TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

February 5, 2003

Mr. Tim Tolliver
Hancor Inc.
401 Olive Street
Findlay, OH 45840 Fax: 419-424-8364 E-mail: ttoliver@hancor.com

SUBJECT: **PPI-PTPVMC PLANT / PRODUCT AUDIT**

Dear Mr. Tolliver:

TRI/Environmental, Inc. (TRI) is pleased to present this report for plant auditing and associated pipe sample testing of Hancor, Inc. (HANCOR) corrugated polyethylene pipe in accordance with the Plastic Pipe Institute's (PPI) Protocol for Third Party Verification of Manufacturer's Certification (PTPVMC) based on the AASHTO M294 and MP7 specifications.

BACKGROUND

On January 8, 2003, TRI/Environmental, Inc. (TRI) performed an unannounced plant audit and secured samples of corrugated polyethylene pipe made by HANCOR.

Plant Location: Findlay (South Plant), OH

Plant Contact: Larry Dunson (419/424-8222)

Pipe Style Sampled/Tested: 12-inch Type SP

The audit and product sampling was performed by TRI personnel. The audit was based on the HANCOR corporate quality control plan submitted and approved with the initial qualification phase of the PTPVMC. The pipe sample was tested to validate that it met or exceeded the requirements established by the AASHTO M294/MP7 standard specifications. The audit findings and test results are detailed in the following sections.

SUMMARY OF FINDINGS

- Manufacturing operations were generally in compliance with the governing quality control plan.
- Some details of the quality control plan and associated in-plant implementation require immediate attention, including:
  1. Date code found 3 @ 10-ft spacing. Other markings found 2 @ 9'-4", not coincident with date codes.
  2. Sample was from a very short production run. QA testing was not done on this run.
  3. Stiffness/Flattening was done only on the 90° specimen. This should be clarified and rationalized in the QC Plan.
- The pipe samples passed all specification requirements. Resin samples will be collected at a future date.

AUDIT SUMMARY

✓ Introduction meeting held with plant management.

✓ Pipe material sampled.
- ✓ Selected a sample of 12-inch diameter Type SP pipe from (__) production or (✓) inventory, witnessed measurements and cutting of specimens for testing, marked specimens with identification, and staged specimens for shipment to Auditor's lab. [✓ length measured before cutting for shipment = 20'- 2"; marking interval = 10'*]
- ✓ Selected pipe identification code: 060402 (*See Finding #1)

✖ Raw material sampling.
- ✖ Selected a sample of resin from (__) production or (__) inventory, bag, marked with identification, and prepared for shipment to Austin lab.
- ✖ Selected resin identification code: No PPI resin available. Return & sample later.
  - ✖ Verified that resin is PPI-listed.

✓ Raw materials documentation.
- ✓ Obtained record of resin used on 060402. Resin was assigned lot #: 1009020578
- ✓ Obtained vendor certification of compliance to AASHTO M 294 for above lot.
- ✓ Obtained test report from verification testing, if available. (Test data available to production indicates approval from corporate QA lab)
- N/A Example of a rejected resin, if available, including the associated vendor notification letter. (N/A = not available, controlled by corporate QA lab)

✓ Pipe materials documentation.
- ✓ Obtained production record of pipe made from above resin. Pipe was assigned lot #: 060402
- ✖ Obtained test report(s) from pipe QC and QA testing of above lot. Verify testing frequency and values satisfy requirements in the table below. (see Finding #2)
- ✓ Letter of certification for the selected pipe lot obtained, if available. Obtained a recent letter of certification.
- ✓ Obtained example of nonconforming product, including QC and QA test reports and documentation of disposition and corrective action.

Test	PTPVMC App. 1 Suggested Frequencies	Min. testing freq. in QC plan	Actual testing frequency	Comments
Workmanship	-	2/day	1 / shift	
Liner thickness	one time per week	1/shift	1 / shift	
Min inside diameter	one time per week	1/shift	1 / shift	
Length	one time per day	1/shift	1 / shift	
Perforations	one time per week	1/shift	-	Non-perforated
Pipe stiffness	three times per week	2/day	1 / shift (90° only)	Finding #3
Pipe flattening	three times per week	2/day	1 / shift (90° only)	Finding #3
Env. stress cracking	once per production run	1 / prod. run	-	Finding #2
Brittleness	three times per week	2/day	-	Finding #2
Joint integrity	once per production run	1 / prod. run	-	Finding #2
Marking	-	2/day	1 / shift	

✓ QC/QA Lab Facility Review.
- ✓ All necessary testing and monitoring equipment is operational, calibrated, and documented as to condition.
- ✓ Copies of test procedures are available to lab personnel. (On computer)
- ✓ Lab temperature and humidity is monitored and recorded as required by QC Plan.

✓ Review Meeting At The End Of Audit With Plant Management.

✓ Verified That Samples Are Staged For Shipment.

SAMPLE TESTING SUMMARY:

1000 g (Not Available) Resin;
12" Type SP Corrugate Polyethylene Pipe;
Specification: AASHTO M 294-01/MP-7;
Pipe Conditioning: Not less than 24 hours at 23°C ± 2°C (73°F)

SECTION 6.1 BASIC MATERIALS - RESIN

Specifications: ASTM D 3350-00; Minimum cell class 335400C; Density: 0.945 - 0.955 g/cm^3; Melt Index: 0.15 to 0.40 g/10 min.; Carbon Black Content: 2% minimum / 5% maximum; SP-NCTL: 15%/24 hours; [Note: Compounds that have a higher cell classification in one or more properties with the exception of density are acceptable provided requirements are met.]

PPI Listed Resin? __yes __ no (Resin 8, Blend A)

Test Results:

Property	Density (g/cc)	Melt Index (g/10 min)	Flexural Modulus (psi)	Tensile Strength (psi)	SP-NCTL (hrs)	Thermal Stability (°C)
TRI Test Result						
TRI Cell Classificatio n					-	-
AASHTO M294 Req't	3	3	5	4	> 24	220

Carbon Black Content Of Pipe (%) = 2.69%

Conclusion: Specifications were met. Resin to be sampled at a later date.

SECTION 7.1 WORKMANSHIP

Specification: Free of foreign inclusions and visible defects. The inner liner shall be fused to the outer corrugated wall at all internal corrugation crests.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
All	Pass

Conclusions: Specifications were met.

SECTION 7.2 PIPE DIMENSIONS

Section 7.2.2 Wall Thickness

Specification: The minimum inner wall thickness requirement is 1.8 mm (0.070”). Not applicable to Type C pipe. (Average of 8 measurements)

Test Results:

INNER WALL THICK., mm (in)	OUTER WALL THICK., mm (in)
3.73 (0.147)	-

Conclusion: Specification was met.

Section 7.2.3 Inside Diameter

Specification: Nominal inside diameter shall not exceed 4.5% oversize or 1.5% undersize and not more than 30 mm oversize. (Avg of 16 measurements)

Test Results:

INSIDE DIAMETER , mm (in)	% Oversize / Undersize
303 (11.95)	+1.0%

Conclusion: Specifications were met.

Section 7.2.4 Length

Specification: The length must be at least 99% of the stated length of 20 ft.

Test Results:

LENGTH, m (ft)	>99% of Stated Length (Pass/Fail)
6.15 (20.17)	Pass

Conclusion: Specifications were met.

SECTION 7.3 PERFORATION: (NOT PERFORATED)

Specification: Perforations shall be placed in external valleys and uniformly spaced along pipe length and circumference. Circular perforations shall be a minimum of 5 mm (0.197") and shall not exceed 10 mm (0.394") in diameter. The minimum water inlet area shall be 30 cm^2/m (1.42 sq. in./ft.).

Test Results: Perf placement in external valleys and uniformly spaced? __ yes __no

DIAMETER, mm (in.)	WATER INLET AREA, cm^2/m (sq. in./ft)
N/A	N/A

Conclusion: Specifications were met.

SECTION 7.4 PIPE STIFFNESS

Specification: The min. pipe stiffness requirement at 5% deflection is 345 kPa (50 psi).

Test Results:

SAMPLE NO.	ORIENTATION	PIPE STIFFNESS kPa (psi)
1	Seam Horizontal	395 (57.3)
2	45°	414 (60.0)
3	90°	409 (59.4)

Conclusion: Specification was met.

SECTION 7.5 PIPE FLATTENING

Specification: There shall be no evidence of buckling, cracking, splitting, or delamination when the vertical inside diameter is reduced by 20%.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
1	Pass
2	Pass
3	Pass

Conclusion: Specification was met.

SECTION 7.6 ENVIRONMENTAL STRESS CRACKING

Specification: There shall be no cracking of the pipe.

Test Results:

SAMPLE NO.	1	2	3
RESULTS (Pass/Fail)	Pass	Pass	Pass

Conclusion: Specification was met.

SECTION 7.7 BRITTLENESS

Specification: The pipe specimens shall not crack or split. Five non-failures out of six impacts will be acceptable.

Test Results:

IMPACT NO.	1	2	3	4	5	6
RESULTS (Pass/Fail)	Pass	Pass	Pass	Pass	Pass	Pass

Conclusion: Specification was met.

SECTION 7.8 FITTING REQUIREMENTS

Specification: Pipe connections shall not separate to create a gap exceeding 5 mm (0.2") when measured between the bell and spigot portions of pipe. Fittings shall not crack or delaminate.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
1	Pass

Conclusion: Specifications were met.

SECTION 11 MARKING

Specification: Pipe shall be marked at intervals of no more than 3.5 m with manufacturer's name or trademark, nominal size, AASHTO M294, and plant and date of manufacture or appropriate code.

Test Results:

060402 C Hancor 12" (300mm) AASHTO M294 Made in the USA

Conclusion: Specification was not met. Date code and other markings don't coincide. (See Finding #1)

All tests were conducted by TRI personnel.

CONCLUSION

HANCOR has voluntarily submitted to the random independent plant audit, including product sampling and testing, described herein and been found to be generally in compliance with the requirements established by AASHTO M294 / MP7 specifications under the PPI-PTPVMC, except as noted under the Summary of Findings section. HANCOR has seven (7) days to provide a written course of action to address the findings of this audit. If the proposed remedies are approved, HANCOR will be authorized to continue to use the PPI-PTPVMC "Program Mark", subject to on-going annual auditing and testing under the PTPVMC.

If you have any questions or require any additional information, please do not hesitate to call.

Sincerely,

C. Joel Sprague, PTPVMC Administrator
TRI/Environmental, Inc.
864/242-2220
fax 242-3107
cjoelsprague@cs.com

cc: Sam Allen, Vice President, TRI/Environmental, Inc.

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

February 5, 2003 (Reissued June 4, 2004)

Mr. Tim Tolliver
Hancor Inc.
401 Olive Street
Findlay, OH 45840 Fax: 419-424-8364 E-mail: ttoliver@hancor.com

SUBJECT: **PPI-PTPVMC PLANT / PRODUCT AUDIT**

Dear Mr. Tolliver:

TRI/Environmental, Inc. (TRI) is pleased to present this report for plant auditing and associated pipe sample testing of Hancor, Inc. (HANCOR) corrugated polyethylene pipe in accordance with the Plastic Pipe Institute's (PPI) Protocol for Third Party Verification of Manufacturer's Certification (PTPVMC) based on the AASHTO M294 and MP7 specifications.

BACKGROUND

On January 8, 2003, TRI/Environmental, Inc. (TRI) performed an unannounced plant audit and secured samples of corrugated polyethylene pipe made by HANCOR. **Additionally, on May 4, 2004 the plant was revisited to collect a resin sample for independent testing.**

Plant Location: Findlay (South Plant), OH

Plant Contact: Larry Dunson (419/424-8222)

Pipe Style Sampled/Tested: 12-inch Type SP

The audit and product sampling was performed by TRI personnel. The audit was based on the HANCOR corporate quality control plan submitted and approved with the initial qualification phase of the PTPVMC. The pipe sample was tested to validate that it met or exceeded the requirements established by the AASHTO M294/MP7 standard specifications. The audit findings and test results are detailed in the following sections.

SUMMARY OF FINDINGS

- Manufacturing operations were generally in compliance with the governing quality control plan.
- Some details of the quality control plan and associated in-plant implementation required immediate attention and have been resolved.
- The pipe and resin samples passed all specification requirements.

• AUDIT SUMMARY

✓ Introduction meeting held with plant management.

✓ Pipe material sampled.
- ✓ Selected a sample of 12-inch diameter Type SP pipe from (__) production or (✓) inventory, witnessed measurements and cutting of specimens for testing, marked specimens with identification, and staged specimens for shipment to Auditor's lab. [✓ length = 20'- 2"; marking interval = 10']
- ✓ Selected pipe identification code: 060402

✓ Raw material sampling.
- ✓ Selected a sample of resin from (✓) production or (__) inventory, bag, marked with identification, and prepared for shipment to Austin lab.
- ✓ Selected resin identification code: Resin 8, Blend A, lot # 1009040364.
  - ✓ Verified that resin is PPI-listed.

✓ Raw materials documentation.
- ✓ Obtained record of resin used on 060402. Resin was assigned lot #: 1009020578
- ✓ Obtained vendor certification of compliance to AASHTO M 294 for above lot.
- ✓ Obtained test report from verification testing, if available. (Test data available to production indicates approval from corporate QA lab)
- N/A Example of a rejected resin, if available, including the associated vendor notification letter. (N/A = not available, controlled by corporate QA lab)

✓ Pipe materials documentation.
- ✓ Obtained production record of pipe made from above resin. Pipe was assigned lot #: 060402
- ✓ Obtained test report(s) from pipe QC and QA testing of above lot. Verify testing frequency and values satisfy requirements in the table below. (see Finding #2)
- ✓ Letter of certification for the selected pipe lot obtained, if available. Obtained a recent letter of certification.
- N/A Obtained example of nonconforming product, including QC and QA test reports and documentation of disposition and corrective action.

Test	PTPVMC App. 1 Suggested Frequencies	Min. testing freq. in QC plan	Actual testing frequency	Comments
Workmanship	-	2/day	1 / shift	
Liner thickness	one time per week	1/shift	1 / shift	
Min inside diameter	one time per week	1/shift	1 / shift	
Length	one time per day	1/shift	1 / shift	
Perforations	one time per week	1/shift	-	
Pipe stiffness	three times per week	2/day	2/day	
Pipe flattening	three times per week	2/day	2/day	
Env. stress cracking	once per production run	1 / prod. run	1 / prod. run	
Brittleness	three times per week	2/day	2/day	
Joint integrity	once per production run	1 / prod. run	1 / prod. run	
Marking	-	2/day	1 / shift	

✓ QC/QA Lab Facility Review.
- ✓ All necessary testing and monitoring equipment is operational, calibrated, and documented as to condition.
- ✓ Copies of test procedures are available to lab personnel. (On computer)
- ✓ Lab temperature and humidity is monitored and recorded as required by QC Plan.

✓ Review Meeting At The End Of Audit With Plant Management.

✓ Verified That Samples Are Staged For Shipment.

SAMPLE TESTING SUMMARY:

1000 g Resin 8, Blend A Resin;
12" Type SP Corrugate Polyethylene Pipe;
Specification: AASHTO M 294-01/MP-7;
Pipe Conditioning: Not less than 24 hours at 23°C ± 2°C (73°F)

SECTION 6.1 BASIC MATERIALS - RESIN

Specifications: ASTM D 3350-00; Minimum cell class 335400C; Density: 0.945 - 0.955 g/cm^3; Melt Index: 0.15 to 0.40 g/10 min.; Carbon Black Content: 2% minimum / 5% maximum; SP-NCTL: 15%/24 hours; [Note: Compounds that have a higher cell classification in one or more properties with the exception of density are acceptable provided requirements are met.]

PPI Listed Resin? ✓ yes __ no (Resin 8, Blend A)

Test Results:

Property	Density (g/cc)	Melt Index (g/10 min)	Flexural Modulus (psi)	Tensile Strength (psi)	SP-NCTL (hrs)	Thermal Stability (°C)
TRI Test Result	0.949	0.294	134,580	3489	58.1	241.0
TRI Cell Classification	3	3	5	4	-	-
AASHTO M294 Req't	3	3	5	4	> 24	220

Carbon Black Content Of Pipe (%) = 2.69%

Conclusion: Specifications were met.

SECTION 7.1 WORKMANSHIP

Specification: Free of foreign inclusions and visible defects. The inner liner shall be fused to the outer corrugated wall at all internal corrugation crests.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
All	Pass

Conclusions: Specifications were met.

SECTION 7.2 PIPE DIMENSIONS

Section 7.2.2 Wall Thickness

Specification: The minimum inner wall thickness requirement is 1.8 mm (0.070”). Not applicable to Type C pipe. (Average of 8 measurements)

Test Results:

INNER WALL THICK., mm (in)	OUTER WALL THICK., mm (in)
3.73 (0.147)	-

Conclusion: Specification was met.

Section 7.2.3 Inside Diameter

Specification: Nominal inside diameter shall not exceed 4.5% oversize or 1.5% undersize and not more than 30 mm oversize. (Avg of 16 measurements)

Test Results:

INSIDE DIAMETER , mm (in)	% Oversize / Undersize
303 (11.95)	+1.0%

Conclusion: Specifications were met.

Section 7.2.4 Length

Specification: The length must be at least 99% of the stated length of 20 ft.

Test Results:

LENGTH, m (ft)	>99% of Stated Length (Pass/Fail)
6.15 (20.17)	Pass

Conclusion: Specifications were met.

SECTION 7.3 PERFORATION: (NOT PERFORATED)

Specification: Perforations shall be placed in external valleys and uniformly spaced along pipe length and circumference. Circular perforations shall be a minimum of 5 mm (0.197") and shall not exceed 10 mm (0.394") in diameter. The minimum water inlet area shall be 30 cm^2/m (1.42 sq. in./ft.).

Test Results: Perf placement in external valleys and uniformly spaced? __ yes __no

DIAMETER, mm (in.)	WATER INLET AREA, cm^2/m (sq. in./ft)
N/A	N/A

Conclusion: Specifications were met.

SECTION 7.4 PIPE STIFFNESS

Specification: The min. pipe stiffness requirement at 5% deflection is 345 kPa (50 psi).

Test Results:

SAMPLE NO.	ORIENTATION	PIPE STIFFNESS kPa (psi)
1	Seam Horizontal	395 (57.3)
2	45°	414 (60.0)
3	90°	409 (59.4)

Conclusion: Specification was met.

SECTION 7.5 PIPE FLATTENING

Specification: There shall be no evidence of buckling, cracking, splitting, or delamination when the vertical inside diameter is reduced by 20%.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
1	Pass
2	Pass
3	Pass

Conclusion: Specification was met.

SECTION 7.6 ENVIRONMENTAL STRESS CRACKING

Specification: There shall be no cracking of the pipe.

Test Results:

SAMPLE NO.	1	2	3
RESULTS (Pass/Fail)	Pass	Pass	Pass

Conclusion: Specification was met.

SECTION 7.7 BRITTLENESS

Specification: The pipe specimens shall not crack or split. Five non-failures out of six impacts will be acceptable.

Test Results:

IMPACT NO.	1	2	3	4	5	6
RESULTS (Pass/Fail)	Pass	Pass	Pass	Pass	Pass	Pass

Conclusion: Specification was met.

SECTION 7.8 FITTING REQUIREMENTS

Specification: Pipe connections shall not separate to create a gap exceeding 5 mm (0.2") when measured between the bell and spigot portions of pipe. Fittings shall not crack or delaminate.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
1	Pass

Conclusion: Specifications were met.

SECTION 11 MARKING

Specification: Pipe shall be marked at intervals of no more than 3.5 m with manufacturer's name or trademark, nominal size, AASHTO M294, and plant and date of manufacture or appropriate code.

Test Results:

060402 C Hancor 12" (300mm) AASHTO M294 Made in the USA

Conclusion: Specification was not met.

All tests were conducted by TRI personnel.

CONCLUSION

HANCOR has voluntarily submitted to the random independent plant audit, including product sampling and testing, described herein. Any noncompliances have been resolved and, thus, Hancor has been found to be generally in compliance with the requirements established by AASHTO M294 / MP7 specifications under the PPI-PTPVMC.. HANCOR is authorized to continue to use the PPI-PTPVMC "Program Mark", subject to on-going annual auditing and testing under the PTPVMC.

If you have any questions or require any additional information, please do not hesitate to call.

Sincerely,

C. Joel Sprague, PTPVMC Administrator
TRI/Environmental, Inc.
864/242-2220
fax 242-3107
cjoelsprague@cs.com

cc: Sam Allen, Vice President, TRI/Environmental, Inc.

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

September 10, 2002

Mr. Tim Tolliver
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SUBJECT: **PPI-PTPVMC PLANT / PRODUCT AUDIT**

Dear Mr. Tolliver:

TRI/Environmental, Inc. (TRI) is pleased to present this report for plant auditing and associated pipe sample testing of Hancor, Inc. (HANCOR) corrugated polyethylene pipe in accordance with the Plastic Pipe Institute's (PPI) Protocol for Third Party Verification of Manufacturer's Certification (PTPVMC) based on the AASHTO M294 and MP7 specifications.

BACKGROUND

On August 16, 2002, TRI/Environmental, Inc. (TRI) performed an unannounced plant audit and secured samples of corrugated polyethylene pipe made by HANCOR.

Plant Location: N. Springfield, VT Pipe Style(s) Sampled/Tested: 15-inch Type S

Plant Contact: Greg Purtle (802/886-8403)

The audit and product sampling was performed by TRI personnel. The audit was based on the HANCOR corporate quality control plan submitted and approved with the initial qualification phase of the PTPVMC. The pipe sample was tested to validate that it met or exceeded the requirements established by the AASHTO M294/MP7 standard specifications. The audit findings and test results are detailed in the following sections.

SUMMARY OF FINDINGS

- Manufacturing operations were generally in compliance with the governing quality control plan.
- Some details of the quality control plan and associated in-plant implementation require immediate attention, including:
  1. Markings had errors. Incorrect year and missing plant code.
  2. Stiffness is tested at the plant at 0, 35, and 70 degrees. M294 requires 0, 45, and 90 degrees for certification. Documentation should be on file showing that the central lab results (done at 0, 45, and 90) correlate to the plant testing and therefore can be used for certification.
  3. Documentation of perforation testing should be maintained.
  4. Humidity is not monitored in the lab and length is measured at ambient temperature.
- The pipe and resin samples passed all specification requirements.

AUDIT SUMMARY

✔ Introduction meeting held with plant management.

✔ Pipe material sampled.
- ✔ Selected a sample of 15-inch diameter Type __ pipe from (__) production or (✔) inventory, witnessed measurements and cutting of specimens for testing, marked specimens with identification, and staged specimens for shipment to Auditor's lab.
  [✔ length measured before cutting for shipment = 20'- 3"; marking interval = 5']
- ✔ Selected pipe identification code: 081102

✔ Raw material sampling.
- ✔ Selected a sample of resin from (✔) production or (__) inventory, bag, marked with identification, and prepared for shipment to Austin lab.
- ✔ Selected resin identification code: Resin 8, Blend A
  - ✔ Verified that resin is PPI-listed.

✔ Raw materials documentation.
- ✔ Obtained record of resin used on 081102. Resin was assigned lot #: 1007020251
- ✔ Obtained vendor certification of compliance to AASHTO M 294 for above lot.
- N/A Obtained test report from verification testing, if available. **(Fully rely on COA)**
- N/A example of a rejected resin, if available, including the associated vendor notification letter. (N/A = not available, no failures on record in last __ mos.)

✔ Pipe materials documentation.
- ✔ Obtained production record of pipe made from above resin. Pipe was assigned lot #: 081102
- ✔ Obtained test report(s) from pipe QC and QA testing of above lot. Verify testing frequency and values satisfy requirements in the table below.
- ✔ Letter of certification for the selected pipe lot obtained, if available. Obtained a recent letter of certification.
- N/A Obtained example of nonconforming product, including QC and QA test reports and documentation of disposition and corrective action.

Test	PTPVMC App. 1 Suggested Frequencies	Min. testing freq. in QC plan	Actual testing frequency	Comments
Workmanship	-	2/day	1 / shift	
Liner thickness	one time per week	1/shift	1 / shift	
Min inside diameter	one time per week	1/shift	1 / shift	
Length	one time per day	1/shift	1 / shift	
Perforations	one time per week	1/shift	1 / shift	Finding #3
Pipe stiffness	three times per week	2/day	1 / shift	Finding #2
Pipe flattening	three times per week	2/day	1 / shift	
Env. stress cracking	once per production run	1 / prod. run	1 / prod. run	
Brittleness	three times per week	2/day	1 / shift	
Joint integrity	once per production run	1 / prod. run	1 / prod. run	
Marking	-	2/day	1 / shift	

✔ QC/QA Lab Facility Review.
- ✔ All necessary testing and monitoring equipment is operational, calibrated, and documented as to condition.
- ✔ Copies of test procedures are available to lab personnel. **(On computer)**
- X Lab temperature and humidity is monitored and recorded. (See Finding #4)

✔ Review Meeting At The End Of Audit With Plant Management.

✔ Verified That Samples Are Staged For Shipment.

SAMPLE TESTING SUMMARY:

1000 g Resin 8, Blend A Resin;
15" Type S Corrugate Polyethylene Pipe;
Specification: AASHTO M 294-01/MP-7;
Pipe Conditioning: Not less than 40 hours at 23°C ± 2°C (73°F)

SECTION 6.1 BASIC MATERIALS - RESIN

Specifications: ASTM D 3350-00; Minimum cell class 335400C; Density: 0.945 - 0.955 g/cm^3; Melt Index: 0.15 to 0.40 g/10 min.; Carbon Black Content: 2% minimum / 5% maximum; SP-NCTL: 15%/24 hours; [Note: Compounds that have a higher cell classification in one or more properties with the exception of density are acceptable provided requirements are met.]

PPI Listed Resin? X yes __ no (Resin 8, Blend A)

Test Results:

Property	Density (g/cc)	Melt Index (g/10 min)	Flexural Modulus (psi)	Tensile Strength (psi)	SP-NCTL (hrs)	Thermal Stability (°C)
TRI Test Result	0.948	0.175	129,097	3822	> 24	239
TRI Cell Classification	3	3	5	5	-	-
AASHTO M294 Req't	3	3	5	4	> 24	220

Carbon Black Content Of Pipe (%) = 2.5%

Conclusion: Specifications were met.

SECTION 7.1 WORKMANSHIP

Specification: Free of foreign inclusions and visible defects. The inner liner shall be fused to the outer corrugated wall at all internal corrugation crests.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
All	Pass

Conclusions: Specifications were met.

SECTION 7.2 PIPE DIMENSIONS

Section 7.2.2 Wall Thickness

Specification: The minimum inner wall thickness requirement is 1.0 mm (0.040”). Not applicable to Type C pipe. (Average of 8 measurements)

Test Results:

INNER WALL THICK., mm (in)	OUTER WALL THICK., mm (in)
1.75 (0.069)	-

Conclusion: Specification was met.

Section 7.2.3 Inside Diameter

Specification: Nominal inside diameter shall not exceed 4.5% oversize or 1.5% undersize and not more than 30 mm oversize. (Avg of 16 measurements)

Test Results:

INSIDE DIAMETER , mm (in)	% Oversize / Undersize
378 (14.89)	+0.8%

Conclusion: Specifications were met.

Section 7.2.4 Length

Specification: The length must be at least 99% of the stated length of 20 ft.

Test Results:

LENGTH, m (ft)	>99% of Stated Length (Pass/Fail)
6.17 (20.25)	Pass

Conclusion: Specifications were met.

SECTION 7.3 PERFORATION: **(Not Applicable)**

Specification: Perforations shall be placed in external valleys and uniformly spaced along pipe length and circumference. Circular perforations shall be a minimum of 5 mm (0.197") and shall not exceed 10 mm (0.394") in diameter. The minimum water inlet area shall be ___ cm^2/m (____ sq. in./ft.).

Test Results: Perf placement in external valleys and uniformly spaced? _ yes __no

DIAMETER, mm (in.)	WATER INLET AREA, cm^2/m (sq. in./ft)
-	-

Conclusion: Not Applicable – Unperforated

SECTION 7.4 PIPE STIFFNESS

Specification: The min. pipe stiffness requirement at 5% deflection is 290 kPa (42 psi).

Test Results:

SAMPLE NO.	ORIENTATION	PIPE STIFFNESS kPa (psi)
1	Seam Horizontal	324 (47.0)
2	45°	316 (45.8)
3	90°	327 (47.4)

Conclusion: Specification was met.

SECTION 7.5 PIPE FLATTENING

Specification: There shall be no evidence of buckling, cracking, splitting, or delamination when the vertical inside diameter is reduced by 20%.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
1	Pass
2	Pass
3	Pass

Conclusion: Specification was met.

SECTION 7.6 ENVIRONMENTAL STRESS CRACKING

Specification: There shall be no cracking of the pipe.

Test Results:

SAMPLE NO.	1	2	3
RESULTS (Pass/Fail)	Pass	Pass	Pass

Conclusion: Specification was met.

SECTION 7.7 BRITTLENESS

Specification: The pipe specimens shall not crack or split. Five non-failures out of six impacts will be acceptable.

Test Results:

IMPACT NO.	1	2	3	4	5	6
RESULTS (Pass/Fail)	Pass	Pass	Pass	Pass	Pass	Pass

Conclusion: Specification was met.

SECTION 7.8 FITTING REQUIREMENTS

Specification: Pipe connections shall not separate to create a gap exceeding 5 mm (0.2”) when measured between the bell and spigot portions of pipe. Fittings shall not crack or delaminate.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
1	Pass

Conclusion: Specifications were met.

SECTION 11 MARKING

Specification: Pipe shall be marked at intervals of no more than 3.5 m with manufacturer’s name or trademark, nominal size, AASHTO M294, and plant and date of manufacture or appropriate code.

Test Results:

081105 WH 1 Hancor 15” (375mm) AASHTO M294 BNQ3624 120 CSA 182.6 R320 STORM PE 324400C Cert 26599SP

Conclusion: Specification was not met. Note date code error – year should be 02 – and missing plant code – II. (See Finding #1)

All tests were conducted by TRI personnel.

CONCLUSION

HANCOR has voluntarily submitted to the random independent plant audit, including product sampling and testing, described herein and been found to be generally in compliance with the requirements established by AASHTO M294 / MP7 specifications under the PPI-PTPVMC, except as noted under the Summary of Findings section. HANCOR has seven (7) days to provide a written course of action to address the findings of this audit. If the proposed remedies are approved, HANCOR will be authorized to continue to use the PPI-PTPVMC "Program Mark", subject to on-going annual auditing and testing under the PTPVMC.

If you have any questions or require any additional information, please do not hesitate to call.

Sincerely,

C. Joel Sprague, PTPVMC Administrator
TRI/Environmental, Inc.
864/242-2220
fax 242-3107
cjoelsprague@cs.com

cc: Sam Allen, Vice President, TRI/Environmental, Inc.

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

June 13, 2002

Mr. Tim Tolliver
Hancor Inc.
401 Olive Street
Findlay, OH 45840

SUBJECT: **PPI-PTPVMC PLANT / PRODUCT AUDIT**

Dear Mr. Tolliver:

TRI/Environmental, Inc. (TRI) is pleased to present this report for plant auditing and associated pipe sample testing of Hancor, Inc. (HANCOR) corrugated polyethylene pipe in accordance with the Plastic Pipe Institute's (PPI) Protocol for Third Party Verification of Manufacturer's Certification (PTPVMC) based on the AASHTO M294 and MP7 specifications.

BACKGROUND

On May 10, 2002, TRI/Environmental, Inc. (TRI) performed an unannounced plant audit and secured samples of corrugated polyethylene pipe made by HANCOR.

Plant Location: Mebane, NC

Plant Contact: Burt Austin (919/563-3609)

Pipe Style(s) Sampled/Tested: 24-inch Type S

The audit and product sampling was performed by TRI personnel. The audit was based on the HANCOR corporate quality control plan submitted and approved with the initial qualification phase of the PTPVMC. The pipe sample was tested to validate that it met or exceeded the requirements established by the AASHTO M294/MP7 standard specifications. The audit findings and test results are detailed in the following sections.

SUMMARY OF FINDINGS

- Manufacturing operations were generally in compliance with the governing quality control plan.
- Some details of the quality control plan and associated in-plant implementation require immediate attention, including:
  1. Resin was not sampled at the plant in accordance with the QA/QC Plan.
  2. The in-plant QA/QC plan document was out-of-date.
  3. Measurement and recording of markings was very casual and imprecise.
  4. Length measurements were approximated and not made within a controlled environment.
  5. Pipe markings were non-uniformly spaced, sometimes not meeting spec.
- The pipe sample passed all specification requirements.

AUDIT SUMMARY

✔ Introduction meeting held with plant management.

✔ Pipe material sampled.
- ✔ Selected a sample of 24-inch diameter Type S pipe from (✔) production or (__) inventory, witnessed measurements and cutting of specimens for testing, marked specimens with identification, and staged specimens for shipment to Auditor's lab.
  [✔ length measured before cutting = 20'-7"; marking interval = See Note 5]
- ✔ Selected pipe identification code: 051002H1 Hancor 24" AASHTO M294

✔ Raw material sampling.
- ✔ Selected a sample of resin from (✔) production or (__) inventory, bag, marked with identification, and prepared for shipment to Austin lab.
- ✔ Selected resin identification code: Resin 8 – Blend C
  - ✔ Verified that resin is PPI-listed.

✔ Raw materials documentation.
- ✔ Obtained record of resin used on 5/10/02. Resin was assigned lot #: 1010020170
- ✔ Obtained vendor certification of compliance to AASHTO M 294 for above lot.
- X Obtained test report from verification testing, if available. (see Note 1)
- N/A example of a rejected resin, if available, including the associated vendor notification letter. (N/A = not available, no failures on record in last 6+ mos.)

✔ Pipe materials documentation.
- ✔ Obtained production record of pipe made from above resin. Pipe was assigned lot #: 051002H1 (Note: lot of production = 1 day of production)
- ✔ Obtained test report(s) from pipe QC and QA testing of recent lot. Verified testing frequency and values satisfy requirements in the table below.
- ✔ Letter of certification for the selected pipe lot not available. Obtained a recent letter of certification. [Note: Lot number not recorded on certification.]
- N/A Obtained example of nonconforming product, including QC and QA test reports and documentation of disposition and corrective action.

Test	PTPVMC App. 1 Suggested Frequencies	Minimum testing frequency in QC plan	Actual testing frequency	Comments
Workmanship	-	2/day	1/shift	
Liner thickness	one time per week	1/shift	1/shift	
Min inside diameter	one time per week	1/shift	1/shift	
Length	one time per day	1/shift	1/shift	Finding #4
Perforations	one time per week	1/shift	1/shift	off line
Pipe stiffness	three times per week	2/day	1/shift	
Pipe flattening	three times per week	2/day	1/shift	
Env. stress cracking	once per production run	once per production run	once per production run	
Brittleness	three times per week	2/day	1/shift	
Joint integrity	once per production run	once per production run	once per production run	
Marking	-	2/day	1/shift	Finding #3

✔ QC/QA Lab Facility Review.
- ✔ All necessary testing and monitoring equipment is operational, calibrated, and documented as to condition.
- ✔ Copies of test procedures are available to lab personnel. (kept in foreman's office)
- ✔ Lab temperature and humidity is monitored and recorded.

✔ Review Meeting At The End Of Audit With Plant Management.

✔ Verified That Samples Are Staged For Shipment.

SAMPLE TESTING SUMMARY:

1000 g of Resin 8, Blend C Resin;
24" Type S Corrugate Polyethylene Pipe;
Specification: AASHTO M 294-01/MP-7;
Pipe Conditioning: Not less than 40 hours at 23°C ± 2°C (73°F)

SECTION 6.1 BASIC MATERIALS - RESIN

Specifications: ASTM D 3350-00; Minimum cell class 335400C; Density: 0.945 - 0.955 g/cm^3; Melt Index: 0.15 to 0.40 g/10 min.; Carbon Black Content: 2% minimum / 5% maximum; SP-NCTL: 15%/24 hours; [Note: Compounds that have a higher cell classification in one or more properties with the exception of density are acceptable provided requirements are met.]

PPI Listed Resin? X yes __ no

Test Results:

Property	Density (g/cc)	Melt Index (g/10 min)	Flexural Modulus (psi)	Tensile Strength (psi)	SP-NCTL (hrs)	Thermal Stability (°C)
TRI Test Result	0.948	0.275	112,556	3697	> 24	234
TRI Cell Classification	3	3	5	5	-	-
AASHTO M294 Req't	3	3	5	4	> 24	220

Carbon Black Content Of Pipe (%) = 2.0

Conclusion: Specifications were met.

SECTION 7.1 WORKMANSHIP

Specification: Free of foreign inclusions and visible defects. The inner liner shall be fused to the outer corrugated wall at all internal corrugation crests.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
All	Pass

Conclusions: Specifications were met.

SECTION 7.2 PIPE DIMENSIONS

Section 7.2.2 Wall Thickness

Specification: The minimum inner wall thickness requirement is 1.5 mm (0.06”). Not applicable to Type C pipe. (Average of 8 measurements)

Test Results:

INNER WALL THICK., mm (in)	OUTER WALL THICK., mm (in)
1.75 (0.07)	-

Conclusion: Specification was met.

Section 7.2.3 Inside Diameter

Specification: Nominal inside diameter shall not exceed 4.5% oversize or 1.5% undersize and not more than 30 mm oversize. (Avg of 16 measurements)

Test Results:

INSIDE DIAMETER , mm (in)	% Oversize / Undersize
608 (23.95)	+1.4

Conclusion: Specifications were met.

Section 7.2.4 Length

Specification: The length must be at least 99% of the stated length.

Test Results:

LENGTH, m (ft)	>99% of Stated Length (Pass/Fail)
6.3 (20.6)	Pass

Conclusion: Specifications were met.

SECTION 7.3 PERFORATION: Not Applicable

Specification: Perforations shall be placed in external valleys and uniformly spaced along pipe length and circumference. Circular perforations shall be a minimum of 5 mm (0.197") and shall not exceed 10 mm (0.394") in diameter. The minimum water inlet area shall be ___ cm^2/m (____ sq. in./ft.).

Test Results: Perf placement in external valleys and uniformly spaced? _ yes __no

DIAMETER, mm (in.)	WATER INLET AREA, cm^2/m (sq. in./ft)
-	-

Conclusion: Not Applicable – Unperforated

SECTION 7.4 PIPE STIFFNESS

Specification: The min. pipe stiffness requirement at 5% deflection is 235 kPa (34 psi).

Test Results:

SAMPLE NO.	ORIENTATION	PIPE STIFFNESS kPa (psi)
1	Seam Horizontal	271 (39.3)
2	45°	260 (37.7)
3	90°	275 (39.9)

Conclusion: Specification was met.

SECTION 7.5 PIPE FLATTENING

Specification: There shall be no evidence of buckling, cracking, splitting, or delamination when the vertical inside diameter is reduced by 20%.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
1	Pass
2	Pass
3	Pass

Conclusion: Specification was met.

SECTION 7.6 ENVIRONMENTAL STRESS CRACKING

Specification: There shall be no cracking of the pipe.

Test Results:

SAMPLE NO.	1	2	3
RESULTS (Pass/Fail)	Pass	Pass	Pass

Conclusion: Specification was met.

SECTION 7.7 BRITTLENESS

Specification: The pipe specimens shall not crack or split. Five non-failures out of six impacts will be acceptable.

Test Results:

IMPACT NO.	1	2	3	4	5	6
RESULTS (Pass/Fail)	Pass	Pass	Pass	Pass	Pass	Pass

Conclusion: Specification was met.

SECTION 7.8 FITTING REQUIREMENTS

Specification: Pipe connections shall not separate to create a gap exceeding 5 mm (0.2”) when measured between the bell and spigot portions of pipe. Fittings shall not crack or delaminate.

Test Results:

SAMPLE NO.	RESULTS (Pass/Fail)
1	Pass

Conclusion: Specifications were met.

SECTION 11 MARKING

Specification: Pipe shall be marked at intervals of no more than 3.5 m with manufacturer’s name or trademark, nominal size, AASHTO M294, and plant and date of manufacture or appropriate code.

Test Results:

051002H1 HANCOR 24” AASHTO M294

Conclusion: Specification was partially met. Partial marking at pipe mid-point (no date code).

All tests were conducted by TRI personnel.

CONCLUSION

HANCOR has voluntarily submitted to the random independent plant audit, including product sampling and testing, described herein and been found to be generally in compliance with the requirements established by AASHTO M294 / MP7 specifications under the PPI-PTPVMC, except as noted under the Summary of Findings section. HANCOR has seven (7) days to provide a written course of action to address the findings of this audit. If the proposed remedies are approved, HANCOR will be authorized to continue to use the PPI-PTPVMC "Program Mark", subject to on-going annual auditing and testing under the PTPVMC.

If you have any questions or require any additional information, please do not hesitate to call.

Sincerely,

C. Joel Sprague

C. Joel Sprague, PTPVMC Administrator
TRI/Environmental, Inc.
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cjoelsprague@cs.com

cc: Sam Allen, Vice President, TRI/Environmental, Inc.

North Carolina Quality System Gap Analysis
4-24-02 / 4-25-02

Opening Meeting- Bert Austin, Joe Haasis, Jeff Brawn and Rhonda Vaughn
Auditors: Jo Dible & Dave Gonso

The purpose of this audit was to review the overall status of NC plants implementation of the HQS system – Gap Analysis. The Audit also focused on those areas that could be audited by the 3rd Party auditor. Those areas were:

Inventory/Product Release
Production QC Control
Calibration System
Raw Material Controls

We also reviewed the Training System & Document Control from a HQS viewpoint.

Below are the results of the audit. There were many observations that need to be addressed. The items that are "boxed" in need to have a corrective action response sent to Jo and myself detailing what will be done to correct the particular issue.

GENERAL

Overall we were impressed with what we saw. A lot of hard work has been done. Bert, Joe, Jeff and Rhonda were very helpful and active during this "gap analysis". Bert was especially engaged in the audit process that demonstrates his commitment to the Quality System.

1. No Quality Policy hanging anywhere.
2. SOP manual needs to be updated.
3. Document Control system verified by process - need to assure current documents are available to the plant personnel.

YARD and INVENTORY CONTROL

1. Product release system well identified and people understand it. See pictures 1,2,3 on H: "NC pics" folder.
2. Yard and fittings were well organized and neat.
3. Need to manage single piece non-conforming product.
4. Markings are inconsistent and do not meet the AASHTO requirements.

During the Yard visit, several date codes were selected and two were chosen for trace ability to raw materials and finish product testing. Both of these had the PPI logo sticker on them. They were as follows:

18" (3-29-02-H-1)
48" (4-19-02-HH-1)

PRODUCTION AREA'S

Production areas (all processes) were also neat, clean and organized. Employees were knowledgeable and friendly. The production area had a well-identified Non-Conforming area.

260-44 PROCESS

1. Running 4" AASHTO, not using current control plan or correct S.P.C. chart. AASHTO control plans have not been updated in the manual.
2. Not following interpretation for rules at bottom of control chart.
3. Chest freezer needs to be defrosted.
4. Operator logs needs to be a controlled document.
5. Out of the specification tolerances for "% of air flow". 80% is max. and the actual was 100%.
6. Recording "ok" for length and pitch instead of actual value.
7. Small diameter impact tester had a good poka-yoke system in place. See Picture 4 on the H: "NC pics" folder.

3020 PROCESS

1. Single wall control charts are not current.
2. 12", 15", 18", and 24" HI-Q / S/L control plans were not current in the manual.
3. 12" AASHTO 3 out of 5 pieces looked at were not marked "AASHTO". Date code was consistently not legible.
4. Production logs were furnished for 18" Sure-LOK (3-29-01-H-1). The logs were provided very quickly.
5. 1st pc record for the 18" product showed an out of the specification for crown range, root range and liner skiver lip.
6. 18"date code was not placed in the middle of the pipe and the "Hancor" inscription was spaced more than 10' apart.
8. Large diameter impact tester had a good poka-yoke system in place. See Picture 5 on the H: "NC pics" folder.

3660 PROCESS

Running 48" S/L using the correct 1st pc. form, control chart, control plan and verification methods. Talked with Oddie Brooks who demonstrated several test procedures.

1. Not asking for a deviation number when running out of spec. (I.E. 48" Wt/Ft 30.2 lbs. Vs. 29 Targets.)

2. Liner Flatness gauge not adequate. Does not span the root. Dave G. will provide proper gauging.

3. Blend Calibration is out of spec. with no check to verify that is still okay. per Work Instructions for Calibration.

4. Not following out of control responses on control plan for characteristics that are out of spec.

5. Production logs were furnished for selected date 48" (4-19-02-HH-1)

6. Not doing some QC PII tests consistently. The requirement is 2 times per 24 hr period. Examples: on 4-15 1st shift was done but not 2nd or 3rd. On 4-16 3rd shift was done but not 1st or 2nd. On 4-17 1st shift was done but not 2nd or 3rd and on 4-19 1st shift was done but not 2nd or 3rd.

7. No shift recorded on some 1st pc. Records. 48" inside circumference and liner skiver height were out of spec.

8. Recording "0" for the Out of Round specification on many of the records we looked at. (all processes, different diameters).

9. 42" Sure-Lok was also looked at and the 1st pc was out of spec. on WT/FT, spigot OD and thickness in the gasket area.

CALIBRATION SYSTEM PROCESS

Checked several gages all were ok. Good system. The gages are identified properly and the documentation was excellent.

1. Process gages are not under the system yet. Not required for 3rd party.

2. Suggested that when verifying/calibrating a gage, record the actual results not just OK. (I.E. for a weigh scale if you use the 50gm, 100gm, 200 gm, and 500 gm wt stds then record what the scale read when you placed those weights on it. This will show the accuracy of the scale and also the linearity of the scale.)

RAW MATERIALS PROCESS

1. Well-defined non-conforming raw material area. But not using red stickers on rejected box's. Dave G will look at altering the SOP and WI to allow this as an option.

2. Using white boards to show layout of silos / railcars and blackboard to show layout of raw material inventory. Board was only showing location of LDV and HOV not HDV.

3. Silo / blending system may be confusing to an untrained eye. See picture 6 on H: "NC pics" folder.

4. Raw material inspection ok, but -need to get a new hydrometer (it was broken).

5. Using different color mat'l tags for regrinds. This is a good visual method for people to use. Another Poka-Yoke example. See Picture 7 on the H: "NC pics" folder.

6. Blender calibration – needs work / training- percentages not figured correctly.

7. Some RM work instructions are not current.

8. Need to make sure that the Blend operator (Rhonda) and her back ups clearly understand the Blend percentage and specifications required with the 3rd Party NCTL materials. Dave G and Mike Harris will be available as needed.

TRAINING SYSTEM PROCESS

The NC plants training records were well organized by process. Suggested that the documentation include the date of training. They are using the email document notification system for revision to existing documents.

CLOSING MEETING- Bert Austin, Joe Haasis, Jeff Braun, Rhonda Vaughn

Summarized and reviewed the audit and discussed good things observed and some of the non-conformances described above.

NY Third Party Preparation Audit Summary

4-9-02 / 4-10-02

It was explained that this was only a sample for TRI and was not an all inclusive "HQS" gap analysis.

Yard

- Identified PPI labeled inventory, selected 5 random date codes out of those 5 random 3 were chosen to trace.

  12" 4-7-02-TT-B-1
  24" 4-5-02-T-A-2
  48" 03-25-02-AR-1

- Not managing single piece non-conforming product in yard.

- 24" date code 4-9-02 (approx 25 pcs) without control to prevent loading of product before release.

Review of Quality records

- Only 1 of the three quality records could be furnished upon request (the other 2 were produced the next day, they are in a document transition)

- 24" – 1st Pc. Operators recording "Ok" instead of value for pitch and end to end bow.

- Not using ST-7 form (this will serve as evidence of testing) to record QA samples according to Gen-WI-1.

- PII graphs No shift preference recorded on graphs. Inconsistent information being recorded by operators.

- A sample of Control charts, various dimensions, no action taken for two consecutive points in the yellow, blanks spaces within a 24-hour period, no deviation for running in the red.

- "0" out of round on 4 out of 4 records reviewed (different dimensions).

- 48" blanks on first piece forms.

- A sample of Blender calibration forms, not using current form, not filling out completely, no hourly visual check of the Auger.

- QA lot 3-25-02 (PII Graph's) 3 samples were done 2 were recorded as being horizontal and one vertical. (Typo?)

- Wrong blend number recorded between 1st pc (122), PII (128), Blend Calibration (128). 122 was a valid blend for 48' but was never used. Questioned why the operator had it on the 1st pc.form.

- 12" out of spec on Skived Liner length 4-7-02-TT-B-1

- Not doing 1st pc at blend change only once per shift.

- Cold Temperature Impact was not checked on first pc I.E. pass/fail, so there was no record of it being done. Suggestion was to use a log sheet at the freezer to have back-up evidence that the test was performed.

Raw Material

- RM-WI-12 needs to be updated.

- WI's in RM manual that do not pertain to NY (can be removed).

- Blends out of spec for HDV %

  123
  124
  129
  130
  131
  134
  135
  136
  150
  122 out on the high end of HOV% (Approximately 1500 pieces, will contain product and submit blend for approval or remove stickers)

- Not labeling rejects according to RM-WI-6

- Not labeling in-house regrinds per RM-WI-11

- Not using Nonconforming tags FF-F-18, they do not have any of these in case that they would want to use as an option per WI.

- Make sure that we have test results for regrind being used over 15%

- Silos will be permanently hard lined and identified by w/e 4-19-02

Calibrations

- No formal calibration system in place. (Art Sudam going to NY to assist) Scales, PII Tester (done through an outside source) and some new Micrometers are the only calibrated instruments.

Observations from NY to us

- Memos e-mails and Quality alerts being sent out uncontrolled they conflict with work instructions, specs etc. they are coming from multiple sources, are confusing and are not going through the quality system.

Good thing observed

- Plant looks good
- Yard looks good
- People were friendly and cooperative

April 17, 2003

New York Plant Certification Audit – Summary

Audit Dates: April 16 – 17

Auditor: Dave Gonso

Scope and purpose of Audit: To assess the New York facility to the Hancor Quality System for the purpose of certifying the facility. The entire system will be audited from raw material receiving to distribution utilizing the appropriate work instructions and SOP's found in the HQS document triangle.

Observations during the audit. Some of these are general in nature and some are specific to the point they will need addressed (highlighted below.).

- The hospitality and helpfulness of everyone was great.
- Both the East and West yards were neat and organized.
- The East yard products rolled rims look excellent.
- The use of caution tape to identify NCP is good
- Non conforming areas are well identified in both yards
- Sampling of rail cars from backside to prevent accidental use is a good idea.
- All associates (Scott Watson, Al Waters, Rich Lafritz, George Ramsted, Kevin W, Lissa H, DJ, Don G,) were very helpful and were knowledgeable about their jobs.
- Document revision process with the red folders is a good and effective.
- The Poka Yoke system used at the rail siding to prevent accidental hookup of the wrong material type is good.
- Traceability of product date codes was excellent. Record retrieval was quick.

- **In the west yard there was some 30" SL dated 4-15 / 4-16 that had bells damaged and with no bell lips rolled.**
- **Need to send in-house regrind samples into lab on a weekly basis. Evidence showed it being done but infrequently.**
- **In the 260-44 process first piece report operator was placing N/A in the field for OD. We still need the data to establish a spec.**
- **On the small diameter impact tester you need to check the wt of the flat plate and identify the wt on the flat plate. You may want to use the North Carolina method.**
- **In customer service area suggest that you document activities that drive actions based upon what the trend or Pareto charts are telling you.**
- **Inside diameter measurement method (3660 line) is not real accurate. Suggest you use a ½" metal band that is scaled to give the user a measurement. This method can be done by one person.**
- **In the Fab shop you may want to get Buddy and John Borsani involvement in cell design and work flow. Also, use the system on the ITP for getting fitting build prints. The UL auditor was amazed at what he saw and shared it with the Executive staff.**

- **6" date coding is very hard to read. Suggest you call Rob Pennebaker (Iowa Plant manager)**

Minor Non-Conformances.

- **Product Identification Stickers are not being used on the product (3020, 3660, 260-44) per SOP 7.11**
- **24" Blue Seal Banding not in right location. Seen in the West Yard.**
- **Document Control Issues:**
- **Contamination Test procedure WI-04 in the labs book is of the wrong revision. Was Rev 4 and should be Rev 5.**
  VM-9 rev2 and should be Rev 3.
- **Part of the regrind raw material sampling procedure it is required to use a magnetic probe. No probe is being used.**
- **Calibration Control Issues:**
  Ohaus CD-11 blender scale - overdue on calibration
  6.TA.104.xx.12 tape measure on the 3660 process was not in the system
  Ohaus scale 6.SC. 266.1.1 – over due no record of calibration
  Master gage block set – overdue on calibration
  Length wheel on 266-44 line had no calibration sticker
- **Nonconforming areas in the plant need to be identified.**
- **Bell measurement of thickness was not performed correctly. The root measurement was taken back in the sloped area of the bell.**

Safety Issues:

- **In the East Yard a grate broke away leaving a good size hole in the ground. One of the associates placed an orange pylon over it.**

Recommendation for Certification:

Pending review of and corrections to the minor non-conformances and to the highlighted observations I will recommend the New York facility be certified. This process will involve several Ohio staff members who will discuss with me and will review this report and my notes.

Dave Gonso
QA manager
Hancor, Inc.

Jim Johnson
QA Manager
Hancor, Inc. NY