APPENDIX F.1
Manufacturers Submittals

GSE®

Geomembranes

GSE HD • GSE HD Textured • GSE White • GSE White Textured • GSE Conductive • GSE Conductive Textured • GSE Conductive White
GSE Green Textured • GSE HD Weld Edge Textured • GSE UltraFlex • GSE UltraFlex Textured • GSE UltraFlex White • GSE Ultraflex White Textured

Manufacturing Quality Assurance Manual

www.gseworld.com

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I. 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 supply materials that meet or exceed the requirements and specifications of GSE and our customers.

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.

II. 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 implementation of basic manufacturing quality assurance (MQA) procedures necessary to ensure consistent production of quality products supplied to the geosynthetic market. Note that at this time, these procedures are limited to polyethylene geomembranes.

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 assure that raw materials and process parameters are controlled to provide products complying with GSE's pre-defined minimum characteristics.

III. MANUFACTURING QUALITY ASSURANCE ORGANIZATION

This organization consists of the Manufacturing Quality Assurance Laboratories 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. 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 detailed training that includes factory exposure.

IV. STAFF AND SCHEDULING

The Quality Assurance Laboratories are staffed whenever manufacturing is occurring; this is usually 24 hours per day, 365 days per year. This minimizes the amount of potentially inferior product produced before a manufacturing problem is identified.

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V. PRODUCT IDENTIFICATION AND DOCUMENTATION

A. *Roll Numbering*

Each roll of geomembrane is assigned a unique roll number. The Quality Assurance Laboratory maintains records documenting the raw materials and resulting product quality information.

B. *Approval Procedure*

Results for each tested roll of product are checked against both GSE and customer specifications for compliance. The Quality Assurance Laboratory approves those materials that meet both of these requirements for shipment.

C. *Non-Conformance*

Material that 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.

Material that 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. *Documentation*

Individual Quality Assurance Certificates are generated and supplied for each roll of geomembrane product to include all relevant quality assurance information about the material(s).

VI. RECORDS RETENTION

GSE maintains 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.

MATERIAL	ITEM	YEARS
Raw materials	Resin Supplier Test Reports and Certifications	≥2
	GSE Resin Test Reports	≥2
	Resin Sample Retain (Archive)	≥2
Geomembrane	Raw Test Data (in computer database)	≥5
	Quality Control Certificates (in computer database)	≥5
	Sample Retain (approximately one square foot)	≥3

VII. TESTING CAPABILITIES

GSE maintains high capacity, state-of-the-art laboratory equipment suitable for performing the procedures listed in Appendices A-D. GSE's Houston laboratories are accredited by the GAI-LAP program. GSE's Houston laboratories, as part of GSE's Product Division, also hold ISO certification. The appropriate certificates are maintained for review upon request by authorized parties.

A. *Routine Testing*

Through careful investigation, GSE has developed a strict and thorough Quality Assurance program that exceeds the vast majority of customer specifications including GRI GM13, "Test Properties, Testing

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Frequency and Recommended Warranty for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes" and GRI GM17 "Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes". The testing program covers raw materials (see Appendix A) and finished goods (see Appendix B) and is adhered to at all GSE laboratories. The laboratory equipment used by GSE represents the most modern equipment available and meets or exceeds the requirements of all the test standards used.

B. Other Testing Capabilities

In addition to routine testing, GSE laboratories are equipped to perform a wide variety of other tests as required for unusual requests or product development. Further, although the GSE Quality Assurance Laboratories are fully equipped and able to perform most routinely specified tests in the industry, there are some tests that 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.

VIII. MATERIAL QUALITY ASSURANCE

GSE Lining Technology, Inc. has established strict specifications for all raw materials and finished products. Test results must fall within the acceptable limits of GSE and customer specifications.

A. Raw Material

GSE primarily uses two types of raw materials, "natural resin" and "masterbatch" in the manufacture of geomembrane products. Natural resin is the base material that is used to make a geomembrane. It contains stabilizers to prevent degradation from occurring during and after extrusion. "Masterbatch" is the term referring to the concentrated carbon black material used with the natural resin to produce the finished product. The natural resin and masterbatch are blended at the appropriate ratio at the manufacturing stage. The masterbatch can contain other additives depending upon the geomembrane product to be produced. GSE verifies the properties of each lot of raw material prior to their utilization.

When natural resin is received, samples are taken and subjected to the tests outlined in Appendix A. All test data are entered into the computer database and checked for accuracy, consistency and compliance with GSE specifications. The material is not accepted unless all standard test requirements are met and the GSE test values meet the requirements set forth in the raw material specifications.

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 are provided in a separate report upon request.

Virgin resin 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., 23,000 kg)

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 products. Tables containing GSE minimum properties and test frequencies for all GSE geomembrane products includ-

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ing specialty products such as GSE White (light-reflective geomembrane) and GSE Conductive (field spark-testable geomembrane) are in Appendix B.

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 that 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 geomembrane is being produced, thickness readings are taken continuously over the length and width of the roll. These data are used to establish the minimum, maximum and average thickness values for each roll and are 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 holes are rejected from standard product inventory.

2. *Smooth Geomembrane Materials*

Smooth geomembrane products available include high density and linear low density polyethylene materials with 2-3% carbon black. Specialty materials include White, electrically conductive, green surfaced, and smooth edge textured geomembranes.

a) Sampling

Geomembrane rolls are sampled for QA testing according to the frequencies in Appendix B. An approximate one-foot by roll width sample is cut for Quality Assurance testing. Specimens for testing are taken from five predetermined positions across the width of the roll. Specimens are cut for testing the machine direction and transverse direction. A "retain" or archive sample approximately 12 x 12 inch (30 x 30 cm) is taken from the corresponding transverse direction position from the laboratory sample. The retain is labeled and kept for future reference (see Section VI).

b) Evaluation of Results

All data are entered into a computer database for calculation and comparison to GSE and customer-specific specifications. If materials do not meet 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.

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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.

3. Coextruded Textured Geomembranes

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. Regular, White, green surfaced, and conductive geomembranes are available with coextruded texturing.

a) Sampling

Geomembrane rolls are sampled for QA testing according to the frequencies in Appendix B. An approximate one-foot by roll width sample is cut for Quality Assurance testing. Specimens for testing are taken from five predetermined positions across the width of the roll. Specimens for testing the machine and transverse direction tensile are cut from each of the five positions. A "retain" or archive sample approximately 12 x 12 inch (30 x 30 cm) is taken from the corresponding transverse direction position from the laboratory sample. The retain is labeled and kept for future reference (see Section VI).

Evaluation of results and reporting practices are the same as for smooth geomembranes.

C. 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.

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Appendix A - Minimum Testing Frequencies and Properties for GSE Raw Materials

MINIMUM TESTING FREQUENCIES FOR GSE RAW MATERIALS

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*/4218	N/A
Carbon Black Dispersion	ASTM D 5596	NA

[1] GSE utilizes test equipment and procedures that 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.
*Modified.

MINIMUM PROPERTIES FOR GSE RAW MATERIALS

Property	Test Method[1]	HDPE	LLDPE
Density [g/cm³]	ASTM D 1505	0.932	0.915
Melt Flow Index [g/10 min]	ASTM D 1238 (190/2.16)	≤ 1.0	≤ 1.0
OIT [minutes]	ASTM D 3895 (1 ATM at 200° C)	100	100

[1] GSE utilizes test equipment and procedures that 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.

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MINIMUM PROPERTIES FOR GSE HD

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE				
Product Code			HDE 030A000	HDE 040A000	HDE 060A000	HDE 080A000	HDE 100A000
Thickness, (minimum average) mil (mm)	ASTM D 5199	every roll	30 (0.75)	40 (1.00)	60 (1.50)	80 (2.00)	100 (2.50)
Lowest individual reading (-10%)			27 (0.69)	36 (0.91)	54 (1.40)	72 (1.80)	90 (2.30)
Density, g/cm³	ASTM D 1505	200,000 lb	0.94	0.94	0.94	0.94	0.94
Tensile Properties (each direction)	ASTM D 6693, Type IV	20,000 lb					
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		114 (20)	152 (27)	228 (40)	304 (53)	380 (67)
Strength at Yield, lb/in-width (N/mm)			63 (11)	84 (15)	126 (22)	168 (29)	210 (37)
Elongation at Break, %	G.L. 2.0 in (51 mm)		700	700	700	700	700
Elongation at Yield, %	G.L. 1.3 in (33 mm)		12	12	12	12	12
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	21 (93)	28 (125)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	54 (240)	72 (320)	108 (480)	144 (640)	180 (800)
Carbon Black Content, %	ASTM D 1603*/4218	20,000 lb	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1	+Note 1	+Note 1
Notched Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lb	300	300	300	300	300
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**				
Oxidative Induction Time, min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>100	>100	>100	>100	>100
Roll Length[1] (approximate), ft (m)			1,120 (341)	870 (265)	560 (171)	430 (131)	340 (104)
Roll Width[1], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft² (m²)			25,200 (2,341)	19,575 (1,819)	12,600 (1,171)	9,675 (899)	7,650 (711)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- GSE HD is available in rolls weighing about 3,900 lb (1,769 kg)
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [1]Roll lengths and widths have a tolerance of ± 1%.
- *Modified.

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APPENDIX F.2
Conformance Test

ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.
7943 PECUE LANE SUITE A BATON ROUGE, LA 70809 TEL (225) 291-2700 FAX (225) 291-2788

TO: Saiia Construction, LLC
324 Commons Drive
Birmingham, AL 35209
Tel # : (205) 290 - 0400
ATTENTION: Gary Wilford

DATE: October 17, 2008
JOB NAME: International Paper Riegelwood
Cell 1 South Expansion
TRANSMITTAL NUMBER: 03
ESI PROJECT NUMBER: 08-08-1240

WE ARE SENDING YOU [X] ATTACHED [ ] UNDER SEPARATE COVER VIA _____ THE FOLLOWING ITEMS:

[ ] SHOP DRAWINGS [ ] PRINTS [ ] PLANS [ ] SAMPLES [ ] SPECIFICATIONS

[ ] COPY OF LETTER [ ] CHANGE ORDER [ ] _____

COPIES	DATE	DRAWING NO.	REV.	DESCRIPTION	ACTION (*)
1	10/17/08			GSE 60 Mil Textured HDPE Liner Certs	

ACTION (*)

[ ] AS - AS REQUESTED [X] FA - FOR APPROVAL [ ] _____

[ ] F – FILE [ ] RC - REVIEW & COMMENT [ ] _____

COMMENTS: _____

SENT VIA:

[X] E-MAIL [ ] MAIL [ ] OVERNIGHT [ ] HAND DELIVERY [ ] OTHER

COPY TO: _____ BY: Kevin Simms

If enclosures are not as noted, please notify us at once.....

GSE Roll Allocation

Order 55726
Customer ESI
Site International Paper Reigelwood Cell 1

Roll#	*Resin Lot*	*Product Code*	*Description*	*Mfg. Date*	*Length*
105140262	8281183	HDT060G000	HDT060G000	10/11/2008	520
105140263	8281183	HDT060G000	HDT060G000	10/11/2008	520
105140264	8281183	HDT060G000	HDT060G000	10/11/2008	520
105140265	8281183	HDT060G000	HDT060G000	10/11/2008	520
105140266	8281183	HDT060G000	HDT060G000	10/11/2008	520
105140267	8281183	HDT060G000	HDT060G000	10/11/2008	520
105140268	8281183	HDT060G000	HDT060G000	10/11/2008	520
105140269	8281183	HDT060G000	HDT060G000	10/11/2008	520
105140270	8281183	HDT060G000	HDT060G000	10/12/2008	520
105140271	8281183	HDT060G000	HDT060G000	10/12/2008	520
105140272	8281183	HDT060G000	HDT060G000	10/12/2008	520

Lining Technology, Inc

Roll T Data Report

Sales Order No.	Project Number	Customer Name	Project Location	Product Name	Report Date
55726	525526	ESI	Reigelwood, NC	HDT060G000	########

GSE QC APPROVED

	ASTM D 5994		ASTM D638,Type IV / D6693								ASTM D 1004		ASTM D 4833	ASTM D 1505	ASTM D 4218/1603	ASTM D 5596	GRI GM 12	
	Average Thickness (mils)	Minimum Thickness (mils)	TD Strength @ Yield (ppi)	MD Strength @ Yield (ppi)	TD Strength @ Break (ppi)	MD Strength @ Break (ppi)	TD Elongation @ Yield (%)	MD Elongation @ Yield (%)	TD Elongation @ Break (%)	MD Elongation @ Break (%)	TD Tear Resistance (lbs)	MD Tear Resistance (lbs)	Puncture Resistance (lbs)	Density (g/cc.)	Carbon Black Content (%)	Carbon Black Dispersion Views in Cat1 - Cat2	Asperity Height Side A (mils)	Asperity Height Side B (mils)
Roll No.	every roll		every 4th								every 4th		every 4th	every 4th	every 4th	every 4th	every 2nd	
105140262	59	56	154	151	177	186	17	18	481	497	50	52	142	0.945	2.36	10	24	28
105140263	60	56	163	163	156	206	16	18	367	517	51	55	152	0.945	2.40	10	23	31
105140264	58	55	163	163	156	206	16	18	367	517	51	55	152	0.945	2.40	10	23	31
105140265	58	54	163	163	156	206	16	18	367	517	51	55	152	0.945	2.40	10	23	26
105140266	59	55	163	163	156	206	16	18	367	517	51	55	152	0.945	2.40	10	23	26
105140267	64	57	149	148	170	193	17	18	413	531	51	52	141	0.945	2.58	10	24	24
105140268	65	57	149	148	170	193	17	18	413	531	51	52	141	0.945	2.58	10	24	24
105140269	64	57	149	148	170	193	17	18	413	531	51	52	141	0.945	2.58	10	24	23
105140270	66	57	149	148	170	193	17	18	413	531	51	52	141	0.945	2.58	10	24	23
105140271	63	57	150	149	174	194	18	18	443	528	49	51	144	0.945	2.39	10	24	29
105140272	65	58	150	149	174	194	18	18	443	528	49	51	144	0.945	2.39	10	24	29

Laboratory Manager: Jane Allen

GSE-8.2.4-029 Rev -- 03/05

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19103 Gundle Road - Houston, Texas 77073

CoA Date: 09/02/2008

Certificate of Analysis

Shipped To: CHEVRON PHILLIPS CHEM. CO LP: GSE 19103 GUNDLE ROAD WESTFIELD TX 77090 USA	CPC Delivery #: 87729177 PO #: 44276 Weight: 187400 LB Ship Date: 09/02/2008 Package: BULK
Recipient: UP TRACK 14732 Phouangsavanh Fax:	Mode: Hopper Car Car #: PSPX006786 Seal No: 268222

Product:
MARLEX POLYETHYLENE K306 BULK

Lot Number: 8281183

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.1	g/10mi
HLMI Flow Rate	ASTM D1238	12.6	g/10mi
Density	ASTM D1505	0.937	g/cm3
Production Date		08/31/2008	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at 800-231-1212

ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.
7943 PECUE LANE SUITE A BATON ROUGE, LA 70809 TEL (225) 291-2700 FAX (225) 291-2788

TO: Saiia Construction, LLC
324 Commons Drive
Birmingham, AL 35209
Tel # : (205) 290 - 0400
ATTENTION: Gary Wilford

DATE: December 2, 2008
JOB NAME: International Paper Riegelwood
Cell 1 South Expansion
TRANSMITTAL NUMBER: 10
ESI PROJECT NUMBER: 08-08-1240

WE ARE SENDING YOU [X] ATTACHED [ ] UNDER SEPARATE COVER VIA _____ THE FOLLOWING ITEMS:

[ ] SHOP DRAWINGS [ ] PRINTS [ ] PLANS [ ] SAMPLES [ ] SPECIFICATIONS

[ ] COPY OF LETTER [ ] CHANGE ORDER [ ] _____

COPIES	DATE	DRAWING NO.	REV.	DESCRIPTION	ACTION (*)
1	12/2/08			ESCR, OIT & Oven Aging Test Results	

ACTION (*)

[ ] AS - AS REQUESTED [X] FA - FOR APPROVAL [ ] _____

[ ] F – FILE [ ] RC - REVIEW & COMMENT [ ] _____

COMMENTS:

SENT VIA:

[X] E-MAIL [ ] MAIL [ ] OVERNIGHT [ ] HAND DELIVERY [ ] OTHER

COPY TO: _____

BY: Kevin Simms

If enclosures are not as noted, please notify us at once.....

Report Date
12/2/2008

Quality Assurance Laboratory Test Results

Job Name: International Paper Reigelwood Cell 1
SO Number: 55726

The table below summarizes additive performance of GSE Houston products as perceived by OIT retention after Oven and UV Aging per GRI Test Method GM13:

		Oven Aging @ 85° C (ASTM D 5721)				UV Resistance per GRI GM11			
		90 days per ASTM D 3895				1600 hours UV Aging per ASTM D 5885			
Product Type	**Formulation**	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)
HDPE Geomembrane	Chevron Phillips Marlex® K306 + Carbon Black	697	661	94	80	697	565	81	50

Approved By: Jane Allen
Date: December 2, 2008

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Report Date
12/2/2008

Quality Assurance Laboratory Test Results

Job Name: International Paper Reigelwood Cell 1
Sales Order: 55726

Required Testing: ASTM D 3895 -- Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry

Custom Frequency: 1/200,000 lbs

Custom Criteria: 100 minutes

Product Code	Resin Lot Number	Test Results
HDT060G000	8281183	PASS

Approved By: Jane Allen
Date Approved: December 2, 2008

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Report Date
12/2/2008

Quality Assurance Laboratory Test Results

Job Name: International Paper Reigelwood Cell 1
Sales Order: 55726

Required Testing: ASTM D 5397 - Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test

Custom Frequency: 1/Resin Lot

Custom Criteria: 300 hours

Product Code	Resin Lot Number	Test Results
HDT060G000	8281183	PASS

Approved By: Jane Allen
Date Approved: December 2, 2008

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APPENDIX F.3
HDPE CQA Conformance Test & Roll Inventory

GEOSYNTHETICS INVENTORY LOG
60 MIL HDPE GEOMEMBRANE (TEXTURED)

Project Name: **IP Cell 1 Extension**
Project Number: IP-08-4
Contractor: SAIIA
Geosynthetics Installer: ESI

Total Rolls: 11
Total Lots: 1
Total SF: 125840
Storage Area: Unlined Landfill Access Area
Inventory Monitor(s): RMS

Geosynthetic Material Type: 60-Mil HDPE Geomembrane (Textured)
Geosynthetic Product Identification: GSE HDT060

Material		Material Dimensions		Conformance Sample	Remarks
Roll No.	Batch/Lot No.	Length (Feet)	Width (Feet)		
105140262	8281183	520	22	CQA	MQC
105140263	8281183	520	22		MQC
105140264	8281183	520	22		MQC
105140265	8281183	520	22		MQC
105140266	8281183	520	22		MQC
105140267	8281183	520	22		MQC
105140268	8281183	520	22		MQC
105140269	8281183	520	22		MQC
105140270	8281183	520	22		MQC
105140271	8281183	520	22		MQC
105140272	8281183	520	22		MQC

Totals:

Total Rolls: 11
Total Lots: 1
Total SF: 125,840

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Geotechnics
..... GEOTECHNICAL, GEOENVIRONMENTAL, AND GEOSYNTHETIC LABORATORIES

November 3, 2008

Project No.: L08102-02

Mr. Greg Mills
Richardson, Smith, Gardner & Associates
14 N. Boylan Ave.
Raleigh, NC 27603

REC'D NOV 05 2008

Transmittal
Laboratory Test Results
IP Riegelwood Mill – Cell 1 South Expansion

Please find attached the laboratory test results for the above referenced project. The tests were performed in general accordance with the procedures referenced on the data tables as well as industry practice. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to be of service and trust that our efforts have contributed to the success of your project. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

J.P. Kline, P.E.
Laboratory Director

GAI-LAP
Initials: JPK **#: 14-96**
Date: 11-3-08

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: RICHARDSON, SMITH,GARDNER & ASSOCIATES, INC
CLIENT PROJECT: IP RIEGELWOOD MILL
CELL 1 SOUTH EXPANSION
PROJECT NO.: L08102-02
LAB ID NO.: L08102-02-01
MATERIAL: GSE 60 MIL TEXTURED HDPE
ROLL NO: 105140262

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	66	58	68	67	64		
			62	59	64	67	58	**63.3**	3.86
DENSITY	D 1505	g/cc	0.9481	0.9481	0.9481			**0.9481**	0.0000
CARBON BLACK CONTENT	D 1603	%	2.51	2.38				**2.44**	0.095
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
TEAR RESISTANCE	D 1004	MD-lbs	56.0	53.2	58.0	57.9	56.1		
			53.6	55.8	56.3	55.7	55.9	**55.9**	1.54
		CD-lbs	53.9	51.8	51.9	54.9	54.4		
			52.6	58.5	57.1	50.4	53.1	**53.9**	2.49
TENSILE PROPERTIES	D 6693								
STRENGTH AT YIELD		MD-ppi	163	174	158	180	164	**168**	8.80
		CD-ppi	167	166	177	163	173	**169**	5.55
STRENGTH AT BREAK		MD-ppi	178	213	202	219	196	**202**	16.04
		CD-ppi	160	169	184	180	194	**177**	13.21
ELONGATION AT YIELD		MD%	17	16	15	17	17	**16.3**	1.04
Lo = 1.3"		CD%	14	16	15	15	15	**15.1**	0.74
ELONGATION AT BREAK		MD%	405	509	513	514	493	**487**	46.50
Lo = 2.0"		CD%	406	422	461	484	494	**453**	38.32

CHECKED BY: BF DATE: 10-21-08

\\GEOSERVER\Data Drive\Synthetics\2008 synthetics\[L08102-02-01 HDPE IP RIEGELV L08102-02-01 10/21/2008

APPENDIX F.4
Subgrade Acceptance

ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

SUBGRADE ACCEPTANCE

PROJECT NAME: TD RIEGELWOOD L.F

LOCATION: RIEGELWOOD L.F N.C

I, undersigned, a duly appointed representative of Environmental Specialties International, Inc., have visually observed the soil subgrade surface described below, and found it to be an acceptable surface on which to install geomembrane.

The certification is based on observations of the subgrade only. No subterranean inspections or tests have been performed by Environmental Specialties International, Inc. and ESI makes no representations or warranties regarding conditions which may exist below the surface of the subgrade. Environmental Specialties International, Inc. accepts no responsibility for conformance of the subgrade to this project's specifications.

Area Being Accepted : 12/2/08 PANELS DEPLOYMENT 1-21

Date: 12/2/08

Signature:

Name: KHOOPHONE SOCKLUKSI

Title: Q.C

OWNERS REPRESENTATIVE:

Date: 12/3/08

Signature:

Name: RICHARD SHELEHAM

Title: CQA ENGINEER

Company: RSG ENGINEERS

ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

SUBGRADE ACCEPTANCE

PROJECT NAME: IP-RIEGELWOOD L.F.

PROJECT NUMBER: 08-08-1280

OWNER:

LOCATION: RIEGELWOOD, N.C

I, undersigned, a duly appointed representative of Environmental Specialties International, Inc., have visually observed the soil subgrade surface described below, and found it to be an acceptable surface on which to install geomembrane.

The certification is based on observations of the subgrade only. No subterranean inspections or tests have been performed by Environmental Specialties International, Inc. and ESI makes no representations or warranties regarding conditions which may exist below the surface of the subgrade. Environmental Specialties International, Inc. accepts no responsibility for conformance of the subgrade to this project's specifications.

Area Being Accepted : 12/3/08 PANELS DEPLOYMENT 22-39

Date: 12/3/08

Signature:

Name: KHOPHONE SOCKLUXA.

Title: Q.C

OWNERS REPRESENTATIVE:

Date: 12/3/08

Signature:

Name: RICHARD SHEEHAN

Title: CQA ENGINEER

Company: RSG ENGINEERS

ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

SUBGRADE ACCEPTANCE

PROJECT NAME: JD. RIEGELWOOD L.F

PROJECT NUMBER: 08-08-1240

OWNER:

LOCATION: RIEGELWOOD, N.C

I, undersigned, a duly appointed representative of Environmental Specialties International, Inc., have visually observed the soil subgrade surface described below, and found it to be an acceptable surface on which to install geomembrane.

The certification is based on observations of the subgrade only. No subterranean inspections or tests have been performed by Environmental Specialties International, Inc. and ESI makes no representations or warranties regarding conditions which may exist below the surface of the subgrade. Environmental Specialties International, Inc. accepts no responsibility for conformance of the subgrade to this project's specifications.

Area Being Accepted : 12/4/08 PANELS DEPLOYMENTS 40-57

Date: 12/4/08

Signature: [signature]

Name: KATHONE SOCKLUKAI

Title: Q.C

OWNERS REPRESENTATIVE:

Date: 12/4/08

Signature: [signature]

Name: RICHARD SHEEHAN

Title: CQA ENGINEER

Company: RSG ENGINEERS

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APPENDIX F.5
Trial Weld Logs

Trial Weld Summary

Project Name: International Paper Cell 1 Extension

QA/QC Monitor: RMS

Project Number: IP-08-4

60 mil HDPE Minimum Value 120 ppi (Peel) / 91 ppi (Shear) / 78 ppi (extrusion seams)

Test No.	Date	Time	Weather (Cloudy/ Sunny)	Amb. Temp. (°F)	Welder I.D.	Machine Number	Temp. Setting/ Speed	Weld Type	PEEL (ppi)						SHEAR (ppi)			Test Result (P/F)	Comments
									Outside Weld			Inside Weld							
									1	2	3	1	2	3	1	2	3		
1	12/2/2008	12:55	Sunny	53	TE	843	860/5	HW	136	137	147	137	152	139	179	180	185	P	
2	12/2/2008	1:00	Sunny	53	PT	834	860/5	HW	144	141	147	154	141	156	160	180	176	P	
3	12/2/2008	1:10	Sunny	53	OD	837	840/5	HW	131	123	142	131	141	149	179	183	191	P	
4	12/3/2008	9:12	Sunny	45	SS	2	550	EW	124	135	145				185	180	181	P	
5	12/3/2008	9:30	Sunny	45	TE	19	550	EW	153	149	141				186	186	187	P	
6	12/3/2008	1:05	Sunny	58	PT	834	860/5	HW	150	145	139	139	147	126	171	179	180	P	
7	12/3/2008	1:45	Sunny	58	OD	837	850/5	HW	137	143	145	139	125	135	174	180	171	P	
8	12/3/2008	1:50	Sunny	58	TE	843	860/5	HW	141	151	148	137	146	141	182	184	170	P	
9	12/3/2008	1:15	Sunny	56	SS	19	550	EW	143	115	131				171	170	170	P	
10	12/4/2008	7:30	Sunny	32	SS	2	550	EW	123	121	119				155	160	153	P	
11	12/4/2008	1:21	Sunny	60	OD	837	850/5	HW	131	131	140	130	131	135	164	157	150	P	
12	12/4/2008	1:22	Sunny	60	PT	834	860/5	HW	125	134	132	142	152	161	172	171	160	P	
13	12/4/2008	1:15	Sunny	60	TE	843	850/5	HW	139	140	132	134	135	135	177	177	178	P	
14	12/4/2008	1:10	Sunny	60	SS	2	550	EW	125	130	115				153	150	138	P	
15	12/5/2008	7:30	Cloudy	42	SS	2	550	EW	114	111	136				198	187	195	P	
16	12/5/2008	7:32	Cloudy	42	SS	2	550	EW	118	97	113				180	170	176	P	
17	12/5/2008	8:10	Cloudy	42	TE	19	550	EW	133	158	129				188	194	191	P	
18	12/5/2008	8:10	Cloudy	42	TE	19	550	EW	92	102	108				171	170	166	P	
19	12/5/2008	1:11	Cloudy	50	SS	2	550	EW	108	113	113				176	177	178	P	

Trial Weld Summary

Project Name: International Paper Cell 1 Extension

QA/QC Monitor: RMS

Project Number: IP-08-4

60 mil HDPE Minimum Value 120 ppi (Peel) / 91 ppi (Shear) / 78 ppi (extrusion seams)

Test No.	Date	Time	Weather (Cloudy/ Sunny)	Amb. Temp. (°F)	Welder I.D.	Machine Number	Temp. Setting/ Speed	Weld Type	PEEL (ppi)						SHEAR (ppi)			Test Result (P/F)	Comments
									Outside Weld			Inside Weld							
									1	2	3	1	2	3	1	2	3		
20	12/5/2008	1:20	Cloudy	50	TE	19	550	EW	97	125	114				160	149	160	P	
21	12/5/2008	2:00	Cloudy	45	TE	19	550	EW	111	126	105				170	172	167	P	

APPENDIX F.6
Panel Replacement

Panel Placement Summary

Project Name: International Paper - Cell 1 South Extension

Project Number: IP-08-4

QA/QC Monitor: RMS

Panel Number	Date	Time	Roll Number	Mat. Id.	Final Length (Feet)	Width (ft)	Final Area (Sq. Ft.)	Comments
1	12/2/2008	1:40	267	60 mil.	97	18	1,746	
2	12/2/2008	1:45	267	60 mil.	42	9	378	Wedge/Pie
3	12/2/2008	1:47	267	60 mil.	91	22.5	2,048	
4	12/2/2008	1:55	267	60 mil.	92	22.5	2,070	
5	12/2/2008	2:10	267	60 mil.	93	22.5	2,093	
6	12/2/2008	2:15	267	60 mil.	94	22.5	2,115	
7	12/2/2008	2:20	267	60 mil.	41	22.5	923	
8	12/2/2008	2:30	268	60 mil.	56	22.5	1,260	
9	12/2/2008	2:35	268	60 mil.	95	22.5	2,138	
10	12/2/2008	2:40	268	60 mil.	96	22.5	2,160	
11	12/2/2008	2:45	268	60 mil.	97	22.5	2,183	
12	12/2/2008	2:50	268	60 mil.	97	22.5	2,183	
13	12/2/2008	2:55	268	60 mil.	59	22.5	1,328	
14	12/2/2008	3:05	265	60 mil.	38	22.5	855	
15	12/2/2008	4:17	265	60 mil.	101	22.5	2,273	
16	12/2/2008	4:23	265	60 mil.	103	22.5	2,318	
17	12/2/2008	4:30	265	60 mil.	105	22.5	2,363	
18	12/2/2008	4:35	265	60 mil.	105	22.5	2,363	
19	12/2/2008	4:40	265	60 mil.	58	22.5	1,305	
20	12/2/2008	4:45	272	60 mil.	47	22.5	1,058	
21	12/2/2008	4:50	272	60 mil.	107	22.5	2,408	
22	12/3/2008	1:36	272	60 mil.	110	22.5	2,475	
23	12/3/2008	1:48	272	60 mil.	111	22.5	2,498	
24	12/3/2008	2:05	272	60 mil.	111	22.5	2,498	
25	12/3/2008	2:20	264	60 mil.	113	22.5	2,543	
26	12/3/2008	2:26	264	60 mil.	111	22.5	2,498	
27	12/3/2008	2:35	264	60 mil.	110	22.5	2,475	
28	12/3/2008	2:40	264	60 mil.	110	22.5	2,475	
29	12/3/2008	2:55	264	60 mil.	62	22.5	1,395	
30	12/3/2008	3:10	263	60 mil.	112	22.5	2,520	
31	12/3/2008	3:16	263	60 mil.	119	22.5	2,678	

Panel Placement Summary

Project Name: International Paper - Cell 1 South Extension

Project Number: IP-08-4

QA/QC Monitor: RMS

Panel Number	Date	Time	Roll Number	Mat. Id.	Final Length (Feet)	Width (ft)	Final Area (Sq. Ft.)	Comments
32	12/3/2008	3:22	263	60 mil.	122	22.5	2,745	
33	12/3/2008	3:35	263	60 mil.	98	22.5	2,205	
34	12/3/2008	3:40	263	60 mil.	32	22.5	720	
35	12/3/2008	3:50	270	60 mil.	123	22.5	2,768	
36	12/3/2008	3:58	270	60 mil.	125	22.5	2,813	
37	12/3/2008	4:04	270	60 mil.	124	22.5	2,790	
38	12/3/2008	4:10	270	60 mil.	124	22.5	2,790	
39	12/3/2008	4:15	270	60 mil.	125	22.5	2,813	
40	12/4/2008	1:33	271	60 mil.	123	22.5	2,768	
41	12/4/2008	1:38	271	60 mil.	123	22.5	2,768	
42	12/4/2008	1:43	271	60 mil.	58	8	464	Wedge/Pie
43	12/4/2008	1:50	271	60 mil.	121	22.5	2,723	
44	12/4/2008	1:55	266	60 mil.	119	22.5	2,678	
45	12/4/2008	2:02	266	60 mil.	118	22.5	2,655	
46	12/4/2008	2:07	266	60 mil.	119	22.5	2,678	
47	12/4/2008	2:12	266	60 mil.	120	22.5	2,700	
48	12/4/2008	2:18	262	60 mil.	121	22.5	2,723	
49	12/4/2008	2:24	262	60 mil.	121	22.5	2,723	
50	12/4/2008	2:30	262	60 mil.	122	22.5	2,745	
51	12/4/2008	2:36	262	60 mil.	122	22.5	2,745	
52	12/4/2008	2:41	269	60 mil.	101	22.5	2,273	
53	12/4/2008	2:47	269	60 mil.	85	22.5	1,913	
54	12/4/2008	2:54	269	60 mil.	69	22.5	1,553	
55	12/4/2008	3:00	269	60 mil.	44	20	880	
56	12/4/2008	3:08	269	60 mil.	44	11	484	

APPENDIX F.7
Panel Seaming

Panel Seaming Summary

Cell 1 Extension

Project Name: International Paper - Riegelwood

QA/QC Monitor: RMS

Project Number: IP-08-4

SEAM NUMBER	SEAMER I.D.	TIME		DATE	APPROX. LENGTH OF SEAM (Feet)	DIRECTION OF SEAMING	COMMENTS
		IN	OUT				
P1/P3	PT - 834	1:55	2:08	12/2/2008	49	West to East	DS-1
P3/P4	TE - 843	2:00	2:15	12/2/2008	92	West to East	DS-2
P4/P5	OD - 837	2:06	2:23	12/2/2008	93	West to East	DS-3
P1/P2	PT - 834	2:08	2:16	12/2/2008	42	West to East	
P2/P3	PT - 834	2:20	2:25	12/2/2008	40	West to East	
P5/P6	TE - 843	2:20	2:40	12/2/2008	93	West to East	
P6/P7	OD - 837	2:47	3:03	12/2/2008	39	West to East	
P6/P8	OD - 837	2:30	2:47	12/2/2008	54	West to East	
P7/P8	PT - 834	2:32	2:40	12/2/2008	22	North to South	
P7/P9	PT - 834	2:58	3:08	12/2/2008	39	West to East	
P8/P9	PT - 834	2:40	2:58	12/2/2008	56	West to East	
P9/P10	TE - 843	2:45	3:05	12/2/2008	95	West to East	
P10/P11	OD - 837	2:55	3:14	12/2/2008	96	West to East	
P11/P12	PT - 834	3:10	3:30	12/2/2008	97	West to East	
P12/P13	OD - 837	3:27	3:38	12/2/2008	59	West to East	
P12/P14	OD - 837	3:19	3:27	12/2/2008	38	West to East	

Panel Seaming Summary

Cell 1 Extension

Project Name: International Paper - Riegelwood

QA/QC Monitor: RMS

Project Number: IP-08-4

SEAM NUMBER	SEAMER I.D.	TIME		DATE	APPROX. LENGTH OF SEAM (Feet)	DIRECTION OF SEAMING	COMMENTS
		IN	OUT				
P1/P3	PT - 834	1:55	2:08	12/2/2008	49	West to East	DS-1
P13/P14	TE - 843	3:20	3:24	12/2/2008	22	North to South	
P14/P15	PT - 834	4:23	4:31	12/2/2008	41	West to East	
P13/P15	PT - 834	4:31	4:42	12/2/2008	58	West to East	
P15/P16	OD - 837	4:30	4:50	12/2/2008	101	West to East	
P16/P17	TE - 843	4:33	4:54	12/2/2008	103	West to East	
P17/P18	PT - 834	4:45	5:05	12/2/2008	104	West to East	DS-4
P18/P19	TE - 843	5:10	5:20	12/2/2008	58	West to East	
P18/P20	TE - 843	5:00	5:10	12/2/2008	47	West to East	DS-5
P19/P20	OD - 837	4:53	4:58	12/2/2008	22	North to South	DS-6
P19/P21	OD - 837	5:12	5:30	12/2/2008	57	West to East	
P20/P21	OD - 837	5:02	5:12	12/2/2008	50	West to East	
P21/P22	PT - 834	1:50	2:07	12/3/2008	110	West to East	
P22/P23	OD - 837	2:07	2:28	12/3/2008	110	West to East	
P23/P24	PT - 834	2:15	2:37	12/3/2008	111	West to East	DS-7
P26/P27	OD - 837	2:47	3:24	12/3/2008	111	West to East	DS-9

Panel Seaming Summary

Cell 1 Extension

Project Name: International Paper - Riegelwood

QA/QC Monitor: RMS

Project Number: IP-08-4

SEAM NUMBER	SEAMER I.D.	TIME		DATE	APPROX. LENGTH OF SEAM (Feet)	DIRECTION OF SEAMING	COMMENTS
		IN	OUT				
P1/P3	PT - 834	1:55	2:08	12/2/2008	49	West to East	DS-1
P25/P26	PT - 834	2:50	3:08	12/3/2008	111	West to East	
P27/P28	TE - 843	3:00	3:20	12/3/2008	110	West to East	
P25/P30	PT - 834	3:15	3:35	12/3/2008	113	West to East	
P24/P33	TE - 843	3:45	4:06	12/3/2008	98	West to East	
P31/P32	PT - 834	3:30	4:12	12/3/2008	119	West to East	DS-10
P29/P34	TE - 843	4:03	4:10	12/3/2008	32	West to East	
P30/P31	OD - 837	3:30	4:18	12/3/2008	112	West to East	
P33/P34	TE - 843	4:10	4:36	12/3/2008	33	West to East	
P28/P24	TE - 843	4:42	4:44	12/3/2008	15	West to East	
P33/P28	TE - 843	4:44	4:49	12/3/2008	36	West to East	
P28/P29	TE - 843	4:49	5:09	12/3/2008	62	West to East	DS-8
P32/P35	PT - 834	4:20	4:52	12/3/2008	119	West to East	
P35/P36	OD - 837	4:27	5:01	12/3/2008	118	West to East	DS-11
P36/P37	PT - 834	5:00	5:30	12/3/2008	125	West to East	
P37/P38	OD - 837	5:04	5:36	12/3/2008	124	West to East	

Panel Seaming Summary

Cell 1 Extension

Project Name: International Paper - Riegelwood

QA/QC Monitor: RMS

Project Number: IP-08-4

SEAM NUMBER	SEAMER I.D.	TIME		DATE	APPROX. LENGTH OF SEAM (Feet)	DIRECTION OF SEAMING	COMMENTS
		IN	OUT				
P1/P3	PT - 834	1:55	2:08	12/2/2008	49	West to East	DS-1
P38/P39	TE - 843	5:30	5:50	12/3/2008	124	West to East	DS-12
P39/P40	TE - 843	1:20	1:50	12/4/2008	124	West to East	
P40/P41	PT - 834	1:27	1:57	12/4/2008	123	West to East	
P41/P42	OD - 837	2:16	2:26	12/4/2008	51	West to East	
P42/P43	OD - 837	1:36	2:05	12/4/2008	51	West to East	DS-13
P43/P44	PT - 834	2:00	2:30	12/4/2008	121	East to West	
P44/P45	TE - 843	2:05	2:30	12/4/2008	119	East to West	DS-14
P45/P46	OD - 837	2:31	2:55	12/4/2008	118	East to West	
P46/P47	TE - 843	2:40	3:05	12/4/2008	119	East to West	
P47/P48	PT - 834	2:35	3:05	12/4/2008	120	East to West	DS-15
P48/P49	OD - 837	3:00	3:24	12/4/2008	121	East to West	
P49/P50	PT - 834	3:10	3:40	12/4/2008	121	East to West	
P41/P43	OD - 837	1:19	1:35	12/4/2008	72	West to East	
P50/P51	OD - 837	3:44	4:08	12/4/2008	122	East to West	
P51/P52	PT - 834	3:45	4:10	12/4/2008	122	East to West	DS-16

Panel Seaming Summary

Cell 1 Extension

Project Name: International Paper - Riegelwood

QA/QC Monitor: RMS

Project Number: IP-08-4

SEAM NUMBER	SEAMER I.D.	TIME		DATE	APPROX. LENGTH OF SEAM (Feet)	DIRECTION OF SEAMING	COMMENTS
		IN	OUT				
P1/P3	PT - 834	1:55	2:08	12/2/2008	49	West to East	DS-1
P52/P53	OD - 837	4:13	4:35	12/4/2008	101	East to West	
P53/P54	PT - 834	4:12	4:30	12/4/2008	85	East to West	DS-17
P54/P55	OD - 837	4:40	5:00	12/4/2008	69	East to West	
P55/P56	PT - 834	4:37	4:49	12/4/2008	36	East to West	

TOTAL LENGTH OF SEAMS	5355
NUMBER OF DESTRUCT REQUIRED	11
NUMBER OF DESTRUCTS TAKEN	17

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APPENDIX F.8
Non-Destructive Tests

Non-Destructive Test Summary

International Paper - Riegelwood

Project Name: Cell 1 Extension QA/QC Monitor: RMS

Project Number: IP-08-4

Seam Number	Distance (Feet)	Air Test						Vacuum Test		Comments
		Date Air Tested	Air Pressure				Air Test Results (P/F)	Date Vacuum Tested	Vac. Test Results (P/F)	
			Start		End					
			PSI	Time	PSI	Time				
P1/P2	36	12/2/2008	30	2:41 PM	30	2:46 PM	P		P	
P2/P3	39	12/2/2008	30	2:42 PM	30	2:47 PM	P		P	
P1/P3	52	12/2/2008	30	2:49 PM	30	2:54 PM	P		P	
P3/P4	92	12/2/2008	30	3:00 PM	30	3:05 PM	P		P	
P4/P5	93	12/2/2008	30	3:03 PM	30	3:08 PM	P		P	
P5/P6	93	12/2/2008	30	3:34 PM	30	3:39 PM	P		P	
P6/P7	39	12/2/2008	30	3:30 PM	30	3:35 PM	P		P	
P6/P8	54	12/2/2008	30	4:00 PM	30	4:05 PM	P		P	
P7/P8	22	12/2/2008	30	4:07 PM	30	4:12 PM	P		P	
P7/P9	39	12/2/2008	30	3:31 PM	30	3:36 PM	P		P	
P9/P10	95	12/2/2008	30	4:17 PM	30	4:22 PM	P		P	
P10/P11	96	12/2/2008	30	4:32 PM	30	4:37 PM	P		P	
P11/P12	97	12/2/2008	30	4:33 PM	30	4:38 PM	P		P	
P12/P13	59	12/2/2008	30	4:46 PM	30	4:51 PM	P		P	
P12/P14	38	12/2/2008	30	4:47 PM	30	4:52 PM	P		P	
P14/P15	41	12/2/2008	30	5:07 PM	30	5:12 PM	P		P	

Non-Destructive Test Summary

International Paper - Riegelwood

Project Name: Cell 1 Extension QA/QC Monitor: RMS

Project Number: IP-08-4

Seam Number	Distance (Feet)	Air Test						Vacuum Test		Comments
		Date Air Tested	Air Pressure				Air Test Results (P/F)	Date Vacuum Tested	Vac. Test Results (P/F)	
			Start		End					
			PSI	Time	PSI	Time				
P13/P15	58	12/3/2008	30	9:07 AM	30	9:12 AM	P		P	
P15/P16	107	12/3/2008	30	9:08 AM	30	9:13 AM	P		P	
P16/P17	103	12/3/2008	30	9:20 AM	30	9:25 AM	P		P	
P17/P18	104	12/3/2008	30	9:21 AM	30	9:26 AM	P		P	
P18/P19	58	12/3/2008	30	9:33 AM	30	9:38 AM	P		P	
P18/P20	47	12/3/2008	30	9:41 AM	29	9:46 AM	P		P	
P20/P21	58	12/3/2008	30	9:51 AM	30	9:56 AM	P		P	
P19/P21	57	12/3/2008	30	9:50 AM	30	9:55 AM	P		P	
P21/P22	108	12/3/2008	30	3:00 PM	30	3:05 PM	P		P	
P22/P23	71	12/3/2008	30	3:01 PM	30	3:06 PM	P		P	39' E of AT to 71' E of AT
P22/P23	9	12/3/2008	30	3:16 PM	30	3:21 PM	P		P	AT to 9' E of AT
P22/P23	30	12/3/2008	30	3:15 PM	30	3:20 PM	P		P	9' E of AT to 39' E of AT
P23/P24	111	12/3/2008	30	3:30 PM	30	3:35 PM	P		P	
P25/P30	113	12/3/2008	30	4:25 PM	30	4:30 PM	P		P	
P25/P26	111	12/3/2008	30	4:26 PM	30	4:31 PM	P		P	
P26/P27	58	12/3/2008	30	4:35 PM	30	4:40 PM	P		P	52' E of AT to 110' E of AT

Non-Destructive Test Summary

International Paper - Riegelwood

Project Name: Cell 1 Extension QA/QC Monitor: RMS

Project Number: IP-08-4

Seam Number	Distance (Feet)	Air Test						Vacuum Test		Comments
		Date Air Tested	Air Pressure				Air Test Results (P/F)	Date Vacuum Tested	Vac. Test Results (P/F)	
			Start		End					
			PSI	Time	PSI	Time				
P26/P27	8	12/3/2008	30	4:45 PM	30	4:50 PM	P		P	44' E of AT to 52' E of AT
P26/P27	15	12/3/2008	30	4:46 PM	30	4:51 PM	P		P	29' E of AT to 44' E of AT
P26/P27	29	12/3/2008	30	4:53 PM	30	4:58 PM	P		P	
P27/P28	110	12/3/2008	30	4:36PM	30	4:41 PM	P		P	
P24/P33	98	12/4/2008	30	8:23 AM	30	8:28 AM	P		P	
P24/P28	15	12/4/2008	30	8:22 AM	30	8:27 AM	P		P	
P28/P33	32	12/4/2008	30	8:28 AM	30	8:33 AM	P		P	
P33/P29	34	12/4/2008	30	8:34 AM	30	8:39 AM	P		P	
P28/P29	62	12/4/2008	30	8:35 AM	30	8:40 AM	P		P	
P33/P34	33	12/4/2008	30	8:42 AM	30	8:47 AM	P		P	
P29/P34	32	12/4/2008	30	8:43 AM	30	8:48 AM	P		P	
P32/P35	92	12/4/2008	30	9:19 AM	30	9:24 AM	P		P	32' E of AT to 122' E of AT
P32/P35	9	12/4/2008	30	9:58 AM	30	10:03 AM	P		P	23' E of AT to 32' E of AT
P32/P35	23	12/4/2008	30	9:57 AM	30	10:02 AM	P		P	AT to 23' E of AT
P35/P36	123	12/4/2008	30	9:38 AM	30	9:43 AM	P		P	
P36/P37	125	12/4/2008	30	9:39 AM	30	9:44 AM	P		P	

Non-Destructive Test Summary

International Paper - Riegelwood

Project Name: Cell 1 Extension QA/QC Monitor: RMS

Project Number: IP-08-4

Seam Number	Distance (Feet)	Air Test						Vacuum Test		Comments
		Date Air Tested	Air Pressure				Air Test Results (P/F)	Date Vacuum Tested	Vac. Test Results (P/F)	
			Start		End					
			PSI	Time	PSI	Time				
P37/P38	124	12/4/2008	30	9:47 AM	30	9:52 AM	P		P	
P38/P39	124	12/4/2008	30	9:48 AM	30	9:53 AM	P		P	
P39/P40	124	12/4/2008	30	2:40 PM	30	2:45 PM	P		P	
P40/P41	41	12/4/2008	30	3:00 PM	30	3:05 PM	P		P	82' E of AT to 123' E of AT
P30/P31	117	12/3/2008	30	5:05 PM	30	5:10 PM	P		P	
P31/P32	119	12/3/2008	30	5:08 PM	30	5:13 PM	P		P	
P40/P41	82	12/4/2008	30	3:01 PM	30	3:06 PM	P		P	
P40/P41	41	12/4/2008	30	3:00 PM	30	3:05 PM	P		P	
P41/P42	51	12/4/2008	30	3:50 PM	30	3:55 PM	P		P	
P42/P43	51	12/4/2008	30	3:37 PM	30	3:42 PM	P		P	
P41/P43	72	12/4/2008	30	3:56 PM	30	4:01 PM	P		P	
P43/P44	121	12/4/2008	30	4:23 PM	30	4:28 PM	P		P	
P44/P45	119	12/4/2008	30	4:11 PM	30	4:16 PM	P		P	
P45/P46	118	12/5/2008	30	7:27 AM	30	7:32 AM	P		P	
P46/P47	119	12/5/2008	30	7:28 AM	30	7:33 AM	P		P	
P47/P48	120	12/5/2008	30	7:39 AM	30	7:44 AM	P		P	

Non-Destructive Test Summary

International Paper - Riegelwood

Project Name: Cell 1 Extension

QA/QC Monitor: RMS

Project Number: IP-08-4

Seam Number	Distance (Feet)	Air Test						Vacuum Test		Comments
		Date Air Tested	Air Pressure				Air Test Results (P/F)	Date Vacuum Tested	Vac. Test Results (P/F)	
			Start		End					
			PSI	Time	PSI	Time				
P48/P49	121	12/5/2008	30	7:40 AM	30	7:45 AM	P		P	
P49/P50	122	12/5/2008	30	7:49 AM	30	7:54 AM	P		P	
P50/P51	122	12/5/2008	30	7:50 AM	30	7:55 AM	P		P	
P51/P52	122	12/5/2008	30	8:30 AM	30	8:35 AM	P		P	

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APPENDIX F.9
Destructive Tests

Field Destructive Test Summary

Project Number: IP-08-4

QA/QC Monitor: RMS

Project Name: International Paper - Riegelwood Cell 1 Extension

Destructive Sample Number	Seam Number	Date Seamed	Welder ID	Machine Number	Date Sampled	Sample Location Description	Peel (ppi) Inside Track	Peel (ppi) Outside Track	Shear (ppi)	Comments
DS-1	P1/P3	12/2/2008	PT	834	12/3/2008	25' East of Anchor Trench	130	132	166	PASS
							131	131	169	
							134	121	173	
							135	129	174	
							127	126	162	
DS-2	P3/P4	12/2/2008	TE	843	12/3/2008	78' East of Anchor Trench	145	121	172	PASS
							132	153	157	
							139	139	171	
							131	134	170	
							139	126	150	
DS-3	P4/P5	12/2/2008	OD	837	12/3/2008	75' East of Anchor Trench	145	139	181	PASS
							141	131	184	
							143	134	175	
							143	137	155	
							135	131	168	
DS-4	P17/P18	12/2/2008	PT	834	12/3/2008	25' East of Anchor Trench	145	140	182	PASS
							131	144	181	
							129	128	176	
							137	136	181	
							139	140	179	

Field Destructive Test Summary

Project Number: IP-08-4

QA/QC Monitor: RMS

Project Name: International Paper - Riegelwood Cell 1 Extension

Destructive Sample Number	Seam Number	Date Seamed	Welder ID	Machine Number	Date Sampled	Sample Location Description	Peel (ppi) Inside Track	Peel (ppi) Outside Track	Shear (ppi)	Comments
DS-5	P18/P20	12/2/2008	TE	843	12/3/2008	25' East of Anchor Trench	139	128	172	PASS
							136	129	169	
							134	130	169	
							142	143	173	
							139	142	176	
DS-6	P19/P20	12/2/2008	OD	837	12/3/2008	50' East of Anchor Trench	135	136	175	PASS
							140	134	182	
							133	141	182	
							145	141	185	
							147	142	182	
DS-7	P23/P24	12/3/2008	PT	834	12/4/2008	23' East of Anchor Trench	127	131	183	PASS
							136	126	175	
							132	139	180	
							141	132	181	
							142	135	170	
DS-8	P28/P29	12/3/2008	TE	843	12/4/2008	77' East of Anchor Trench	129	130	186	PASS
							151	131	182	
							140	139	179	
							153	139	181	
							135	143	186	

Field Destructive Test Summary

Project Number: IP-08-4

QA/QC Monitor: RMS

Project Name: International Paper - Riegelwood Cell 1 Extension

Destructive Sample Number	Seam Number	Date Seamed	Welder ID	Machine Number	Date Sampled	Sample Location Description	Peel (ppi) Inside Track	Peel (ppi) Outside Track	Shear (ppi)	Comments
DS-9	P26/P27	12/3/2008	OD	837	12/4/2008	84' East of Anchor Trench	139	141		PASS
							137	132		
							131	137		
							135	131		
							143	144		
DS-10	P31/P32	12/3/2008	PT	834	12/4/2008	14' East of Anchor Trench	135	141	186	PASS
							141	155	177	
							136	124	191	
							134	143	179	
							152	131	191	
DS-11	P35/P36	12/3/2008	OD	837	12/4/2008	98' East of Anchor Trench	130	134	181	PASS
							137	147	179	
							129	147	179	
							147	142	179	
							137	126	179	
DS-12	P38/P39	12/4/2008	TE	843	12/4/2008	67' East of Anchor Trench	132	140	177	PASS
							152	143	171	
							131	132	170	
							143	129	170	
							137	135	163	

Field Destructive Test Summary

Project Number: IP-08-4

QA/QC Monitor: RMS

Project Name: International Paper - Riegelwood Cell 1 Extension

Destructive Sample Number	Seam Number	Date Seamed	Welder ID	Machine Number	Date Sampled	Sample Location Description	Peel (ppi) Inside Track	Peel (ppi) Outside Track	Shear (ppi)	Comments
DS-13	P42/P43	12/4/2008	OD	837	12/5/2008	102' East of Anchor Trench	130	133	186	PASS
							144	149	189	
							145	154	178	
							137	150	184	
							143	149	184	
DS-14	P44/P45	12/4/2008	TE	843	12/5/2008	65' East of Anchor Trench	158	153	192	PASS
							153	144	194	
							148	139	194	
							134	153	195	
							149	142	198	
DS-15	P47/P48	12/4/2008	PT	834	12/5/2008	85' East of Anchor Trench	152	154	199	PASS
							146	148	194	
							149	148	193	
							148	138	195	
							164	147	190	
DS-16	P51/P52	12/4/2008	PT	834	12/5/2008	47' East of Anchor Trench	139	153	189	PASS
							126	136	178	
							132	148	189	
							130	149	186	
							143	149	188	

Field Destructive Test Summary

Project Number: IP-08-4

QA/QC Monitor: RMS

Project Name: International Paper - Riegelwood Cell 1 Extension

Destructive Sample Number	Seam Number	Date Seamed	Welder ID	Machine Number	Date Sampled	Sample Location Description	Peel (ppi)		Shear (ppi)	Comments
							Inside Track	Outside Track		
DS-17	P53/P54	12/4/2008	OD	837	12/5/2008	48' East of Anchor Trench	124	143	186	PASS
							145	141	181	
							141	141	187	
							143	142	178	
							137	147	188	

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Laboratory Test Results

geotechnics
.....GEOTECHNICAL, GEOENVIRONMENTAL, AND GEOSYNTHETIC LABORATORIES

LABORATORY TEST REPORT

December 4, 2008

Mr. Greg Mills
RSG & Associates

RE: DESTRUCTIVE SEAM TEST RESULTS
IP Rieglewood
PROJECT NO. 2008-659-01

Transmitted herein are the results of the destructive seam tests performed for RSG & Associates Inc. on the samples submitted as follows:

Date Submitted	Project No.	No. Samples	Sample I.D.
12/03/08	NA	7	DS 01 – DS 07

We are pleased to be of service and trust that our efforts have contributed to the success of your project.

Respectfully submitted,

Michael P. Smith
Regional Manager

attachments: 7 Data Pages

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

geotechnics
INTEGRITY IN TESTING

CLIENT: RSG & Associates
CLIENT PROJECT: IP Rieglewood

CLIENT PROJ. NO.:
PROJECT NO.: 2008-659-01
LAB ID NO.: 2008-659-01-01
MATERIAL: 60 Mil HDPE tex
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-01

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	125.4	FTB-SE1	<10
2	130.5	FTB-SE1	<10
3	134.7	FTB-SE1	<10
4	127.7	FTB-SE1	<10
5	129.5	FTB-SE1	<10
AVERAGE	**129.6**		
STD. DEV.	3.47		
INSIDE TRACK (WELD "B")			
1	142.8	FTB-SE1	<10
2	124.6	FTB-SE1	<10
3	133.8	FTB-SE1	<10
4	137.8	FTB-SE1	<10
5	130.7	FTB-SE1	<10
AVERAGE	**133.9**		
STD. DEV.	6.91		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	160.9	FTB-SE1
2	164.1	FTB-SE1
3	172.1	FTB-SE1
4	163.2	FTB-SE1
5	165.3	FTB-SE1
AVERAGE	**165.1**	
STD. DEV.	4.22	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

geotechnics
INTEGRITY IN TESTING

CLIENT: RSG & Associates
CLIENT PROJECT: IP Rieglewood

CLIENT PROJ. NO.:
PROJECT NO.: 2008-659-01
LAB ID NO.: 2008-659-01-02
MATERIAL: 60 Mil HDPE tex
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-02

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	134.1	FTB-SE1	<10
2	129.1	FTB-SE1	<10
3	130.9	FTB-SE1	<10
4	128.9	FTB-SE1	<10
5	123.5	FTB-SE1	<10
AVERAGE	**129.3**		
STD. DEV.	3.85		
INSIDE TRACK (WELD "B")			
1	135.0	FTB-SE1	<10
2	139.7	FTB-SE1	<10
3	140.1	FTB-SE1	<10
4	135.9	FTB-SE1	<10
5	134.5	FTB-SE1	<10
AVERAGE	**137.0**		
STD. DEV.	2.66		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	166.4	FTB-SE1
2	161.2	FTB-SE1
3	167.3	FTB-SE1
4	170.2	FTB-SE1
5	171.2	FTB-SE1
AVERAGE	**167.3**	
STD. DEV.	3.93	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

geotechnics
INTEGRITY IN TESTING

CLIENT: RSG & Associates
CLIENT PROJECT: IP Rieglewood

CLIENT PROJ. NO.:
PROJECT NO.: 2008-659-01
LAB ID NO.: 2008-659-01-03
MATERIAL: 60 Mil HDPE tex
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-03

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	130.6	FTB-SE1	<10
2	128.5	FTB-SE1	<10
3	129.9	FTB-SE1	<10
4	135.1	FTB-SE1	<10
5	133.6	FTB-SE1	<10
AVERAGE	**131.5**		
STD. DEV.	2.73		
INSIDE TRACK (WELD "B")			
1	140.9	FTB-SE1	<10
2	134.3	FTB-SE1	<10
3	133.8	FTB-SE1	<10
4	132.7	FTB-SE1	<10
5	134.3	FTB-SE1	<10
AVERAGE	**135.2**		
STD. DEV.	3.25		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	163.3	FTB-SE1
2	165.2	FTB-SE1
3	167.8	FTB-SE1
4	164.0	FTB-SE1
5	165.5	FTB-SE1
AVERAGE	**165.2**	
STD. DEV.	1.72	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

geotechnics
INTEGRITY IN TESTING

CLIENT: RSG & Associates
CLIENT PROJECT: IP Rieglewood

CLIENT PROJ. NO.:
PROJECT NO.: 2008-659-01
LAB ID NO.: 2008-659-01-04
MATERIAL: 60 Mil HDPE tex
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-04

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	138.3	FTB-SE1	<10
2	142.2	FTB-SE1	<10
3	145.1	FTB-SE1	<10
4	139.7	FTB-SE1	<10
5	146.1	FTB-SE1	<10
AVERAGE	**142.3**		
STD. DEV.	3.36		
INSIDE TRACK (WELD "B")			
1	140.0	FTB-SE1	<10
2	133.6	FTB-SE1	<10
3	132.5	FTB-SE1	<10
4	140.2	FTB-SE1	<10
5	132.7	FTB-SE1	<10
AVERAGE	**135.8**		
STD. DEV.	3.95		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	168.9	FTB-SE1
2	177.0	FTB-SE1
3	190.7	FTB-SE1
4	179.8	FTB-SE1
5	168.2	FTB-SE1
AVERAGE	**176.9**	
STD. DEV.	9.20	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

geotechnics
INTEGRITY IN TESTING

CLIENT: RSG & Associates
CLIENT PROJECT: IP Rieglewood

CLIENT PROJ. NO.:
PROJECT NO.: 2008-659-01
LAB ID NO.: 2008-659-01-05
MATERIAL: 60 Mil HDPE tex
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-05

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	133.1	FTB-SE1	<10
2	134.8	FTB-SE1	<10
3	137.9	FTB-SE1	<10
4	142.8	FTB-SE1	<10
5	143.1	FTB-SE1	<10
AVERAGE	**138.3**		
STD. DEV.	4.55		
INSIDE TRACK (WELD "B")			
1	145.3	FTB-SE1	<10
2	138.9	FTB-SE1	<10
3	134.2	FTB-SE1	<10
4	130.1	FTB-SE1	<10
5	133.2	FTB-SE1	<10
AVERAGE	**136.3**		
STD. DEV.	5.92		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	173.7	FTB-SE1
2	173.5	FTB-SE1
3	173.0	FTB-SE1
4	173.4	FTB-SE1
5	173.6	FTB-SE1
AVERAGE	**173.4**	
STD. DEV.	0.27	

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PEEL AND SHEAR TEST RESULTS
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ASTM D 6392 & 4437 w/NSF 54

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INTEGRITY IN TESTING

CLIENT: RSG & Associates
CLIENT PROJECT: IP Rieglewood

CLIENT PROJ. NO.:
PROJECT NO.: 2008-659-01
LAB ID NO.: 2008-659-01-06
MATERIAL: 60 Mil HDPE tex
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-06

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	144.3	FTB-SE1	<10
2	148.0	FTB-SE1	<10
3	150.0	FTB-SE1	<10
4	149.1	FTB-SE1	<10
5	145.5	FTB-SE1	<10
AVERAGE	**147.4**		
STD. DEV.	2.41		
INSIDE TRACK (WELD "B")			
1	140.5	FTB-SE1	<10
2	142.3	FTB-SE1	<10
3	138.9	FTB-SE1	<10
4	141.7	FTB-SE1	<10
5	19.9	FTB-SE1	<10
AVERAGE	**116.7**		
STD. DEV.	54.11		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	170.8	FTB-SE1
2	176.2	FTB-SE1
3	173.1	FTB-SE1
4	174.0	FTB-SE1
5	181.7	FTB-SE1
AVERAGE	**175.2**	
STD. DEV.	4.14	

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ASTM D 6392 & 4437 w/NSF 54

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INTEGRITY IN TESTING

CLIENT: RICHARDSON,SMITH,GARDNER & ASSOC.
CLIENT PROJECT: IP RIEGELWOOD MILL
PROJECT NO.: L08102-04
LAB ID NO.: L08102-04-01
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-7

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	133.1	SE1	<10
2	130.4	SE1	<10
3	132.9	SE1	<10
4	134.6	SE1	<10
5	127.6	SE1	<10
AVERAGE	**131.7**		
STD. DEV.	2.75		
INSIDE TRACK (WELD "B")			
1	133.9	SE1	<10
2	134.2	SE1	<10
3	135.5	SE1	<10
4	124.8	SE1	<10
5	133.4	SE1	<10
AVERAGE	**132.4**		
STD. DEV.	4.30		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	155.3	SE1
2	158.8	SE1
3	157.5	SE1
4	156.9	SE1
5	156.1	SE1
AVERAGE	**156.9**	
STD. DEV.	1.34	

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ASTM D 6392 & 4437 w/NSF 54

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INTEGRITY IN TESTING

CLIENT: RICHARDSON,SMITH,GARDNER & ASSOC.
CLIENT PROJECT: IP RIEGELWOOD MILL
PROJECT NO.: L08102-04
LAB ID NO.: L08102-04-02
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-8

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	136.1	SE1	<10
2	132.5	SE1	<10
3	138.1	SE1	<10
4	126.8	SE1	<10
5	126.2	SE1	<10
AVERAGE	**131.9**		
STD. DEV.	5.36		
INSIDE TRACK (WELD "B")			
1	141.1	SE1	<10
2	141.2	SE1	<10
3	137.2	SE1	<10
4	136.0	SE1	<10
5	130.5	SE1	<10
AVERAGE	**137.2**		
STD. DEV.	4.40		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	163.0	SE1
2	160.8	SE1
3	160.7	SE1
4	161.4	SE1
5	160.6	SE1
AVERAGE	**161.3**	
STD. DEV.	1.00	

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ASTM D 6392 & 4437 w/NSF 54

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CLIENT: RICHARDSON,SMITH,GARDNER & ASSOC.
CLIENT PROJECT: IP RIEGELWOOD MILL
PROJECT NO.: L08102-04
LAB ID NO.: L08102-04-03
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-9

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	140.2	SE1	<10
2	139.7	SE1	<10
3	144.8	SE1	<10
4	132.7	SE1	<10
5	141.9	SE1	<10
AVERAGE	**139.9**		
STD. DEV.	4.47		
INSIDE TRACK (WELD "B")			
1	141.7	SE1	<10
2	137.3	SE1	<10
3	138.3	SE1	<10
4	135.4	SE1	<10
5	135.2	SE1	<10
AVERAGE	**137.6**		
STD. DEV.	2.65		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	160.6	SE1
2	160.8	SE1
3	160.3	SE1
4	161.7	SE1
5	159.5	SE1
AVERAGE	**160.6**	
STD. DEV.	0.80	

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CLIENT: RICHARDSON,SMITH,GARDNER & ASSOC.
CLIENT PROJECT: IP RIEGELWOOD MILL
PROJECT NO.: L08102-04
LAB ID NO.: L08102-04-04
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-10

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	139.7	SE1	<10
2	125.4	SE1	<10
3	137.1	SE1	<10
4	136.3	SE1	<10
5	132.9	SE1	<10
AVERAGE	**134.3**		
STD. DEV.	5.53		
INSIDE TRACK (WELD "B")			
1	130.4	SE1	<10
2	137.6	SE1	<10
3	130.0	SE1	<10
4	139.6	SE1	<10
5	143.1	SE1	<10
AVERAGE	**136.1**		
STD. DEV.	5.77		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	163.5	SE1
2	162.9	SE1
3	163.8	SE1
4	164.5	SE1
5	163.7	SE1
AVERAGE	**163.7**	
STD. DEV.	0.58	

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PEEL AND SHEAR TEST RESULTS
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ASTM D 6392 & 4437 w/NSF 54

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CLIENT: RICHARDSON,SMITH,GARDNER & ASSOC.
CLIENT PROJECT: IP RIEGELWOOD MILL
PROJECT NO.: L08102-04
LAB ID NO.: L08102-04-05
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-11

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	139.9	SE1	<10
2	134.3	SE1	<10
3	133.0	SE1	<10
4	142.5	SE1	<10
5	139.6	SE1	<10
AVERAGE	**137.9**		
STD. DEV.	4.03		
INSIDE TRACK (WELD "B")			
1	130.3	SE1	<10
2	133.2	SE1	<10
3	129.8	SE1	<10
4	138.0	SE1	<10
5	133.0	SE1	<10
AVERAGE	**132.9**		
STD. DEV.	3.26		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	155.5	SE1
2	156.1	SE1
3	156.0	SE1
4	155.7	SE1
5	157.9	SE1
AVERAGE	**156.2**	
STD. DEV.	0.96	

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ASTM D 6392 & 4437 w/NSF 54

CLIENT: RICHARDSON,SMITH,GARDNER & ASSOC.
CLIENT PROJECT: IP RIEGELWOOD MILL
PROJECT NO.: L08102-04
LAB ID NO.: L08102-04-06
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-12

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	131.0	SE1	<10
2	127.3	SE1	<10
3	134.2	SE1	<10
4	123.5	SE1	<10
5	131.0	SE1	<10
AVERAGE	**129.4**		
STD. DEV.	4.10		
INSIDE TRACK (WELD "B")			
1	142.0	SE1	<10
2	132.5	SE1	<10
3	133.2	SE1	<10
4	137.0	SE1	<10
5	130.7	SE1	<10
AVERAGE	**135.1**		
STD. DEV.	4.50		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	157.0	SE1
2	156.3	SE1
3	156.9	SE1
4	155.9	SE1
5	156.1	SE1
AVERAGE	**156.4**	
STD. DEV.	0.49	

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LABORATORY TEST REPORT

December 9, 2008

Mr. Greg Mills
RSG & Associates

RE: DESTRUCTIVE SEAM TEST RESULTS
IP Rieglewood
PROJECT NO. 2008-659-02

Transmitted herein are the results of the destructive seam tests performed for RSG & Associates Inc. on the samples submitted as follows:

Date Submitted	Project No.	No. Samples	Sample I.D.
12/08/08	NA	7	EW-60/40, DS-13 – DS-17

We are pleased to be of service and trust that our efforts have contributed to the success of your project.

Respectfully submitted,

Michael P. Smith
Regional Manager

attachments: 7 Data Pages

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

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INTEGRITY IN TESTING

CLIENT: RSG & ASSOCIATES
CLIENT PROJECT: IP RIEGELWOOD
CLIENT PROJ. NO.: NA
PROJECT NO.: 2008-659-02
LAB ID NO.: 2008-659-02-01
MATERIAL: 60 MIL HDPE
SEAM TYPE: EXTRUSION

SAMPLE I.D.: EW-60/40

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	97.2	SE3	
2	115.0	SE3	
3	102.6	SE3	
4	92.4	SE3	
5	110.2	SE3	
AVERAGE	**103.5**		
STD. DEV.	9.23		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	159.1	SE2
2	152.8	SE2
3	161.9	SE2
4	144.8	SE2
5	150.8	SE2
AVERAGE	**153.9**	
STD. DEV.	6.79	

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PEEL AND SHEAR TEST RESULTS
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CLIENT: RSG & ASSOCIATES
CLIENT PROJECT: IP RIEGELWOOD

CLIENT PROJ. NO.: NA
PROJECT NO.: 2008-659-02
LAB ID NO.: 2008-659-02-02
MATERIAL: 60 MIL
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-13

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	122.4	SE-1	
2	129.1	SE-1	
3	135.3	SE-1	
4	129.0	SE-1	
5	131.1	SE-1	
AVERAGE	**129.4**		
STD. DEV.	4.66		
INSIDE TRACK (WELD "B")			
1	132.6	SE-1	
2	132.2	SE-1	
3	132.8	SE-1	
4	125.6	SE-1	
5	135.8	SE-1	
AVERAGE	**131.8**		
STD. DEV.	3.75		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	174.2	BRK
2	162.3	BRK
3	170.8	BRK
4	173.9	BRK
5	169.4	BRK
AVERAGE	**170.1**	
STD. DEV.	4.82	

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PEEL AND SHEAR TEST RESULTS
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CLIENT: RSG & ASSOCIATES
CLIENT PROJECT: IP RIEGELWOOD

CLIENT PROJ. NO.: NA
PROJECT NO.: 2008-659-02
LAB ID NO.: 2008-659-02-03
MATERIAL: 60 MIL
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-14

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	140.5	SE-1	
2	138.1	SE-1	
3	138.3	SE-1	
4	137.1	SE-1	
5	134.9	SE-1	
AVERAGE	**137.8**		
STD. DEV.	2.03		
INSIDE TRACK (WELD "B")			
1	131.8	SE-1	
2	131.5	SE-1	
3	138.3	SE-1	
4	135.0	SE-1	
5	134.0	SE-1	
AVERAGE	**134.1**		
STD. DEV.	2.76		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	171.4	BRK
2	170.7	BRK
3	172.3	BRK
4	166.2	BRK
5	170.9	BRK
AVERAGE	**170.3**	
STD. DEV.	2.37	

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CLIENT: RSG & ASSOCIATES
CLIENT PROJECT: IP RIEGELWOOD

CLIENT PROJ. NO.: NA
PROJECT NO.: 2008-659-02
LAB ID NO.: 2008-659-02-04
MATERIAL: 60 MIL
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-15

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	132.1	SE-1	
2	139.0	SE-1	
3	143.2	SE-1	
4	141.4	SE-1	
5	137.1	SE-1	
AVERAGE	**138.6**		
STD. DEV.	4.29		
INSIDE TRACK (WELD "B")			
1	135.7	SE-1	
2	130.1	SE-1	
3	137.5	SE-1	
4	131.0	SE-1	
5	132.8	SE-1	
AVERAGE	**133.4**		
STD. DEV.	3.13		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	178.5	BRK
2	176.8	BRK
3	175.5	BRK
4	180.1	BRK
5	175.6	BRK
AVERAGE	**177.3**	
STD. DEV.	1.98	

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PEEL AND SHEAR TEST RESULTS
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ASTM D 6392 & 4437 w/NSF 54

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INTEGRITY IN TESTING

CLIENT: RSG & ASSOCIATES
CLIENT PROJECT: IP RIEGELWOOD

CLIENT PROJ. NO.: NA
PROJECT NO.: 2008-659-02
LAB ID NO.: 2008-659-02-05
MATERIAL: 60 MIL
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-16

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	137.3	SE-1	
2	136.2	SE-1	
3	132.0	SE-1	
4	131.8	SE-1	
5	136.9	SE-1	
AVERAGE	**134.8**		
STD. DEV.	2.71		
INSIDE TRACK (WELD "B")			
1	127.4	SE-1	
2	131.1	SE-1	
3	135.0	SE-1	
4	132.1	SE-1	
5	130.1	SE-1	
AVERAGE	**131.1**		
STD. DEV.	2.78		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	171.8	SE-1
2	170.9	SE-1
3	173.5	SE-1
4	178.3	SE-1
5	172.9	SE-1
AVERAGE	**173.5**	
STD. DEV.	2.87	

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\\Server\c\2008 PROJECTS\2008-659 RSG\[2008-659-02-05 Destructs.xls]Sheet1 2008-659-02-05 12/9/2008

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

geotechnics
INTEGRITY IN TESTING

CLIENT: RSG & ASSOCIATES
CLIENT PROJECT: IP RIEGELWOOD

CLIENT PROJ. NO.: NA
PROJECT NO.: 2008-659-02
LAB ID NO.: 2008-659-02-06
MATERIAL: 60 MIL
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-17

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	130.3	SE-1	
2	125.3	SE-1	
3	121.3	SE-1	
4	121.8	SE-1	
5	124.6	SE-1	
AVERAGE	**124.7**		
STD. DEV.	3.59		
INSIDE TRACK (WELD "B")			
1	126.4	SE-1	
2	123.1	SE-1	
3	127.2	SE-1	
4	128.4	SE-1	
5	127.0	SE-1	
AVERAGE	**126.4**		
STD. DEV.	1.99		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	176.9	BRK
2	180.3	BRK
3	172.8	BRK
4	169.8	BRK
5	175.5	BRK
AVERAGE	**175.1**	
STD. DEV.	3.99	

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\\Server\c\2008 PROJECTS\2008-659 RSG\[2008-659-02-06 Destructs.xls]Sheet1 2008-659-02-06 12/9/2008

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APPENDIX F.10
Repairs

Repair Summary

Project Name: International Paper - Riegelwood Cell 1 Extension

QA/QC Monitor: RMS

Project Number: IP-08-4

DEFECT ID NO.	REPAIR LOCATION		LOG DATE	RECORDED BY	COMMENTS	REPAIR DATE	VACUUM TEST DATE
	SEAM PANEL OR DEFECT NO.	DEFECT LOCATION DESCRIPTION					
1	P1/P2/P2	53' East of Anchor Trench	12/3/2008	RMS	DS-1	12/3/2008	12/5/2008
2	P1/P3	25' East of Anchor Trench	12/3/2008	RMS	Wedge Piece	12/3/2008	12/5/2008
3	P3/P4	78' East of Anchor Trench	12/3/2008	RMS	DS-2	12/3/2008	12/5/2008
4	P4/P5	75' East of Anchor Trench	12/3/2008	RMS	DS-3	12/3/2008	12/5/2008
5	P6/P7/P8	54' East of Anchor Trench	12/3/2008	RMS	Intersection	12/3/2008	12/5/2008
6	P7/P8/P9	56' East of Anchor Trench	12/3/2008	RMS	Intersection	12/3/2008	12/5/2008
7	P12/P13/P14	38' East of Anchor Trench	12/3/2008	RMS	Intersection	12/3/2008	12/5/2008
8	P13/P14/P15	41' East of Anchor Trench	12/3/2008	RMS	Intersection	12/3/2008	12/5/2008
9	P17/P18	25' East of Anchor Trench	12/3/2008	RMS	DS-4	12/3/2008	12/5/2008
10	P18/P20	25' East of Anchor Trench	12/3/2008	RMS	DS-5	12/3/2008	12/5/2008
11	P18/P19/P20	47' East of Anchor Trench	12/3/2008	RMS	Intersection	12/3/2008	12/5/2008
12	P19/P20	50' East of Anchor Trench	12/3/2008	RMS	DS-6	12/3/2008	12/5/2008
13	P1/P2/40 mil	95' East of Anchor Trench	12/3/2008	RMS	Tie-In Intersection	12/3/2008	12/5/2008
14	P2/P3/40 mil	93' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
15	P3/40 mil	92' East of Anchor Trench	12/4/2008	RMS	At 40 mil Tie-In	12/4/2008	12/5/2008
16	P3/P4/40 mil	92' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
17	P4/P5/40 mil	93' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
18	P5/P6	93' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
19	P6/P7	93' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
20	P7/P9	95' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
21	P9/P10	95' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008

Repair Summary

Project Name: International Paper - Riegelwood Cell 1 Extension

QA/QC Monitor: RMS

Project Number: IP-08-4

DEFECT ID NO.	REPAIR LOCATION		LOG DATE	RECORDED BY	COMMENTS	REPAIR DATE	VACUUM TEST DATE
	SEAM PANEL OR DEFECT NO.	DEFECT LOCATION DESCRIPTION					
22	P10	48' East of Anchor Trench	12/4/2008	RMS	Hole	12/4/2008	12/5/2008
23	P12	72' East of Anchor Trench	12/4/2008	RMS	Hole	12/4/2008	12/5/2008
24	P13	75' East of Anchor Trench	12/4/2008	RMS	Hole	12/4/2008	12/5/2008
25	P22/P23	10' East of Anchor Trench	12/4/2008	RMS	Burnout	12/4/2008	12/5/2008
26	P22/P23	117' East of Anchor Trench	12/4/2008	RMS	Burnout	12/4/2008	12/5/2008
27	P23/P24	45' East of Anchor Trench	12/4/2008	RMS	DS-7	12/4/2008	12/5/2008
28	P28/P33/P24	16' East of Anchor Trench	12/4/2008	RMS	Intersection	12/4/2008	12/5/2008
29	P28/P29/P33	48' East of Anchor Trench	12/4/2008	RMS	Intersection	12/4/2008	12/5/2008
30	P28/P29	73' East of Anchor Trench	12/4/2008	RMS	DS-8	12/4/2008	12/5/2008
31	P33/P34/P39	34' East of Anchor Trench	12/4/2008	RMS	Intersection	12/4/2008	12/5/2008
32	P26/P27	82' East of Anchor Trench	12/4/2008	RMS	DS-9	12/4/2008	12/5/2008
33	P26/P27	52' East of Anchor Trench	12/4/2008	RMS	Burnout	12/4/2008	12/5/2008
34	P26/P27	44' East of Anchor Trench	12/4/2008	RMS	Burnout	12/4/2008	12/5/2008
35	P26/P27	29' East of Anchor Trench	12/4/2008	RMS	Burnout	12/4/2008	12/5/2008
36	P30/P31	10' East of Anchor Trench	12/4/2008	RMS	Burnout	12/4/2008	12/5/2008
37	P30/P31	Edge of Anchor Trench	12/4/2008	RMS	Burnout	12/4/2008	12/5/2008
38	P31/P32	20' East of Anchor Trench	12/4/2008	RMS	DS-10	12/4/2008	12/5/2008
39	P32/P35	3' East of Anchor Trench	12/4/2008	RMS	Sheet Defect	12/4/2008	12/5/2008
40	P35	3' East of Anchor Trench	12/4/2008	RMS	Hole	12/4/2008	12/5/2008
41	P32/P35	23' East of Anchor Trench	12/4/2008	RMS	Burnout	12/4/2008	12/5/2008
42	P32/P35	32' East of Anchor Trench	12/4/2008	RMS	Burnout	12/4/2008	12/5/2008

Repair Summary

Project Name: International Paper - Riegelwood Cell 1 Extension

QA/QC Monitor: RMS

Project Number: IP-08-4

DEFECT ID NO.	REPAIR LOCATION		LOG DATE	RECORDED BY	COMMENTS	REPAIR DATE	VACUUM TEST DATE
	SEAM PANEL OR DEFECT NO.	DEFECT LOCATION DESCRIPTION					
43	P38/P39	68' East of Anchor Trench	12/4/2008	RMS	DS-12	12/4/2008	12/5/2008
44	P35/P36	98' East of Anchor Trench	12/4/2008	RMS	DS-11	12/4/2008	12/5/2008
45	P19/P20/P21	50' East of Anchor Trench	12/4/2008	RMS	Intersection	12/4/2008	12/5/2008
46	P10/P11/40 mil	96' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
47	P11/P12/40 mil	97' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
48	P12/P13/40 mil	95' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
49	P13/P15/40 mil	99' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
50	P15/P16/40 mil	101' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
51	P16/P17/40 mil	103' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
52	P17/P18/40 mil	104' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/4/2008	12/5/2008
53	P18/P19/40 mil	105' East of Anchor Trench	12/4/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
54	P19/P21/40 mil	107' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
55	P21/P22/40 mil	108' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
56	P22/P23/40 mil	110' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
57	P23/40 mil	110' East of Anchor Trench	12/5/2008	RMS	Hole in 40 mil Liner	12/5/2008	12/5/2008
58	P23/P24/40 mil	111' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
59	P24/P33/40 mil	98' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
60	P33/P34/40 mil	100' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
61	P29/P34/40 mil	98' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
62	P28/P29/40 mil	111' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
63	P28/40 mil	110' East of Anchor Trench	12/5/2008	RMS	On Existing 40 mil	12/5/2008	12/5/2008

Repair Summary

Project Name: International Paper - Riegelwood Cell 1 Extension

QA/QC Monitor: RMS

Project Number: IP-08-4

DEFECT ID NO.	REPAIR LOCATION		LOG DATE	RECORDED BY	COMMENTS	REPAIR DATE	VACUUM TEST DATE
	SEAM PANEL OR DEFECT NO.	DEFECT LOCATION DESCRIPTION					
64	P27/P28/40 mil	110' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
65	P26/P27/40 mil	110' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
66	P25/P26/40 mil	111' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
67	P25/P30/40 mil	113' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
68	P30/P31/40 mil	117' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
69	P31/P32/40 mil	119' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
70	P32/P35/40 mil	122' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
71	P35/P36/40 mil	123' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
72	P36/P37/40 mil	125' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
73	P37/P38/40 mil	125' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
74	P38/P39/40 mil	126' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
75	P39	122' East of Anchor Trench	12/5/2008	RMS	Hole	12/5/2008	12/5/2008
76	P39/P40/40 mil	124' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
77	P40/P41/40 mil	123' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
78	P41/P42/P43	72' East of Anchor Trench	12/5/2008	RMS	Intersection	12/5/2008	12/5/2008
79	P41/P42/40 mil	125' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
80	P42/P43/40 mil	126' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
81	P40/P41	82' East of Anchor Trench	12/5/2008	RMS	Burnout	12/5/2008	12/5/2008
82	P42/P43	102' East of Anchor Trench	12/5/2008	RMS	DS-13	12/5/2008	12/5/2008
83	P43/P44/40 mil	127' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
84	P44/P45	65' East of Anchor Trench	12/5/2008	RMS	DS-14	12/5/2008	12/5/2008

Repair Summary

Project Name: International Paper - Riegelwood Cell 1 Extension QA/QC Monitor: RMS

Project Number: IP-08-4

DEFECT ID NO.	REPAIR LOCATION		LOG DATE	RECORDED BY	COMMENTS	REPAIR DATE	VACUUM TEST DATE
	SEAM PANEL OR DEFECT NO.	DEFECT LOCATION DESCRIPTION					
85	P44/P45/40 mil	128' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
86	P45/P46/40 mil	127' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
87	P46/P47/40 mil	127' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
88	P47/P48/40 mil	129' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
89	P47/P48	85' East of Anchor Trench	12/5/2008	RMS	DS-15	12/5/2008	12/5/2008
90	P48/P49/40 mil	127' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
91	P49/P50/40 mil	126' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
92	P50/P51/40 mil	127' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
93	P51/P52/40 mil	122' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
94	P51/P52	47' East of Anchor Trench	12/5/2008	RMS	DS-16	12/5/2008	12/5/2008
95	P52/P53	1' East of Anchor Trench	12/5/2008	RMS	Burnout	12/5/2008	12/5/2008
96	P53/P54	48' East of Anchor Trench	12/5/2008	RMS	DS-17	12/5/2008	12/5/2008
97	P53	58' East of Anchor Trench	12/5/2008	RMS	Indentation in Liner	12/5/2008	12/5/2008
98	P53	60' East of Anchor Trench	12/5/2008	RMS	Indentation in Liner	12/5/2008	12/5/2008
99	P52/P53	87' East of Anchor Trench	12/5/2008	RMS	Defective Seam	12/5/2008	12/5/2008
100	P52/P53/40 mil	101' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
101	P53/P54/40 mil	85' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
102	P54/P55/40 mil	69' East of Anchor Trench	12/5/2008	RMS	Tie-In Intersection	12/5/2008	12/5/2008
103	P55/40 mil	50' East of Anchor Trench	12/5/2008	RMS	40 mil Repair	12/5/2008	12/5/2008
104	P55/P56	44' East of Anchor Trench	12/5/2008	RMS	In Anchor Trench by Tie-In	12/5/2008	12/5/2008
105	P55/P56	3' East of Anchor Trench	12/5/2008	RMS	Burnout	12/5/2008	12/5/2008

Repair Summary

Project Name: International Paper - Riegelwood Cell 1 Extension

QA/QC Monitor: RMS

Project Number: IP-08-4

DEFECT ID NO.	REPAIR LOCATION		LOG DATE	RECORDED BY	COMMENTS	REPAIR DATE	VACUUM TEST DATE
	SEAM PANEL OR DEFECT NO.	DEFECT LOCATION DESCRIPTION					
106	P54	75' East of Anchor Trench	12/5/2008	RMS	Tear	12/5/2008	12/5/2008
107	P54	75' East of Anchor Trench	12/5/2008	RMS	Tear	12/5/2008	12/5/2008
108	P41/P42/P43	72' East of Anchor Trench	12/5/2008	RMS	Intersection	12/5/2008	12/5/2008