
Fax: 407/740-8958

Job Number: _____

Date: 10/14/98

Sending To: Keith

Office: Eclipse/Omni

Fax #: 941 773 0767

Originator: Jeff Ladd, P.E. Office: _____

Transmit Date/Time: _____

Total Number Of Pages (Cover Sheet Included): 4

Remarks: copy for your file, as requested

If you have trouble receiving this transmission,

please call _____ ***at extension*** _____

POST, BUCKLEY, SCHUH & JERNIGAN, INC.
Winter Park Plaza • 1560 Orange Avenue, Suite 700 • Winter Park, Florida 32789

TRANSMIT CONFIRMATION REPORT

NO.	:	002
RECEIVER	:	19417732521
TRANSMITTER	:	4076478945
DATE	:	OCT 14'99 8:24
DURATION	:	02'01
MODE	:	STD
PAGES	:	04
RESULT	:	OK

SECTION 4.3

GEOTEXTILE MANUFACTURER QUALITY CONTROL TEST RESULTS

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

October 7, 1999

Mr. Jeff Wild, P.E.
PBS & J
1560 Orange Ave.
Winter Park, FL 32789

fax: 910-343-0078

Dear Mr. Wild:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing in support of the Hardee County Landfill project.

TRI Job Reference Number:	E2127-88-09
Material(s) Tested:	1 nonwoven geotextile
Test(s) Requested:	Grab Tensile (ASTM D 4632) Mass/Unit Area (ASTM D 3776) Puncture Resistance (ASTM D 4833) Apparent Opening Size (ATM D 4751)

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Sam R. Allen (SRA)

Sam R. Allen
Vice President and Division Manager

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

GEOTEXTILE TEST RESULTS

PBS & J
Hardee County Landfill

Material: woven geotextile
Roll#: B830122A
TRI Log #: E2127-88-09

JNS 10-7-99
Quality Review/Date

PARAMETER	TEST REPLICATE NUMBER										MEAN	STANDARD DEV.	COEFF. OF VAR.
Grab Tensile Properties (ASTM D 4632)	1	2	3	4	5	6	7	8	9	10			
MD - Tensile Strength (lbs)	308	305	201	214	234	218	223	222	266	257	245	36	
TD - Tensile Strength (lbs)	264	258	228	265	271	258	278	239	248	255	256	14	
MD - Elongation @ Max. Load (%)	53	53	59	63	78	76	62	67	77	70	66	9	
TD - Elongation @ Max. Load (%)	95	86	67	86	72	65	71	65	73	84	76	10	
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	137	156	133	136	133	154	142	159	140	152	143	11	
	124	128	145	154	158								
Mass/Unit Area (ASTM D 3776)													
5" diameter circle (grams)	4.40	4.23	3.51	3.53	3.37	3.66	3.45	3.51	4.16	3.93			
Mass/Unit Area (oz/sq.yd)	10.23	9.84	8.16	8.21	7.84	8.51	8.02	8.16	9.68	9.14	8.78	0.823	
Apparent Opening Size (ASTM D 4751)													
Opening Diameter (mm)	0.150	0.125	0.125	0.125	0.150						0.135		
US Sieve #	100	120	120	120	100						100		

MD Machine Direction
TD Transverse Directio N/A Not Available

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI niether accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

9063 Bee Caves Road • Austin, TX 78733-6201 • (512) 263-2101 • FAX (512) 263-2558

Carthage Mills

"Since 1958 - America's First Geotextile Company"

CERTIFICATION OF COMPLIANCE

I hereby certify that the Carthage Mills FX-80HS as furnished by Carthage Mills, Cincinnati, Ohio furnished to Eclipse Construction for incorporation into Hardy County Landfill Expansion is a nonwoven geotextile fabric manufactured of 100% polypropylene yarns, from lot # 80213, and has the actual results:

Roll #	Grab Tensile	Elongation	Burst	Trap Tear	Puncture	AOS
B830080A	238 x 223	62 x 71	423	108 x 122	139	
B830100A	216 x 215	61 x 75	409	120 x 129	127	.153 mm (100 Sieve)
B830120A	207 x 225	61 x 72	420	110 x 170	128	
B830140A	234 x 234	65 x 69	417	192 x 126	135	
B830155A	226 x 233	59 x 71	468	106 x 126	141	

By: Tom Turner
Tom Turner
Title: National Sales Manager

Subscribed and sworn before me this 11th day of October, 19 99

at Cincinnati, Hamilton County, Ohio

Seal

NOTARIAL SEAL * STATE OF OHIO *

Toni M. Haines
Toni M. Haines
Notary Public, State of Ohio

My commission expires September 2, 2003

LARRY STARK
941 773 0767

JEFF WILD
407 647 8945

4243 Hunt Road • Cincinnati, Ohio 45242 • 513-794-1600 • 800-543-4430 • 513-794-3434 FAX

PBSJ POST, BUCKLEY, SCHUH & JERNIGAN, INC.

1560 Orange Avenue, Suite 700
Winter Park, FL 32789 (407) 647-7275

REQUEST FOR TESTING SERVICES

REPORT RESULTS TO

Name	Jeff Wild, P.E.	Purchase Order No.	[redacted] 070862 39
Company	PBSJ	Client Job	HARDEE Co, FL-LANDFILL
Mailing Address	1560 ORANGE AVENUE SUITE 700	Shipped by	J. WILD Date 10-4-99
City, State, Zip	WINTER PARK FLORIDA 32789	Mode of Shipment	FED-EX.
Telephone No.	407 647 7275 FAX 407 647 8945	Airbill No.	

GEOMEMBRANE TESTING

	Sample ID	Peel ASTM D413 Shear D3083	Peel and Shear ASTM D4437	Thickness ASTM D751/1593	Tensile ASTM D638	Tear ASTM D1004	Puncture FTMS101C 2031/2065	Carbon Cont. ASTM D1603	Carbon Disp. ASTM D3015	Density ASTM D1505/D79	Water Abs. ASTM D570	Dimens. Stab. ASTM D1204	Melt Flow Index ASTM D1238	Low Temp ASTM D746 temp: ___	Other:
1	[redacted]														
2	115105708			X	X			X	X	X					
3	115105718			X	X			X	X	X					
4															
5															
Remarks:															

GEOTEXTILE TESTING

	Sample ID	AOS ASTM D4751	Grab ASTM D1682 or D46312	Mass/Area ASTM D3776	Puncture ASTM D4833	Tear ASTM D4533	Thickness ASTM D1777	Widewidth Tensile ASTM D4595	UV Resistance ASTM D4355 hours: ___	Burst ASTM D3786 or D751	Permitivity ASTM D4491	Transmissivity ASTM D4716	Density ASTM D792 or D1505 (net)	Ball Burst ASTM 3787	Other:
1	B830122A	X	X	X	X										
2															
3															
4															
5															
Remarks:															

GEOCOMPOSITE/GEONET TESTING

	Sample ID	Mass/Area ASTM D3776	Thickness ASTM D1777	Tensile ASTM D4595/D751	Carbon Cont. ASTM D1603	Melt Index ASTM D1238	Density ASTM D1505/D792	Transmittivity ASTM D4716-87	Peel Strength ASTM F904	Net Comp. GRI GNI	Other:
1											
2											
3											
4											
5											
Remarks:											

Special Instructions:

WHITE: Original YELLOW: File Copy PINK: Document Copy

SECTION 5.1

GEOMEMBRANE PANEL PLACEMENT RECORD DRAWING

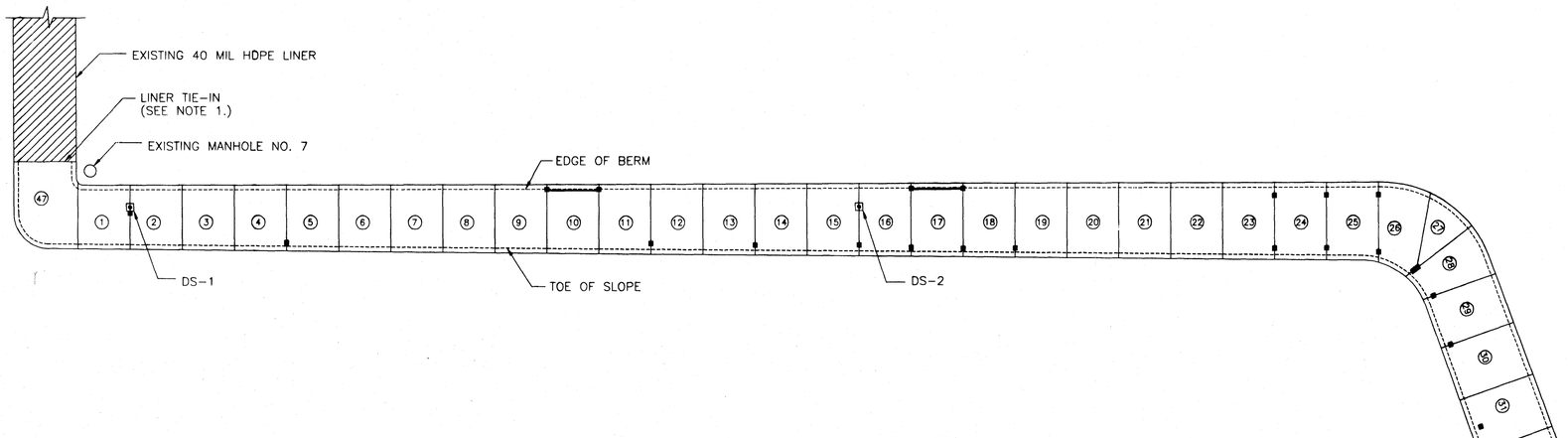
1073539 (1)

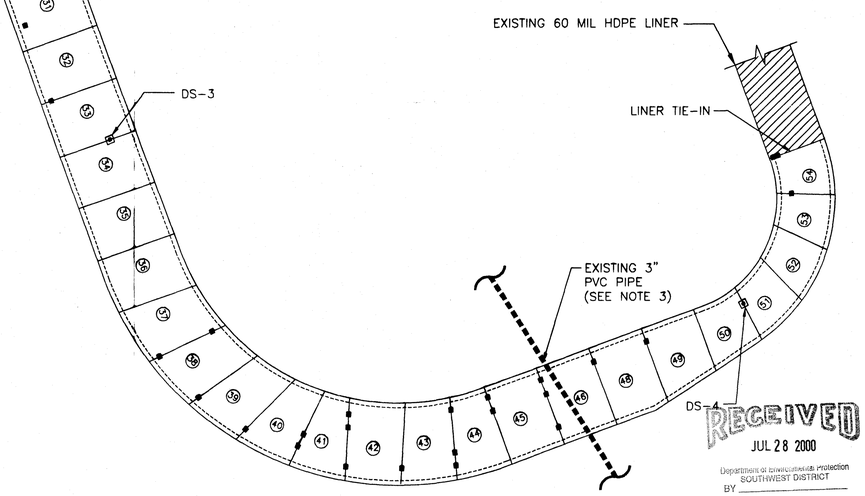
LEGEND :

- ▲ BEAD
- ■ PATCH
- ⊡ DESTRUCTIVE SAMPLE
- (29) PANEL NUMBER
- ○ EXISTING MANHOLE
- ▨ EXISTING GEOMEMBRANE LINER

NORTH

0 15 30 60





NOTES:

1. THE NEW 60 MIL HDPE LINER WAS TIED IN TO THE EXISTING 40 MIL PVC LINER AT THE SOUTH WEST CORNER OF THE LANDFILL BY OVERLAPPING BOTH LINER TWENTY FOUR INCHES AND BACKFILLING AND COMPACTING WITH CLAY.
2. THE NEW 60 MIL HDPE LINER WAS TIED IN TO THE EXISTING 60 MIL HDPE LINER AT THE SOUTH EAST CORNER OF THE LANDFILL BY WELDING BOTH LINER TOGETHER.
3. THE EXISTING 3" PVC PIPE WAS PLACED OVER THE NEW 60 MIL HDPE PIPE AND THEREFORE AVOIDING A LINER PENETRATION.

RECEIVED
JUL 28 2000
Department of Environmental Protection
SOUTHWEST DISTRICT
BY _____

"RECORD DRAWINGS"

INCORPORATING THOSE CHANGES MADE DURING THE CONSTRUCTION PROCESS.

H:\ENVCAD\WASTEMAN\HARDEE\CONSTRUCTION\RECORDWG\ASBUILT.DWG
RGC 07/24/00 08:00:30
AutoCAD - Release 13

PBS&J
1560 ORANGE AVENUE
SUITE 700
WINTER PARK, FL. 32789
TEL. (407) 647-7275
FAX. (407) 647-0624
www.pbsj.com

CLIENT	PROJECT	TASK
HARDEE COUNTY	HARDEE COUNTY LANDFILL	GEOMEMBRANE PANEL
BOARD OF COUNTY COMMISSIONERS	LATERAL EXPANSION AND	PLACEMENT RECORD DRAWING
	LEACHATE STORAGE TANK FACILITY	

ORIGINAL JUNE 2000
REVISIONS:
1 _____
2 _____
3 _____
4 _____
5 _____
6 _____
7 _____
8 _____
9 _____
10 _____
11 _____
12 _____

JOB NO. 07-862.35
DRAWN _____
DESIGN _____
CHECKED _____
Q.C. _____
SHEET 1 / 1

SECTION 5.2

SAMPLE WARRANTIES

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

Date:	March 30, 2000	Warranty No.:	502980
Purchaser Name:	Hardee County B.O.C.C.	Project No.:	502980
Address:	412 W. Orange Street, Room A-203	Effective Date:	November 24, 1999
City, State:	Wauchula, Florida A-203	Project Name:	Hardee County Landfill Lateral Expansion
Product Type/Description:	GSE HyperFlex 60 mil	Project Address:	Wauchula, Florida

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

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

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

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

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

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

GSE LINING TECHNOLOGY, INC.

BY: Carolyn Gregor
Authorized Representative

SAMPLE INSTALLATION WARRANTY

COMANCO

COMANCO

ENVIRONMENTAL CORPORATION

SAMPLE

LIMITED WARRANTY

PROJECT: _____

OWNER: _____

CONTRACT AMOUNT: _____

COMANCO ENVIRONMENTAL CORPORATION ("COMANCO"), subject to the terms and conditions set forth below, warrants the above referenced installation shall be installed free from defects in workmanship for a period of two (2) years from the date the installation is completed. This Limited Warranty extends only to the proper installation of the lining system and does not include damages or defects in the installation caused by entities other than COMANCO or resulting from Acts of God or casualty or catastrophe, including but not limited to, earthquakes, fire, floods, hail, tornados, hurricanes, tropical storms, gale force winds, other events of force majeure or vandalism. Further, this Limited Warranty does not include damages or defects in the installation resulting from exposure to harmful chemicals, abuse by machinery, equipment or people, excessive pressures or stresses from any source, subsurface or overburdened soil conditions, total or differential soil settlements, or any other cause not within COMANCO's control.

The extent of COMANCO's liability for breach of this Limited Warranty shall be limited to repairing or replacing the defective installation workmanship that will result in providing the Owner with the pro-rated performance remaining under the original period of this Limited Warranty. COMANCO shall have the right to inspect and determine the cause of any alleged defect in the installation and to take the appropriate steps to repair or replace the installation workmanship if a defect exists and is within the terms of this Limited Warranty.

This Limited Warranty will not be effective unless COMANCO receives written notice, by certified mail, to the President of COMANCO within thirty (30) days after the alleged defect is first discovered or should have been discovered by the Owner. Should the required notice not be given, the defect and all warranties shall be deemed to have been waived by Owner and Owner shall have no right of recovery against COMANCO. In the event repairs or replacement are to be effected, said repairs and/or replacements shall not become due until the area subject to repair or replacement is made available to COMANCO in a clean, dry, unencumbered condition. This includes, but is not limited to, the repair or replacement area being free from all water, dirt, sludge, waste, residuals, liquids, or overlying material of any kind. In no event will COMANCO be liable for any costs expended by any person or entity other than COMANCO on any defective work with respect to the installation. Any repairs, replacements or alterations which affect COMANCO's original installation work will void this Limited Warranty.

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SAMPLE

Notwithstanding anything herein to the contrary, COMANCO's liability under this Limited Warranty shall in no event exceed the Contract Amount above stated. Further, under no circumstances, shall COMANCO be liable for any special, direct, indirect or consequential damages arising from loss of production or product, or any other losses, including losses due to personal injuries and product liability owing to the failure of the material or installation. Owner shall be deemed to have waived its rights under this Limited Warranty with respect to any repairs, replacements or alterations made by Owner without the express written consent of COMANCO. COMANCO neither assumes nor authorizes any person other than an officer of COMANCO to assume for it any other or additional liability in connection with the installation. This Limited Warranty is extended to Owner only is non-transferable and non-assignable. No rights against COMANCO will survive an attempted transfer or assignment.

THE LIMITED WARRANTY HEREIN IS GIVEN IN LIEU OF ALL WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE, OR OTHER WARRANTIES OR REPRESENTATIVES, EXPRESS OR IMPLIED. BY ACCEPTING THE INSTALLATION, OWNER WAIVES ALL OTHER SUCH POSSIBLE WARRANTIES OR REPRESENTATIONS, EXCEPT THOSE SPECIFICALLY GIVEN HEREIN. CORRECTION OF NONCONFORMITIES, IN THE MANNER AND FOR THE PERIOD OF TIME PROVIDED ABOVE, SHALL CONSTITUTE FULFILLMENT OF ALL LIABILITIES OF COMANCO TO OWNER, WHETHER BASED ON CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE WITH RESPECT TO OR ARISING OUT OF THE INSTALLATION OF THE LINING SYSTEM. THE PARTIES HERETO EXPRESSLY AGREE THAT THE SALE HEREUNDER IS FOR COMMERCIAL OR INDUSTRIAL USE ONLY. WARRANTIES, IF ANY, CONCERNING THE MATERIALS INCORPORATED INTO THE LINING SYSTEM ARE COVERED, IF AT ALL, BY SEPARATE WARRANTIES FROM THE MANUFACTURERS OR SUPPLIERS OF SUCH MATERIALS AND ARE EXPRESSLY EXCLUDED FROM THE SCOPE OF THIS LIMITED WARRANTY AND OWNER ACKNOWLEDGES AND AGREES THAT COMANCO HAS MADE NO WARRANTIES OR REPRESENTATIONS TO IT CONCERNING EITHER THE AVAILABILITY OR SUFFICIENCY OF ANY SUCH WARRANTIES OR REPRESENTATIONS FROM MANUFACTURERS OR SUPPLIERS.

EXCEPT AS EXPRESSLY STATED ABOVE, COMANCO MAKES NO WARRANTY OF ANY KIND AND HEREBY DISCLAIMS ALL WARRANTIES WITH RESPECT TO THE INSTALLATION OF THE LINING SYSTEM, BOTH EXPRESSED AND IMPLIED, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

No terms or conditions other than those stated herein and no agreement or understanding, oral or written and no course of conduct or performance in any way purporting to modify this Limited Warranty or to waive COMANCO's rights hereunder shall be binding on COMANCO unless the same shall be clearly described in writing that refers to this Limited Warranty and is signed by an officer of COMANCO. Additional liabilities created by other documents shall have no force or effect upon this Limited Warranty or the installation performed by COMANCO. The laws of the State of Florida will govern the rights and duties of the parties under this Warranty. Venue for all proceedings involving this Limited Warranty or any other matter contained herein shall be in Hillsoborough County, Florida.

COMANCO ENVIRONMENTAL CORPORATION

BY: _____ ***TITLE:*** *Executive Vice President* ***DATE:*** *January 20, 1997*

COMANCO

COMANCO

ENVIRONMENTAL CORPORATION

LIMITED WARRANTY

PROJECT: **HARDEE COUNTY LANDFILL LATERAL EXPANSION** **OWNER: HARDEE COUNTY B.O.C.C.**
WAUCHULA, FLORIDA **CONTRACT AMOUNT: $ 26,110.98**

COMANCO ENVIRONMENTAL CORPORATION ("COMANCO"), subject to the terms and conditions set forth below, warrants the above referenced installation shall be installed free from defects in workmanship for a period of TWO (2) YEARS from the date the installation is completed. This LIMITED WARRANTY extends only to the proper installation of the lining system and does not include damages or defects in the installation caused by entities other than COMANCO, or resulting from Acts of God, or casualty, or catastrophe, including but not limited to, earthquakes, fire, floods, hail, tornados, hurricanes, tropical storms, gale force winds, other events of force majeure or vandalism. Further, this LIMITED WARRANTY does not include damages or defects in the installation resulting from exposure to harmful chemicals, abuse by machinery, equipment or people, excessive pressures or stresses from any source, subsurface or overburdened soil conditions, total or differential soil settlements, or any other cause not within COMANCO's control.

The extent of COMANCO's liability for breach of this LIMITED WARRANTY shall be limited to repairing or replacing the defective installation workmanship that will result in providing the OWNER with the pro-rated performance remaining under the original period of this LIMITED WARRANTY. COMANCO shall have the right to inspect and determine the cause of any alleged defect in the installation and to take appropriate steps to repair or replace the installation workmanship if a defect exists and is within the terms of this LIMITED WARRANTY.

This LIMITED WARRANTY will not be effective unless COMANCO receives written notice, by certified mail, to the PRESIDENT of COMANCO within thirty (30) days after the alleged defect is first discovered,or should have been discovered by the OWNER. Should the required notice not be given, the defect and all warranties shall be deemed to have been waived by OWNER, and OWNER shall have no right of recovery against COMANCO. In the event repairs or replacement are to be effected, said repairs and/or replacements shall not become due until the area subject to repair or replacement is made available to COMANCO in a clean, dry and unencumbered condition. This includes, but is not limited to, the repair or replacement area being free from all water, dirt, sludge, waste, residuals, liquids, or overlying material of any kind. In no event will COMANCO be liable for any costs expended by any person or entity other than COMANCO on any defective work with respect to the installation. Any repairs, replacements or alterations which affect COMANCO's original installation work will VOID this LIMITED WARRANTY.

Notwithstanding anything herein to the contrary, COMANCO's liability under this LIMITED WARRANTY shall in no event exceed the Contract Amount above state. Further, under no circumstances shall COMANCO be liable for any special, direct, indirect or consequential damages arising from loss of production or product, or any other losses, including losses due to personal injuries and product liability owing to the failure of the material or installation. OWNER shall be deemed to have waived its rights under this LIMITED WARRANTY with respect to any repairs, replacements or alterations made by OWNER without the express written consent of COMANCO.

COMANCO neither assumes nor authorizes any person other than an officer of COMANCO to assume for it any other or additional liability in connection with the installation. This LIMITED WARRANTY is extended to OWNER only, and is non-transferable and non-assignable. No rights against COMANCO will survive an attempted transfer or assignment.

The LIMITED WARRANTY herein is given in lieu of all warranties of merchantability, fitness for purpose, or other warranties or representatives, expressed or implied. By accepting the installation, OWNER waives all other such possible warranties or representations, except those specifically given herein. Correction of nonconformities, in the manner and for the period of time provided above, shall constitute fulfillment of all liabilities of COMANCO to OWNER, whether based on contract, negligence, strict liability or otherwise with respect to or arising out of the installation of the lining system. The parties hereto expressly agree that the sale hereunder is for commercial or industrial use only. Warranties, if any, concerning the materials incorporated into the lining system are covered, if at all, by separate warranties from the manufacturers or suppliers of such materials and are expressly excluded from the scope of this LIMITED WARRANTY, and OWNER acknowledges and agrees that COMANCO has made no warranties or representations to it concerning either the availability or sufficiency of any such warranties or representations from manufacturers or suppliers.

Except as expressly stated above, COMANCO makes no warranty of any kind and hereby disclaims all warranties with respect to the installation of the lining system, both expressed and implied, including, but not limited to, implied warranties or merchantability and fitness for a particular purpose.

No terms or conditions other than those stated herein and no agreement or understanding, oral or written, and no course of conduct or performance in any way purporting to modify this LIMITED WARRANTY or to waive COMANCO's rights hereunder shall be binding on COMANCO unless the same shall be clearly described in writing that refers to this LIMITED WARRANTY and is signed by an officer of COMANCO. Additional liabilities created by other documents shall have no force or effect upon this LIMITED WARRANTY or the installation performed by COMANCO. The laws of the STATE OF FLORIDA will govern the rights and duties of the parties under this LIMITED WARRANTY. Venue for all proceedings involving this LIMITED WARRANTY or any other matter contained herein shall be in Hillsborough County, Florida.

COMANCO ENVIRONMENTAL CORPORATION:

BY: **TRACY ROBERT JOHNSON** TITLE: **EXECUTIVE VICE-PRESIDENT**

SIGNED: _____ DATED: 4/3/00

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SECTION 5.3

GEOMEMBRANE INSTALLER CONSTRUCTION QUALITY ASSURANCE MANUAL

GSE MANUFACTURING QUALITY ASSURANCE MANUAL

COMANCO

GSE MANUFACTURING QUALITY ASSURANCE MANUAL

For environmental lining solutions... the world comes to GSE.®

R 05/26/98

GSE Lining Technology, Inc.

Manufacturing Quality Assurance
Policies and Procedures

This manual contains proprietary information belonging to GSE Lining Technology, Inc. Any information contained herein is not to be discussed with others outside the involved organizations, except with the express prior written consent of GSE's management.

This manual replaces in its entirety and supersedes all earlier versions issued by GSE Lining Technology, Inc. We suggest you maintain contact with your GSE representative to confirm the validity of this version at future dates.

GSE Lining Technology, Inc. reserves the right to change, modify, or discontinue the use of the policies and procedures described herein without notice or prior consent except as contractually obligated otherwise.

TABLE OF CONTENTS

GSE MISSION STATEMENT

To be the world leader in providing geosynthetic lining solutions, products and services to satisfy our customers' needs for protecting the environment.

I. GSE LINING TECHNOLOGY QUALITY MANIFEST

GSE Lining Technology, Inc. is committed to providing the highest quality products and services to our customers. This requires a firm, total quality commitment from all individuals within our organization that we will only produce materials that meet or exceed the requirements and specifications of GSE and our customers. In order to maintain the leadership position within our markets, we will continue to seek quality improvements that ensure superior products and eliminate waste of materials and human resources.

GSE's commitment to quality starts with the highest quality raw materials. The quality of incoming raw materials is controlled at the supplier level with a complete vendor evaluation program in place. This means purchasing only from suppliers who are committed to statistical process control thereby providing a consistent, high level of quality assurance of their products.

We will continually ensure that our equipment is maintained to the highest level possible and is upgraded as necessary to maintain the state-of-the-art facilities we operate. This attitude pervades throughout every branch of the GSE organization. The ultimate responsibility rests on the Manufacturing Department, through analysis of facts and measurements, to make the products right the first time, every time.

GSE's people are its most important asset and are the key to a successful quality program. Our employees have the training, experience and knowledge needed for GSE to remain the world's leading supplier of environmental lining products.

II. OVERVIEW OF GSE MANUFACTURING QUALITY ASSURANCE

GSE Lining Technology, Inc. has an on-site Manufacturing Quality Assurance Laboratory at each manufacturing plant. Having a fully equipped, well staffed, dedicated laboratory at each of the manufacturing facilities allows GSE to maintain a high level of quality and up-to-the-minute results on finished products. Each facility follows the same guidelines for evaluating the quality of GSE products and is capable of adapting to market-driven requirements.

A. Objective

The objective of the GSE Quality Assurance program is to define and enforce implementation of all Quality Control/Quality Assurance procedures necessary to insure consistent production of the highest quality products supported by the geosynthetic market.

B. Scope

In order to achieve GSE's stated purpose, a rigorous set of minimum standards and an effective test program to assure compliance has been established. These procedures and requirements are frequently reviewed and adjusted to assure compliance with current market demands and/or predetermined project specifications. These procedures effectively assure that raw materials and process parameters are controlled to provide products exceeding GSE's pre-defined minimum acceptable characteristics for material produced.

III. MANUFACTURING QUALITY ASSURANCE ORGANIZATION

This organization consists of the Manufacturing Quality Assurance Laboratories, GSE Technical Support Department as well as the manufacturing personnel. The combination of expertise and experience from these groups provides GSE with the proper tools to maintain the highest level of quality and customer service in the industry.

The Quality Assurance Department at GSE is charged by the President to assure that only products meeting both GSE's and the customer's requirements are released for shipment. To maintain the most effective manufacturing quality assurance procedures in the industry and to minimize the potential for conflict, the Quality Assurance Laboratory Manager reports to the Vice President of Engineering Services who reports directly to the President. To ensure a continuing current awareness of the marketplace demands and the performance of GSE products beyond the laboratory environment, the VP of Engineering Services also manages GSE's other technical service support functions.

The Quality Assurance personnel are directly responsible for monitoring testing and providing feedback to the manufacturing department to ensure the production of the specified product quality. Each member of the Quality Assurance team must participate in a detailed training which includes factory exposure.

IV. STAFF AND SCHEDULING

The Quality Assurance Laboratories are staffed 24 hours a day, 7 days a week, 365 days a year during any manufacturing run. All key test procedures are performed promptly after the sample is available and a continuous communication link between the laboratory and manufacturing regarding current product quality is maintained. This minimizes the amount of potentially inferior product produced before a manufacturing problem is identified.

V. PRODUCT IDENTIFICATION AND DOCUMENTATION

A. Roll Numbering

Each roll of finished product is assigned a unique roll number. The Quality Assurance Laboratory maintains records documenting the raw materials and resulting product quality information that can be associated with any specific roll of geomembrane or any tested geonet and geocomposite.

B. Approval Procedure

Results for each tested roll of standard GSE product is checked against both GSE and customer specifications for compliance. Only those materials that meet both of these requirements are approved for shipment by the Quality Assurance Laboratory.

C. Non-Conformance

Material which does not meet GSE minimum standards is given a roll number but is rejected and ***not*** placed into inventory. The material is identified as scrap and will not be utilized by GSE or GSE customers.

Material which meets GSE minimum standards but does not meet a stricter customer specification is not allocated to that customer but is placed into inventory as GSE standard material.

D. Shipping Assurance

Each roll is checked for quality and conformance with customer and GSE requirements prior to commitment for shipment. Each roll number and the corresponding quality assurance approval is confirmed at the time of shipment.

E. Documentation

Individual Quality Assurance Certificates are generated and supplied for each roll of geomembrane and every fifth roll of geonet or geocomposite products to include all relevant quality assurance information about the material(s).

VI. Records Retention

GSE maintains all necessary reports and/or samples for products produced and sold. Records and/or samples are maintained according to GSE's standard retention policy according to the item.

A. Raw Materials

Item	Years
Resin Supplier Test Reports and Certifications	≥2
GSE Resin Test Reports	≥2
Resin Sample Retain (Archive)	≥2

B. Geomembrane, Geonet and Geocomposite

Item	Years
Raw Test Data (in computer database)	≥5
Quality Control Certificates	≥5
Sample Retain (approximately one square foot)	≥5

VII. Testing Capabilities

GSE maintains modern, state-of-the-art, quality assurance laboratory equipment suitable for performing the procedures listed in Appendices A-D. Calibration of all pertinent equipment is updated on an approximate annual cycle. The appropriate certificates are maintained for review upon request.

A. Routine Testing

Through careful investigation, GSE has developed a strict and thorough Quality Assurance program which exceeds the vast majority of customer specifications. The testing program covers raw materials (see Appendix A) and finished goods (see Appendix B & D) and is adhered to at all GSE laboratories.

B. Extended Capabilities

In addition to routine testing, GSE's laboratories are equipped to perform a wide variety of other tests as required for product development or unusual customer requirements. These include, but are not limited to, the following:

- Differential Scanning Calorimetry (DSC)
- Chemical Resistance (EPA Method 9090)
- Hardness-Shore, Type D (ASTM D 2240)

- Large Scale Hydrostatic Puncture Test (ASTM D 5514)
- Low Temperature Brittleness Testing (ASTM D 746 to ≥ -70°C)
- Notched Constant Tensile Load Stress Crack (ASTM D 5397)
- Three Dimensional Tension Test (ASTM D 5617)

C. Limited Capabilities

Although the GSE Quality Assurance Laboratories are fully equipped and capable to perform most routinely specified tests in the industry, there are a few tests which are more economically performed by a dedicated testing facility. GSE believes requirements for such testing should be carefully considered and defined in terms of specific design requirements if they are found to be necessary. Some of these tests which GSE recommends be performed via customer arrangement with an outside testing facility are as follows:

- Friction Angle Testing/Direct Shear (ASTM D 5321)
- Low Temperature Brittleness (ASTM D 746 to < -70°C)
- Soil Burial (ASTM D 3083)
- Volatile Loss (ASTM D 1203)

The friction characteristics of membranes and/or other geosynthetic products against adjoining materials are specific to the adjoining material and the specific conditions of the installation. Friction characteristics critical to design parameters are best determined by independent testing incorporating site specific conditions. GSE does not control and cannot warrant specific friction characteristics.

VIII. Material Quality Assurance

GSE Lining Technology, Inc. has established strict specifications for all raw materials and finished products. The results from every test performed must fall within the acceptable limits of these specifications.

A. Raw Material

GSE utilizes two primary types of raw materials, natural resin and masterbatch. All natural resin and some masterbatch arrives in pellet form while some masterbatch is delivered in smaller containers. The natural resin and masterbatch are blended at the appropriate ratio at the manufacturing stage. The masterbatch can contain carbon black or other additives depending upon the geomembrane or geonet product to be produced. Upon receipt of these materials, GSE begins the quality assurance program.

1. Natural Resin

a) Sampling

Upon the arrival of each rail car (about 200,000 lb.), four sample bags are filled (one for each compartment) and labeled with date, lot number, compartment number, and masterbatch type. These bags are then delivered to the laboratory for immediate testing (see Appendix A for test frequencies and minimum properties).

If resin is received by other transport and/or in other quantities, an equivalent suitable sampling procedure is provided (i.e. not less than one sample per lot, shipment or one sample for each 50,000 lb.).

b) Evaluation of Results

All test data are entered into the computer database and checked for accuracy, consistency and compliance with GSE specifications. The rail car is not accepted unless all standard test requirements are met and the GSE test values meet the results on the suppliers' certificates of analysis within the normal limits of variation.

c) Reporting

Copies of the supplier's certificate of analysis (COA) for each lot of resin utilized in the production of the materials supplied to a specific project are supplied as standard documentation. In addition, the GSE test results for each lot of resin is provided in a separate report.

2. Masterbatch

a) Sampling

Upon the arrival of each rail car (about 200,000 lb.), four sample bags are filled (one for each compartment) and labeled with date, lot number, compartment number, and resin type. These bags are then delivered to the laboratory for immediate verification of carbon black content.

Masterbatch (carbon black concentrate) is normally received in rail car lots. If resin is received by other transport and/or in other quantities, an equivalent suitable sampling procedure is provided (i.e. Not less than one sample per shipment or one sample for each 50,000 lb.)

b) Evaluation of Results

All test data are entered into the computer database and checked for accuracy, consistency and compliance with GSE specifications. The rail car or container is not accepted unless all standard test requirements are met and the GSE test values meet the results on the suppliers' certificates of analysis within the normal limits of variation.

c) Reporting

Certificates of analysis for masterbatch are not part of a standard submittal provided by GSE. Copies of this document may be supplied upon request at the discretion of the GSE Quality Assurance Laboratory Manager.

B. Geomembrane Products

GSE has implemented a strict and thorough Quality Assurance program for all geomembrane products. The geomembrane product line can be broken into two primary categories: smooth and textured with two types of textured products. Tables containing GSE minimum properties and test frequencies for all GSE geomembrane products including specialty products such as GSE White™ (light-reflective geomembrane) and GSE Conductive™ (field spark-testable geomembrane) are located in Appendix B of this document.

1. On-Line Manufacturing Quality Assurance

The Quality Assurance program for finished product begins during the manufacturing process. Each manufacturing line is equipped with state-of-the-art

monitoring devices which provide feedback on the physical quality of the materials being produced. Each geomembrane production line is equipped with both a thickness gage and spark testing device.

a) Thickness Measurement

As each roll is being produced, thickness readings are taken continuously throughout the length and width of the roll. These readings are utilized to establish the minimum, maximum and average thickness values for each roll and is verified by thickness testing upon sampling of the finished goods.

b) Spark Testing

An electrical spark detector is in place on each manufacturing sheet line. This apparatus provides immediate notification of holes in the finished product. If a hole is detected an alarm is triggered and the hole is identified. Rolls containing more than two holes are rejected.

2. Smooth

Smooth geomembrane products can be produced in three nominal widths: 22.5 ft., 24 ft., and 34.5 ft. In addition, GSE has the technology to manufacture geomembranes by way of both a round die and a flat cast extrusion process.

a) Sampling

A one foot by roll width sample is cut for Quality Assurance testing as each roll is completed. The laboratory sample is labeled with the roll number, and production date. Specimens for testing are taken from two of five predetermined positions across the width of the roll. The five specimen positions are defined as a constantly repeating set of locations determined by the roll number. This enables the position from which any specimen was taken to be determined for future reference. Specimens for testing the machine direction are cut from one test sample and transverse direction specimens cut from the other. A retain sample approximately 12" by 12" in size taken from the corresponding transverse direction position from the laboratory sample. The retain is labeled and kept for future reference (see Section VII.B).

b) Evaluation of Results

All data are entered into a computer database for calculation and comparison to established order specifications. If materials do not meet the required GSE minimums and/or the customer specifications the manufacturing personnel are immediately notified in order for the appropriate adjustments to be made. Only products meeting GSE minimums and customer specifications will be approved for shipment to the corresponding project.

c) Reporting

Every roll of material has a quality assurance roll certificate or Roll Test Data Report (RTDR). This report identifies the standards on which the GSE approval is based along with the actual test results demonstrated by the material. Each report is then reviewed by QA personnel, stamped and initialed if approved, or so noted if rejected.

3. *Coextruded Texture*

Coextruded textured geomembrane products are produced in a nominal width of 22.5 ft. This type of textured geomembrane is produced utilizing a round die with coextrusion technology. The texture is produced in a process in which one or two of the outer layers of a three layer extrusion are blended with nitrogen gas. Nitrogen bubbles form in the molten resin and escape upon exiting the die, creating a rough, textured surface.

a) Sampling

Test samples are then taken from five predetermined positions across the roll width. Specimens for testing both the machine direction and transverse direction properties are taken from each of the five samples. A retain sample approximately 12" by 12" in size taken from the corresponding transverse direction position from the laboratory sample. The retain is labeled and kept for future reference (see Section VII.B).

b) Evaluation of Results

All data are entered into a computer database for calculation and comparison to established order specifications. If materials do not meet the required GSE minimums and/or the customer specifications the manufacturing personnel are immediately notified in order for the appropriate adjustments to be made. Only products meeting GSE minimums and customer specifications will be approved for shipment to the corresponding project.

c) Reporting

Every roll of material has a quality assurance roll certificate or Roll Test Data Report (RTDR). This report identifies the standards on which the GSE approval is based along with the actual test results demonstrated by the material. Each report is then reviewed by QA personnel, stamped and initialed if approved, or so noted if rejected.

4. *FrictionFlex® (Spray-On) Texture*

FrictionFlex textured products are available in nominal roll widths of 22.5 ft. and 24.5 ft. The FrictionFlex process is a secondary texturing process in which molten polyethylene is sprayed onto one or both sides of a smooth geomembrane creating a textured surface. The smooth geomembrane used is tested according to standard GSE QA procedures prior to being textured. Once the material is textured the roll is subjected to additional testing as indicated in Appendix B. The FrictionFlex texturing process does not significantly change the minimum physical properties for most geomembranes thicknesses.

a) Sampling

The smooth geomembrane is sampled and tested according to Section VIII.B.2.a). Once textured, a one foot by roll width sample is cut for Quality Assurance testing as each roll is completed. The sample is labeled with the roll number. Specimens for testing are taken from two of five predetermined positions across the width of the roll. The five specimen positions are defined as a constantly repeating set of locations determined by the roll number. This enables the position from which any specimen was taken to be determined for future

reference. Specimens for testing the machine direction are cut from one test sample and transverse direction specimens cut from the other. A retain sample approximately 12" by 12" in size taken from the left edge (east edge based on position of the manufacturing line) of the laboratory sample. The retain is labeled and kept for future reference (see Section VII.B).

b) Evaluation of Results

All data are entered into a computer database for calculation and comparison to established order specifications. If materials do not meet the required GSE minimums and/or the customer specifications the manufacturing personnel are immediately notified in order for the appropriate adjustments to be made. Only products meeting GSE minimums and customer specifications will be approved for shipment to the corresponding project.

c) Reporting

Every roll of material has a quality assurance roll certificate or Roll Test Data Report (RTDR). This report identifies the standards on which the GSE approval is based along with the actual test results demonstrated by the material. Each report is then reviewed by QA personnel, stamped and initialed if approved, or so noted if rejected.

C. Geonet Products

Geonet drainage products are produced in nominal roll widths of 8 ft. and 14 ft. on three different manufacturing lines. Tables containing GSE properties and test frequencies for all GSE geonet and geocomposite products including are located in Appendix B of this document.

1. Sampling

A one foot by roll width sample is cut for Quality Assurance testing as every fifth roll is completed. The sample is labeled with the roll number, and production date. Two machine direction specimens are cut from the sample and tested. A random location retain sample approximately 18" x 24" is cut from the laboratory sample, labeled and kept for future reference (see Section VI.A).

2. Evaluation of Results

All data are entered into a computer database for calculation and comparison to established order specifications. If materials do not meet the required GSE standards and/or the customer specifications the manufacturing personnel are immediately notified in order for the appropriate adjustments to be made. Only products meeting GSE standards and customer specifications will be approved for shipment to the corresponding project.

3. Reporting

Every tested roll of material has a quality assurance roll certificate or Roll Test Data Report (RTDR). This report identifies the standards on which the GSE approval is based along with the actual test results demonstrated by the material. Each report is then reviewed by QA personnel, stamped and initialed if approved, or so noted if rejected.

D. Geocomposite Products

Geocomposite products are produced in nominal roll widths of 8 ft. and 14 ft. This product is manufactured by heat bonding a geotextile to one or both sides of a geonet product.

1. Sampling

A one foot by roll width sample is cut for Quality Assurance testing as every fifth roll is completed. The sample is labeled with the roll number, and production date. Specimens for testing are taken from five predetermined positions across the width of the roll and tested. The net portion of the geocomposite is tested according to Appendix D. A random location retain sample approximately 18" x 24" is cut from the laboratory sample, labeled and kept for future reference (see Section VI.A).

2. Evaluation of Results

All data are entered into a computer database for calculation and comparison to established order specifications. If materials do not meet the required GSE standards and/or the customer specifications the manufacturing personnel are immediately notified in order for the appropriate adjustments to be made. Only products meeting GSE standards and customer specifications will be approved for shipment to the corresponding project.

3. Reporting

Every tested roll of material has a quality assurance roll certificate or Roll Test Data Report (RTDR). This report identifies the standards on which the GSE approval is based along with the actual test results demonstrated by the material. Each report is then reviewed by QA personnel, stamped and initialed if approved, or so noted if rejected.

E. Third Party Conformance Sampling

Some specifications require independent Quality Assurance and/or conformance testing. GSE can provide assistance with the sampling of products by arranging for the conformance samples to be taken during production. By taking samples during production rather than on site, the customer can be assured that the samples are clean and available for conformance testing in a timely manner.

GSE encourages customers to audit GSE manufacturing and manufacturing quality assurance operations and/or to collect samples and conduct independent conformance testing prior to shipment of materials.

APPENDIX A

TEST FREQUENCIES AND MINIMUM PROPERTIES FOR GSE RAW MATERIALS

Minimum Testing Frequencies for GSE Natural Resin

Property	Test Method[1]	Natural Resin
Density	ASTM D 1505	once per rail car compartment
Melt Flow Index	ASTM D 1238 (190/2.16)	once per rail car compartment
OIT	ASTM D 3895 (1 atm at 200 °C)	once per resin lot
Carbon Black Content	ASTM D 1603, modified	N/A
Carbon Black Dispersion	ASTM D 3015	NA

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

Minimum Properties for GSE Natural Resin

Property	Test Method[1]	HDPE Resins			VFPE Resin
		Mobil 600 Series	Mobil 025 Series[2]	Phillips HDPE	Mobil 100 Series[3]
Density [g/cm^3]	ASTM D 1505	0.932	0.945	0.934	0.915
Melt Flow Index [g/10 min.]	ASTM D 1238 (190/2.16)	≤ 1.0	≤ 1.0	≤ 1.0	≤ 1.0
OIT [minutes]	ASTM D 3895 (1 atm at 200°C)	100	100	100	100

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] This resin is used exclusively for production of GSE geonet products.

[3] OIT for Mobil VFPE resin is performed on a representative finished product for each lot of resin rather than on the natural (without carbon black) resin.

APPENDIX B

TEST FREQUENCIES AND MINIMUM PROPERTIES FOR GSE GEOMEMBRANE PRODUCTS

Minimum Testing Frequencies for Standard GSE Geomembrane Products

Property	Test Method[1]	Smooth	FrictionFlex® Texture	Coextruded Texture
Thickness	ASTM D 751, D 1593, D 5199 or D 5994	every roll	Note 2	every roll
Density	ASTM D 1505	every 5th roll	Note 2	every 5th roll
Carbon Black Content	ASTM D 1603, modified	every 5th roll	Note 2	every 5th roll
Carbon Black Dispersion	ASTM D 3015	every 5th roll	Note 2	every 5th roll
Tensile Properties	ASTM D 638 Type IV, 2 ipm	every roll	every roll	every roll
Tear Resistance	ASTM D 1004	every roll	every roll	every roll
Puncture Resistance	FTMS 101 Method 2065	every roll	every roll	every roll
ESCR	ASTM D 1693 (B)	every roll	Note 2	Note 3
Dimensional Stability	ASTM D 1204 (1 hr. at 100 °C)	every roll	Note 2	every roll

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] The base liner of the FrictionFlex® textured product is tested according to GSE standard testing routines prior to being textured. Once the material is textured, tensile, tear and puncture tests are performed again.

[3] It is not possible to properly notch a textured surface, therefore, a representative smooth sample for each compounded resin lot is tested for ESCR. Five machine direction and five transverse direction test specimens are taken from the sample and average results will be used for all rolls made from that resin lot.

Minimum Properties for Standard Smooth HDPE Geomembranes

GSE HyperFlex® and GSE HD™

Property	Test Method[1]	30[2]	40	60	80	100	120[3]
Minimum Thickness[4] [mil]	ASTM D 751, D 1593 or D 5199	27	36	54	72	90	108
Density [g/cm³]	ASTM D 1505	0.94	0.94	0.94	0.94	0.94	0.94
Carbon Black Content [%]	ASTM D 1603, modified	2.0	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 3015	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1
Tensile Properties: (each direction)	ASTM D 638 Type IV, 2 ipm						
Strength at Yield [lb/in]		65	86	130	173	216	259
Strength at Break [lb/in]		122	162	243	324	405	486
Elongation @ Yield [%]	(1.3" gauge length)	13	13	13	13	13	13
Elongation @ Break [%]	(2.5" gauge length)	560	560	560	560	560	560
Tear Resistance [lb]	ASTM D 1004	22	30	45	60	75	90
Puncture Resistance [lb]	FTMS 101 Method 2065	39	52	80	105	130	156
ESCR [hours]	ASTM D 1693 (B)	1500	1500	1500	1500	1500	1500
Dimensional Stability [% change]	ASTM D 1204 (1 hr. at 100 °C)	± 2	± 2	± 2	± 2	± 2	± 2

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] Only GSE HD is available in thickness of 30 mil.

[3] Standard 120 mil material is produced utilizing flat cast extrusion.

[4] Flat cast extrusion lines can achieve, when necessary, ± 5% of nominal thickness except for < 60 mil; co-extruded lines can routinely achieve a range of -10% to +15% of nominal thickness. Specifications with more restrictive tolerances will be priced accordingly.

Minimum Properties for Standard Smooth White-Surfaced HDPE Geomembranes

GSE WHITE™

Property	Test Method[1]	30	40	60	80	100
Minimum Thickness [mil]	ASTM D 751, D 1593 or D 5199	27	36	54	72	90
Density [g/cm^3]	ASTM D 1505	0.94	0.94	0.94	0.94	0.94
Carbon Black Content[2] [%]	ASTM D 1603, modified	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 3015	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1
Tensile Properties: (each direction)	ASTM D 638 Type IV, 2 ipm					
Strength at Yield [lb/in]		65	86	130	173	216
Strength at Break [lb/in]		122	162	243	324	405
Elongation @ Yield [%]	(1.3" gauge length)	13	13	13	13	13
Elongation @ Break [%]	(2.5" gauge length)	560	560	560	560	560
Tear Resistance [lb]	ASTM D 1004	22	30	45	60	75
Puncture Resistance [lb]	FTMS 101 Method 2065	39	52	80	105	130
ESCR [hours]	ASTM D 1693 (B)	1500	1500	1500	1500	1500
Dimensional Stability [% change]	ASTM D 1204 (1 hr. at 100 °C)	± 2	± 2	± 2	± 2	± 2

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] GSE White may have an overall ash content greater than 3.0% due to the white layer.

Minimum Properties for Standard Smooth Conductive HDPE Geomembranes

GSE Conductive™ and GSE Conductive White™

Property	Test Method[1]	40	60	80	100
Minimum Thickness [mil]	ASTM D 751, D 1593 or D 5199	36	54	72	90
Density [g/cm³]	ASTM D 1505	0.94	0.94	0.94	0.94
Carbon Black Content[2] [%]	ASTM D 1603, modified	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 3015	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1
Tensile Properties[3]: (each direction)	ASTM D 638 Type IV, 2 ipm				
Strength at Yield [lb/in]		86	130	173	216
Strength at Break [lb/in]		162	243	324	405
Elongation @ Yield [%]	(1.3" gauge length)	13	13	13	13
Elongation @ Break [%]	(2.5" gauge length)	560	560	560	560
Tear Resistance [lb]	ASTM D 1004	30	45	60	75
Puncture Resistance [lb]	FTMS 101 Method 2065	52	80	105	130
ESCR [hours]	ASTM D 1693 (B)	1500	1500	1500	1500
Dimensional Stability [% change]	ASTM D 1204 (1 hr. at 100 °C)	± 2	± 2	± 2	± 2

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] GSE Conductive and GSE Conductive White may have an overall ash content of greater than 3.0% due to the conductive and, when applicable, the white layer.

[3] Due to surface effects caused by the conductive layer, these tensile properties are minimum average values.

Minimum Properties for Standard Coextruded Textured HDPE Geomembranes

GSE HD TEXTURED™

Property	Test Method[1]	30	40	60	80	100
Minimum Thickness [mil]	D 5994	27	36	54	72	90
Density [g/cm³]	ASTM D 1505	0.94	0.94	0.94	0.94	0.94
Carbon Black Content [%]	ASTM D 1603, modified	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 3015	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1
Tensile Properties[2]: *(each direction)*	ASTM D 638 Type IV, 2 ipm					
Strength at Yield [lb/in]		65	86	130	173	216
Strength at Break [lb/in]		38	50	75	100	125
Elongation @ Yield [%]	(1.3" gauge length)	13	13	13	13	13
Elongation @ Break [%]	(2.5" gauge length)	120	120	120	120	120
Tear Resistance [lb]	ASTM D 1004	22	30	45	60	75
Puncture Resistance [lb]	FTMS 101 Method 2065	39	52	80	105	130
ESCR[3] [hours]	ASTM D 1693 (B)	1500	1500	1500	1500	1500
Dimensional Stability [% change]	ASTM D 1204 (1 hr. at 100 °C)	± 2	± 2	± 2	± 2	± 2

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variations of test results. Therefore, these tensile properties are minimum average roll values.

[3] ESCR on coextruded textured product is conducted on representative smooth membrane samples.

Minimum Properties for Standard Coextruded Textured White-Surfaced HDPE Geomembranes

GSE WHITE TEXTURED™

Property	Test Method[1]	30	40	60	80	100
Minimum Thickness [mil]	ASTM D 5994	27	36	54	72	90
Density [g/cm³]	ASTM D 1505	0.94	0.94	0.94	0.94	0.94
Carbon Black Content[2] [%]	ASTM D 1603, modified	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 3015	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1
Tensile Properties[3]: *(each direction)*	ASTM D 638 Type IV, 2 ipm					
Strength at Yield [lb/in]		65	86	130	173	216
Strength at Break [lb/in]		38	50	75	100	125
Elongation @ Yield [%]	(1.3" gauge length)	13	13	13	13	13
Elongation @ Break [%]	(2.5" gauge length)	120	120	120	120	120
Tear Resistance [lb]	ASTM D 1004	22	30	45	60	75
Puncture Resistance [lb]	FTMS 101 Method 2065	39	52	80	105	130
ESCR[4] [hours]	ASTM D 1693 (B)	1500	1500	1500	1500	1500
Dimensional Stability [% change]	ASTM D 1204 (1 hr. at 100 °C)	± 2	± 2	± 2	± 2	± 2

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] GSE White Textured may have an overall ash content greater than 3.0% due to the white layer.

[3] The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variations of test results. Therefore, these tensile properties are minimum average roll values.

[4] ESCR on coextruded textured product is conducted on representative smooth membrane samples.

MINIMUM PROPERTIES FOR STANDARD SPRAY-ON TEXTURED HDPE GEOMEMBRANES

GSE HYPERFRICTIONFLEX®

Property	Test Method[1]	40	60	80	100
Minimum Thickness [mil]	ASTM D 5994	36	54	72	90
Density [g/cm³]	ASTM D 1505	0.94	0.94	0.94	0.94
Carbon Black Content [%]	ASTM D 1603, modified	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 3015	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1
Tensile Properties: (each direction)	ASTM D 638 Type IV, 2 ipm				
Strength at Yield [lb/in]		86	130	173	216
Strength at Break [lb/in]		162	243	324	405
Elongation @ Yield [%]	(1.3" gauge length)	13	13	13	13
Elongation @ Break [%]	(2.5" gauge length)	500	560	560	560
Tear Resistance [lb]	ASTM D 1004	30	45	60	75
Puncture Resistance [lb]	FTMS 101 Method 2065	52	80	105	130
ESCR [hours]	ASTM D 1693 (B)	1500	1500	1500	1500
Dimensional Stability [% change]	ASTM D 1204 (1 hr. at 100 °C)	± 2	± 2	± 2	± 2

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

MINIMUM PROPERTIES FOR STANDARD SMOOTH VFPE GEOMEMBRANES

GSE ULTRAFLEX®

Property	Test Method[1]	30[2]	40	60	80	100
Minimum Thickness [mil]	ASTM D 751, D 1593 or D 5199	27	36	54	72	90
Density [g/cm^3]	ASTM D 1505	0.92	0.92	0.92	0.92	0.92
Carbon Black Content [%]	ASTM D 1603, modified	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 3015	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1
Tensile Properties: (each direction) Strength at Break [lb/in]	ASTM D 638 Type IV, 2 ipm	122	160	243	324	405
Elongation at Break [%]	(2.5" gauge length)	780	800	800	800	800
Tear Resistance [lb]	ASTM D 1004	18	24	36	48	60
Puncture Resistance [lb]	FTMS 101 Method 2065	40	55	80	110	135
ESCR [hours]	ASTM D 1693 (B)	1500	1500	1500	1500	1500
Dimensional Stability [% change]	ASTM D 1204 (1 hr. at 100 °C)	± 2	± 2	± 2	± 2	± 2

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] 30 mil GSE UltraFlex is available only in 22.5 ft roll widths. All other thicknesses are available in nominal widths of 22.5 or 24 ft.

MINIMUM PROPERTIES FOR STANDARD SMOOTH WHITE-SURFACED VFPE GEOMEMBRANES

GSE ULTRAFLEX WHITE

Property	Test Method[1]	40[2]	60[2]
Minimum Thickness [mil]	ASTM D 751, D 1593 or D 5199	36	54
Density [g/cm³]	ASTM D 1505	0.92	0.92
Carbon Black Content[3] [%]	ASTM D 1603, modified	2.0	2.0
Carbon Black Dispersion	ASTM D 3015	A1, A2, B1	A1, A2, B1
Tensile Properties: (each direction) Strength at Break [lb/in]	ASTM D 638 Type IV, 2 ipm	160	243
Elongation at Break [%]	(2.5" gauge length)	800	800
Tear Resistance [lb]	ASTM D 1004	24	36
Puncture Resistance [lb]	FTMS 101 Method 2065	55	80
ESCR [hours]	ASTM D 1693 (B)	1500	1500
Dimensional Stability [% change]	ASTM D 1204 (1 hr. at 100 °C)	± 2	± 2

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] These values represent the minimum acceptable test values for a roll as tested according to GSE's Manufacturing Quality Assurance procedures. Individual test specimen values are not addressed in this specification.

[3] GSE UltraFlex White may have an overall ash content greater than 3.0% due to the white layer.

MINIMUM PROPERTIES FOR STANDARD SPRAY-ON TEXTURED VFPE GEOMEMBRANES

GSE ULTRAFRICTIONFLEX™

Property	Test Method[1]	40	60	80	100
Minimum Thickness [mil]	ASTM D 5994	36	54	72	90
Density [g/cm³]	ASTM D 1505	0.92	0.92	0.92	0.92
Carbon Black Content [%]	ASTM D 1603, modified	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 3015	A1, A2, B1	A1, A2, B1	A1, A2, B1	A1, A2, B1
Tensile Properties: (each direction) Strength at Break [lb/in]	ASTM D 638 Type IV, 2 ipm	150	243	324	405
Elongation at Break [%]	(2.5" gauge length)	500	600	800	800
Tear Resistance [lb]	ASTM D 1004	24	36	48	60
Puncture Resistance [lb]	FTMS 101 Method 2065	55	80	110	135
ESCR [hours]	ASTM D 1693 (B)	1500	1500	1500	1500
Dimensional Stability [% change]	ASTM D 1204 (1 hr. at 100 °C)	± 2	± 2	± 2	± 2

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

MINIMUM PROPERTIES FOR STANDARD COEXTRUDED TEXTURED VFPE GEOMEMBRANES

GSE ULTRAFLEX TEXTURED™

Property	Test Method[1]	40[2]	60[2]
Minimum Thickness [mil]	ASTM D 5994	36	54
Carbon Black Content [%]	ASTM D 1603, modified	2.0	2.0
Carbon Black Dispersion	ASTM D 3015	A1, A2, B1	A1, A2, B1
Tensile Properties[3]: *(each direction)* Strength at Break [lb/in]	ASTM D 638 Type IV, 2 ipm	80	120
Elongation at Break [%]	(2.5" gauge length)	400	400
Tear Resistance [lb]	ASTM D 1004	24	36
Puncture Resistance [lb]	FTMS 101c Method 2065	55	80
ESCR[4] [hours]	ASTM D 1693 (B)	1500	1500
Dimensional Stability [% change]	ASTM D 1204 (1 hr. at 100 °C)	± 2	± 2

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] These values represent the minimum acceptable test values for a roll as tested according to GSE's Manufacturing Quality Assurance procedures. Individual test specimen values are not addressed in this specification.

[3] The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variations of test results. Therefore, these tensile properties are average roll values.

[4] ESCR on coextruded textured product is conducted on representative smooth membrane samples.

MINIMUM PROPERTIES FOR STANDARD COEXTRUDED TEXTURED WHITE-SURFACED VFPE GEOMEMBRANES

GSE ULTRAFLEX WHITE TEXTURED

Property	Test Method[1]	40[2]	60[2]
Minimum Thickness [mil]	ASTM D 5994	36	54
Carbon Black Content[3] [%]	ASTM D 1603, modified	2.0	2.0
Carbon Black Dispersion	ASTM D 3015	A1, A2, B1	A1, A2, B1
Tensile Properties[4]: *(each direction)* Strength at Break [lb/in]	ASTM D 638 Type IV, 2 ipm	80	120
Elongation at Break [%]	(2.5" gauge length)	400	400
Tear Resistance [lb]	ASTM D 1004	24	36
Puncture Resistance [lb]	FTMS 101 Method 2065	55	80
ESCR[5] [hours]	ASTM D 1693 (B)	1500	1500
Dimensional Stability [% change]	ASTM D 1204 (1 hr. at 100 °C)	± 2	± 2

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] These values represent the minimum acceptable test values for a roll as tested according to GSE's Manufacturing Quality Assurance procedures. Individual test specimen values are not addressed in this specification.

[3] GSE UltraFlex White Textured may have an overall ash content greater than 3.0% due to the white layer.

[4] The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variations of test results. Therefore, these tensile properties are average roll values.

[5] ESCR on coextruded textured product is conducted on representative smooth membrane samples.

APPENDIX C

MINIMUM WELD PROPERTIES FOR GSE GEOMEMBRANE PRODUCTS

MINIMUM WELD PROPERTIES FOR STANDARD SMOOTH HDPE GEOMEMBRANES[1]

Property	Test Method	30	40	60	80	100	120
peel strength (fusion & ext.), ppi	ASTM D 4437	49	65	98	130	162	196
shear strength (fusion & ext.), ppi	ASTM D 4437	61	81	121	162	203	242

[1] These values apply to both coextruded and flat cast produced geomembranes to include white-surfaced and conductive products.

MINIMUM WELD PROPERTIES FOR STANDARD FRICTIONFLEX[1] HDPE GEOMEMBRANES

Property	Test Method	40	60	80	100
peel strength (fusion & ext.), ppi	ASTM D 4437	65	98	130	162
shear strength (fusion & ext.), ppi	ASTM D 4437	81	121	162	203

[1] FrictionFlex® is the patented GSE spray-on texturing process.

MINIMUM WELD PROPERTIES FOR STANDARD COEXTRUDED TEXTURED HDPE GEOMEMBRANES[1]

Property	Test Method	30	40	60	80	100
peel strength (fusion), ppi	ASTM D 4437	44	58	88	116	143
peel strength (extrusion), ppi	ASTM D 4437	31	42	63	84	105
shear strength (fusion & ext.), ppi	ASTM D 4437	56	76	113	151	189

[1] These values also apply to both white-surfaced and conductive geomembrane products.

Minimum Weld Properties for Standard Smooth VFPE Geomembranes[1]

Property	Test Method	30	40	60	80	100
peel strength (fusion & ext.), ppi	ASTM D 4437	36	48	72	96	120
shear strength (fusion & ext.), ppi	ASTM D 4437	40	56	84	112	140

[1] These values apply to both coextruded and flat cast produced geomembranes to include white-surfaced products. GSE UltraFlex White is only available in thicknesses of 40 and 60 mil at this time. Therefore, values for other thicknesses in this table do not apply to white-surfaced products.

Minimum Weld Properties for Standard FrictionFlex[1] VFPE Geomembranes

Property	Test Method	30	40	60	80	100
peel strength (fusion & ext.), ppi	ASTM D 4437	36	48	72	96	120
shear strength (fusion & ext.), ppi	ASTM D 4437	40	56	84	112	140

[1] FrictionFlex® is the patented GSE spray-on texturing process.

Minimum Weld Properties for Standard Coextruded Textured VFPE Geomembranes[1]

Property	Test Method	40	60
peel strength (fusion & ext.), ppi	ASTM D 4437	40	60
shear strength (fusion & ext.), ppi	ASTM D 4437	48	72

[1] These values also apply to white-surfaced geomembrane products.

MINIMUM AVERAGE[1] PROPERTIES FOR STANDARD GEOCOMPOSITE PRODUCTS

GSE FABRINET®

Property	Test Method[2]	with 6 oz/yd²	with 8 oz/yd²	with 10 oz/yd²
GEOCOMPOSITE PROPERTIES				
Transmissivity[3] [m²/sec]	ASTM D 4716	6.0×10^{-5}	4.0×10^{-5}	3.0×10^{-5}
Ply Adhesion	ASTM D 413, F 904 or GRI GC7			
Average [gram/inch] (ppi)		250 (0.55)	250 (0.55)	250 (0.55)
Minimum [gram/inch] (ppi)		100 (0.22)	100 (0.22)	100 (0.22)
GEONET PROPERTIES				
Transmissivity[3] [m²/sec]	ASTM D 4716	1.0×10^{-3}	1.0×10^{-3}	1.0×10^{-3}
Thickness [mil]	ASTM D 5199	200	200	200
Density [g/cm³]	ASTM D 1505	0.94	0.94	0.94
Tensile Strength (MD) [lb/in]	ASTM D 5034/D 5035	45	45	45
Carbon Black Content [%]	ASTM D 1603, modified	2.0	2.0	2.0
GEOTEXTILE PROPERTIES[4]				
Thickness [mil]	ASTM D 5199	70	90	105
Grab Tensile [lb]	ASTM D 4632	160	210	260
Puncture Strength [lb]	ASTM D 4833	110	140	180
AOS [US Sieve]	ASTM D 4751	70	80	100
Flow Rate [gpm/ft²]	ASTM D 4491	110	110	85
UV Resistance [% retained]	ASTM D 4355 (after 500 hours)	70	70	70

[1] These are typical values and are based on the cumulative results of specimens tested as determined by GSE Quality Assurance practices.

[2] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[3] Gradient of 1.0, normal load of 10,000 psf, water at 70°F between stainless steel plates

[4] Other geotextiles are available and may be provided as agreed upon by GSE. All geotextile property values are as determined by the supplier.

MINIMUM AVERAGE[1] PROPERTIES FOR STANDARD GEOCOMPOSITE PRODUCTS

GSE FABRICAP

Property	Test Method[2]	with 4 oz/yd²	with 6 oz/yd²	with 8 oz/yd²
GEOCOMPOSITE PROPERTIES				
Transmissivity[3] [m²/sec]	ASTM D 4716	1.1×10^{-4}	1.0×10^{-4}	9.0×10^{-5}
Ply Adhesion	ASTM D 413, F 904 or GRI GC7			
Average [gram/inch] (ppi)		250 (0.55)	250 (0.55)	250 (0.55)
Minimum [gram/inch] (ppi)		100 (0.22)	100 (0.22)	100 (0.22)
GEONET PROPERTIES				
Transmissivity[3] [m²/sec]	ASTM D 4716	1.0×10^{-3}	1.0×10^{-3}	1.0×10^{-3}
Thickness [mil]	ASTM D 5199	200	200	200
Density [g/cm³]	ASTM D 1505	0.94	0.94	0.94
Tensile Strength (MD) [lb/in]	ASTM D 5034/D 5035	32	32	32
Carbon Black Content [%]	ASTM D 1603, modified	2.0	2.0	2.0
GEOTEXTILE PROPERTIES[4]				
Thickness [mil]	ASTM D 5199	45	60	80
Grab Tensile [lb]	ASTM D 4632	100	150	200
Puncture Strength [lb]	ASTM D 4833	65	95	130
AOS [US Sieve]	ASTM D 4751	70	70	80
Flow Rate [gpm/ft²]	ASTM D 4491	140	110	110
UV Resistance [% retained]	ASTM D 4355 (after 500 hours)	70	70	70

[1] These are typical values and are based on the cumulative results of specimens tested as determined by GSE Quality Assurance practices.

[2] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[3] Gradient of 1.0, normal load of 4,000 psf, water at 70°F between stainless steel plates.

[4] Other geotextiles are available and may be provided as agreed upon by GSE. All geotextile property values are as determined by the supplier.

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APPENDIX D

TEST FREQUENCIES AND MINIMUM PROPERTIES FOR GSE GEONET AND GEOCOMPOSITE PRODUCTS

Minimum Testing Frequencies for Standard GSE Geonet & Geocomposite Products

Property	Test Method[1]	Geonet	Geocompqsite[2]
Transmissivity[3]	ASTM D 4716	every 100,000 linear feet	every 100,000 linear feet
Thickness	ASTM D 5199	every 5th roll	Note 4
Density	ASTM D 1505	every 5th roll	Note 4
Tensile Strength (MD)	ASTM D 5034/D 5035	every 5th roll	Note 4
Carbon Black Content	ASTM D 1603, modified	every 5th roll	Note 4
Ply Adhesion	ASTM D 413, F 904 or GRI GC7	N/A	every 5th roll

[1] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[2] The geonet portion of the geocomposite is tested according to the procedure specified for GSE standard geonet testing. Ply adhesion is the only test which is unique to the geocomposite product.

[3] Routine transmissivity tests on geonet and geocomposite are performed at normal loads of 500, 5000, 10000 and 15000 psf and gradients of 0.1 and 1.0. between stainless steel plates. The routine frequency covers approximately one test per product per 100,000 linear feet. Special transmissivity tests must be approved by Technical Services prior to commitment. Results can be furnished upon request.

[4] These properties apply only to the geonet portion of the geocomposite.

MINIMUM AVERAGE[1] PROPERTIES FOR STANDARD GEONET PRODUCTS

GSE HYPERNET®, GSE HYPERNET HF AND GSE HYPERNET CP

Property	Test Method[2]	HyperNet	HyperNet HF	HyperNet CP
Transmissivity [m^2/sec]	ASTM D 4716	1.0×10^{-3} [3]	2.0×10^{-3} [3]	1.0×10^{-3} [4]
Thickness [mil]	ASTM D 5199	200	250	200
Density [g/cm^3]	ASTM D 1505	0.94	0.94	0.94
Tensile Strength (MD) [lb/in]	ASTM D 5034/D 5035	45	55	32
Carbon Black Content [%]	ASTM D 1603, modified	2.0	2.0	2.0

[1] These are typical values and are based on the cumulative results of specimens tested as determined by GSE Quality Assurance practices.

[2] GSE utilizes test equipment and procedures which enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

[3] Gradient of 1.0, normal load of 10,000 psf, water at 70°F between stainless steel plates

[4] Gradient of 1.0, normal load of 4,000 psf, water at 70°F between stainless steel plates

SECTION 6.1

COPY OF THE FDEP PERMIT TO CONSTRUCT

Department of Environmental Protection

Lawton Chiles
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Virginia B. Wetherell
Secretary

PERMITTEE
Hardee County Board of
County Commissioners
Mr. J.R. Prestridge,
Solid Waste Superintendent
685 Airport Road
Wauchula, Fl 33873

PERMIT/CERTIFICATION
GMS ID No: 4025C20001
Permit No: **38414-001-SC**
Date of Issue: **12/18/1998**
Expiration Date: **02/01/2000**
County: Hardee
Lat/Long: 27°34'10"N
81°47'01"W
Sec/Town/Rge: 35/33S/25E
Project: Hardee County
Class I Landfill
Construction

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule(s) 62-3, 62-4, 62-302, 62-330, 62-520, 62-522, and 62-701. The above named permittee is hereby authorized to perform the activities shown on the application and approved drawing(s), plans and other documents, attached hereto or on file with the Department and made a part hereof and specifically described as follows:

To construct site improvements at the Class I landfill (approximately 12.5 acres), referred to as the Hardee County Regional Landfill, subject to the specific and general conditions attached, located at **675 Airport Road, east of the City of Wauchula,** Hardee County, Florida. The specific conditions attached are for the construction of:

1. Landfill liner and
2. Leachate collection and storage tanks system

General Information -Construction:
60 mil HDPE Geomembrane Seams: Shear - 120 ppi & FTB [ref. CQAP, Table 2-3]
Peel - 85 ppi & FTB [ref. CQAP, Table 2-3]
Hydraulic Conductivity:
Filter Aggregate: min. 1 x 10-3 cm/sec [ref. CQAP, 2.1.1.4.]
Drainage Sand: min. 1 x 10-3 cm/sec [ref. CQAP, 2.1.1.5.]
Clay layer: max. 4.3 x 10-7 cm/sec [ref. SC#2.a(1), App. C; SC#2.a(2), Att. G].

Replaces Permit No.: N/A, new

This permit contains compliance items summarized in **Attachment 1** that shall be complied with and submitted to the Department by the dates noted. If the compliance dates are not met and submittals are not received by the Department on the dates noted, enforcement action may be initiated to assure compliance with the conditions of this permit.

GENERAL CONDITIONS

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit, are "permit conditions" and are binding and enforceable pursuant to Sections 403.141, 403.161, 403.727, or 403-859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in subsections 403.087(6) and 403.722(5), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, State, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in this permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed and used by the permittee to achieve compliance with the conditions of this permit, are required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

GENERAL CONDITIONS:

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at reasonable times, access to the premises where the permitted activity is located or conducted to:

(a) Have access to and copy any records that must be kept under conditions of the permit;

(b) Inspect the facility, equipment, practices, or operations regulated or required under this permit; and

(c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

(a) A description of and cause of noncompliance; and

(b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.111 and 403.73, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and Florida Statues after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

GENERAL CONDITIONS:

11. This permit is transferable only upon Department approval in accordance with Rule 62-4.120 and 62-730.300, Florida Administrative Code, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. This permit also constitutes:

(a) Determination of Best Available Control Technology (BACT)

(b) Determination of Prevention of Significant Deterioration (PSD)
(c) Certification of compliance with State Water Quality Standards (Section 401, PL 92-500)
(d) Compliance with New Source Performance Standards

14. The permittee shall comply with the following:

(a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

(b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

(c) Records of monitoring information shall include:

1. the date, exact place, and time of sampling or measurements;
2. the person responsible for performing the sampling or measurements;
3. the dates analyses were performed
4. the person responsible for performing the analyses;
5. the analytical techniques or methods used;
6. the results of such analyses.

GENERAL CONDITIONS:

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware the relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

16. In the case of an underground injection control permit, the following permit conditions also shall apply:

(a) All reports or information required by the Department shall be certified as being true, accurate and complete.

(b) Reports of compliance or noncompliance with, or any progress reports on, requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

(c) Notification of any noncompliance which may endanger health or the environment shall be reported verbally to the Department within 24 hours and again within 72 hours, and a final written report provided within two weeks.

1. The verbal reports shall contain any monitoring or other information which indicate that any contaminant may endanger an underground source of drinking water and any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.

2. The written submission shall contain a description of and a discussion of the cause of the noncompliance and, if it has not been corrected, the anticipated time the noncompliance is expected to continue, the steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance, and all information required by Rule 62-28.230(4)(b), F.A.C.

(d) The Department shall be notified at least 180 days before conversion or abandonment of an injection well, unless abandonment within a lesser period of time is necessary to protect waters of the State.

GENERAL CONDITIONS:

17. The following conditions also shall apply to a hazardous waste facility permit.

(a) The following reports shall be submitted to the Department:

1. Manifest discrepancy report. If a significant discrepancy in a manifest is discovered, the permittee shall attempt to rectify the discrepancy. If not resolved within 15 days after the waste is received, the permittee shall immediately submit a letter report, including a copy of the manifest, to the Department.

2. Unmanifested waste report. The permittee shall submit an unmanifested waste report to the Department within 15 days of receipt of unmanifested waste.

3. Biennial report. A biennial report covering facility activities during the previous calendar year shall be submitted by March 1 of each even numbered year pursuant to Chapter 62-730, F.A.C.

(b) Notification of any noncompliance which may endanger health or the environment, including the release of any hazardous waste that may endanger public drinking water supplies or the occurrence of a fire or explosion from the facility which could threaten the environment or human health outside the facility, shall be reported verbally to the Department within 24 hours, and a written report shall be provided within 5 days. The verbal report shall include the name, address, I.D. number, and telephone number of the facility, its owner or operator, the name and quantity of materials involved, the extent of any injuries, an assessment of actual or potential hazards, and the estimated quantity and disposition of recovered material. The written submission shall contain:

1. A description and cause of the noncompliance.

2. If not corrected, the expected time of correction, and the steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

(c) Reports of compliance or noncompliance with, or any progress reports on, requirements in any compliance schedule shall be submitted no later than 14 days after each schedule date.

(d) All reports or information required by the Department by a hazardous waste permittee shall be signed by a person authorized to sign a permit application.

SPECIFIC CONDITIONS:

1. **Landfill Designation.** This site shall be classified as a Class I landfill and shall be operated in accordance with all applicable requirements of Chapters 62-3, 62-4, 62-302, 62-330, 62-520, 62-522, and 62-701, Florida Administrative Code (F.A.C.), and all applicable requirements of Department Rules.

2. **Permit Application Documentation.**

a. This permit is valid for construction of the liner system and leachate storage tanks system for the Class I landfill in accordance with Department rules, the conditions of this permit, and the reports, plans and other information, submitted by Post, Buckley, Schuh and Jernigan, Inc.(PBSJ)(or as otherwise noted) as follows:

1) Hardee County Regional Landfill, Application for Construction Permit, dated June 26, 1997 (received June 27, 1997);

2) Response to Request for Additional Information dated July 25, 1997 for the Application for Construction Permit, dated December 31, 1997 (received January 2, 1998);

3) Response to Request for Additional Information dated January 30, 1998 for the Application for Construction Permit, dated April 24, 1998 (received April 27, 1998);

4) Construction Quality Assurance Plan, dated June 1997 (received June 27, 1997), including pages dated April, June and December 1997, and February, March and April 1998;

5) Technical Specifications, dated June 1997 (received June 27, 1997), including pages dated September and December 1997; February, March and April 1998; and Dewatering, Section 02140 revised October 16, 1998 (received October 30, 1998);

6) The following Plan Sheets dated June 1997 (received June 27, 1997):

a) Sheet M-1, "Leachate Storage Tanks and Yard Piping Plan,"
b) Sheet M-2, "Submersible Leachate Pump Station Plan, Section and Details,"
c) Sheet M-6, "Miscellaneous Details,"
d) Sheet M-8, "Existing Leachate Pump Station Demolition Plan,"
e) Sheet E-1, "Leachate Storage Tanks Pump Station and Lift Station Electrical Plan,"
f) Sheet S-1, "General Notes,"

SPECIFIC CONDITIONS:

(Specific Condition #2.a(6) cont'd)

g) Sheet S-2, "Truck Loading Facility and Pump Station Plan, Section and Details;"

7) The following Plan Sheets including revisions dated September 1997 (received January 2, 1998):

a) Sheet M-3, "Leachate Storage Tanks and Truck Loading Pump Station Plan,"
b) Sheet M-4, "Leachate Storage Tanks Sections and Details,"
c) Sheet M-5, "Truck Loading Facility and Pump Station Sections, Detail and Schedule,"
d) Sheet M-7, "Miscellaneous Details;"

8) The following Plan Sheets including revisions dated September 1997 and April 1998 (received April 27, 1998):

a) Sheet C-1, "Site Plan,"
b) Sheet C-2, "Construction Plan,"
c) Sheet C-3, "Leachate Storage Area Grading and Drainage," and
d) Sheet C-4, "Sections and Details;"

9) Sheet 5 of 5, including revisions April, June and August 1997, "Gas Management System and Miscellaneous Details at Closure" (received January 2, 1998); and

10) Information received via fax dated November 12, 1998 regarding the clay/geomembrane tie-in.

b. Activities approved as part of this permit include construction of the landfill liner system, leachate collection and storage tanks system, groundwater monitoring wells, gas monitoring probes and related construction. This permit does not authorize the operation of the systems listed above.

c. "Engineer" shall refer to the Engineer of Record as defined in the documents referenced in Specific Condition #2.a., above.

d. The construction activities shall be completed in accordance with Department rules, the information listed in Specific Condition #2.a., above, and the conditions of this permit. The construction activities authorized by this permit shall be completed no later than **October 1, 1999**, or as otherwise approved by the Department.

SPECIFIC CONDITIONS:

3. **Permit Modifications.** Any construction not previously approved as part of this permit will require a separate Department permit unless the Department determines a permit modification to be more appropriate. Permits shall be modified in accordance with the requirements of Rule 62-4.080, F.A.C. A modification which is reasonably expected to lead to substantially different environmental impacts which require a detailed review by the Department is considered a substantial modification.

4. **Permit Renewal.** No later than **one hundred eighty (180) days** before the expiration of the Department Permit, the permittee shall apply for a renewal of a permit on forms and in a manner prescribed by the Department, in order to assure conformance with all applicable Department rules. Permits shall be renewed at least every five years as required by Rule 62-701.330(3), F.A.C.

5. **Pre-Construction Submittals.**

a. At least **thirty (30) days prior** to initiation of any construction activity, unless otherwise specified, the permittee shall submit the following information to the Department:

1) A complete set of Plans, Specifications and CQA Plan to be used for construction which includes all changes (i.e., all additions, deletions, revisions to the plans previously approved by the Department). Significant changes in the plans, as determined by the Department, shall require a permit modification. All changes in the plans shall be noted on the plans and accompanied by a narrative indicating the change, the cause of the deviation, and a re-certification of the alternate design by the design engineer. These alternate designs shall be approved by the Department prior to construction. If no changes have been made to the construction plans, Specifications or CQA Plan, the permittee shall notify the Department in writing that no changes have been made, and re-submittal of these documents will not be required prior to construction.

2) The role and name of the specific company/organization for each of the parties shown in Figure 1-1, CQA Plan.

b. **At least thirty (30) days prior** to initiation of construction activities for the leachate storage tanks system, the permittee shall submit the following information to the Department:

1) Calculations which verify the secondary containment capacity. [Specifications Sections 11200-1.04.A., 1.06.A.2. and 13200-1.04.C., 1.05.A.3.]

SPECIFIC CONDITIONS:

(Specific Condition #5.b. cont'd)

2) The method of anchoring the leachate storage tanks to the secondary containment. [Specification Sections 11200-1.04. and 13200-1.04.]

3) Details of the leachate storage tanks cathodic protection system. [Specification Sections 11200-1.04. and 13200-1.04.]

c. **At least ten (10) days prior** to initiation of geomembrane liner installation, the permittee shall submit the following information to the Department:

1) Installer's Quality Control Plan [Specification Section 02776-1.03.A.2(e)],

2) Geomembrane Manufacturer's Material test results [Specification Section 02776-1.03.A.2(h)],

3) Alternative seaming processes other than extrusion of fusion welding [Specification Section 02776-1.03.A.2(n)], and

4) Booting details [Specification Section 02776-5.01.A.2(c)].

6. **Pre-Construction Meeting Notification.** Department Solid Waste Permitting staff shall be notified **72 hours** before all pre-construction meetings. Prior to initiating construction activities, the permittee shall make arrangements for the Engineer of Record to meet on site and discuss all plan changes with Department Solid Waste Permitting Staff of the Southwest District Office. A copy of the minutes from the pre-construction conference shall be submitted to the Department **within two (2) weeks** of the conference.

7. **Construction Schedule and Progress Report.**

a. **No later than one (1) week** after the pre-construction conference, the owner or operator shall submit a construction schedule which includes estimated dates for each portion of the construction to the Department. The Engineer of Record or another qualified professional engineer shall make periodic inspections during construction to ensure that design integrity is maintained.

SPECIFIC CONDITIONS:

(Specific Condition #7. cont'd)

b. An updated construction schedule and progress report shall be submitted to the Department **monthly.** The monthly progress report should be submitted in an appropriately labeled three-ring binder of sufficient size to store the monthly progress reports for the entire project. The monthly progress reports shall include, but not be limited to:

1) A narrative explaining the status (and any delays) of major stages of the construction (i.e. liner, tank, piping, etc.),

2) A summary of submittals and change order requests [Specification Section 01340-1.01.C.], and

3) Color copies of photographs which are representative of the typical construction activities for the reporting period, and photographs which show major stages of construction such as the liner toe tie-in. [Specification Section 01380]

8. **Construction Tolerances.**

a. Sufficient spot elevations (grade shots) of the leachate collection trenches shall be recorded to demonstrate, at the 98% confidence level, that the leachate collection system has been constructed to the slopes and grades shown on Sheet C-2 [ref. SC#2.a(8)(b)]. In the event that the frequency required by the Specifications is not sufficient to provide this demonstration, additional spot elevations shall be taken. [Specification Section 02776-7.02.B.] This information shall be included with the Record Documents (see Specific Condition #13, below).

b. As-built topographic surveys shall demonstrate that each liner component phase and leachate collection system was constructed within the tolerance (0.1 feet) required by the Drawings and Specifications. [Specification Sections 01050-1.04.B. and 02220-3.10.A.]

c. As-built elevations of the geomembrane/clay tie-in (i.e. toe of the geomembrane) shall be taken. These elevations (grade shots) shall be taken a minimum of every 100 lineal feet of liner trench and at locations where the underlying clay abruptly changes elevation. In areas which exhibit inconsistent subsurface conditions, the grade shots shall be taken more frequently.

SPECIFIC CONDITIONS:

(Specific Condition #8. cont'd)

d. **No later than 48 hours after** completion of construction of the geomembrane subgrade, an as-built topographic survey shall be provided to the Engineer to verify conformance with the Drawings and Specifications. The geomembrane subgrade shall be accepted by the Liner Installer and Engineer in writing before placement of the geomembrane. [CQAP, Section 3.1.1., Specification Section 02776-5.01.B.2.]

9. **Construction Quality Assurance.**

a. Liner systems shall have a construction quality assurance plan to provide personnel with adequate information to achieve continuous compliance with the construction requirements. The Construction Quality Assurance Plan shall be in accordance with Rules 62-701.400(7) and (8), F.A.C., the CQA Plan [ref. SC#2.a(4)], and the conditions of this permit. The professional engineer or his designee shall be on-site at all times during construction (including liner system, and leachate collection and storage tanks system) to monitor construction activities.

b. A complete set of construction drawings and shop drawings, which include daily additions, deletions and revisions, shall be maintained on-site at all times for reference. Drawings which show the locations of geomembrane panel seams and repairs shall be kept on-site at all times for reference.

c. Leachate shall not be deposited, injected, dumped, spilled, leaked, or discharged in any manner to the land, surface water or groundwater outside the liner system or existing leachate ditch, except as provided in Specific Condition #21 of this permit, at any time during the construction activities.

d. Unsatisfactory, defective or non-conforming work shall be reported to the Engineer and shall be corrected, or the reasons for not correcting the work shall be recorded and maintained onsite for reference and inspections. [CQAP 1.2.7.5.b. page 1-11] Documentation of the corrections or reasons for not correcting the work shall be submitted with the Record Documents required by Specific Condition #13.

SPECIFIC CONDITIONS:

ecific Condition #9. cont'd)

e. Construction activities such as geomembrane seaming, QA/QC testing of the geomembrane or soil materials, surveying, etc. shall not be carried out in non-daylight hours without prior Department approval. If these activities will be conducted during nighttime hours, the Department shall be notified **at least 1 week** in advance to allow for Department observation. This notification shall include a description of the methods which will be used to provide adequate illumination to ensure that the quality of the construction is not compromised. [Specification Section 02776-5.01.D.8(d)]

f. The liner trench excavation bottom shall be maintained free from standing water. [Specification Section 02220-3.01.B.3.] Except for the stormwater management system construction, no construction, including pipe laying, shall be allowed in water. Groundwater shall be maintained at least 12 inches below excavations. In the event that it appears that the excavation is being impacted by groundwater, the contractor shall take the corrective actions necessary to demonstrate that the groundwater is at least 12 inches below the bottom of the excavation. [Specification Section 02220-3.03.C.]

g. Hydrostatic leak testing of the solid wall piping and manholes shall be completed prior to backfilling around the structures. [CQAP Section 5.4., Specification Sections 03800-3.02.B. and 15050-3.10.D.]

h. The Site Specific Health and Safety Plan shall be kept on-site for reference and inspections. [Specification Section 01030-1.03.]

i. Explosives shall not be used in this construction project without prior Department approval. [Specification Section 02220-1.01.B.3.]

j. Sandbags or other temporary anchoring devices shall be removed prior to placement of materials (e.g. select common fill, clay backfill) over the geomembrane. [Specification Sections 02776-5.01.C.3(d)(5) and 5.01.D.11(f)]

k. Where sod is used over lined areas, pegging of sod shall not damage the liner. [Specification Section 02934-3.03.C.]

l. All exterior painting shall be done only in dry weather. [Specification Section 09900-3.04.A.]

SPECIFIC CONDITIONS:

(Specific Condition #9. cont'd)

m. **At least one (1) week prior to** the field holiday testing of the tank, the Department shall be notified to allow for observation. [Specification Sections 11200-3.01.E. and 13200-3.01.B.4.]

10. **Geosynthetic Materials and HDPE Piping.**

a. The permittee shall ensure that the clay layer which the geomembrane is keyed into is consistent with the clayey material described in the permit application [ref. SC#2.a(1), Appendix C and SC#2.a(2), Attachment G]. The geomembrane shall be keyed into clay material at an elevation no higher than +70 feet NGVD. [ref. SC#2.a(1), Appendix C] If the Contractor excavates to this depth and ties the geomembrane liner into a clayey material consistent with that shown in the boring logs referenced in this Specific Condition, then permeability testing will not be required. If the material which is encountered at this elevation is not consistent with the green to gray clay shown in the boring logs, the permittee shall ensure that the Contractor excavates to a depth sufficient to tie the geomembrane into a clay layer consistent with that shown in the boring logs. The Department shall be notified **immediately** if the Contractor discovers that the clay material is not present at the expected elevation. If this is the case, the Department may require additional documentation or testing to ensure that the geomembrane has been sufficiently tied into the clay layer.

b. The geomembrane shall be keyed a minimum of 1.5 feet into the clay layer in all locations. [Specification Section 02776-5.01.B.1.]

c. Written acceptance of the subgrade by the geomembrane installer shall be provided to the Engineer prior to placement of the geomembrane on the subgrade. [Specification Section 02776-5.01.B.]

d. The procedure used to temporarily bond adjacent geomembrane panels together shall not damage the geomembrane. [Specification Section 02776-5.01.D.3(b)]

e. Geomembrane seaming activities shall only be conducted during daylight hours and within the weather requirements of the Specifications, unless otherwise specifically approved by the Department. [Specification Sections 02776-5.01.D.3(c), 5.01.D.6. and 5.01.D.8(d)]

SPECIFIC CONDITIONS:

(Specific Condition #10. cont'd)

f. Conformance testing for the geosynthetic materials shall be in accordance with the CQAP Table 3-2, and Specification Sections 02330-2.03.B., 02776-2.02.B.4. and 02776-4.01. The geomembrane material shall meet the requirements listed in Specification Table 02776-A.

g. The construction methods used shall minimize wrinkles. Excessive wrinkles shall be removed, and the areas repaired. Areas where wrinkles are removed shall be repaired and re-tested in accordance with the Specifications and CQA Plan. [CQAP Section 4.2.4.5., Specification Section 02776-5.01.C.3(d)(6) and 5.01.D.11(f)]

h. The liner system shall not be damaged by excessive traffic. [Specification Section 02776-5.01.D.5(a)]

i. Destructive tests of the geomembrane seams shall be taken at random locations, at a frequency of one test location per 500 feet of seam. [CQAP Section 4.2.3.1., Specification Section 02776-5.01.D.10(b)]

j. Geomembrane seams which are field tested "by hand", and appear to acceptable, shall also be tested by tensiometer to verify the adequacy of the weld. [Specification Section 02776-5.01.D(10)(e), CQAP Section 4.2.3.2.]

k. Geomembrane seams shall meet the requirements of Specification Section 02776, Table 02776-B. Destructive tests conducted on the geomembrane field seams shall demonstrate that the actual shear strength is at least 90 percent of the yield strength of the geomembrane, and failure is outside of the seam area. Five samples shall be taken for strength testing. All of the samples shall meet the requirements for each test method (peel and shear) listed in Table 02776-B. The strength results shall not be averaged. [Specification Section 02776-5.01.D.7(b), 5.01.D.10(f)]

l. During the construction of, and until the geomembrane is placed on, the geomembrane subgrade, the subgrade shall be inspected **daily** for signs of desiccation, excessive moisture, or other damage. In the event that the condition of the subgrade deteriorates, corrective actions shall be implemented **immediately**. Washouts or erosion of the geomembrane subgrade shall repaired immediately. [Specification Section 02776-5.01.B.5.]

SPECIFIC CONDITIONS:

(Specific Condition #10. cont'd)

m. No geomembrane shall be placed in an area of the geomembrane subgrade that has become softened by precipitation or desiccated and cracked due to lack of moisture. No standing water or excessive moisture shall be allowed on the area to be lined before the geomembrane installation. [Specification Sections 02776-5.01.B.1. and 5.01.C.3(c)]

n. HDPE pipe or fittings shall not be dropped during loading, unloading or placement. [Specification Section 02730-1.03.B.2.]

o. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench or weather conditions are unsuitable for such work. [Specification Section 02730-3.02.A.]

11. **Soil Materials.**

a. Soil materials, specified in Specification Section 02220, shall not include materials which were previously used for daily or intermediate cover or for berms around the working face of the landfill.

b. Soil materials which contact the liner (above or below) shall not contain any sharp or granular objects exceeding 1/4-inch in diameter. [ref. SC#2.a(3), page 14; Specification Sections 02220-2.01.C and 02776-5.01.B.1.]

c. The clay backfill (above the toe of the liner) shall be compacted to a minimum of 90% Standard Proctor density. [Specification Section 02220, Table 02220-A; CQAP Section 4.1.1.]

d. Each layer of material being compacted (e.g. clay backfill and geomembrane subgrade) shall have a uniform moisture content and adequate compaction. [Specification Section 02220-3.06.B.2. and Table 02220-A]

e. Crushed rock or gravel shall not be used to reinforce the geomembrane trench subgrade bottom (tie-in area) which may have become mucky as a result of construction activities. [Specification Section 02220-3.05.B.]

12. **Laboratory and Field Testing Requirements.** Field and laboratory testing during the construction activities shall be conducted by a qualified testing laboratory, independent of the manufacturer or installer, representing the owner. A qualified field technician representing the owner shall provide full time, on-site inspection during construction. The field technician shall work under the supervision of a professional engineer registered in the State of Florida with experience in landfill liner construction.

SPECIFIC CONDITIONS:

13. **Certification of Construction Completeness.** Within **sixty (60) days** after all specified construction has been completed, and prior to the operation of the leachate storage tanks system, the following activities shall be completed:

a. The owner or operator shall submit a Certification of Construction Completion, Form 62-701.900(2), signed and sealed by the professional engineer in charge of construction and quality assurance to the Department for approval, and shall arrange for Department representatives to inspect the construction in the company of the permittee, the engineer, and the facility operator.

b. The owner or operator shall submit Record Drawings/Documents showing all changes (i.e. all additions, deletions, revisions to the plans previously approved by the Department including site grades and elevations).

c. The owner or operator shall submit a narrative indicating all changes in plans, the cause of the deviations, and certification of the Record Drawings/Documents by the Engineer to the Department.

d. The Groundwater Monitoring System requirements listed in Specific Condition #20 shall be complete.

e. The professional engineer in charge of construction quality assurance shall submit to the Department a final report to verify conformance with the plans and specifications in accordance with Rule 62-701.400(7) and (8), F.A.C.

f. The permittee shall request a modification of Operation Permit 38414-002-SO to allow operation of the leachate storage tanks system. This request shall be submitted with the Certification of Construction Completion.

14. **Record Drawings/Documents.**

a. The Record Documents shall demonstrate that the geomembrane was sufficiently keyed into a clay layer with material properties consistent with the clayey materials described in the PSI Geotechnical Report [ref. SC#2.a(1), Appendix C, Table 1 and SC#2.a(2), Attachment G].

b. The Record Drawings/Documents referenced in Specific Condition #13, above, shall include, but not be limited to, the following information:

1) All anchor trenches,

SPECIFIC CONDITIONS:

(Specific Condition #14.b. cont'd)

2) Documentation described in Specific Conditions #8 and #9.d.,

3) As-built invert elevations for the leachate collection pipes, as listed on Sheet C-2 of the Drawings [Specification Section 01050-1.04.B.],

4) As-built elevations of the liner/clay tie-in (i.e. toe of the liner) required by Specific Condition #8.c.,

5) The "Daily Record of Work Progress" [CQAP Section 6, Attachment A],

6) Meeting Minutes from monthly progress meetings [Specification Section 01200-1.03.], and

7) As-built drawings showing the geomembrane panel installation layout. [Specification Section 02776-1.03.A(2)(l)] These drawings shall show the locations of fabricated and field seams, actual sampling and repair locations, and panel designations.

15. **Control of Access.** During construction, access to, and use of, the facility shall be controlled as required by Rule 62-701.500(5), F.A.C.

16. **Control of Nuisance Conditions.** The permittee shall be responsible for the control of odors and fugitive particulates arising from this construction. Such control shall minimize the creation of nuisance conditions on adjoining property. Complaints received from the general public, and confirmed by Department personnel upon site inspection, shall constitute a nuisance condition, and the permittee must take immediate corrective action to abate the nuisance. The owner or operator shall control disease vectors so as to protect the public health and welfare.

17. **Facility Maintenance and Repair.**

a. **On or prior to the one-year anniversary date** of initial use of the leachate storage tanks system, the manufacturer's authorized representative shall make a visual inspection of the tank interior coating and appurtenances; tank exterior coating and appurtenances; and the immediate area surrounding the tank. A written summary of this inspection shall be filed with the tank owner and the tank manufacturer. [Specification Sections 11200-3.05.A. and 13200-3.06.A.] The permittee shall submit a copy of the written report to the Department **no later than thirty (30) days** after receipt of the report from the tank manufacturer's authorized representative.

SPECIFIC CONDITIONS:

(Specific Condition #17.a cont'd)
In the event that deficiencies are noted by the tank inspector, a schedule for corrective measures shall be submitted to the Department **within fifteen (15) days** of the owner's receipt of the written inspection report. The corrective measures shall be completed **within sixty (60) days** of the date of the inspector's report, or as otherwise approved by the Department.

b. In the event of damage to any portion of the landfill site facilities or failure of any portion of the landfill systems, the permittee shall **immediately (within 24 hours)** notify the Department of Environmental Protection explaining such occurrence and remedial measures to be taken and time needed for repairs. Written detailed notification shall be submitted to the Department **within seven (7) days** following the occurrence.

c. In the event that any portion of the groundwater monitoring system is damaged, remedial measures shall be completed **within sixty (60) days** of the written notification specified in Specific Condition #17.b. above, unless otherwise approved by the Department.

d. In the event that the stormwater or leachate management systems are damaged or are not operating effectively, corrective actions shall be implemented **within thirty (30) days** of the written notification specified in Specific Condition #17.b. above, unless otherwise approved by the Department.

18. **Stormwater System Management.** The landfill shall continue to have a surface water management system designed, constructed, operated, and maintained to prevent surface water from running on to waste filled areas, and a stormwater runoff control system designed, constructed, operated, and maintained to collect and control stormwater to meet the requirements of Chapter 62-330, F.A.C., and the requirements for management and storage of surface water in accordance with Rule 62-701.500(10), F.A.C., to meet applicable standards of Chapters 62-3, 62-302, and 62-330, F.A.C.

19. **Gas, Leachate Surface Water and Ground Water Quality Monitoring.** All gas, leachate, surface water and ground water monitoring shall be conducted in accordance with Permit No. 38414-002-SO.

20. **Ground Water Monitoring Well and Gas Probe Construction.** Monitoring wells MW-8 and MW-9 shall be constructed, and the following information submitted prior to the Certification of Construction Completion required by Specific Condition #13:

SPECIFIC CONDITIONS:

(Specific Condition #20. cont'd)

a. Documentation of the following for each well installed:

Well Identification	Boring (Lithology) Log
Aquifer monitored	Total depth of well
Screen type and slot size	Casing diameter
Screen length	Casing type and length
Screen diameter	Well seal and filter pack type and thickness
Elevation at top of casing	SWFWMD construction permit No.
Elevation at ground surface	

b. **Within one week of well completion** and development, each new well shall be sampled for the parameters listed in Rule 62-701.510(8)(a) and (d), F.A.C., to establish initial ground water quality for that well. Results of the sampling shall be submitted to DEP prior to the Certification of Construction Completion required by Specific Condition #13.

c. A surveyed drawing shall be submitted in accordance with Rule 62-701.510(3)(d)(1), F.A.C., showing the location of all monitoring wells (active and abandoned) horizontally located in degrees, minutes and seconds of latitude and longitude, the Universal Transverse Mercator coordinates, and the elevation of the top of the well casing to the nearest 0.01 foot, National Geodetic Vertical Datum. The surveyed drawing shall include the monitor well identification number, locations and elevations of all permanent benchmarks and/or corner monument markers at the site. The survey shall be conducted by a Florida Registered Surveyor. Approved locations for MW-8, MW-9, P-15, and P-16 are shown on Figure 3-1 (attached) [ref. SC#2.a(1), Appendix D].

d. Piezometers P-15 and P-16, shall be constructed, and the information described in Specific Conditions #20.a., and #20.c. (above) shall be submitted prior to the Certification of Construction Completion required by Specific Condition #13.

e. All field and laboratory work done in connection with routine groundwater monitoring shall be conducted by a firm possessing a Generic Quality Assurance Plan or a Comprehensive Quality Assurance Plan approved by the Department in accordance with Chapter 62-160, F.A.C. The Quality Assurance Plan must specifically address the sampling and analytical work that is required by the permit. The approved Quality Assurance Plan shall be followed by all persons collecting or analyzing samples related to this permit.

SPECIFIC CONDITIONS:

(Specific Condition #20. cont'd)

f. All water quality monitoring analysis shall be reported on the Department's Groundwater Monitoring Report Form 62-522.900(2). The Sampling Report shall include the items listed in Rule 62-701.510(9)(a), F.A.C. The results shall be sent to the Solid Waste Section, Department of Environmental Protection Southwest District Office, 3804 Coconut Palm Drive, Tampa, Florida 33619-8313.

g. Gas Probes GP-1 through GP-9 are shown on Sheet 5 of 5 in the Plan Sheets entitled, "Gas Management System and Miscellaneous Details at Closure," [ref. SC#2.a(9)]. These probes shall be constructed, and the information described in Specific Conditions #20.a., and #20.c. (above), as appropriate, shall be submitted prior to the Certification of Construction Completion required by Specific Condition #13.

21. **Management of Dewatering Fluids.** Dewatering fluids from the trench excavation shall be either:

a. Managed as leachate and disposed of at a permitted wastewater treatment facility, if the fluid chemistry is the same as the site's leachate (no additional testing required) or;

b. Discharged to an on-site reinfiltration pond, if initial testing of the ground waters (i.e. dewatering fluids) to be removed indicates that it will not present a violation of ground water quality standards in excess of the background water quality, **AND** reinfiltration is conducted under the Department-approved plan which specifies sampling parameters, frequency, discharge rate and other pertinent information.

c. In the event that the option described in Specific Condition #21.b. (see also Option 1, Specification Section 02140-3.02.A.2.), is used, **within 30 days of** implementation, a leachate management plan shall be submitted to the Department for approval. This plan shall include, but not be limited to, sampling parameters, frequencies, discharge rate and other pertinent information. In no case shall use of the reinfiltration pond cause a violation of Department water quality standards.

22. **Professional Certification.** Where required by Chapter 471 (P.E.) or Chapter 492 (P.G.), Florida Statutes, applicable portions of permit applications and supporting documents which are submitted to the Department for public record shall be signed and sealed by the professional(s) who prepared or approved them.

SPECIFIC CONDITIONS:

23. **Permit Acceptance.** By acceptance of this Permit, the permittee certifies that he/she has read and understands the obligations imposed by the Specific and General Conditions contained herein and also including date of permit expiration and renewal deadlines. It is a violation of this permit for failure to comply with all conditions and deadlines.

24. **General Conditions.** The permittee shall be aware of and operate under the "General Conditions". General Conditions are binding upon the permittee and enforceable pursuant to Chapter 403, Florida Statutes.

Executed in Tampa, Florida

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

for Richard D. Garrity, Ph.D.
Director of District Management
Southwest District

ATTACHMENT 1

SPECIFIC CONDITION	SUBMITTAL DUE DATE	REQUIRED ITEM
2.d.	No later than October 1, 1999	Complete Construction
4.	180 days prior to expiration	Apply for permit renewal
5.a.	30 days prior to construction	Submit complete plans and specifications, noting changes; CQA Figure 1-1
5.b.	30 days prior to initiation of tank system construction	Submit tank anchorage details, cathodic protection details, secondary containment calculations
5.c.	10 days prior to liner installation	Submit Installer's QC Plan, GM mfg. material test results, alternative seaming procedures, boot details
6.	72 hours prior to meeting	Notification of pre-construction meetings
6.	2 weeks after meeting	Submit minutes of pre-construction meeting
7.a.	1 week after pre-construction meeting	Submit construction schedule
7.b.	Monthly	Update construction schedule and progress report
9.e.	1 week prior to initiation	Notify of night activities
9.m.	1 week prior to testing	Notify of holiday testing
10.	Immediately (within 24 hours)	Notify if clay layer is not found at the expected elevation

ATTACHMENT 1 (cont'd)

SPECIFIC CONDITION	SUBMITTAL DUE DATE	REQUIRED ITEM
13.	Within 60 days after construction is complete	Submit Certification of Construction Completion, Arrange for inspection, submit Record Documents, submit narrative describing all deviations, submit final report, request modification to Operation Permit
17.a.	No later than 30 days after completion	Submit tank mfg. inspection report
17.a.	Within 15 days of owner's receipt of inspection report	Submit schedule for corrective measures
17.a.	Within 60 days of inspection report	Complete corrective measures
17.b.	Within 24 hours of occurrence	Notify the Department of damage to any portion of the landfill, groundwater monitoring or tanks systems
17.c.	Within 60 days of notification	Complete repairs to groundwater monitoring system
17.d.	Within 30 days of notification	Implement corrective actions to stormwater or leachate management systems
20.	Prior to submittal of Certification Documents	Groundwater monitoring system requirements complete
21.	Within 30 days of implementation	Submit leachate management plan for reinfiltration pond