

**Report**

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**Construction Documentation Report**

**Type I Settling Ponds Liner Construction**

**Scope: 95F004**

**Flambeau Mining Company  
Ladysmith, Wisconsin**

**December 1995**

December 13, 1995

Ms. Jana Murphy  
Supervisor of Environmental Affairs  
Flambeau Mining Company  
N4100 Highway 27  
Ladysmith, WI 54848

Dear Ms. Murphy:

Re: Settling Pond PVC Liner Installation Documentation Report

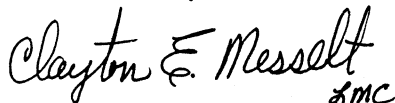
Pursuant to your request, Foth & Van Dyke is presenting the attached report which documents the installation of a 30 mil, polyvinyl chloride (PVC) liner over the settling ponds located at the Flambeau Mining Company facility in Ladysmith, Wisconsin. The lining of the ponds was performed in general conformance with plans and specifications submitted to the Wisconsin Department of Natural Resources (WDNR) and pursuant to the Industrial Wastewater Section of the WDNR approval letter dated October 3, 1995 (file 95-1690).

Competent resident inspectors from Foth & Van Dyke were present during the course of construction of the liner. Along with the daily field notes and description of the PVC installation, the documentation report also contains photographs and various test results documenting the PVC material characteristics.

If you have any questions or comments concerning this report, please contact Jim Hutchison at (414) 497-2500.

Sincerely,

Foth & Van Dyke



Clayton E. Messelt, P.E.  
Construction Project Manager



James B. Hutchison, P.E.  
Project Manager

CEM:JBH1:lmc

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Type I Settling Ponds Liner Construction  
Ladysmith, Wisconsin**

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Supervisor of Environmental Affairs  
Flambeau Mining Company  
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Ladysmith, WI 54848

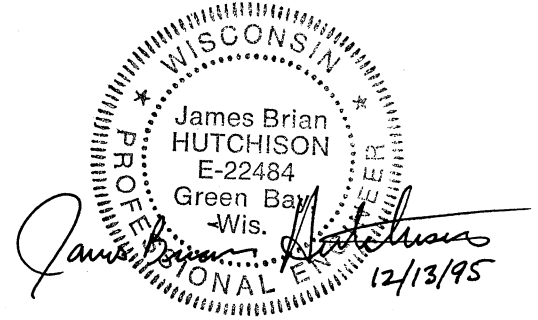
**Construction Documentation Report  
Type I Settling Ponds Liner Construction  
Ladysmith, Wisconsin**

95F004

Prepared for  
**Flambeau Mining Company**  
N4100 Highway 27  
Ladysmith, Wisconsin 54848

Prepared by  
**Foth & Van Dyke and Associates Inc.**

December 1995



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Type I Settling Ponds Liner Construction  
October 1995**

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# **1 Introduction**

## **1.1 Authority**

This Construction Documentation Report was prepared on behalf of Flambeau Mining Company (Flambeau) by Foth & Van Dyke and Associates of Green Bay, Wisconsin. This report has been prepared in accordance with the conditions of the Wisconsin Department of Natural Resources (WDNR) October 3, 1995, approval letter in Appendix A. The purpose of the settling pond liner project is to facilitate minimization of site surface water migration to the groundwater in order to enhance slope stability of the pit north wall.

## **1.2 General Project Information**

Flambeau operates an open pit copper mine near Ladysmith, Wisconsin. The mine has been in production since June of 1993. At its maximum size, the open pit is approximately 32 to 35 acres in size, approximately 550 to 600 feet wide, approximately 2,600 feet long, and a depth of approximately 225 feet. Phase 1 of the site development of the stockpile areas was performed in 1991 and 1992.

The Phase 1 site development included construction of the unlined settling ponds.

## **1.3 Project Description**

Foth & Van Dyke of Green Bay, Wisconsin, was retained by Flambeau to provide project management, project administration and geomembrane Quality Assurance Testing and observations for the soil preparation and installation of a 30 mil polyvinyl chloride (PVC) geomembrane in the settling ponds.

Foth & Van Dyke observed contractor's methods and operations during the removal of riprap and vegetation, fine grading of the pond bottoms and sideslopes, excavation and backfilling of anchor trenches, installation of the PVC liner, PVC liner field destructive tests and non-destructive field seam testing for integrity. The project was initiated on October 4, 1995, with the removal of riprap and vegetation within the ponds and was completed on October 17, 1995 with the final welding of the PVC liner.

## **1.4 Purpose and Scope**

This report presents field observations and test results related to the soil preparation and installation of the 30 mil PVC geomembrane. The report complies with the WDNR suggestions contained in their October 3, 1995 approval letter. A copy of the WDNR letter is contained in Appendix A.

## 2 Quality Assurance and Quality Control (QA/QC)

### 2.1 Quality Assurance Testing

Table 2-1 contains the 30 mil PVC material properties specified for the project.

**Table 2-1**  
**Type I Settlement Ponds Liner Construction**  
**30 mil PVC Material Properties**

Property	Test Method	30 mil PVC Value	Manufacturer Test Frequency
Thickness, mils	ASTM 1593 Para. 8.1.3	28.5 min.	50,000 ft <sup>2</sup>
Specific Gravity	ASTM D 792	1.20 min.	50,000 ft <sup>2</sup>
Volatile Loss	ASTM D 1203 Method A	0.5% max.	50,000 ft <sup>2</sup>
Minimum Tensile Properties (each direction)	ASTM D 882 Method A or B		
1. Breaking factor (pounds/inch width)		69 min.	50,000 ft <sup>2</sup>
2. Elongation at Break (percent)		325 min.	50,000 ft <sup>2</sup>
3. Modulus at 100% Elongation (pounds/inch width)		30 min.	50,000 ft <sup>2</sup>
Tear Resistance (pounds)	ASTM D 1004 Die C	8 min.	50,000 ft <sup>2</sup>
Low Temperature impact, °C maximum allowable failure temperature	ASTM D 1790	-29°	1 per product
Water Extraction (percent loss)	ASTM 03083 (as modified in Annex A)	-0.25 max.	1 per product
Resistance to Soil Burial (percent change max. in original value)	ASTM 03083 (as modified in Annex A)		
1. Breaking Factor		5%	1 per product
2. Elongation @ Break		20%	1 per product
3. Modulus @ 100% Elongation		20%	1 per product

**Table 2 (Continued)**

Property	Test Method	30 mil PVC Value	Manufacturer Test Frequency
Dimensional Stability (each direction percent change maximum)	ASTM D 1204 212° F, 15 min.	5	1 per product
Friction Resistance between PVC and Drainage Soil <sup>1</sup>	ASTM D5321	27.7° min.	1 per product
Hydrostatic Resistance (psi, min.)	ASTM D 751 Method A	82 min.	1 per product

**Factory and Field Seam Requirements**

Property	Test Method	30 mil PVC Value	Manufacturer Test Frequency	Third-Party Conformance Test Frequency
Bonded Seam Strength (ppi width)	ASTM D 3083 (as modified in Annex A)	55.2 min.	1 per fabricated panel	1 per 500 lineal feet of field seam
Peel Adhesion (lb/in minimum)	ASTM D 413 (as modified in Annex A)	10 min <sup>2,3</sup>	1 per fabricated panel	1 per 500 lineal feet of field seam

<sup>1</sup>Unsaturated condition.

<sup>2</sup>Failure must be a Film Tearing Bond (FTB).

<sup>3</sup>No more than 10% of the seam width may separate.

**2.2 Geomembrane Conformance Testing**

Twelve 30 mil PVC panels (Photograph #3 in Appendix C) were factory assembled by EPI from thirty-three (33) rolls of 30 mil PVC. Twenty-two (22) rolls were manufactured by Textileather Corporation of Toledo, Ohio and nine (9) rolls by HPG International of Mountaintop, Pennsylvania. Certification results for the rolls are presented in Appendix B. The panel layouts are included in Appendix D.

**2.3 Factory Seam Tests**

EPI's laboratory performed twelve (12) seam tests, one on each of the twelve (12) factory assembled panels. The chemically fused seam samples were tested for peel adhesion, bonded seam strength and Wolschon peel strengths. The test results are presented in Appendix B. All factory seams were subjected to non-destructive testing as specified in the Project Manual. All tests met or exceeded specifications.

## 2.4 Field Seam Tests

EPI's laboratory performed six (6) peel adhesion and bond seam strength tests on the six (6) destructive samples taken in the field. The test results are also presented in Appendix B. The tests were performed on both the wedge welded and chemically fused seam destructive samples. All tests met or exceeded specifications.

### 3 Summary of Construction Activities

The following is a sequence of construction for the Type I settling ponds.

- Strip vegetation.
- Removal and disposal of unsuitable soils.
- Removal of riprap.
- Removal of culvert endwalls.
- Removal of life saver rings and posts.
- Excavate anchor trenches.
- Placed the PVC liner including culvert and miscellaneous structure boots.
- Backfilled anchor trenches.
- Built safety berm.
- Installed life saver rings and mounting posts.

The earthwork described above was performed by Koshak Construction Co., Inc. of Park Falls, Wisconsin. Their workforce generally consisted of:

- 1 Foreman
- 2 Dozers (350C LGP, 450C)
- 1 Backhoe (American)
- 1 Vibratory Compactor
- 1 Tri-axle Dump Truck

The installation of PVC liner was performed by Koshak Construction Co., Inc. and Environmental Protection, Inc. (EPI) of Mancelona, Michigan. EPI's workforce consisted of:

- 4 Permanent Employees
- 4 Temporary Employees
- Miscellaneous Handtools
- Tensiometer
- Air Compressor
- Portable Generator

#### 3.1 Earthwork

##### 3.1.1 Subgrade Preparation

Koshak Construction Co., Inc. constructed a truck ramp (Photograph #2, Appendix C) in each pond to facilitate removal of the excavated vegetation and soils from the bottom and sides of the ponds. The contractor utilized the granular materials in the mine safety berms around the ponds for the ramps. After the ramps were removed, the granular materials was used to re-construct the safety berms at the pond perimeter.

The contractor removed the rip-rap at the spillways (Photograph #2, Appendix C) and stockpiled the salvageable rip-rap in the lay-down area. The remainder was placed in the Type I stockpile area. The existing 24" diameter culvert end-wall sections were also removed and stored in the lay-down area.

The contractor removed the vegetation (Photographs #1 and #4, Appendix C) and fine graded the bottom and sides of each pond. The mixture of vegetation and soil was loaded, hauled and placed in the Type I stockpile area.

### **3.1.2 Anchor Trench**

The contractor excavated the two foot deep anchor trench with a hydraulic backhoe using a 27" wide bucket. The excavated material was stockpiled on the pond berms, leveled and used for placement of the geomembrane pallets for deployment. After the geomembrane was deployed and the panel seams welded, the trench was backfilled (Photograph #7, Appendix C) by dozing the excavated material into the trench. The anchor trench was located three feet (3±) from the edge of the berm.

### **3.1.3 Deviations from the Plans and Specifications**

Approximately 40 lineal feet of the east anchor trench of the north pond was relocated approximately one (1) foot to the west to avoid an existing 24" diameter pond bypass culvert. This resulted in a two (2) foot berm top instead of the three (3) foot top as called for on the drawings.

### **3.1.4 Damage to Underground Utilities**

During the excavation of the anchor trenches, the contractor damaged the following utilities:

#### **1. Underground Electrical Cable.**

Flambeau located and marked a buried electrical cable on the north edge of the south pond. The markers were offset by the contractor to avoid being destroyed. The buried electrical cable was de-energized by Flambeau on 10/9/95.

The contractor started excavation of the north anchor trench on 10/10/95, at the northwest corner of the south pond next to a 480 volt, 15 KVA transformer. In the process of excavating the anchor trench, the backhoe hooked the buried electrical cable and tore it out of the transformer. The contractor dug the trench for the cable repair replacement.

Flambeau has repaired the damaged cable.

#### **2. 24" Diameter Bypass Culvert**

During the 10/11/95 excavation of the east anchor trench for the north pond, the contractor hit and tore out a section of the 24" diameter rivetted corrugated metal bypass culvert. The hole was patched by the contractor on 10/12/95.

### **3.1.5 Settling Pond Berm Seeps**

During the removal of the vegetation and soils from the sides of the ponds, several seeps were noticed at different elevations in both ponds. These seeps were observed and concluded to be the outlets for accumulated moisture in the berms. Prior to and during the construction, several inches of precipitation were received in the area. The safety berms at the edge of each berm

prevented normal run-off and the moisture percolated into the granular soil berms. When the moisture reached the native silty sandy layers of soil, it moved along those layers horizontally until it became a seep.

The seeps were considered minor and did not hinder the fine grading of the pond sides or the placement of the geomembrane.

## **3.2 Geomembrane Installation**

### **3.2.1 Geomembrane Manufacturer and Installer**

The 30 mil PVC geomembrane material for the settling ponds liner was fabricated into panels by EPI. Panel numbers were assigned to each panel of geomembrane liner during fabrication by the manufacturer. These numbers were used in referencing a particular panel number to corresponding field seam tests performed by EPI. The Geomembrane Panel Layout for each pond is included in Appendix D.

The geomembrane material was delivered to the site on October 9, 1995, in panels folded and wrapped in poly on pallets. A total of 12 pallets (Photograph #3, Appendix C) was delivered (six for each pond). The geomembrane installation was completed on October 17, 1995.

### **3.2.2 Liner Deployment**

The geomembrane panels were positioned for deployment by placing the pallets at designated locations using a backhoe (Photograph #5, Appendix C). The folded geomembrane panels were unfolded using a dozer to pull the panels to the deployment location. The panels were placed to allow overlap with the next panel. The liner was deployed by anchoring the bottom folded layer with personnel and/or dozers to prevent the entire liner from sliding down the sideslope of the pond.

The deployment crew (consisting of 8 to 10 personnel spread along the length of the panel) picked up the upper layer of the panel and unfolded it as they proceeded down the sideslope to the center of the pond (Photograph #6, Appendix C). The panels final location was then adjusted to maintain the proper minimum panel lap to allow seaming to the adjacent panel. Panel Placement Summary is found in Appendix D.

Once deployed, the seams between panels were assigned a seam identification number in order to reference test results and field locations.

The geomembrane panel was secured in an anchor trench dug along the perimeter of the liner area. The anchor trench was generally two feet deep by two-and-one-half feet wide. The trench was inspected for and cleared of sharp rocks prior to panel anchoring. Ends of the panels were extended down into and across the bottom of the trench. Adjoining geomembrane panels were overlapped a minimum of four inches in preparation for seaming. Sand bags were placed on the geomembrane and the anchor trench partially backfilled to prevent liner movement and wind damage prior to final seaming and backfilling the anchor trench. Excavated granular soil containing some rounded smaller rocks were placed by dozers in the anchor trench.

Throughout the liner installation, the panels were visually examined for evidence of damage or visible manufacturing defects.

### **3.2.3 Liner Seaming and Welding Methods**

Geomembrane panel seaming was performed by one of the two industry standard methods, solvent welding or hot wedge welding. Solvent welding was used for panel seams with the exception of the A1/A2, A1/A3 and A2/A4 seams where a double hot wedge welder was used. The hot wedge welder was used in lieu of the solvent weld when the installer's supply of solvent was not adequate to finish the project with solvent welds. Solvent welding was used for repairs, and for adjoining panels. Panel Seaming Summary is found in Appendix E.

### **3.2.4 Hot Wedge Welding**

Seaming by hot wedge welding began after accepted pre-production testing for the welder and welding unit. The seams were aligned with a minimum overlap of four inches prior to welding and the surfaces to be joined were cleaned and dried prior to seaming. A slip sheet was pulled below the liner to insure a dry lower panel for the seaming operation.

The hot wedge heats the liner surface to a molten state in front of the drive rollers which compress the molten surfaces together forming one or two welded seams. The unwelded area between the seams forms an air space which can be pressurized to test for leaks. The speed setting and temperature of the welding unit were monitored during welding operations to document that the machine settings were not changed from those used to prepare the test seams. Photograph #9 illustrates the use of a hot wedge welding machine.

### **3.2.5 Solvent Welding**

The exposed surfaces of the two panels were cleaned of dust and soil particles. Solvent was applied by sponge or brush to the lower panel. The upper panel was then placed over the solvent and pressed with a hand held roller to seal the seam (Photograph #8, Appendix C). Surplus solvent was removed from the panel surface with absorbent rags. Filling of solvent application containers was performed over a piece of PVC geomembrane. An absorbent rope dam surrounded the filling area to absorb any potential spills.

### **3.2.6 Pre-Production Welds**

A test seam was welded prior to the commencement of hot wedge weld seaming. The seam was made on representative pieces of geomembrane liner, using the procedures described above. One test seam was made to check the performance of the machine.

Two specimens measuring one inch in width were die-cut from the test seam. Both specimens were tested in peel adhesion using a field tensiometer furnished by EPI.

Criteria for acceptance of a hot wedge pre-production welded seam tested in peel adhesion was defined as a minimum of 10 lb/in. Both specimens exceeded the 10 lb/in. criteria.



### **3.2.7 Seam Testing**

Three types of tests were used to document field seaming. The tests were 1) field destructive testing of pre-production welds, 2) non-destructive testing of field seams, and 3) laboratory destructive testing of seam samples.

#### **3.2.7.1 Non-Destructive Seam Tests**

Hot wedge and solvent welded seams were non-destructively tested by directing compression air (60 psi) at the leading edge of the seam through a 3/16" diameter nozzle and observing any unsealed areas (air lance testing).

If the air lance test indicated a discontinuous seam, the seam was repaired and the seam retested. For seams that could not be repaired by using solvent and applying pressure, the defective area was cut out and a solvent welded patch applied over the cut-out area. The perimeter of the welded seam was tested by using the air lance. Photograph #10 in Appendix C shows the non-destructive testing procedure.

#### **3.2.7.2 Destructive Seam Test**

Destructive samples of field seams were collected at a minimum rate of one sample per 500 feet of seam. The Foth & Van Dyke quality assurance technicians collected one (1) additional sample in each pond.

The destructive samples were cut by EPI at the locations designated by the Foth & Van Dyke quality assurance team. The samples were a minimum of 12 inches wide by 48 inches long with the seam centered lengthwise. Two 1-inch wide strips were cut, one from each end of the sample and tested in the field with a tensiometer for peel adhesion. Results of the field tests are included in the Trial Weld Summary found in Appendix F. The remaining sample was cut into three parts and distributed as following:

1. One portion for Foth & Van Dyke archive storage.
2. One portion to Flambeau for archive storage.
3. One portion to EPI for destructive testing.

Criteria for passing of destructive laboratory seam tests required the results of each peel adhesion test to be greater than 10 lb/in. All tests met or exceeded specifications.

### **3.2.8 Repairs**

During the course of observation and testing, all welded areas and the liner surface were monitored for defects and damage. Observed defects were marked for repair.

Geomembrane repairs were required for typical reasons including wrinkles, fish mouths, and welder burn-through. Minor repairs were marked on the liner with a paint crayon, repaired, and non-destructively tested. Results of the non-destructive tests were recorded on the liner adjacent the repair with a paint crayon.

Patches were placed over destructive sample and welder burn-through locations. Patches were cut from the same 30 mil PVC material, solvent welded and non-destructively tested.

Foth & Van Dyke personnel observed non-destructive testing and walked along each panel to observe that all repairs and repair tests were completed to project requirements.

### **3.2.9 Liner Penetrations**

Three types of liner penetrations were encountered during the installations. Each type of penetration was treated as follows:

#### **1. Control Structures**

Each pond has a vertical 30" diameter steel pipe control structure with several butterfly valves at various elevations to control the water level.

Prior to the placement of the PVC boot around the structure, a layer of geotextile clay liner (GCL) was placed on the subgrade (Photograph #11, Appendix C).

The PVC boot was field constructed around the control structure and a stainless steel band installed and tightened to seal the PVC to the steel pipe (Photograph #12).

#### **2. Concrete Piers and Abutments**

Each control structure access bridge is supported by four (4) concrete piers and an abutment (Photograph #2, Appendix C).

A PVC boot was field fabricated for each pier and abutment. The liner was attached to each pier as illustrated by the Liner Attachment Details for Bridge Piers found in Appendix H (Photograph #13, Appendix C). The boot was attached to the bridge abutment as illustrated by the Bridge Abutment Detail.

#### **3. Corrugated Metal Pipes (CMP)**

PVC boots were field fabricated for four 24" diameter CMPs (two for each pond). They were installed and solvent welded to the PVC liner (Photograph #14, Appendix C). A seamless steel band was installed and tightened to seal the PVC to the CMP. The fabrication and installation seams were air lance tested.

## 4 Conclusion

The scope of work for documentation of the PVC geomembrane liner construction included observation of the liner subgrade preparation for PVC liner placement; observation of panel deployment, seam welding, testing procedures, repairs, and large diameter boot installations. PVC material property testing was also performed by EPI, the manufacturer. These test results were reviewed by Foth & Van Dyke for conformance with project requirements.

Foth & Van Dyke and EPI have completed field observations and laboratory testing to document the methods and materials used in construction of the PVC geomembrane liner for the Type I settling ponds.

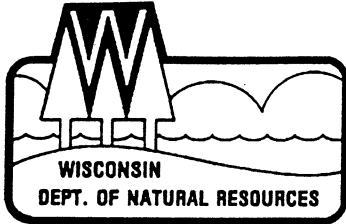
The documentation report supports the following conclusions regarding the liner system:

1. The 30 mil PVC geomembrane material test results were in conformance with the project requirements.
2. Non-destructive test results indicate that field geomembrane seaming was performed in compliance with the requirements of the project manual.
3. Seams that initially were not in compliance with project requirements were repaired. The repairs were tested, and the tests indicate that the repairs were in complete conformance with the project requirements.
4. The field fabrication and installation of the PVC geomembrane large diameter pipe boots were observed and tested. Test results confirm that the boots were installed in compliance with the project requirements.

Based on field observations and field and laboratory test results, it is Foth & Van Dyke's opinion that the 30 mil PVC geomembrane liner installation for the Type I settling ponds for Flambeau meets the project requirements expected by Flambeau and the suggestions set forth in the WDNR letter dated October 3, 1995 in Appendix A.

**Appendix A**

**WDNR Letter**



George E. Meyer  
Secretary

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

101 South Webster Street  
PO Box 7921  
Madison, Wisconsin 53707  
TELEPHONE 608-267-7694  
TELEFAX 608-267-7664  
TDD 608-267-6897

October 3, 1995

IN REPLY REFER TO: 95-1690

JANA MURPHY  
FLAMBEAU MINING COMPANY  
N4100 HIGHWAY 27  
LADYSMITH WI 54848

Dear Jana:

The Division for Environmental Quality is conditionally approving plans and specifications for settling pond liners to serve the Flambeau Mining Company located at N4100 Highway 27 in Ladysmith, Wisconsin. The plans and specifications were submitted under the seal of James Brian Hutchison, Professional Engineer, Green Bay, Wisconsin, and received for approval on September 27, 1995.

Currently the settling ponds used in the treatment of stormwater runoff from the Type I Stockpile area are unlined. Efforts to maintain pit wall stability include minimizing subsurface seepage toward the north wall of the open pit. Water seeping from the settling ponds is seen as a contributing factor to this seepage. Lining the settling ponds is intended to decrease the amount of seepage at the north wall, thereby increasing the stability of the wall.

The Department concerns regarding this project are minimal. The only significant issue regarding the project is that lining the settling ponds will most likely result in more frequent discharges from outfall 002. Typically, this should not be a significant concern since discharges through outfall 002 are monitored and limited in accordance with a WPDES discharge permit. However, actions should be taken to control overflow from the settling ponds during storm events that exceed the design capacity of the ponds.

The plans and specifications are hereby approved in accordance with sec. 144.04, Wis. Stats., as attested by affixing on them the stamp of approval, Number 95-1690, subject to the following conditions:

1. That the facility take all reasonable steps to maintain treatment of wastewater and minimize the amount of overflow for storm events that exceed the design capacity of the ponds.
2. That all existing treatment facilities be operated as effectively as possible during the course of the construction period and that the proposed system be operated effectively when it is placed in operation.
3. That Jim Hansen, Northwest District Area Engineer (phone number (715) 762-3204), be notified when the facilities are placed in operation.

4. That a competent resident inspector be provided during the course of construction.
5. That the improvement be installed in accordance with the above conditions, or subsequent essential and approved modifications.

These plans and specifications have been reviewed in accordance with sec. 144.04, Wis. Stats. Where necessary, plans and specifications should be submitted to the Department of Industry, Labor and Human Relations or other state or local agencies to insure conformance with applicable codes or regulations of such agencies.

The Division reserves the right to order changes or additions should conditions arise making this necessary.

This approval is not to be construed as a Department determination on the issuance of a Wisconsin Pollutant Discharge Elimination System permit or an opinion as to the ability of the proposed system to comply with effluent limitations in such permit, an approval of the Environmental Assessment that may be prepared for this project, or an approval for any activities requiring a permit under Chapter 30 or 31, Wis. Stats.

Tangible personal property which becomes part of a waste treatment or pollution abatement plant or equipment, may be exempt from sales tax under sec. 77.54(26), Wis. Stats. Similarly, property purchased or constructed as a waste treatment facility and used for the treatment of industrial wastes may be exempt from general property taxes under sec. 70.11(21)(a), Wis. Stats. A prerequisite to exemption is the filing of a statement on forms prescribed by the Department of Revenue. To obtain the necessary forms, and information on whether or not your property qualifies for these exemptions, please contact the Department of Revenue, P.O. Box 8933, Madison, Wisconsin, 53708.

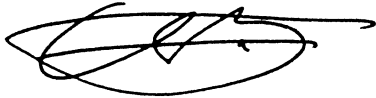
In case installation of these improvements has not been commenced within two years from this date, this approval shall become void. After two years, therefore, new application must be made for approval of these or other plans and specifications before any construction is undertaken.

If you believe that you have a right to challenge this decision, you should know that Wisconsin Statutes and administrative rules establish time periods within which requests to review Department decisions must be filed.

For judicial review of a decision pursuant to secs. 227.52 and 227.53, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

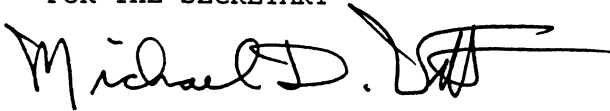
To request a contested case hearing pursuant to sec. 227.42, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the 30-day period for filing a petition for judicial review.

This notice is provided pursuant to sec. 227.48(2), Wis. Stats.



Thomas S. Bauman  
Industrial Wastewater Section

STATE OF WISCONSIN  
DEPARTMENT OF NATURAL RESOURCES  
FOR THE SECRETARY



Michael D. Witt, P.E., Chief  
Industrial Wastewater Section  
Bureau of Wastewater Management

MDW:TSB

c:\permits\flambeau\liner.app

cc: NWD(Park Falls) - Jim Hansen  
SW/3 - Larry Lynch  
DILHR - Plumbing Section  
Permit File  
Plan File (2 copies)  
James Hutchison, Foth & Van Dyke, 2737 S. Ridge Road, P.O. Box 19012,  
Green Bay, WI 54307-9012

# Appendix B

## PVC Geomembrane Laboratory Test Results





The Liner Company

## Environmental Protection, Inc.

9939 US-131 South NE, PO Box 333 | Ph 616-587-9108 Fax 616-587-8020  
Mancelona, Michigan 49659-0333 | MI 800-221-2535 US 800-34-LINER

October 25, 1995

Mr. Mark Koshak  
KOSHAK Construction Company Inc.  
P.O. Box 491  
Park Falls, Wisconsin 54552

RE: FLAMBEAU MINING CO., LADYSMITH WI, SETTLING POND LINER

Enclosed are the EPI lab samples, seam test results for the factory and field seams on the 30 Mil PVC. Also enclosed are the 30 Mil PVC material certificates for all rolls of material used for the Flambeau Mining Co., Ladysmith WI, Settling Pond Liner Project.

If I can answer any questions or be of any further assistance, please contact me at your convenience.

Sincerely,

Mark A. C. Wolschon  
Quality Control Manager  
Enclosures

CC:

Claton Messelt, Froth & Van Dyke



VERIFICATION OF MATERIAL PROPERTIES OF 30 MIL POLYVINYL CHLORIDE SEAM SAMPLES FOR THE FLAMBEAU MINING CO., LADYSMITH WI, SETTLING POND LINER PROJECT

INTRODUCTION:

Environmental Protection, Inc. performed physical testing on 30 Mil Polyvinyl Chloride factory seam samples for the Flambeau Mining Co., Ladysmith WI, Settling Pond Liner Project. The samples are identified by serial number and letter designation. All factory seam samples were constructed by chemical fusion welding, all of the field seams are identified by there weld type. One sample for every 3000 linear foot or one per panel, whichever was greater, was removed and tested per the following.

TEST PROCEDURES:-

The samples were allowed to acclimate under laboratory conditions for a minimum of 40 hours after fabrication prior to testing. Complete curing of the chemically fused seam requires approximately 28 days. The samples were tested for seam peel adhesion and bonded seam strength. Seam peel adhesion was tested in accordance with ASTM D-413 as modified by the National Sanitation Foundation (NSF) Standard #54 using a one (1) inch wide specimen with a strain rate of two inches per minute. Bonded seam strength was tested in accordance with ASTM D-882 using a one inch wide specimen and a strain rate of 20 inches per minute.

EPI has also performed peel testing in accordance with section 2.07 of the EPI GEOMEMBRANE INSTALLATION AND QUALITY ASSURANCE FOR PVC AND Ultra Tech® manual. The minimum required value for this test is 4.25 pounds per inch width.

TEST RESULTS:

The results of the testing is reported on the tables attached. The unit in which the data is reported is pounds per inch width. The break types are either film tearing bond (FTB) or peel (PEEL).

All of the test results listed in this report have met the requirements for Peel and Bonded Seam Strength and Wolschon Peel Strengths outlined in the project specification and EPI's Quality Control Manual.

All factory seams were also subjected to non - destructive testing per section 2.04 of the EPI GEOMEMBRANE INSTALLATION AND QUALITY ASSURANCE FOR PVC AND Ultra Tech® manual; and the project specification.

**Factory Seam Test Results for the Flambeau Mining Co., Ladysmith Wi, Settling  
Pond Liner Project**

---

<u>Serial No</u>	<u>Des.</u>	<u>Bonded Seam Strength</u>	<u>Peel Strength</u>	<u>Wolschon Peel Strength</u>
36694	A-1	65.175	19.275	5.95
36694	A-2	63.325	18.625	6.2
36694	A-3	58.225	21.4	6.5
36694	A-4	55.675	22.325	6.9
36694	A-5	62.625	17.525	6.9
36694	A-6	62.1	21.7	6
36694	B-1	59.2	21.575	6.5
36694	B-2	57.15	21.75	7.1
36694	B-3	58.8	22.875	6.8
36694	B-4	56.05	18.95	7.95
36694	B-5	60.75	23.2	9.15
36694	B-6	58.75	16.375	6.55

**Field Seam Test Results for the Flambeau Mining Co., Ladysmith Wi, Settling Pond  
Liner Project**

---

<u>Seam Designation</u>	<u>Peel Strength</u>	<u>Bonded Seam Strength</u>	<u>Weld Type</u>
A2-A4	30.64	61.06	Wedge
A5-A6	19.66	60.98	Chemical
B5-B3	16.82	62.66	Chemical
B2-B4	15.92	60.34	Chemical
B5-B6	16.64	61	Chemical
A4-A6	21.36	58.16	Chemical

Lot Traceability

Panel Id	Lot Number	Roll Numbers Used
A-1	55468-TXL	19, 20, 34
A-2	55468-TXL	31, 32, 33
A-3	55334-TXL	49, 50
	55468-TXL	17, 18
A-4	55468-TXL	15, 16, 17, 18
A-5	55468-TXL	31
	55334-TXL	50, 51, 52
A-6	55468-TXL	15
	55334-TXL	24, 25, 34
B-1	55334-TXL	33, 34, 35
B-2	55334-TXL	32, 33, 40
B-3	55334-TXL	37
	95010-HPG	3, 9, 11
B-4	95010-HPG	17, 18, 27
B-5	55334-TXL	37, 38, 39
B-6	95010-HPG	27, 28, 32, 33

Certification Results:

Containment Liner:

Polyvinyl Chloride

<u>Property</u>	<u>N.S.F. Spec Specified</u>	<u>Result</u>	<u>Test Method</u>
Thickness (mils)	30.0 28.5 min.	31.3	ASTM D1593
Specific Gravity (min)	1.20	1.29	ASTM D792
Tensile (lbs, min)	69	88 x 79	ASTM D882
Elongation (%) At Break	325	534 x 561	ASTM D882
100% Modulus (lbs, min)	30(1000 PSI)	36 x 32	ASTM D822
Tear Resistance (lbs, min)	8	11.8 x 10.3	ASTM D1004
Low Temperature (F)	-20	PASSED	ASTM D1790
Dim. Stability (% max)	5	-1.5 x .2	ASTM D1204 (212 F, 15 min)
Water Extraction (% max)	0.25	.04	ASTM D3083
Volatile Loss (%)	0.7	.4	ASTM D1203
Resistance To Soil Burial		Formula Used Previously Tested Satisfactorily	
Hydrostatic Resistance (PSI min)	82	Passed 100	ASTM D751 Method A

TLC Identification No.: 7625 DK GRAY  
Product #658970

TLC Lot No.: 5468

Roll Numbers: 10 - 18

Gerald Mitchell      8-7-95  
Testing Supervisor      Date:

Certification Results:  
Containment Liner:

Polyvinyl Chloride

<u>Property</u>	<u>N.S.F. Spec Specified</u>	<u>Result</u>	<u>Test Method</u>
Thickness (mils)	30.0 28.5 min.	30.0	ASTM D1593
Specific Gravity (min)	1.20	1.29	ASTM D792
Tensile (lbs, min)	69	82 x 76	ASTM D882
Elongation (%) At Break	325	547 x 536	ASTM D882
100% Modulus (lbs, min)	30(1000 PSI)	33 x 31	ASTM D822
Tear Resistance (lbs, min)	8	11.2 x 10.4	ASTM D1004
Low Temperature (F)	-20	PASSED	ASTM D1790
Dim. Stability (% max)	5	-1 x + 0.5	ASTM D1204 (212 F, 15 min)
Water Extraction (% max)	0.25	.05	ASTM D3083
Volatile Loss (%)	0.7	.4	ASTM D1203
Resistance To Soil Burial		Formula Used Previously Tested Satisfactorily	
Hydrostatic Resistance (PSI min)	82	Passed 100	ASTM D751 Method A

TLC Identification No.: 7625 DK GRAY  
Product #658970

TLC Lot No.: 5468

Roll Numbers: 19 - 27

Gerald Mitchell 8-7-95  
Testing Supervisor Date:

Certification Results:

Containment Liner:

Polyvinyl Chloride

<u>Property</u>	<u>N. S. F. Spec Specified</u>	<u>Result</u>	<u>Test Method</u>
Thickness (mils)	30.0 28.5 min.	30.4	ASTM D1593
Specific Gravity (min)	1.20	1.29	ASTM D792
Tensile (lbs, min)	69	91 x 84	ASTM D882
Elongation (%) At Break	325	533 x 542	ASTM D882
100% Modulus (lbs,min)	30(1000 PSI)	38 x 36	ASTM D822
Tear Resistance (lbs,min)	8	11.6 x 11.2	ASTM D1004
Low Temperature (F)	-20	PASSED	ASTM D1790
Dim. Stability (% max)	5	-1.0 x + .5	ASTM D1204 (212 F, 15 min)
Water Extraction (% max)	0.25	.07	ASTM D3083
Volatile Loss (%)	0.7	.6	ASTM D1203
Resistance To Soil Burial		Formula Used Previously Tested Satisfactorily	
Hydrostatic Resistance (PSI min)	82	Passed 100	ASTM D751 Method A

TLC Identification No.: 7625 DK GRAY  
Product #658970

TLC Lot No.: 5468

Roll Numbers: 28 - 36

Herald Mitchell 8-7-95  
Testing Supervisor Date:

Certification Results:

Containment Liner:

Polyvinyl Chloride

<u>Property</u>	<u>N.S.F. Spec Specified</u>	<u>Result</u>	<u>Test Method</u>
Thickness (mils)	30.0 28.5 min.	.030	ASTM D1593
Specific Gravity (min)	1.20	1.28	ASTM D792
Tensile (lbs, min)	69	80 x 75	ASTM D882
Elongation (%) At Break	325	534 x 538	ASTM D882
100% Modulus (lbs, min)	30(1000 PSI)	32 x 30	ASTM D822
Tear Resistance (lbs, min)	8	11.2 x 9.8	ASTM D1004
Low Temperature (F)	-20	PASSED	ASTM D1790
Dim. Stability (% max)	5	-1.5 x + .5	ASTM D1204 (212 F, 15 min)
Water Extraction (% max)	0.25	.11	ASTM D3083
Volatile Loss (%)	0.7	.5	ASTM D1203
Resistance To Soil Burial		Formula Used Previously Tested Satisfactorily	
Hydrostatic Resistance (PSI min)	82	Passed 100	ASTM D751 Method A

TLC Identification No.: 9929-30MIL 7625 DK GRAY  
Product #658970

TLC Lot No.: 5334

Roll Numbers: 19 -27

Gerald Mitchell 7/27/95  
Testing Supervisor Date:



Certification Results:

Containment Liner:

Polyvinyl Chloride

<u>Property</u>	<u>N.S.F. Spec Specified</u>	<u>Result</u>	<u>Test Method</u>
Thickness (mils)	30.0 28.5 min.	.030	ASTM D1593
Specific Gravity (min)	1.20	1.28	ASTM D792
Tensile (lbs, min)	69	81 x 75	ASTM D882
Elongation (%) At Break	325	530 x 528	ASTM D882
100% Modulus (lbs, min)	30(1000 PSI)	33 x 30	ASTM D822
Tear Resistance (lbs, min)	8	10.7 x 10.0	ASTM D1004
Low Temperature (F)	-20	PASSED	ASTM D1790
Dim. Stability (% max)	5	-2 x + 1.0	ASTM D1204 (212 F, 15 min)
Water Extraction (% max)	0.25	10	ASTM D3083
Volatile Loss (%)	0.7	5	ASTM D1203
Resistance To Soil Burial		Formula Used Previously Tested Satisfactorily	
Hydrostatic Resistance (PSI min)	82	Passed 100	ASTM D751 Method A

TLC Identification No.: 9929-30MIL 7625 DK GRAY  
Product #658970

TLC Lot No.: 5334

Roll Numbers: 28 - 36

Gerald Mitchell 7/27/95  
Testing Supervisor Date:

Certification Results:  
Containment Liner:

Polyvinyl Chloride

<u>Property</u>	<u>N.S.F. Spec Specified</u>	<u>Result</u>	<u>Test Method</u>
Thickness (mils)	30.0 28.5 min.	.030	ASTM D1593
Specific Gravity (min)	1.20	1.28	ASTM D792
Tensile (lbs, min)	69	82 x 75	ASTM D882
Elongation (%) At Break	325	522 x 543	ASTM D882
100% Modulus (lbs,min)	30(1000 PSI)	33 x 31	ASTM D822
Tear Resistance (lbs,min)	8	11.0 x 10.2	ASTM D1004
Low Temperature (F)	-20	PASSED	ASTM D1790
Dim. Stability (% max)	5	-1.5 x + .5	ASTM D1204 (212 F, 15 min)
Water Extraction (% max)	0.25	.09	ASTM D3083
Volatile Loss (%)	0.7	.5	ASTM D1203
Resistance To Soil Burial		Formula Used Previously Tested Satisfactorily	
Hydrostatic Resistance (PSI min)	82	Passed 100	ASTM D751 Method A

TLC Identification No.: 9929-30MIL 7625 DK GRAY  
Product #658970

TLC Lot No.: 5334

Roll Numbers: 37 - 45

Margaret Mitchell 7/27/95  
Testing Supervisor Date:

Certification Results:  
Containment Liner:

Polyvinyl Chloride

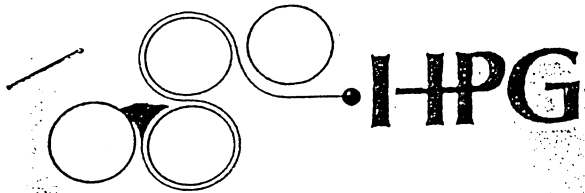
<u>Property</u>	<u>N.S.F. Spec Specified</u>	<u>Result</u>	<u>Test Method</u>
Thickness (mils)	30.0 28.5 min.	.030	ASTM D1593
Specific Gravity (min)	1.20	1.28	ASTM D792
Tensile (lbs, min)	69	78 x 74	ASTM D882
Elongation (%) At Break	325	505 x 546	ASTM D882
100% Modulus (lbs,min)	30(1000 PSI)	32 x 32	ASTM D822
Tear Resistance (lbs,min)	8	10.8 x 9.5	ASTM D1004
Low Temperature (F)	-20	PASSED	ASTM D1790
Dim. Stability (% max)	5	-2 x + 1.0	ASTM D1204 (212 F; 15 min)
Water Extraction (% max)	0.25	.08	ASTM D3083
Volatile Loss (%)	0.7	.54	ASTM D1203
Resistance To Soil Burial		Formula Used Previously Tested Satisfactorily	
Hydrostatic Resistance (PSI min)	82	Passed 100	ASTM D751 Method A

TLC Identification No.: 9929-30MIL 7625 DK GRAY  
Product #658970

TLC Lot No.: 5334

Roll Numbers: 46 - 54

Gerald Mitchell 7/27/95  
Testing Supervisor Date:



HPG INTERNATIONAL, INC.

Oakhill Road

Crestwood Industrial Park  
Tel: (717) 474-6741

Mountaintop, PA 18707  
Fax: (717) 474-0998

**CUSTOMER:** ENVIRONMENTAL PROTECTION, INC.  
**THICKNESS:** 30 MILS  
**PRODUCT NO:** 0176  
**FINISH:** Plain Matte  
**TEST REPORT DATE:** 10/20/95

**HPG ORDER:** 2090695-010  
**ROLLS TESTED:** 4, 14, 24, 34  
**COLOR NO:** 60829 Grey  
**PRODUCED WEEK OF:** 09/13/95

<u>PROPERTY</u>	<u>SPECIFICATION</u>	<u>TEST VALUE</u>	<u>ASTM TEST METHOD</u>
Thickness, mils, +/-5%	30.0	30.2	D-1593
Specific Gravity, min.	1.23	1.27	D-792
Tensile Strength, psi, Nominal min. (breaking factor lbs./in. width, Nominal, min.)	2300 (69.0)	2679 (80.4)	D-882
Elongation at Break, %, Nominal min.	350	447	D-882
Modulus @100% Elongation, psi, Nominal, min. (force @ 100% elongation, lbs./in. width, Nominal, min.)	1000 (30.0)	1059 (31.8)	D-882
Tear Resistance, lbs./in. Nominal, min. (tear force @ gauge lbs., Nominal, min.)	267 (8.0)	287 (8.6)	D-1004
Low Temperature, Deg. F, Pass	-20	Pass	D-1790
Dimensional Stability, % Change, max.	3.5	2.3	D-1204
Water Extraction, % loss, max.	0.25	0.10	D-3083
Volatility, % loss, max.	0.70	0.62	D-1203

Order # 2090695-010

<u>PROPERTY</u>	<u>SPECIFICATION</u>	<u>TEST VALUE</u>	<u>ASTM TEST METHOD</u>
Resistance to soil burial, % Change, max.			D-3083
Breaking Factor	- 5	Pass	
Elongation @ Break	-20	Pass	
Modulus @ 100% elongation	+20	Pass	
Hydrostatic Resistance, psi; Nominal, min.	60	Pass	D-751

  
PARVIN SAWHNEY, PLANT CHEMIST

CC: W. YEAGER, P. SAWHNEY, A. ARENA, Y. FRY, LAB (1), CUSTOMER SERVICE,  
PROJECT 95-178

ENVIRONMENTAL PROTECTION, INC.  
P.O. BOX 333  
9939 US 131 SOUTH N.E.  
MANCELONA, MI 49659-0333  
ATTN: HOWARD

## Appendix C

### Photographs



Photograph 1 October 4, 1995  
Location: North Pond  
Description: Removal of vegetation.



Photograph 2 October 5, 1995  
Location: South Pond  
Description: Removal of Rip-Rap and vegetation.



Photograph 3

October 9, 1995

Description: Pallets of PVC liner.



Photograph 4

October 10, 1995

Location: North Pond

Description: Fine grading south berm.





Photograph 5

October 11, 1995

Description: Distribution of PVC pallets.



Photograph 6

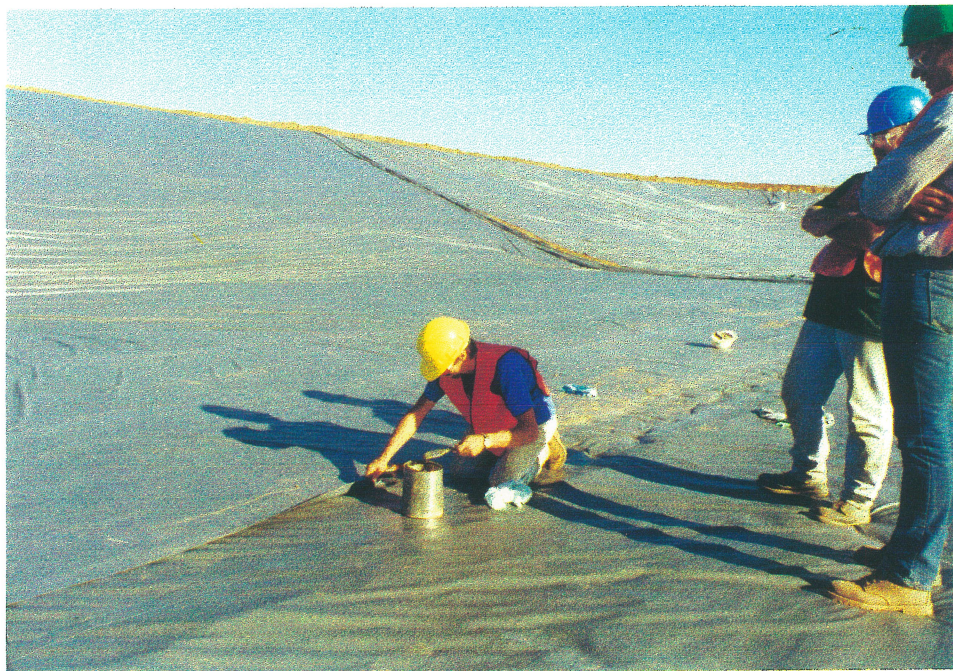
October 11, 1995

Location: South Pond

Description: Deployment of PVC Panel No. 1 (B-6).



Photograph 7 October 11, 1995  
Location: South Pond  
Description: Partially backfilled anchor trench of south berm.



Photograph 8 October 11, 1995  
Location: South Pond  
Description: Solvent welding seam.



Photograph 9

October 13, 1995

Location: North Pond

Description: Double wedge welding seam.



Photograph 10

October 11, 1995

Location: South Pond

Description: Air lance testing seam.

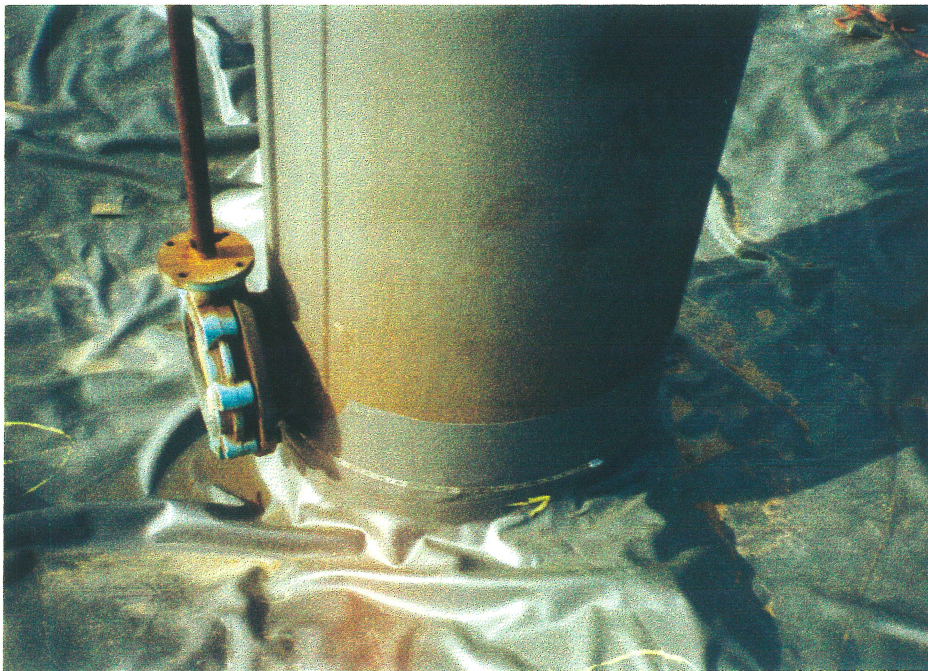


Photograph 11

October 12, 1995

Location: South Pond

Description: Placing GCL below PVC liner around control structure.



Photograph 12

October 16, 1995

Location: South Pond

Description: PVC boot strap around control structure. Note location of seam voids from air lance tests which were repaired.



Photograph 13

October 16, 1995

Location: South Pond

Description: Anchoring PVC liner to concrete piers.



Photograph 14

October 16, 1995

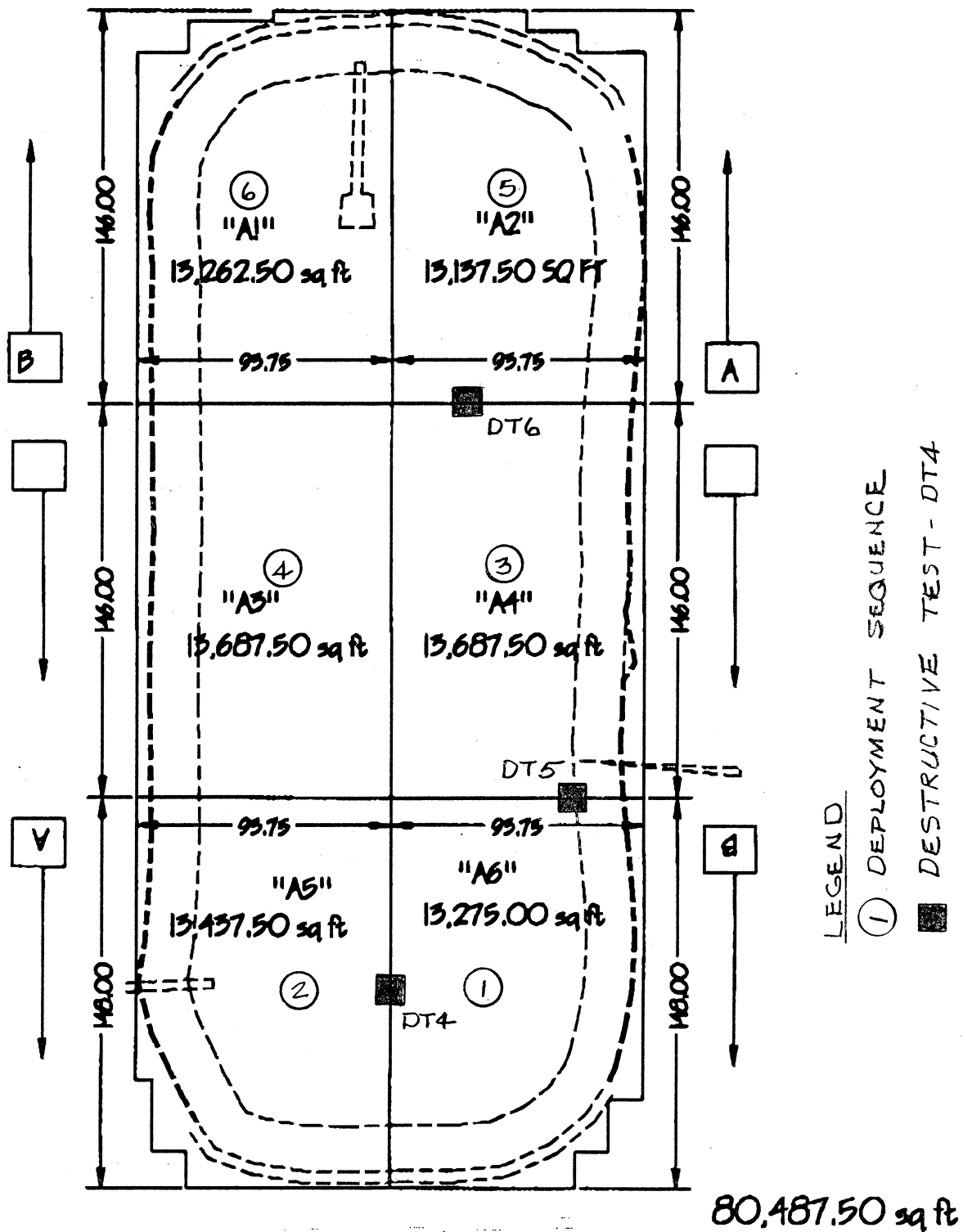
Location: South Pond

Description: Installing PVC boot at 24" diameter culvert.

## Appendix D

### Geomembrane Panel Layout and Panel Placement Summary

### NORTH POND



**LEGEND**  
 (1) DEPLOYMENT SEQUENCE  
 ■ DESTRUCTIVE TEST - DT4

80,487.50 sq ft



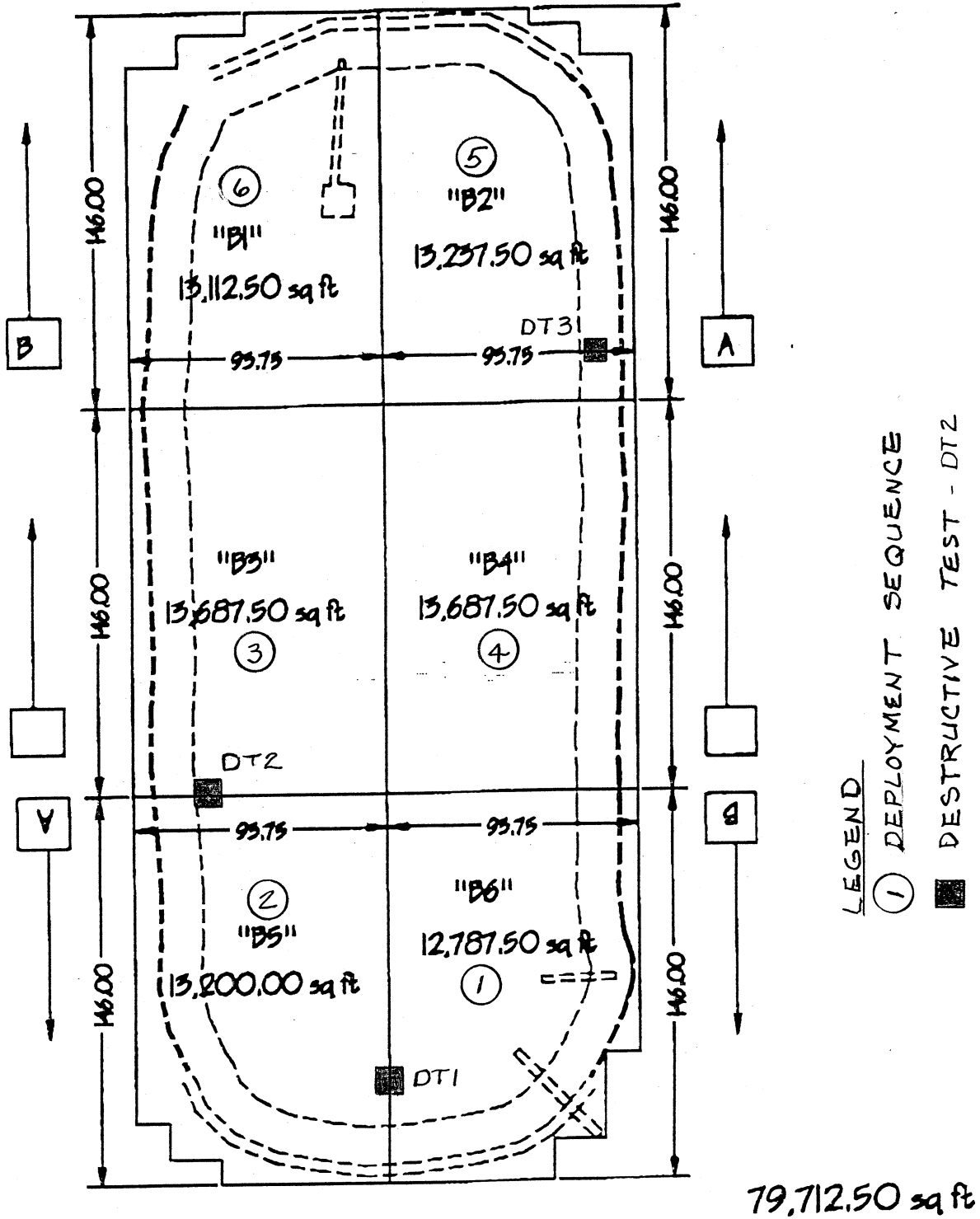
**ENVIRONMENTAL PROTECTION INCORPORATED**

Ph #: 800-OK LINER  
Fx #: 616-587-8020

JOB NAME:  
Flambeau Mine

FLAMB  
9/20/95  
Do Not Scale

### SOUTH POND



**LEGEND**

- ① DEPLOYMENT SEQUENCE
- DESTRUCTIVE TEST - DT2



**ENVIRONMENTAL PROTECTION INCORPORATED**

PH #: 800-OK LNER  
 Fx #: 616-587-8020

JOB NAME:  
 Flambeau Mine

FLAMB  
 9/20/95  
 Do Not Scale





**Foth & Van Dyke**

Client: FLAMBREAU Mining Co. Scope ID: 95F004  
 Project: SETTLEMENT PONDS Page: \_\_\_\_\_  
 Prepared By: C.E.M Date: 10/11/95

**CONSTRUCTION OBSERVATION REPORT**

Location LADYSMITH, WI

WEATHER	Temp (° F)		Sky Cond.	Precip. (in.)			Site Conditions (describe)	
	Low	High	Clear <u>Pt. Cldy</u> Cloudy	Rain	Snow	Dry	Muddy	
	<u>50's</u>		<u>None</u>			<input checked="" type="checkbox"/>		

Contractors on site (include no. of personnel per contractor)

KOSHAK CONSTRUCTION Co. - 350 C DOZER LOP / OPERATOR  
- 450 C DOZER / OPERATOR  
- AMERICAN BACKHOE / OPERATOR  
- TRI-AXLE DUMP TRUCK

EPI - LINER INSTALLATION CREW - 7 PEOPLE

Other personnel on site

Purpose

GREG MARKS - FOTH & VAN DYKE OBSERVE LINER INSTALLATION

Work observation report, comments: ARRIVED ON SITE @ 7:30 A.M.

• PROJECT STATUS - SOUTH POND

- COMPLETED EXCAVATION OF ANCHOR TRENCH.
- DISTRIBUTED 6 EA. PANELS (PALETS) ALONG ANCHOR TRENCH WITH THE BACKHOE.
- KOSHAK CONST. CO. ASSISTED EPI WITH LINER DEPLOYMENT

• PROJECT STATUS - NORTH POND

- FINISH GRADED NORTH, SOUTH AND EAST BERMS AND POND BOTTOM (EXCEPT FOR THE CONTROL STRUCTURE AND ACCESS RAMP AREAS).
- FINISH GRADED THE BERM TOP EXCEPT FOR THE WEST END. UNCOVERED A CAMERA BURIED CABLE IN THE BERM. THE BURIED CABLE ~~THE~~ HAD A YELLOW WARNING RIBBON OVER IT.
- STARTED EXCAVATING THE ANCHOR TRENCH AT THE TWIN 24" DIA. CULVERTS IN THE NORTH BERM. EXCAVATION PROCEEDED TO THE EAST, THEN SOUTH ALONG THE EAST BERM. HIT 24" DIA. CMP @ 7:15 P.M. A HOLE WAS TORN IN THE CMP AND IT WILL ~~BE~~ BE REPAIRED IN THE A.M. THE ANCHOR TRENCH WAS SHIFTED WEST ~ 1' TO AVOID THE PIPE. AFTER WHEN THE TRENCH DIVERGES FROM THE CMP, THE TRENCH WILL RESUME IT'S ORIGINAL ALIGNMENT. STOPPED EXCAVATING @ 9:40 P.M. AT THE WEST END OF THE SOUTH BERM.

Clayton S. Messelt

For additional comments, include additional sheets

# Foth & Van Dyke

Client: Flambeau Mining Co. Scope ID: 95F004  
 Project: Settling Ponds Page: \_\_\_\_\_  
 Prepared By: GAM Date: 10-11-95

## CONSTRUCTION OBSERVATION REPORT

Location Ladysmith, WI

WEATHER	Temp (° F)		Sky Cond.	Precip. (in.)		Site Conditions (describe)	
	Low	High		Rain	Snow	Dry	Muddy
	50's	70's	<u>Clear</u> Pt. Cldy Cloudy	<u>None</u>			Some mud along N, T.O.S.

### Contractors on site (include no. of personnel per contractor)

Kochak Const. (See CEM Report 10-11-95)  
EPI 4 People From EPI  
3 People From Manpower

### Other personnel on site

### Purpose

Work observation report, comments: • EPI began Pallet placement at 9 AM, attempted to use a CAT V140 Fork lift but the soils were too loose. Had to use back hoe to deploy pallets.

• EPI began panel deployment at 11 AM in the SE corner of the west Pond the order of Panel Placement was B6, B5, B3, B4, B2, B1. The Panels were all in place by 3 PM.

• EPI began solvent welding of panels at 3:30 pm in the bottom of the pond. Panel Seaming ended at 5:30 pm due to temperature of the liner. The only seams remaining are part of B5-B6, B4-B6 and part of B3-B5.

*Greg Marks*

For additional comments, include additional sheets

# Foth & Van Dyke

Client: Hambeas Mining Scope ID: 95F004  
 Project: Settling ponds Page: \_\_\_\_\_  
 Prepared By: GAM Date: 10-12-95

## CONSTRUCTION OBSERVATION REPORT

Location Lady Smith WI

WEATHER	Temp (° F)		Sky Cond.	Precip. (in.)		Site Conditions (describe)	
	Low	High		Rain	Snow	Dry	Muddy
	68	80 <sup>s</sup>	<u>Clear</u> Pt. Cldy Cloudy	<u>None</u>			

### Contractors on site (include no. of personnel per contractor)

Kosha K  
EPI - 4 people from EPI  
2 people from Maupower

### Other personnel on site

Jim Hutchinson  
Bob Chasa

### Purpose

Pump & Treat for Settling ponds

### Work observation report, comments:

- Began pallet placement at 8:15 AM. All 6 pallets were in place by 9:30 AM.
- EPI Deployed Panel A6 at 9:40 and deployed panels A5, A4, and A3 in stated order.
- EPI was not able to deploy the remaining 2 panels due to construction remaining on the west end of pond.
- Anchor trench for west end was completed around 2 PM but winds were to great to deploy remaining panels
- Panels A3, A4, A5, A6 were welded but not tested
- EPI finished welding pond B and lance tested all but around the Piers.
- All seams have passed and 3 destructive tests have been taken from pond B

For additional comments, include additional sheets

*Greg Markes*

**Foth & Van Dyke**

Client: FLAMBEAU Mining Co. Scope ID: 95F004  
 Project: SETTLEMENT POND Page: \_\_\_\_\_  
 Prepared By: CEM Date: 10/12/95

**CONSTRUCTION OBSERVATION REPORT**

Location LADYSMITH, WI

WEATHER	Temp (° F)		Sky Cond.	Precip. (in.)			Site Conditions (describe)	
	Low	High	Clear Pt. Cldy Cloudy		Rain	Snow	Dry	Muddy
VERY WINDY IN P.M.	50's		Pt. Cldy Cloudy	None			✓	

**Contractors on site** (include no. of personnel per contractor)

KOSHAK CONST. Co. - AMERICAN BACKHOE / OPERATOR  
 - 350C DOZER L&P / OPERATOR  
 - 450C " / OPERATOR  
 - TRI-AXLE TRUCK

EPI - 8 PERSONNEL INSTALLING THE LINERS

**Other personnel on site**

**Purpose**

RICHARD DACHEL - FLAMBEAU MINING GENERAL OBSERVATION OF CMP DAMAGE  
GREG MARKS - FOTH & VAN DYKE OBSERVING LINER INSTALLATION  
BOB ~~CHIRSA~~ CHIRSA - FOTH & VAN DYKE OBSERVING SITE FOR PUMP DESIGN  
 Work observation report, comments: ARRIVED ON SITE @ 7:30 A.M.

• **PROJECT STATUS - NORTH POND**

- DRESSING BOTTOM AND SIDE SLOPES FOR LINER PLACEMENT
- REMOVING TRUCK ACCESS RAMP FROM NW CORNER
- HELPING DEPLOY PVC PANELS WITH DOZER
- COMPLETED ANCHOR TRENCH EXCAVATION
- EPI DEPLOYED AND ~~SEALED~~ SEALED 4 OF THE 6 PANELS

• **PROJECT STATUS - SOUTH POND**

- EPI COMPLETED 95% OF WORK INSTALLING PANELS
- KOSHAK BACKFILLED ANCHOR TRENCHES AND CONSTRUCTED TRAFFIC BEAMS AROUND POND

• **COMMUNICATIONS**

- RICHARD DACHEL ASKED THAT THE SOUTH POND BERM (SOUTH ONE) BE SLOPED TO THE SOUTH AND THAT 2 OR 3 ADS DRAIN PIPES BE INSTALLED TO ALLOW THE RUN OFF FROM THE ROAD TO DRAIN TO THE OUTER SLOPE OF THE BERM
- THE DAMAGED 24" DIA CULVERT ON THE EAST BERM OF THE NORTH POND WAS REPAIRED BY PLACING A SECTION OF 24" DIA CMP OVER THE DAMAGED AREA, APPLYING A GASKET SEALANT AND FASTENING IT TO THE CMP. THIS METHOD OF REPAIR WAS APPROVED BY RICHARD DACHEL.

• **CONTRACTORS LEFT THE SITE BY 6:00 P.M.**

*Richard Dachel*

For additional comments, include additional sheets

**Foth & Van Dyke**

Client: FLAMBEAU MINING Co. Scope ID: 95F004  
 Project: SETTLEMENT PONDS Page: \_\_\_\_\_  
 Prepared By: CEM Date: 10/17/95

**CONSTRUCTION OBSERVATION REPORT**

Location LADYSMITH, WI.

WEATHER	Temp (° F)		Sky Cond.	Precip. (in.)		Site Conditions (describe)		
	Low	High	Clear	None	Rain	Snow	Dry	Muddy
	<u>50°</u>	<u>70's</u>	<u>Pt. Cldy</u> Cloudy		<u>LITE SNOW</u> @ <u>7:45A.M.</u>			

Contractors on site (include no. of personnel per contractor)

EPI - 2 PERSONNEL

Other personnel on site

Purpose

RICHARD NACHEL, FLAMBEAU MINING TOUR PROJECT, DISCUS DETAILS  
JANA MURPHY, FLAMBEAU MINING

Work observation report, comments: ARRIVED ON SITE @ 7:25 A.M.

- PROJECT STATUS - NORTH POND WAS COMPLETED @ 1:50 P.M. - SOUTH POND WAS COMPLETED @ 1:25 P.M.
- QA/QC - DELIVERED SIX (6) DESTRUCTIVE SAMPLES TO JANA MURPHY, THREE (3) FROM EACH POND.
- SITE CLEAN-UP - EPI WAS GIVEN THE FOLLOWING INSTRUCTIONS FOR CLEAN-UP AND DISPOSAL OF ITEMS:
  1. SOLVENT CANS TO BE EMPTY AND PUT IN THE RECYCLING BIN BEHIND THE LABORATORY.
  2. LARGE PVC PIECES TO BE PLACED ON PALLET BY WATER TREATMENT PLANT
  3. SMALL PCS OF PVC, CARDBOARD, ETC. TO BE PLACED IN DUMPSTER BEHIND LABORATORY
  4. SITE IS TO BE LEFT CLEAN.
- EPI RELEASE SHEET SIGNED @ 2:15 P.M.
- LEFT THE SITE @ 2:55 P.M.

*Christopher S. Menell*

For additional comments, include additional sheets

# Foth & Van Dyke

Client: FLAMBEAU Mining Co. Scope ID: 95F004  
 Project: SETTLEMENT POND Page: \_\_\_\_\_  
 Prepared By: CEM Date: 10/13/95

## CONSTRUCTION OBSERVATION REPORT

Location LADYSMITH, WI

WEATHER	Temp (° F)		Sky Cond.	Precip. (in.)			Site Conditions (describe)	
	Low	High		Clear	Rain	Snow	Dry	Muddy
	60's		Pt. Cldy Cloudy	None				

**Contractors on site** (include no. of personnel per contractor)

KOSHAK CONST. Co. - 350 C LBP & 450 C DOZERS/OPERATORS  
EPL - 5 PERSONNEL WITH DOUBLE WEDGE WELDER

**Other personnel on site**

RICHARD DACHEL - FLAMBEAU Mining  
FLAMBEAU EMPLOYEES - 2

**Purpose**

HELP + OBSERVE BERM GRADING  
HELP PULL PANEL 1, POND "A"

**Work observation report, comments:** ARRIVED ON SITE @ 7:15 A.M.

- PROJECT STATUS - NORTH POND (A)
  - PULLED PANELS 1 & 2 INTO PLACE (PVC LINER). COMPLETED THEM BY 9:00 A.M.
  - STARTED SEAMING WITH DOUBLE WEDGE WELDER AT SEAM A1/A2 @ 9:20 A.M. COMPLETE
  - COMPLETED PANEL SEAM DOUBLE WEDGE WELDING @ 11:39 A.M.
  - FINISHED MAJOR SEAM WELDING USING SOLVENT @ 12:05 A.M.
  - TEMPERATURE @ 2:00 P.M. IS 66°F.
  - " " @ 4:07 P.M. IS 56°F.
  - TOOK SEAM SAMPLE A5/A6 ≈ 75' WEST OF EAST BERM. BOTH SAMPLES PASSED.
  - KOSHAK CONST. Co. COMPLETED FILLING THE ANCHOR TRENCHES AND BUILDING THE TRAFFIC BARRIER BERMS
  - STARTED AIR LAUCE TESTING OF MAJOR SEAMS AND SEAMS AROUND CONTROL STRUCTURE AND ACCESS BRIDGE. COMPLETED THE TESTING WITH ≈ 9 AREAS REQUIRING PATCHING.
  - BOOTS NEED TO BE BUILT AROUND THE INTERMEDIATE BRIDGE SUPPORT.
  - LEFT THE SITE @ 5:00 P.M.

*Raymond S. Murrell*

For additional comments, include additional sheets

Foth & Van Dyke

Client: FLAMBEAU MINING Co. Scope ID: 95F004  
Project: SETTLEMENT POND 5 Page: \_\_\_\_\_  
Prepared By: CEM Date: 10/14/95

CONSTRUCTION OBSERVATION REPORT

Location LADYSMITH, WI

WEATHER	Temp (° F)		Sky Cond.	Precip. (in.)		Site Conditions (describe)	
	Low	High		Rain	Snow	Dry	Muddy
	<u>40's</u>		<u>Cloudy</u>	None	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

Contractors on site (include no. of personnel per contractor)

EPI - 2 PERSONS EXAMINED SITE AND LEFT

Other personnel on site

Purpose

Work observation report, comments:

- ARRIVED ON SITE @ 8:30 A.M.
- LITE ~~RAIN~~ RAIN (DRIZZLE) PREVENTED ANYONE FROM WORKING ON THE LINER. VERY SLIPPERY ON THE SIDE SLOPES (BERMS).
- LEFT THE SITE AT 9:30 A.M. AFTER DISCUSSING THE SITUATION WITH RICHARD DACHEL.
- CONTRACTOR IS WILLING TO WORK ON SUNDAY IF CONDITIONS PERMIT.

*Raymond S. Marshall*

For additional comments, include additional sheets



# Foth & Van Dyke

Client: FLAMBEAU Mining Co. Scope ID: 95F004  
 Project: SETTLEMENT PONDS Page: \_\_\_\_\_  
 Prepared By: CEM Date: 10/16/95

## CONSTRUCTION OBSERVATION REPORT

Location LAPOSMITH, WI

WEATHER	Temp (° F)		Sky Cond.	Precip. (in.)			Site Conditions (describe)	
	Low	High		Clear	Rain	Snow	Dry	Muddy
	30's	60's	Pt. Cldy Cloudy	None			✓	

Contractors on site (include no. of personnel per contractor)

EPI - 2 PERSONS

KOSHAK CONST CO. - 2 PERSONS

- DEMOBILIZING EQUIPMENT

Other personnel on site

Purpose

RICHARD DACHEL - FLAMBEAU MINING VIEW PROGRESS

Work observation report, comments: ARRIVED ON-SITE @ 10:40 A.M.

• PROJECT STATUS - NORTH POND

- EPI FABRICATED THE CULVERT BOOTS AND INSTALLED THEM FOR BOTH PONDS

- KOSHAK CONST. CO. INSTALLED THE TWO (2) LIFE PRESERVER RINGS, ONE ON THE NORTH BERM OF EACH POND

- NORTH POND

• EPI INSTALLED BATTEN STRIPS ON THE LOWER CONCRETE PIERS

• EPI INSTALLED BOOTS ON THE INTERMEDIATE PIERS.

• EPI GLUED OR PATCHED SEAM JOINTS DETECTED DURING THE AIR LAUNCH TEST.

• QA/QC - CUT DESTRUCTIVE TEST SAMPLES FOR SEAMS A2/A4 AND A4/A6. FIELD TRIAL SAMPLES PASSED.

• COMMUNICATIONS

- CALLED KOSHAK'S OFFICE REMINDING THEM TO INSTALL THE TWO (2) LIFE PRESERVER RINGS AT THE PONDS.

• LEFT THE SITE

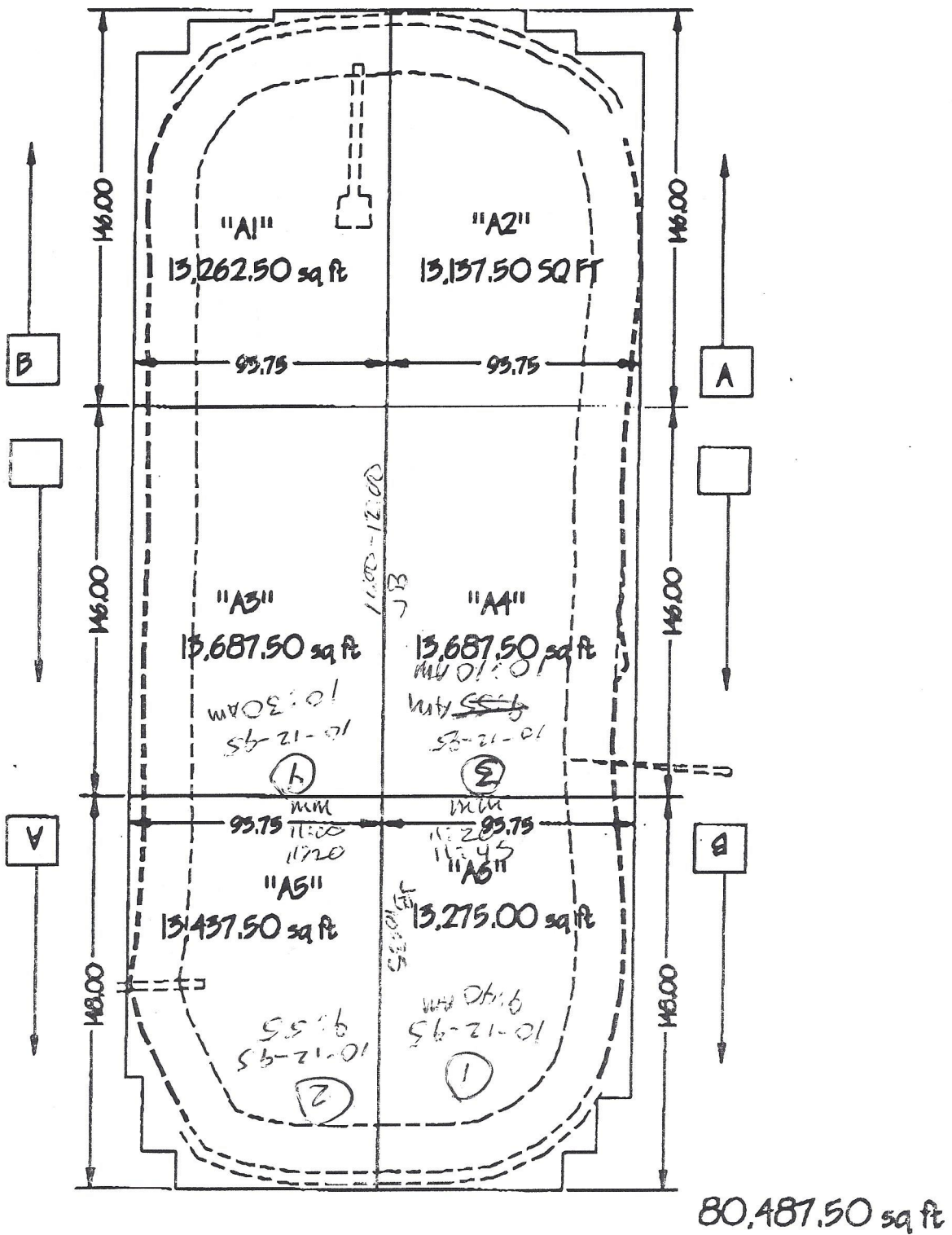
- RICHARD DACHEL STATED THAT HE WOULD LIKE TO START PUMPING WATER INTO THE NORTH POND.

• LEFT THE SITE @ 8:30 P.M.

*Clayton S. Mansell*

For additional comments, include additional sheets





**ENVIRONMENTAL PROTECTION INCORPORATED**

Ph #: 800-OK LINER  
 Fx #: 616-587-8020

JOB NAME:  
 Flambeau Mine

FLAMB  
 9/20/95  
 Do Not Scale

# Foth & Van Dyke

Client: FLAMBEAU MINING Co Scope I.D.: 95F004

Project: \_\_\_\_\_ Page: \_\_\_\_\_

Prepared by: CEM Date: 10/13/95

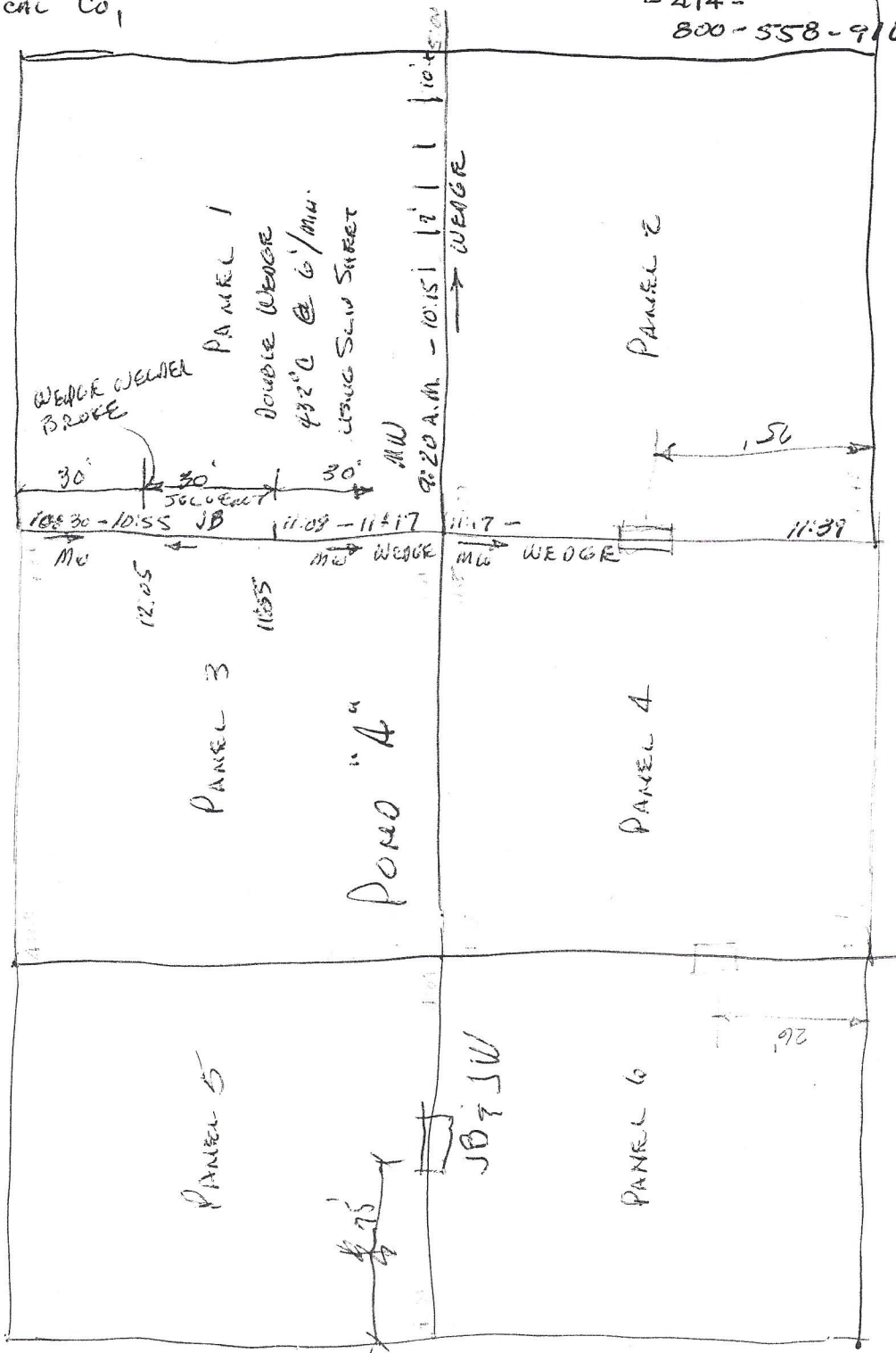
Checked by: \_\_\_\_\_ Date: \_\_\_\_\_

CHEM CENTRAL  
CHEMICAL Co,

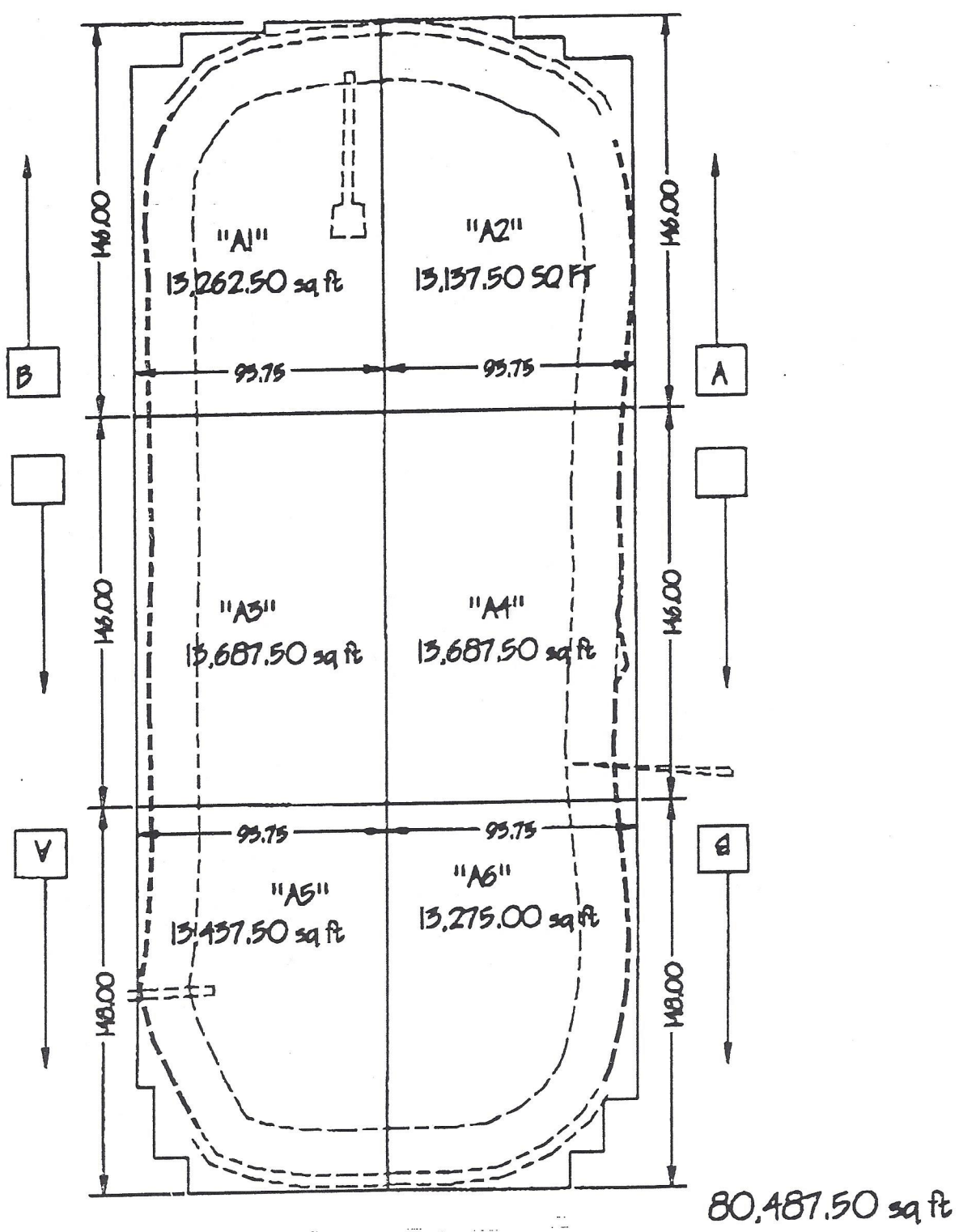
ALDRICH - MILWAUKEE

- 414 -

800-558-9160



115-532-650

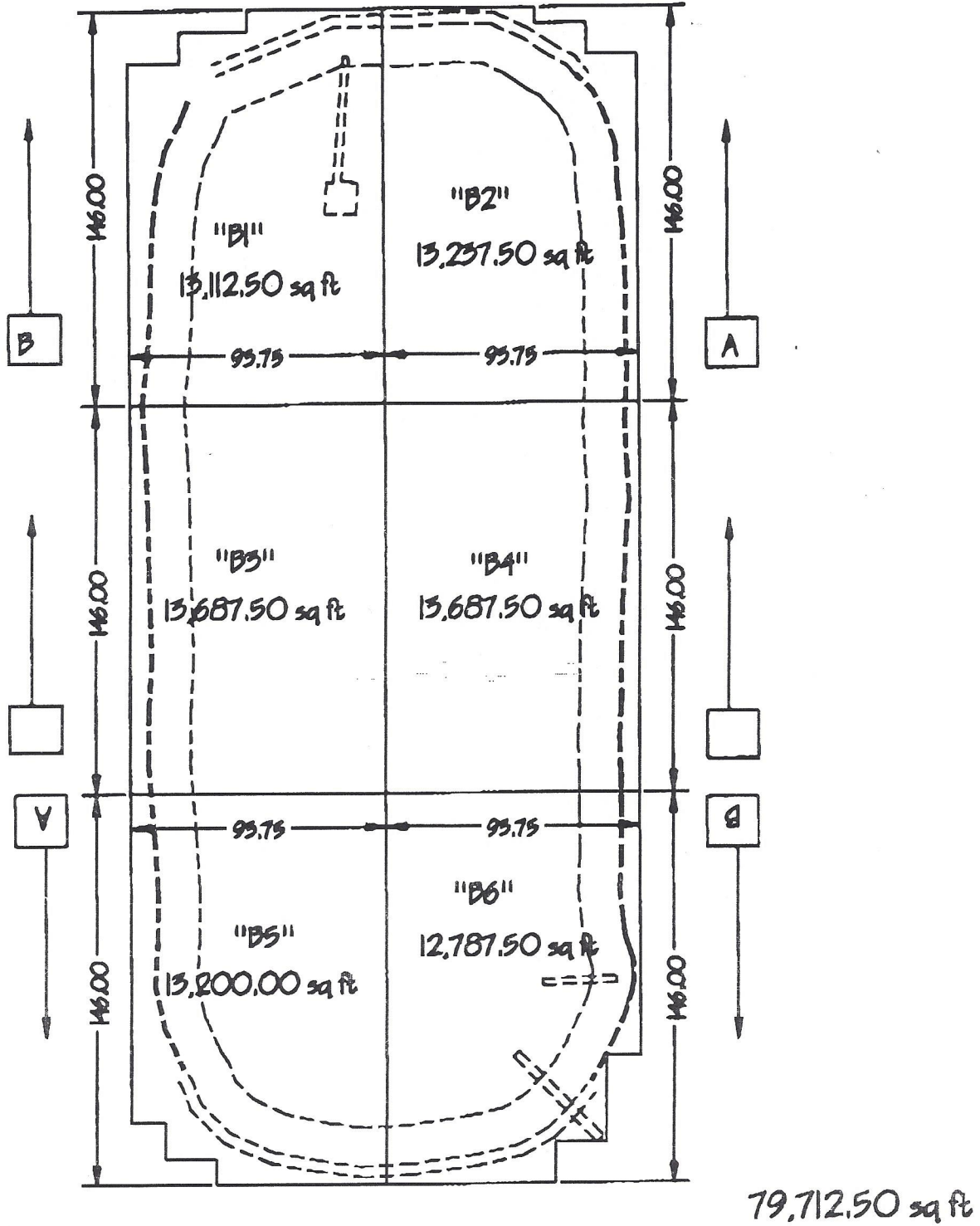


**ENVIRONMENTAL  
PROTECTION  
INCORPORATED**

Ph #: 800-OK LINER  
Fx #: 616-587-8020

JOB NAME:  
Flambeau Mine

FLAMB  
9/20/95  
Do Not Scale



**ENVIRONMENTAL  
PROTECTION  
INCORPORATED**

Ph #: 800-OK LNER  
 Fx #: 616-587-8020

JOB NAME:  
 Flambeau Mine

FLAMB  
 9/20/95  
 Do Not Scale







**Appendix E**  
**Panel Seaming Summary**





# PANEL SEAMING SUMMARY

Project Name: FMC *Settling Pond Liners* Date: 10-11-25 Page 1 of 1  
 Project No: 952 Q44  
 Installer: FDI

Seam Number	Date Seamed	QA Monitor	Weather Conditions			Seam Length (feet)	Welder Initials	Weld Type	Machine Number	Temp. Setting	Speed Setting	Time		Comments
			Ambient Temp.	Sheet Temp. (if req.)	Sky/Wind/Precip.							Start	Stop	
B3-B4 A	10-11	GAM	68		CL 5-10	76'	MM	Solvent				3:30	3:55	
B3-B4 B	10-11	GAM				70'	JW					3:30	3:50	
B5-B6	10-11					146'	JB					3:30	3:55	
B1-B2	10-11					146'	MM					4:05	4:30	20 min Break stopped at Columns
B3-B5	10-11					96'	JB					4:00	4:45	20 min Break
B1-B3	10-11					96'	JW					4:30	4:40	stopped at top
B2-B4	10-11					96'	JW					4:15	5:30	stopped at top
B4-B6	10-11					76'	JB					4:50	5:40	
														stopped at 5:45 due to Temperature
														-Lack of Sun

**Appendix F**  
**Trial Weld Summary**









## Appendix G

### Non-Destructive Seam Test

# NON-DESTRUCTIVE SEAM TEST SUMMARY

Project Name: Flamboro Mining Co  
 Project No: 45F084  
 Installer: EP1

Date: 10-12-95 Page 1 of 1

Lance Test

Seam Number	Interval Tested	QA Monitor	Tester Initials	Date Tested	Air Test						Vacuum Test		Comments
					Air Pressure Test			Drop (PSI)	Air Test Results (P/F)	Date Vacuum Tested	Vac. Test Results (P/F)		
					Start	End	Time						
												PSI	
B1-B2		GAM	MR	10-12			60					P	Lance Test
B3-B4		GAM	MR	10-12			60					P	
B5-B6		GAM	MR	10-12			60					P	
B2-B4		GAM	MR	10-12			60					P	
B1-B3		GAM	MR	10-12			60					P	
B4-B6		GAM	MR	10-12			60					P	
B3-B5		GAM	MR	10-12			60					P	

# NON-DESTRUCTIVE SEAM TEST SUMMARY

Project Name: FLAMBEAU MINING CO.

Project No: 95F004

Date: 10/13/95

Page 1 of 1

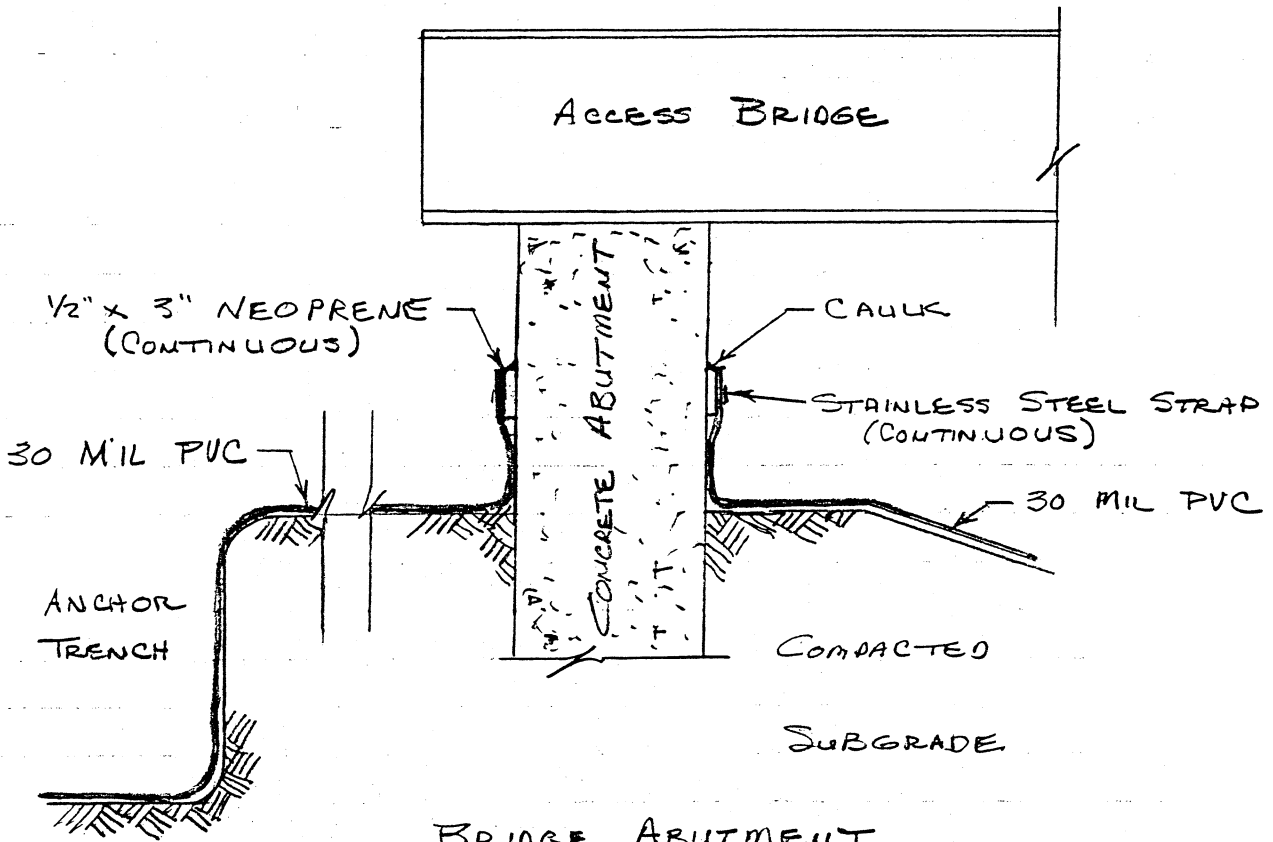
Installer: EPI

Seam Number	Interval Tested	QA Monitor	Tester Initials	Date Tested	Air Test						LARGE TEST Vacuum Test		Comments
					Air Pressure Test			Drop (PSI)	Air Test Results (P/F)	Date Vacuum Tested	Vac. Test Results (P/F)		
					Start Time	PSI	End Time						
								PSI	Time	Time			
A5/A6		CEM	MM	10/13	60	4:00	<del>60</del>	4:07				P	
A3/A5		CEM	MM	10/13	60	4:09		4:15				P	
A4/A6		CEM	MM	10/13	60	4:18		4:24				P	
A3/A4		CEM	MM	10/13	60	4:25		4:32				P	
A1/A5		CEM	MM	10/13	60	4:33		4:40				P	
A2/A4		CEM	MM	10/13	60	4:43		4:50				P	
A1/A2		CEM	MM	10/13	60	4:51		5:00				P	

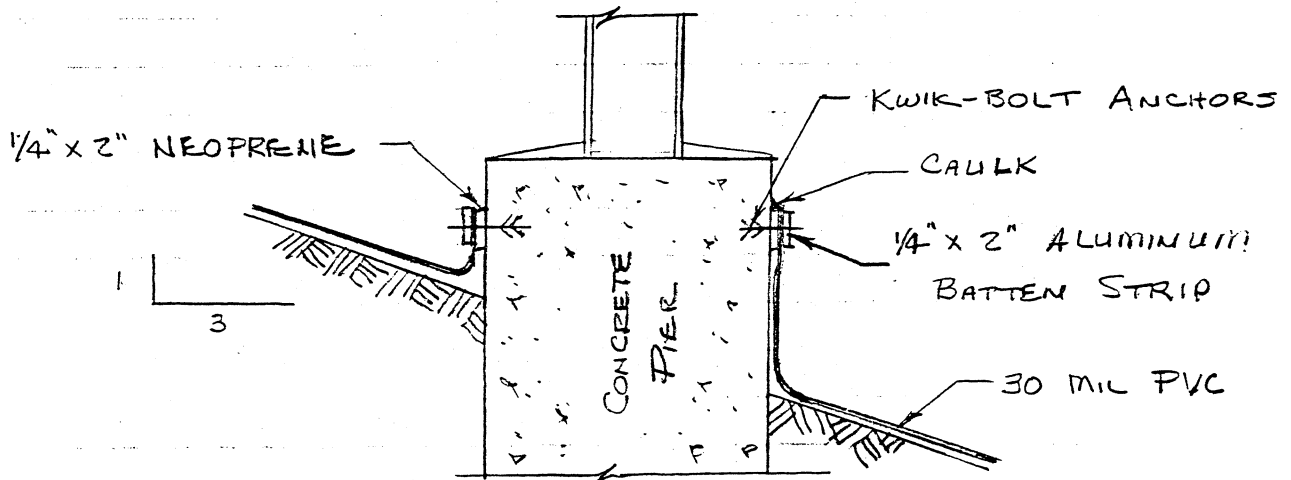
## Appendix H

### Liner Attachment Details

LINER ATTACHMENT DETAILS



BRIDGE ABUTMENT  
N.T.S.



BRIDGE PIER  
N.T.S.

**Appendix I**  
**Daily Observation Reports**

Foth & Van Dyke

Client: FLAMBEAU MINING Co. Scope ID: 95F004

Project: SETTLING PONDS Page: \_\_\_\_\_

Prepared By: CEM Date: 10/4/95

### CONSTRUCTION OBSERVATION REPORT

Location LADYSMITH, WI

WEATHER	Temp (° F)		Sky Cond.	Precip. (in.)			Site Conditions (describe)	
	Low	High	Clear <u>Pt. Cldy</u> Cloudy	Rain	Snow	Dry	Muddy	
	40's	60's	<u>None</u>			✓		

**Contractors on site** (include no. of personnel per contractor)

- KOSHAK CONST. Co. - 4500 JOHN DEERE DOZER / OPERATOR
- AMERICAN BACKHOE / OPERATOR
- TRI-AXLE DUMP TRUCK
- TOW TYPE VIBRATORY ROLLER

**Other personnel on site**

**Purpose**

- RICHARD DACHEL - FLAMBEAU REVIEW PROJECT STATUS
- KEVIN ~~NOTER~~ <sup>NITEL</sup> - AMES - PROJECT ENCR.

**Work observation report, comments:** ● ARRIVED AT FLAMBEAU MINING Co. OFFICE @ 10:20 A.M. RICHARD DACHEL CONDUCTED A ONE HOUR + SAFETY BRIEFING. TOURED THE PROJECT SITE WITH RICHARD UNTIL 11:50 A.M.

- PROJECT STATUS - WORK ON NORTH SETTLING POND
- CONTRACTOR HAD ~~STARTED~~ REMOVED THE FOUR CMP END-WALL APRONS AND STOCKPILED THEM IN THE LAYDOWN AREA.
- CONTRACTOR HAS REMOVED THE RIP-RAP, GEOTEXTILE AND SOME FINES AND STOCKPILED THEM IN THE LAYDOWN AREA. FLAMBEAU MINING WILL NOT ACCEPT THE STOCKPILES AS IS AND WANTS THE RIP-RAP SEPARATED FROM THE GEOTEXTILE AND FINES AND THE FINES AND GEOTEXTILE DISPOSED OF IN THE DESIGNATED DISPOSAL AREA.
- CONTRACTOR IS REMOVING THE VEGETATION AND DISPOSING OF IT ON THE EAST SIDE OF THE HAUL ROAD EAST OF THE SETTLING PONDS. AMES WILL DOZE THE SOIL ~~AND~~ AND VEGETATION INTO THE LOW AREA WHERE FLAMBEAU WANTS IT SPREAD.
- CONTRACTOR COMPLETED REMOVING THE VEGETATION AND TERMINATED WORK @ 6:00 P.M.
- CALLED Jim HUTCHISON (FIV0) AND GAVE HIM A STATUS REPORT

*Clayton S. Messelt*

CC: Jim HUTCHISON  
FILE

For additional comments, include additional sheets

Foth & Van Dyke

Client: FLAMBREAU MINING Co Scope ID: 95F004  
Project: SETTLEMENT PONDOS Page: 1 OF 2  
Prepared By: CEM Date: 10/5/95

CONSTRUCTION OBSERVATION REPORT

Location LAOYSMITH, WI

WEATHER	Temp (° F)		Sky Cond. Clear Pt. Cldy Cloudy	Precip. (in.)		Site Conditions (describe)	
	Low	High		None	Rain	Snow	Dry

Contractors on site (include no. of personnel per contractor)

- KUSHAK CONST. CO. - 450 C JOHN DEERE DOZER / OPERATOR (KEITH)
- AMERICAN BACKHOE / OPERATOR (BOB)
- TRI-AXLE JUMP TRUCK
- TOW TYPE VIBRATORY ROLLER

Other personnel on site

RICHARD DACHEL  
RAYMOND YOST

Purpose

VIEW SEEPS ON BERM BTWN PONDOS  
" " " " " "

Work observation report, comments: ARRIVED ON-SITE AT 7:30 A.M.

PROJECT STATUS

- CONTRACTOR REMOVING SOIL AROUND LOWER PIERS WHICH SUPPORT WALKWAY EXPOSING THEM FOR THE INSTALLATION OF THE PVC LINER BOOT.
- CONTRACTOR FINISH GRADING THE WEST BERM, SHAPING THE SLOPES IN PREPARATION FOR ROLLING AND APPLICATION OF HERBICIDE.
- REMOVED EARTH RIDGE ON SOUTH BERM OF SOUTH POND AND ~~BUILT~~ BOOT CONSTRUCTED HAUL ROAD INTO SOUTH POND. REMOVED RIPRAP AT OVERFLOW.

COMMUNICATIONS

- RECEIVED COPY OF EPI FAX AND ANALYZED THE SIZE OF CONCRETE SLAB REQ'D. ADVISED JIM HUTCHISON THAT SLAB SHOULD BE 6' X 16' TO 18' LONG.
- SENT FAX TO MARK @ KUSHAK CONST. CO. RE: SAFETY VESTS AND TRAFFIC SAFETY CONES. ALSO ADVISING HIM OF CULVERT SIZE AND END CONDITIONS.
- TALKED WITH FRED ROWE, EPI ABOUT CULVERT SIZES AND END CONDITIONS. ALSO DISCUSSED SITE SAFETY REQUIREMENTS. (SEE TELEPHONE MEMO)
- CALLED JIM HUTCHISON & DISCUSSED THE SIZE ON CONCRETE SLAB REQUIRED TO 6' X 16' TO 18' LONG. HE WILL CHECK / ~~FLAMBREAU~~ FLAMBREAU
- DISCUSSED SEEPS WITH RAY AND RICHARD. CALLED JIM

For additional comments, include additional sheets



# Foth & Van Dyke

Client: \_\_\_\_\_ Scope ID: \_\_\_\_\_  
 Project: \_\_\_\_\_ Page: 2 OF 2  
 Prepared By: \_\_\_\_\_ Date: \_\_\_\_\_

## CONSTRUCTION OBSERVATION REPORT

Location \_\_\_\_\_

WEATHER	Temp (° F)		Sky Cond. Clear Pt. Cldy Cloudy	Precip. (in.)		Site Conditions (describe)	
	Low	High		None	Rain	Snow	Dry

**Contractors on site** (include no. of personnel per contractor)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

<b>Other personnel on site</b>	<b>Purpose</b>
_____	_____
_____	_____

**Work observation report, comments:** (CONTINUED FROM PAGE 1)

HUTCHISON. THERE SEEMS TO BE NO LOGICAL TO THE CAUSE OF THE SEEPS. SMALL TRENCHES WERE CUT TO RELIEVE THE BUILDUP IN SEVERAL LOCATIONS IN THE HOPES THAT THEY WILL DRAIN AND DRY UP. THE SEEPS WILL BE VIEWED AGAIN IN THE MORNING

- CONSTRUCTION PROGRESS
  - THE 450C DOZER BROKE DOWN ABOUT MID-MORNING
  - A REPLACEMENT DOZER (350C LGP) WAS DELIVERED ABOUT 2:00 P.M.
  - A TRUCK RAMP WAS CONSTRUCTED AT THE NORTHWEST CORNER OF THE SOUTH POND.
  - STRIPING OF VEGETATION FROM THE SOUTH AND EAST BEHIND OF SOUTH POND
  - CONTRACTOR WORKED UNTIL ~6:00 P.M.
  - CONTRACTOR TO DISPOSE OF VEGETATION AT SO. EDGE OF TYPE I DISPOSAL
- LEFT THE SITE @ 5:50 P.M.

*Clayton S. Marshall*

For additional comments, include additional sheets

# Foth & Van Dyke

Client: FLAMBEAU MINING Co. Scope ID: 95F004

Project: SETTLING PONDS. Page: \_\_\_\_\_

Prepared By: CEM Date: 10/6/95

## CONSTRUCTION OBSERVATION REPORT

Location LAOY SMITH, WI

WEATHER	Temp (° F)		Sky Cond.	Precip. (in.) 1.5+			Site Conditions (describe)	
	Low	High	Clear Pt. Cldy <u>cloudy</u>	None	Rain	Snow	Dry	Muddy
	50°				✓			

### Contractors on site (include no. of personnel per contractor)

- KOSHAK CONSTRUCTION Co. - AMERICAN BACKHUE / OPERATOR  
 - JOHN DEERE 350C LGR DOZER / OPERATOR  
 - TOW TYPE VIBRATORY COMPACTOR  
 - JOHN DEERE 450C DOZER (UNDER REPAIR)  
 - TRI-AXLE DUMP TRUCK

### Other personnel on site

### Purpose

RICHARD DACHEL - FLAMBEAU MINING VIEW SEEPS ON NORTH FACE OF BERM

Work observation report, comments: ARRIVED ON-SITE @ 7:30 A.M.

### PROJECT STATUS

- CONTRACTOR REMOVING VEGETATION THE BOTTOM AND NORTH BERM
- CONTRACTOR DISPOSING OF VEGETATION AT THE SOUTH EDGE OF THE TYPE I DISPOSAL AREA.
- SITE VERY WET FROM THE RAIN DURING THE NIGHT.
- VIEWED THE SEEPS ON THE SOUTH BERM OF THE NORTH POND WITH RICHARD DACHEL. UNABLE TO DETERMINE IF THE DITCHING PERFORMED 10/5/95 ALLOWED THE SEEPS TO DRAIN. A NEW SEEP WAS DISCOVERED AT A HIGHER ELEVATION. IT WAS ~~QUITE~~ APPEARED TO BE QUITE SMALL, PROBABLY WHERE A LARGE ROCK WAS REMOVED AND THE FILL NOT COMPACTED.
- CHECKED WITH RICHARD DACHEL AND MINE SURVEYOR ABOUT MOVING A SURVEY POINT (LATH) LOCATED IN THE SOUTH POND. IT WAS REMOVED BY THE MINE SURVEYOR (9:15 A.M).
- RAINFALL RUN-OFF CAUSED A GULLEY TO BE CUT IN THE NORTH BERM OF THE NORTH POND.
- RELAYED INFO REC'D FROM MARK KOSHAK TO CREW.
  - MARK WILL BE ON-SITE @ 2:00 P.M.
  - REMOVE RAMP FROM POND AFTER REMOVAL OF VEGETATION.

CONTRACTOR QUIT WORK AT 11:00 A.M. - PLACED TRAFFIC CONES ALONG BERMS AND CUT DRAINAGE DITCHES TO DIVERT WATER

For additional comments, include additional sheets

*Handwritten signature: Mark E. Munn*

**Foth & Van Dyke**

Client: FLAMBEAU MINING CO. Scope ID: 95F004  
 Project: SETTLING PONDS Page: \_\_\_\_\_  
 Prepared By: CEM Date: 10/9/95

**CONSTRUCTION OBSERVATION REPORT**

Location LAOYSMITH, WI

WEATHER	Temp (° F)		Sky Cond.	QUANTITY Precip. (in.) '¼"-½'			Site Conditions (describe)	
	Low	High			Rain	Snow	Dry	Muddy
	50's		Cloudy	None	✓			✓

Contractors on site (include no. of personnel per contractor)

- KOSHAK CONST. CO. - 3500 LGA DOZER/OPERATOR
- AMERICAN BACKHOE/OPERATOR
- TRIAXLE DUMP TRUCK
- 4500 DOZER/VIBRATORY ROLLER

Other personnel on site

Purpose

- NEL KOSHAK - KOSHAK CONST.
- RICHARD DACHEL - FLAMBEAU MINING

Work observation report, comments: ARRIVED ON-SITE @ 10:00 A.M.

- CONTRACTOR UNLOADING PALLETS OF PVC LINER MATERIAL FROM EPI, AND STOCKPILING THEM AT THE SW CORNER OF THE SOUTH POND.
- CONTRACTOR STARTED PUMPING RUN-OFF WATER IN SOUTH POND OVER THE SOUTH BERM INTO THE STAGING AREA. RICHARD DACHEL CHANGED THE PUMPING DISCHARGE INTO THE NORTH POND.
- THE PUMP WAS MOVED TO THE NORTH POND AND THE WATER PUMPED INTO THE TYPE I DISPOSAL AREA. FLAMBEAU MINING INSTALLED A CULVERT TO DRAIN THE TYPE I AREA WATER INTO THE PIT AND ULTIMATELY TO THE TREATMENT PLANT. (OVER THE WEEKEND).
- CONTRACTOR CONTINUED REMOVING THE VEGETATION ON THE SLOPES AND BOTTOM. THE MATERIAL AND WET SLAPPY SOIL WAS LOADED INTO THE TRI-AXLE DUMP TRUCK AND DISPOSED OF IN THE TYPE I DISPOSAL AREA.
- CONTRACTOR STARTED REMOVING THE RAPID AND DUMPING THE MATERIAL ON THE SOUTH BERM OF THE SOUTH POND (MATERIAL WAS ORIGINALLY USED AS A BERM ALONG THE POND).
- DISCUSSED MSDS SHEETS ON PROPOSED ~~RESIST~~ HERBICIDE WITH JANA MURPHY AND RICHARD DACHEL. THEY ARE WAITING ON WOUR APPROVAL.
- CONTRACTOR AND I LEFT THE SITE AT 6:15 P.M.

For additional comments, include additional sheets

*Clayton S. Merrill*

**Foth & Van Dyke**

Client: FLAMBEAU Mining Co. Scope ID: 95F004  
 Project: SETTLEMENT PONDS Page: 1 OF 3  
 Prepared By: CEM Date: 10/10/95

**CONSTRUCTION OBSERVATION REPORT**

Location LADYSMITH, WISC.

WEATHER	Temp (° F)		Sky Cond.	Precip. (in.)			Site Conditions (describe)	
	Low	High	Clear	None	Rain	Snow	Dry	Muddy
					<u>Pt. Cldy</u> Cloudy	<u>RAINED BEFORE 6:00 A.M.</u>		
	<u>50'S</u>	<u>70'S</u>						

Contractors on site (include no. of personnel per contractor)

- KOSHAK CONST. CO., - 3SDC JOHN DEERE L6P DOZER / OPERATOR
- 4SDC " " DOZER / OPERATOR
- AMERICAN BACKHOE / OPERATOR
- TRI-AXLE DUMP TRUCK
- VIBRATORY SMOOTH DRUM ROLLER

EPI - TWO REPRESENTATIVES VISITED SITE (MIKE & JOHN)

Other personnel on site Purpose

- RICHARD BACHEL - FLAMBEAU MINING
- JOHN BARNES - " " DISCUSS SEEDS IN BERMS
- GREG MARKS - FOTH & VANDYKE PREPARATION FOR PVC LINER INSTALLATION

Work observation report, comments: ARRIVED ON SITE @ 7:30 A.M.

- PROJECT STATUS - SOUTH POND
  - CONTRACTOR FINISHING REMOVING VEGETATION FROM AROUND THE AREA AROUND THE OUTFALL CONTROL STRUCTURE.
  - REMOVED THE RAMPA
  - WORKED WET AREA IN POND BOTTOM TO ~~AND~~ ACCELERATE DRYING
  - REVIEWED FINISH GRADING REQUIREMENT WITH THE EPI REPS AROUND THE 24" Ø CULVERTS AND THE OUTFALL CONTROL STRUCTURE
  - FINISHED THE TOP OF THE BERM FOR CONSTRUCTION OF THE ANCHOR TRENCH. STARTED EXCAVATING THE ANCHOR TRENCH @ 4:00 P.M. AND TORE UP THE BURIED ELECTRICAL LINE AT THE NW CORNER. CONTINUED EXCAVATING THE ANCHOR TRENCH UNTIL DARK. IRA (FLAMBEAU MINING CO.) EXAMINED THE DAMAGED ELECTRICAL CABLE AND CLAIMED THAT IT COULD BE SPLICED.
- PROJECT STATUS - NORTH POND
  - FINE GRADED THE SOUTH AND NORTH BERMS BY REMOVING SOME OF THE WET SILTY MATERIAL IN THE AREA OF SEEDS TO TAKE ADVANTAGE OF THE WARM DRYING WIND. THE WET SILTY MATERIAL WAS MOVED TO THE BOTTOM OF THE POND AND WILL BE REMOVED.
- DOCUMENTATION - LOCATED SEEDS ON THE NORTH AND SOUTH BERMS FOR THE SOUTH POND.

For additional comments, include additional sheets

Foth & Van Dyke

Client: FLAMBEAU MINING Co. Scope ID: 95F004

Project: SETTLEMENT POND5 Page: 2 OF 3

Prepared By: CEM Date: 10/10/95

### CONSTRUCTION OBSERVATION REPORT

Location LADYSMITH, WI

WEATHER	Temp (° F)		Sky Cond. Clear Pt. Cldy Cloudy	Precip. (in.)		Site Conditions (describe)	
	Low	High		None	Rain	Snow	Dry

Contractors on site (include no. of personnel per contractor)

Other personnel on site

Purpose

Work observation report, comments:

- Documentation (cont.) - Surveyors for Ames located control points 300, 301, 303 & 304 for documenting anchor trench locations.
  - Communications -
    - Reviewed project status with Jim Hutchison. He requested that the observed seed locations be documented.
    - Herbicide - Flambeau received approval from WQMR to apply a maximum of 5 gal./acre. to ponds. A meeting was held in the early P.M. with the following persons attending:
      - Jana Murphy - Flambeau Mining Co.
      - Richard Dachel - " " "
      - Noel Koshak - Koshak Const. Co.
      - Eddy Stanger - Herbicide Applicator
      - Clayton Messelt - Foth & Van Dyke
- The following items were discussed:
1. Herbicide availability - UPS overnight delivery after order is placed.
  2. Application - Application equipment would require mixing extra spray solution which would require disposal. Who would be responsible?
  3. Who is responsible for monitoring well detects? Flambeau Mining Co. has rec'd WQMR approval as per Jana Murphy.
  4. Time rec'd after application before liner installation.

For additional comments, include additional sheets

**Foth & Van Dyke**

Client: FLAMBEAU MINING Co. Scope ID: 95F004

Project: SETTLING PONDS Page: 3 OF 3

Prepared By: CEM Date: \_\_\_\_\_

**CONSTRUCTION OBSERVATION REPORT**

Location \_\_\_\_\_

WEATHER	Temp (° F)		Sky Cond. Clear Pt. Cldy Cloudy	Precip. (in.)		Site Conditions (describe)	
	Low	High		None	Rain	Snow	Dry

Contractors on site (include no. of personnel per contractor)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Other personnel on site

Purpose

\_\_\_\_\_  
 \_\_\_\_\_

Work observation report, comments:

• COMMUNICATIONS (CONT).

A DISCUSSION CONCERNING THE TIME REQUIRED FOR DELIVERY OF THE CHEMICAL, APPLICATION, 1/2 DAY DELAY AFTER APPLICATION BEFORE INSTALLATION OF THE LINER COULD BEGIN, LONG TERM EFFECT OF NOT APPLYING THE HERBICIDE AND DELAYS IN THE LINER INSTALLATION WAS HELD.

- IN CONCLUSION, A DECISION WAS MADE BY FLAMBEAU MINING NOT TO APPLY THE HERBICIDE AND TO PROCEED WITH INSTALLATION OF THE LINER.

- EPI WAS REQUESTED TO PROVIDE MSDS DATA ON THE SOLVENT TO BE USED ON THE INSTALLATION OF THE BOOTS AT THE OUTFALL STRUCTURE AND CULVERTS.

- INFORMED JIM ~~HUTCHISON~~ HUTCHISON OF FLAMBEAU MINING Co.'s DECISION TO NOT APPLY THE HERBICIDE.

- DISCUSSED DAMAGED ELECTRICAL CABLE WITH IRA,

• LEFT THE SITE @ 6:10 P.M.

*Clayton S. Merrill*

For additional comments, include additional sheets